Investigating Anxiety and Depression in Adults with Low Intellectual Ability

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Abstract

Adults with low ability have been routinely excluded from general population research that supports cognitive behavioural therapy for anxiety and depression. Even studies using samples of adults with ability below average exclude potential participants with profound and severe intellectual disability, without testing task-specific capacity. Consequently, little is known about the viability of cognitive models of anxiety and depression amongst adults with low ability. The present study addresses this through four main lines of enquiry: inclusion of all abilities through screening and validity procedures; prevalence of signs and symptoms of anxiety and depression as well as the impact of life stressors on these; cognitions and their specificity for anxiety and depression; and the impact of anxiety and ability on attentional responses to emotional stimuli.

A sample of 70 adults from each level of low ability, unselected for signs or symptoms of anxiety and depression, was recruited from community-based disability support services. Participants were screened for general (receptive language) and task-specific abilities, interviewed for symptoms of anxiety and depression and disorder related cognitions then administered a visual-probe task with emotional face stimuli. Informants provided data on signs of mental ill-health, stressful life events and adaptive behaviour. Task-specific validity procedures governed data included for analysis.

The inclusionary approach meant participants from all ability levels below average were included. Task-specific screening measures were superior to receptive language in predicting validity on research tasks, especially for participants with severe and profound intellectual disability. Dimensional measurements meant ability variables could be covaried or controlled in most analyses. Mean levels of signs and symptoms were lower than those in available reference studies, as were the rates of clinical level cases. General ability was positively correlated with signs of anxiety and depression but was not related to symptoms. Similarly, the number of life events was correlated with all scales on the measure of signs but not with symptoms of anxiety or depression. The lack of concordance highlights the gap between what informants see
and what respondents think and feel. Learning a person’s subjective interpretation of events can help understand their emotions and behaviour.

Depressive cognitions uniquely predicted significant variance in symptoms of depression but only ability, rather than anxious cognitions, predicted anxiety symptoms. Cognitive content-specificity for depression bolsters support for the use of cognitive behaviour therapy but further research into the relationship between ability and anxiety is required. The lack of directional bias in selective attention to emotional faces in any of the anxiety or ability groups means cognitive-motivational theory was not supported but future studies should address methodological issues. Attentional control theory was supported but the slowing of emotional face processing caused by high anxiety, but not depression needs replication. Trials of attentional training may be justified to reduce anxiety. Further research into cognitive models of anxiety and depression is urgently needed and future studies should ask theoretical as well as clinical questions.
Declaration

I Stephen Langley Edwards, declare that this thesis is my original work towards the award of Doctor of Philosophy except where due acknowledgement to the work of others is made in the text. The thesis is less than 100,000 words, excluding tables, figures, reference list and appendices.

[Signature]
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I am extremely grateful to Henry Jackson who has been my supervisor and mentor throughout this project. His patience, wisdom, vast research knowledge and careful editing were all critical in making this academic work possible. He also knows the journey of the clinician researcher and this connection helped sustain me at many points along the way. I also acknowledge Margot Prior and Lawrie Bartak who have both been great champions of this field, I have benefitted from their wise guidance at different points in my academic and clinical journeys.

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Enormous gratitude goes to my wife, Debra who believed in the project all along and supported me through the difficult emotional as well as academic hurdles. I could not have finished it without her assistance in this past year. Thanks also to my children James and Emily for their encouragement and for the example they have set in their own academic achievements.

The research study would not have been possible without the people who volunteered to participate in the research and the services that support them. People at Radius and Impact were extremely helpful throughout the data gathering stage. All participants were generous with their time and energy; they of all people deserve my greatest thanks. I hope the evidence from this study contributes to better psychological treatments for anxiety and depression as well as a better theoretical grounding for these interventions.
Glossary

Terms commonly used in this thesis:

**Intellectual disability (ID):** Denotes intellectual and adaptive functioning two standard deviations or more below the norm that has been evidenced doing the developmental period

**Low ability (LA):** refers to the spectrum of intellectual ability below average regardless of whether an ID exists or not. Thus the IQ categories of low normal, borderline ID, mild ID, moderate ID severe ID and profound ID are all within this spectrum.

**Developmental disability:** denotes a disability, physical or intellectual in nature which originates in childhood and involves impairment in one or more areas of functioning even if this is not related to the brain or central nervous system.

**Neurodevelopmental disorder:** refers to impairments of growth in the developmental years but more strictly related to development of the brain or central nervous system

**Age matched groups:** refers to where groups that are matched on the basis of chronological age are compared on one or more variables

**Ability matched groups:** refers to where groups are matched on either general or specific ability, regardless of chronological age and then compared on one or more variables
Instruments and measures used in the thesis and their abbreviations:

**Peabody Picture Vocabulary Test-4 (PPVT-4)** (Appendix F) (Dunn, L.M., Dunn, D.M., 2007): This test of receptive language that has no reading or writing requirements. It generates a raw score, standardised score and age equivalent and is norm-referenced up to early adulthood.


**Emotional Screening Procedure (ESP)** (Appendix F): This was developed as a screening procedure to quantify ability to recognise the four basic emotions. It yields a dichotomous (pass/fail) as well as dimensional score.

**Scoring Ability Procedure (SAP)** (Appendix F): This was developed as a screening procedure to assess participants’ capacity for understanding questions and providing calibrated answers on symptom and cognitions measures. It generates a dichotomous (pass/fail) as well as dimensional score.


**Beck Depression Inventory (BDI-II)** copyright version (Appendix F) (Beck, A.T., Steer, R.A., Brown, G., 1996): The BDI-II is a 21-item self-report inventory designed to assess the severity of the affective, cognitive, motivational, psychomotor, and
vegetative components of depression, with higher scores indicating more severe depression.

**Beck Anxiety Inventory** modified version (BAI modified) (Appendix F) (Lindsay & Skene 2007): This version was simplified for both language and concepts and is administered with a visual analogue of the one to four scale but scores are entered into the copyright version scoresheet.

**Beck Depression Inventory** modified version (BDI-II modified) (Appendix F) (Lindsay & Skene 2007): This version was simplified for both language and concepts and is administered with a visual analogue of the one to four scale but scores are entered into the copyright version scoresheet.

**Cognitions Checklist – Anxiety (CCL-A) – Depression (CCL-D)** (Appendix F) (Beck, A.T., Brown, G., Steer, R.A. Eidelson, J.I., Riskind, J.H. 1987): The CCL (A&D) is a 26-item self-report instrument developed to measure the frequency of automatic thoughts and contains 14 personal loss and failure items (CCL-D) as well as 12 items that are related to physical and psychological threat (CCL-A).

**Psychiatric Assessment Schedule for Adults with Developmental Disability - Checklist**

(PAS-ADD Checklist) (Appendix F) (Moss, 2002): The PAS-ADD Checklist is an informant completed checklist (carer or support person) comprised of section 1. A life events section and; section 2. A 25 item list of signs of mental health and behaviour problems.
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Chapter One: Overview

1.1 Introduction
This first chapter provides an orientation and outline for the thesis. First the rationale for the study is articulated and then the aims of the study are explained. An outline of the thesis structure follows.

The attitudes toward, and scientific knowledge about, people at the lower end of the ability spectrum have changed dramatically across the ‘developed’ world over the past 30 years, especially for those with intellectual disability (ID). Changes in government policy and legislation have increased the support resources and opportunities for living and working with dignity outside of large institutions. Even people with severe and profound ID now have the right to these opportunities in our society. Much of this change in Victoria, Australia, has occurred since I was first employed as a therapy assistant in a Mental Hospital and then a Training Centre where adults with ID lived out their lives. Adults in these institutions were at worst, mistreated or neglected and at best, their existence in a dormitory directed by rostered staff held little semblance of life in the community. Their thoughts and emotions were of little consequence in those regimented settings.

There were good and bad programs for training and behaviour change with some based on sound behavioural methods but even these had little room for the personal goals of clients. Assistance was not available to set and work toward goals, solve problems, manage emotions like loss, loneliness and fear, or behaviours like assertiveness and self-control. It was thought that adults with ID did not experience anxiety and depression and that they required protection and training, not therapy and personal development. Meanwhile, research with adults in the general population yielded cognitive models of anxiety and depression with cognitive therapies being offered in community and hospital-based clinics. At the centre of these models was the premise that an individual’s emotions and behaviours are influenced by their perceptions of events.
Even though the social and legal circumstances for most adults with ID in Victoria changed some years ago, research about their mental health problems has not kept pace. Through either passive or active neglect, there has been little research into the viability of cognitive models of anxiety and depression or cognitive treatments at the lower end of the ability spectrum. In this study, the intention was to confirm the importance of an individual’s perception for their emotions and behaviour, even at the lowest level of ability. This confirmation would add further to the theoretical foundations of cognitive-behavioural therapies with this neglected group.

1.2 Aims of the study
This study was designed to address the dearth of research on anxiety and depression amongst adults with low ability, particularly those with the lowest levels of ability. The sample was unselected for mental ill-health but comprised adults from each ability level below average. Key concepts underlying cognitive models of anxiety and depression were tested to establish their viability across the spectrum of low ability and consequently, support the case for cognitive therapy in this sub-population.

The aims of the study were fourfold. The first was to recruit a unique sample across the spectrum of low ability (LA) facilitated by task-specific screening procedures that could be useful in future research. Many potential participants with severe and profound ID have been excluded from past studies without task-specific capacity being tested. This has minimised available empirical data from the already scarce cognitive studies with this subpopulation. The second was to establish the prevalence of anxiety and depression and the relationship between these and ability as well as between life events and anxiety and depression. Longstanding assumptions in the field suggested an inverse correlation between ability and anxiety as well as between ability and depression and that psychopathology was more likely as ability decreased. It was also generally asserted that informant observations were superior to respondent interviews for people with the lowest ability.

The third aim was to test the key concept of cognitive content-specificity that underpins cognitive models of anxiety and depression. This concept relates to whether anxious and depressive cognitions predict symptoms of their respective disorder, it is well
established for depression and to a lesser extent anxiety in the general population. Only one study has tested the concept with anxiety as well as depression in a sample with LA. The fourth aim was to test for the effects of anxiety and ability on attentional responses to emotional stimuli with those participants who mastered the visual-probe task. Specific biases at attention stage of information-processing are theoretically important in the advent and maintenance of anxiety problems and the visual-probe task allowed testing of two further concepts. Extensive support exists for an attentional bias toward and away from feared stimuli in anxious children and toward them in anxious adults. This is explained by the cognitive-motivational theory of Mogg and Bradley (Mogg & Bradley, 1998) but the experiment has never been undertaken with a sample including the lowest levels of ability. Evidence also exists for an inverse correlation between ability and speed of response as well as slowing due to threatening emotional stimuli in anxious adults. Attentional control theory (Eysenck & Derakshan, 2011; Eysenck, Derakshan, Santos & Calvo, 2007) asserts that feared stimuli will impair speed rather than accuracy and has not been tested in a low ability sample before.

1.3 Structure of the thesis
Chapters Two to Five contain reviews of the literature covering the four main themes of the study: inclusion through screening and validity procedures; prevalence of signs and symptoms of anxiety and depression as well as the impact of life stressors and ability on these; cognitions and their specificity for anxiety and depression; and attentional responses to emotional stimuli.

Chapter Two is a review of important aspects of ability and ID and sets the context for the present study. The first two sections of the chapter cover aspects of this sub-population that define it within society as well as the policy and research literature. They cover: an overview of definitions and measurement of ability; and the clarification of concepts, terms, definitions, classification and epidemiology of ID. Important aspects of ability are outlined in the next three sections: co-existing non-intellectual disabilities such as epilepsy, motor and sensory impairment; key aspects of emotional processing, the importance of facial stimuli in their communication, the role of brain functioning and the impact of LA; personality, ability and the specific trait of anxiety. The next two sections examine some conceptual and practical barriers to research and how these are
managed in the present study: common barriers to inclusion of adults with low ability in cognitive research, particularly those with severe and profound disability; and the use of screening and validity procedures as part of an ‘inclusionary’ approach to facilitating research with the full spectrum of low ability. A conclusion is followed by the rationale for the three components of the first aim.

In Chapter Three the assessment and prevalence of signs and symptoms of anxiety as well as depression and their relationships with life stressors and ability is examined. First, the nature and prevalence of these common mental health problems in the general population is considered and second, the existing data on the impact of ability on mental health, particularly in the lower levels of the ability spectrum. Third, the particular challenges in the assessment of anxiety and depression amongst adults with ID are discussed, including the range of informant and respondent assessment instruments and methods of enhancing the validity of interviews. The PAS-ADD Checklist (Manchester, 1999; Moss & Brennan, 2002) has long been used to gather informants’ observations of the signs of mental ill health, particularly with adults whose communication is limited. The Beck Depression Inventory (BDI-II) (Beck, Steer & Brown, 1996b) has been used in interviews, usually without its companion measure, the BAI (Beck, Epstein, Brown & Steer, 1988b). Fourth, the limited prevalence data for anxiety and depression in low ability samples are reviewed. Fifth, consideration is given to existing data and assumptions about the relationship between signs and symptoms as well as the correlation between each of these and receptive language in low ability samples. Sixth, the available data on the relationship between stressful life events and signs as well as symptoms is then examined. The limited evidence for capturing participants’ interpretation of these events is also considered in order to establish whether these align with informant’s ratings on the PAS-ADD Checklist. A conclusion is followed with the rationale for hypotheses 1, 2, 3 and 4.

In Chapter Four, cognitive theory is examined along with the cognitive models of anxiety and depression it underpins and the therapies which are based on them. First, behavioural theory and the interventions it informs are considered. Behavioural interventions have a significant evidence base for changing behaviour with people who have LA but evidence for their use treating mental health problems is still limited in this
subpopulation. Second, cognitive theory, the cognitive models of anxiety and depression and their component concepts are discussed. Cognitive models of anxiety and depression are centred around the individual’s own interpretation of their world. The concepts behind these models are far from proven in the subpopulation though. The impact of ability on the viability of these models is the focus of the third section. A few general population studies have incorporated participants with low ability but the theoretical platform for cognitive based therapy in the subpopulation is far from complete. Fourth, cognitive psychotherapies based on cognitive models have proven efficacy in the general population. This literature is briefly reviewed in the next section. Whether by benign neglect or active exclusion, there are scant data on the viability of cognitive therapy with low ability samples but the available evidence is considered. The fifth section contains a detailed discussion of the cognitive content-specificity hypothesis. A key concept underpinning Beck’s cognitive models, it is usually measured by the Cognitions Checklist, Anxiety (CCL-A) and Cognitions Checklist, Depression (CCL-D) (Beck, Brown, Steer, Eidelson & Riskind, 1987) for symptoms of the respective disorders measured by the BAI (Beck, et al., 1988b) and BDI-II (Beck, et al., 1996b). Whilst the relationship between depressive cognitions and symptoms has been previously explored in the subpopulation, only one study has done so for anxiety as well. A conclusion is followed by the rationale for hypotheses 5, 6, 7 and 8.

In Chapter Five, the cognitive theory and experimental research relating to attention and anxiety is examined. There is extensive experimental research carried out with adults within the general population into the impact of emotional stimuli on attentional responses but a dearth of data on how adults with low ability are affected. In the first section of this chapter, the concept of information-processing theory is discussed along with its implications for the cognitive processing of pathological and non-pathological emotion, particularly anxiety. The second section focuses on the initial stage of information processing, attention. The key elements of current neuropsychological models as well as theoretical explanations of the impact of feared emotional stimuli in general population samples is considered. Third, the typical development of the orienting and executive systems of attention is considered followed by an examination of the existing literature on attention in special populations of adults. Fourth, the existing literature on attention and neuro-developmental disorders is discussed. The
empirical data on the impact of feared emotional stimuli on the direction of attention and speed of responses is then considered in the fifth section. Important precedents for directional bias toward and away from feared stimuli are discussed along with implication for cognitive motivational and attentional control theories. Sixth, the impact of ability on attention and anxiety is considered with the child, adolescent and handful of LA studies using the visual probe paradigm surveyed. A conclusion follows before the rationale for hypotheses 9, 10, 11, 12, 13 and exploratory analyses.

In Chapter Six the methods used in the study are explained. The chapter comprises sections covering the sample, measures, procedure and data management. Chapter Seven provides the descriptive results and contains nine sections based around the measures used in the study as well as a summary. The first section depicts the demographics of the sample and the second, all aspects of disability. The third illustrates the current diagnostic status of the sample and the fourth, receptive language (PPVT-4) (Dunn & Dunn, 2007). The fifth section contains adaptive behaviour data from the ABS-RC:2 (Nihira, Leland & Lambert, 1993) and the sixth, distributions of scores on the screening (SAP, ESP) and validity procedures. The seventh section contains the informant-rated signs and life events from the PAS-ADD Checklist (Manchester, 1999; Moss, et al., 2002). Scores from the symptom (BAI, BDI-II) (Beck, et al., 1988b; Beck, et al., 1996b) and cognitions (CCL-A and CCL-D) (Beck, et al., 1987) measures are displayed in section eight. Section nine summarises the visual-probe data.

Chapter Eight is the analytical results chapter and contains results of the hypotheses tested, presented in four sections. The first section covers the analysis of screening and validity procedures, including the capacity of dichotomous screening measures to identify valid and invalid case on the research tasks. The second section addresses the prevalence of signs and symptoms of anxiety and depression as well as the relationship between these and stressful life events. The third section deals with the connection between thoughts and symptoms as well as ability. The fourth section focuses on the impact of anxiety and ability on directional bias and response speed in reaction to emotional faces.
In Chapter Nine, the main findings are addressed and the implications of the study for future research are considered. The introduction summarises the hypotheses and the extent of support for them whilst the first section addresses the implications of the findings against existing empirical and theoretical literature in four subsections: Screening and validity procedures; Prevalence, signs, symptoms and stressors; Cognitive content specificity for anxiety and depression and; Anxiety, attention and ability. In the third section the strengths of the study are highlighted and in the fourth section its weaknesses are discussed. Recommendations for future research are outlined, followed by a conclusion.
Chapter Two: Ability and Intellectual Disability

2.1 Introduction
This chapter is a review of important aspects of ability, LA and in particular, ID. It sets the context for the present study and contains 11 sections. The first two sections cover aspects of the sub-population that define it within society as well as the policy and research literature. They cover: an overview of definitions and measurement of ability; and the clarification of concepts, terms, definitions, classification and epidemiology of ID. Important aspects of ability are outlined in the subsequent three sections: co-existing non-intellectual disabilities such as epilepsy, motor and sensory impairment; key aspects of emotional processing, including the importance of facial stimuli in their communication, the role of brain functioning and the impact of LA; and personality, ability and the specific trait of anxiety. The next two sections examine some conceptual and practical barriers to research: common barriers to inclusion of adults with LA in cognitive research, particularly those with severe and profound disability; and the use of screening and validity procedures as part of an ‘inclusionary’ approach to facilitating research with the full spectrum of LA. A conclusion follows along with the rationale for the three components of the first aim.

2.2 Ability and its measurement
In this section, the origins and motivation of psychometric measurement of ability are reviewed along with other more recent concepts associated with cognitive psychology and information-processing. The section is concluded with a summary

2.2.1 Psychometric assessment
Assessment of ability in modern times is generally traced to Galton’s studies of genius but it was not until the early twentieth century that Binet and Simon developed tests that aimed to measure ‘intelligence’ in terms of a child’s ‘mental age’ by comparing results with age norms (Cornoldi, 2006). For Binet, this was to assist in dealing with ‘backward’ children by distinguishing between lack of ability and laziness (Flugel, 1951). Terman’s translation of these (1919) in North America along with the further development of the Stanford-Binet (Terman & Merrill, 1937) was instrumental in
originating the modern psychometric study of intelligence (Maher, 1963). Standardised, norm-referenced tests producing intelligence quotients (IQs) such as the Wechsler Intelligence Scales (Wechsler, 1949, 1955) and their subsequent revisions have been used for many purposes with groups of children and adults but they still test a construct that is difficult to define (Cornoldi, 2006). Tasks in these tests tap a range of specific abilities thought to be components of general intelligence and whilst based in theory, the construction of modern measures of intelligence is essentially empirically driven.

2.2.2 Cognitive psychology

The rise of cognitive psychology is seen by some as part of a revolution in science (Harre’, 2002). Its focus is on unobservable cognitive processes or functions that generate observable behaviours. Cognitive models of pathological and non-pathological processing of information implicate cognitive functions in the processing of information which is generally seen as a three-stage process involving attention, interpretation and memory. These functions, such as working memory, processing speed, attention and short-term memory are said to underlie intelligence (Cornoldi & Giofrè, 2014). Although the imaging techniques of cognitive neuroscience have driven rapid and significant advances in identifying the neural mechanisms that underlie these cognitive processes, cognitive theory remains the central explanatory framework (Frank & Badre, 2015). Cognitive functions operate partly automatically in response to stimuli and partly under executive control. The executive or control functions are generally implicated in problem-solving and regulation of behaviour as well as emotion. They also have a coordinating role with mechanisms such as working memory, processing speed and attention. Whilst they are correlated with intelligence (Cornoldi, et al., 2014), the study of cognitive mechanisms and executive functions is conceptually separate from the study of IQ and its components aligned to neuropsychology rather than psychometric psychology (Cornoldi, 2006; Heyman & Hauser-Cram, 2015).

In the present study, specific cognitive functions related to information-processing such as attention and processing speed are considered in relation to cognitive models of anxiety and depression in Chapter Five. They may or may not co-vary with intelligence or general ability and can be studied in isolation to general ability. Measures of
intelligence or general ability are approached as variables possessing a dimension upon which all people can be located. General ability is a useful empirical variable, but it also has practical implications in terms of how well a person can solve everyday problems. It also has social implications and these are most relevant when someone’s ability is within the intellectually disabled range. Whilst a person’s attainment is determined psychometrically, the point on the continuum which constitutes disability is determined socially, that is by a combination of academic bodies, professional societies and state authorities. The decision usually involves psychometric assessment of intelligence as well as functional assessment of adaptive ability.

2.2.3 Summary
The empirical study of general intelligence is longstanding and whilst the construct remains difficult to define, psychometric testing of intelligence has long been used to delineate ID. The more recent advent of cognitive psychology has introduced information-processing theory and cognitive functions that operate at automatic and executive levels. The next section contains more specific aspects of ability and ID.

2.3 Concepts, terms, definitions and classification
In this section, the recent history and overview of current concepts, terms, definitions and classification systems relating to LA and in particular, ID are covered. This is followed by a discussion of the epidemiology of ID with a summary concluding the section.

2.3.1 Concepts
Concepts of disability have changed significantly in the past 30 years. Previous terms like mental deficiency, mental retardation and mental sub normality conveyed a concept of universal deficit or defect and this was graded solely according to the empirical criteria of IQ (Grossman, 1973, 1983; Heber, 1961). Applying the criteria was a clinical process leading to a diagnostic and social label (Emerson, McConkey, Walsh & Felce, 2008). Opportunities in mainstream society were often denied and services usually provided all-encompassing care within large institutions (Mercer, 1973). In most developed countries, ID is now seen like other disabilities, as an issue for the person’s environment as much if not more (McKenzie, 2013) than it is for the individual
Public policy promotes access to community-based services with individualised support where needed (DHS, 2009). Current clinical practice involves a greater emphasis on the functional criteria rather than just the empirical criteria of IQ in making the diagnosis (Luckasson, et al., 2002; Luckasson, et al., 1992). As well as identifying the functional limitations related to the disability and what support is needed from societal resources to maximise the person’s functioning, there is a recognition that limitations co-exist with strengths (AAIDD, 2010). This conceptual model of disability underpins lifelong government support services across a range of life areas and stages in Australia (State and Commonwealth Disability Plans). In contrast, illness models are generally used to explain anxiety and depression with services focussed on treating identified symptoms within limited time frames.

2.3.2 Terms
The term Intellectual disability is now universally used in Australia, for what has been called mental retardation in North America and still widely referred to as learning disability in Britain. In developed countries, terms are anchored in national or state legislation then reflected in associated government policy, clinical and support systems. Professional groups, support groups and scientific literature also play a role in determining the use of terms. Victoria has used the term for some time (Intellectually Disabled Person’s Services Act 1986) (IDPS Act) and reaffirmed it in current legislation (Victoria, 2006) as have a number of other Australian states ("Disability Services Act 1993," 1993a; "Disability Services Act 1993," 1993b). Many commentators see intellectual disability as less pejorative and a more objective reference to the individual and environmental challenges faced by a person with an intellectual impairment that occurs during childhood.

The term has become widespread in North America with the American Association on Intellectual and Developmental Disabilities enshrining it in the eleventh and current edition of their Definition Manual (AAIDD, 2010; Schalock & Luckasson, 2013). The term is reflected in the titles of their lead journals as does the International Association for the Scientific Study of Intellectual and Developmental Disabilities in their journals. The term intellectual disability will be used throughout this thesis unless quoting or
paraphrasing the work of others. Other related terms used commonly in this thesis are *developmental disability, neurodevelopmental disorder* and *low ability*. The term *developmental disability* will be used to denote a disability, physical or intellectual in nature which originates in childhood and involves impairment in one or more areas of functioning even if this is not related to the brain or central nervous system. Hence an intellectual disability (ID) is also a developmental disorder. The term *neurodevelopmental disorder* also refers to impairments of growth in the developmental years but more strictly related to development of the brain or central nervous system. It is the overarching term used in the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5) (APA, 2013) for ID, communication disorders, autism spectrum disorders, attention deficit/hyperactivity disorder, specific learning disorder, motor disorders and tic disorders. The term *low ability* will be used to refer to the spectrum of intellectual ability below average regardless of whether an ID exists or not. Thus the IQ categories of low normal, borderline ID, mild ID, moderate ID severe ID and profound ID are all within this spectrum.

### 2.3.3 Definitions

Despite differences in terminology across countries and over the years, there is broad agreement on definitions (Schalock, et al., 2013). These are incorporated in legislation and policy as criteria for access to government-funded support services but have their origins in the current versions of clinical diagnostic manuals; The International Classification of Diseases 10 (ICD-10) (WHO, 2005), the DSM-5 (APA, 2013) and, Intellectual Disability: Definition, Classification and Systems of Supports (11th Edition) (AAIDD, 2010). These all feature three common criteria: a. intellectual functioning assessed at two standard deviations (SD) (SD usually = 15) below the mean (mean usually = 100) on a standardised, norm-referenced Intelligence Quotient (IQ) test existing concurrently with b. significant deficits in adaptive or functional behaviour (measured on a norm-referenced and standardised test) with c. both of these conditions evident during the developmental period, usually understood as between birth and 18 years. Whilst the three components of the definition has remained constant for many years, the relative emphasis between them has changed in recent decades in line with the development of a broader concept of disability (AIHW, 2008). Although the World
Health Organisation’s (WHO) definition is least congruent, it is part of an international system that classifies all health conditions and is currently under review and is likely to be influenced by the North American AAIDD (Tasse, Luckasson & Nygren, 2013).

2.3.4 Classification

Classifying the level or severity of ID is traditionally done by intellectual functioning not by adaptive ability. This provides objective criteria for: calculating an individual’s impairment and long-term support needs (AAIDD, 2010); administrative decisions about who gains access to government-funded support (Wen, 1997); identifying specific clinical treatment needs (Willner & Goodey, 2006a); categorising cognitive capacity for research needs (Glenn, Bihm & Lammers, 2003); identifying the prevalence of ID in the general population (AIHW, 2008); and studying characteristics of the sub-population who have ID (Roeleveld & Zielhuis, 1997). The use of clinically-assessed IQ to classify ID has been part of the influential American Association on Mental Deficiency’s (AAMD) classification system since the Second World War (Grossman, 1973, 1983; Heber, 1961; Schalock, et al., 2013). Using an individual’s score on a standardised, norm-referenced test allows comparison with an empirical norm (usually a mean of 100) and classification according to an arbitrary numerical distance from this (usually a multiple of a standard deviation of 15). The second edition and onward of the influential manual used a score two standard deviations from the norm as the cut-off for mild ID with moderate, severe and profound falling a further one SD below in sequence with an allowance of up to five points at floor or ceiling for standard error. The ICD-10 (WHO, 2005), ICIDH (WHO, 1980) and successive editions of the DSM (APA, 1980, 2000, 2013) use a similar classification approach which has been incorporated into administrative and clinical guidelines in most Australian states (Wen, 1997).

Classification by IQ provides for comparison of an individual score with the empirically-derived normal distribution but it’s utility can be questioned when used beyond the clinical setting. For example: assessment of IQ requires time intensive face-to-face clinical interviewing; people and their carers are only likely to consent to such a process if they are to gain access to resources; commonly-used tests have limited validity when used with people who have little receptive or expressive language; and the difficulty of establishing true IQ amongst the small number of people in the severe
or profound ID means estimates are used and the normal distribution extrapolated (Moss, et al., 1997c).

The challenges of measuring IQ have led some studies to rely on file reviews for ascertaining ability (Glenn, et al., 2003; Nezu, Nezu, Rotherburg, DelliCarpini & Groag, 1995). These can be based on measurement or may be merely estimations that may have occurred many years earlier. This approach is adequate for some studies but there is strong empirical value in dimensional measurement of ability, proximal to the research task. An alternative to full scale IQ, is a standardised test of receptive language such as the British Picture Vocabulary Scale (BPVS) (Dunn, Dunn, Whetton & Pintillie, 1982a; Dunn, Whetton & Pintillie, 1982b; Dunn, Dunn, Sewell & Styles, 2009; Dunn, Dunn, Whetton & Burley, 1997b) or the Peabody Picture Vocabulary Test (Dunn, et al., 2007; Dunn, Dunn & Williams, 1997a; Dunn & Dunn, 1981). Both are commonly used and large positive correlations have been found between the BPVS-II and the full scale ($r=0.59$) as well as the verbal sub-scale ($r=0.62$) of the Wechsler Abbreviated Scale of Intelligence (WASI) (Sams, Collins & Reynolds, 2006). The PPVT and BPVS have normal distributions with means of 100 and standard deviation of 15. A dimensional measure of receptive language provides a proxy for general ability and an independent variable that can be used in correlational analysis with scores from measures of ability (emotion recognition, scoring, adaptive functioning) psychopathology (signs, symptoms and cognitions) as well as attentional responses to emotional stimuli. Its validity is enhanced when administered concurrently with other measures and it could serve as a comparator for task-specific screening measures.

Classification by functional needs on the other hand provides a phenomenological approach yielding practical information about the help a person needs (AAIDD, 2010; Luckasson, et al., 2002). The most recent AAIDD system (AAIDD, 2010) eschews an IQ-based system of classification in return for a system of classifying according to required supports (Thompson, et al., 2004). They set their definition within a 10-dimensional model of human functioning and emphasise that disability should be considered within the context of an individual’s environmental and personal factors (The AAIDD Ad Hoc Committee on Terminology and Classification, 2010). They do not classify levels of disability within the ID diagnosis but once a diagnosis is made,
planning and providing supports is the key to reducing the mismatch between a person’s capabilities and the skills and behaviours needed to successfully participate in all aspects of life. This approach can be clinically time-intensive and has been criticised as lacking empirical utility (MacMillan, Gresham & Siperstein, 1993) and challenging to use as part of a diagnostic assessment (Tasse, et al., 2012). However, detailed data about a person’s functional needs can be gathered from an informant who knows the person well and collated in purpose-designed scales.

This method of data collection facilitates assessment across the entire range of abilities with instruments such as the Adaptive Behaviour Scale – Residential and Community 2nd Edition (ABS-RC:2) (Nihira, et al., 1993) and the Vineland Scales (Sparrow, Cicchetti & Balla, 2005) that are standardised and contain norms in the form of age-level equivalents (Nihira, et al., 1993). Part 1 of the ABS-RC:2 covers the spectrum of adaptive skills and Part 2 covers problem-behaviours. Part 1 has been used in studies of symptoms of mental illness, life events (Owen, et al., 2004) and challenging behaviour (Allen, Lowe, Matthews & Anness, 2012; Felce & Kerr, 2013). Abilities in domains such as Physical Development, Numbers and Time as well as Social Development can also be useful variables in empirical research. Part 2 has been used in a comparison study of problem-behaviour checklists (Walsh & Shenouda, 1999) and personality characteristics (Kishore, Nizamie & Nizamie, 2005). The ABS-RC:2 has not been widely used in studies of cognitive variables amongst adults with LA despite the relatively stable indication of adaptive behaviour it provides and the availability of statistical procedures for estimating IQ using data from part 1 (Moss & Hogg, 1997b).

2.3.5 Epidemiology
A detailed discussion of conceptual and methodological issues associated with the epidemiology of ID is contained in Appendix A. This includes a discussion of Australian and international prevalence studies. Identifying the sub-population of people with ID serves important purposes for policy and service planning (Wen, 1997) so studies have traditionally focussed on registered service users. However, this approach can exclude what some have termed the ‘hidden majority’ who don’t register for or seek help especially after leaving school (Emerson & Glover, 2012). All prevalence studies face the problem of assessment and few still use assessment of IQ,
though this approach yields higher rates than IQ as well as adaptive behaviour (Leonard, 2002). The most recent approaches combine population sampling with non-clinical assessment based on focussed questions that identify disability that is of an intellectual nature though not necessarily neurodevelopmental. The most recent survey in Australia yielded a rate of 2% of people below 65 years with ID, excluding ADHD-related conditions and dementia (AIHW, 2008). Estimates in the United States of America vary between 1.0% and 1.4% (Leonard, 2002).

2.3.6 Summary
Differences in concepts, terms, definitions and classification systems can lead to confusion for researchers but there is reasonable agreement on these in developed countries including Australia. Valid and reliable measures of general ability and adaptive behaviour are available for use within the spectrum of LA. Their total scores and where necessary domain scores could be helpful for not only classification but also validation of task-specific screening procedures.

2.4 Multiple disabilities
In this section, disability or impairment that co-occurs with low intellectual ability is considered. Initially the range of disabilities is considered followed by their impact on research participation. Then the impact of co-occurring disability on mental ill-health is discussed followed by a summary of the section.

2.4.1 Types of disability
Sensory (sight and hearing) impairment (Cooper, Smiley, Morrison, Williamson & Allan, 2007; McClimens, Brennan & Hargreaves, 2015; Warburg, 2001), physical (fine and gross motor) disabilities (Cooper, et al., 2007; Nakken & Vlaskamp, 2002) and epilepsy (Scheepers & Kerr, 2003) occur in higher rates amongst adults with ID than in the general population. They are more likely to occur together as ability declines and are common amongst people with severe or profound ID (Cooper, et al., 2007). The term profound intellectual and multiple disabilities (PIMD) is increasingly used with people who have the greatest disability (Nakken, et al., 2002) and the need for more accurate classification of separate conditions has been signalled (Nakken & Vlaskamp, 2007).
Whilst there is broad agreement that physical disability, sensory impairment and epilepsy can interfere with performance on certain research tasks, there is conflicting evidence about their relationship with mental ill-health. Deb, Thomas and Bright (2001) found a significant positive association between physical disabilities and psychiatric illness in a sample of 90 adults with mild and moderate ID but Cooper et al (2007) found they were negatively associated with mental ill-health in a sample of 1023 adults with ability in the mildly to profoundly disabled ranges. Older studies of epilepsy suggest ill-health is more likely (Besag, 2003) but more recent ones do not (Cooper, et al., 2007).

2.4.2 Disability and research

Controlling for the interference of sensory (visual and auditory), physical (fine and gross motor) and neurological (epilepsy) conditions in research tasks is important. Because these conditions are more common amongst adults with LA it is also important to separate the effects of intellectual ability from those of the co-occurring disabilities. Screening prior to research tasks is the most common method of managing their impact. Doing this on the basis of the specific abilities required for each particular research task enhances participation whilst also controlling for confounding effects. It is rare for cognitive studies of adults in the general population to report screening for these impairments, perhaps due to assumptions about abilities in the predominantly young adult university student samples used in cognitive research. Some studies do report screening for abilities specific to the research task(s) though.

A task that is sensitive to sensory, physical and neurological impairment is the visual-probe task and some general population studies have screened for task-specific abilities. Mogg, Holmes, Garner and Bradley (2008) ensured that adult participants had normal or corrected-to-normal vision prior to a visualprobe task and Bradley, Mogg, Falla and Hamilton (1998) noted the exclusion of two potential participants due to poor visual acuity before a masked version of the visual-probe task. Prior to a study measuring cortisol levels and responses to a visual-probe task Hakamata, Matsui and Tagaya (2014) excluded participants with epilepsy and other neurological conditions. Reports of exclusion due to physical, sensory or neurological are also rare in studies with children from the general population but two document doing so for visual impairment (Waters,
et al., 2014c; Waters, Mogg & Bradley, 2012a) and one for ‘any physical disability that would prevent the use of a computer’ (Waters, et al., 2014c).

### 2.4.3 Co-occurring disability and mental ill-health

Studies of psychopathology and cognitive variables with LA samples have responded differently to co-occurring disabilities. Those using structured interview and informant methods of assessment have often simply recorded their existence without excluding the participants, thus providing useful data on their prevalence. For instance, Bailey (2007), Cooper, Smiley, Finlayson et al. (2007) and Deb, Thomas and Bright (2001) all used structured respondent interviews along with informant measures in samples that included adults with severe and profound ID. They reported 24%, 23.3% and 19% of their samples respectively, had seizure disorders (Cooper, et al., 2007; Powell, 2003).

Studies using self-report measures are more likely to be selective with their sample through recruiting, screening or validity procedures. For instance, Masi, Brovedani, Mucci and Favilla (2002) identified and excluded subjects with severe motor disorders, sensory disorder, seizures, ASD and psychotic disorder from a sample of 50 mildly and moderately disabled adolescents. They had all been previously diagnosed with depressive (major depressive disorder and/or dysthymia) and anxiety disorders (generalised, phobic disorder, obsessive-compulsive disorder) using DSM-IV and were interviewed using a range of symptom measures for the study. Masi, Favilla and Mucci (2000) made similar exclusions from their interview based study of generalised anxiety disorder in an initial sample of 280. It is not always clear why potential participants with physical and sensory disabilities are excluded from interview-based studies. The main threat to validity in these research tasks is more likely to be related to general intellectual and specific language ability.

It is not uncommon for screening procedures to be used to determine scoring ability (Glenn, et al., 2003; Helsel & Matson, 1988; Kazdin, Matson & Senatore, 1983) prior to self-report interviews and for validity procedures (for biased responses) during administration (Benson & Ivins, 1992; Payne & Jahoda, 2004). Little data are usually reported about the co-occurring conditions amongst those that are excluded but there are exceptions where observation-based validity procedures have been used. Two participants were excluded by Benson and Ivins (1992) who were unable to see
important diagrams during the research task and three who were unable to complete all questionnaires due to severe visual impairment by Dagnan and Sandhu (1999). A balanced approach was taken by Powell (2003) when using the BDI and the ZDS with a sample of 120 adults with severe, moderate and mild ID. He excluded those not passing the task-specific screening but recorded the prevalence of seizure disorder (19%) and cerebral palsy (8%).

Many studies simply exclude participants and their data after screening for receptive language (Esbenson & Benson, 2005, 2007; Reed & Clements, 1989; Sams, et al., 2006). As most of those excluded are in the lower levels of ability, this can incidentally remove those with multiple disabilities. For instance, Reed and Clements (1989) excluded 28 participants after screening with the BPVS and noted that ‘several’ of these had motor or sensory disabilities that impaired their functioning on the tasks.

Research studies using informant assessment of functional ability have been able to provide a much richer picture of disability or impairment accompanying ID. By surveying staff or family that know the person well, a picture of all the participants’ abilities can be gathered without the concern of these affecting performance on research tasks. For example, Owen et al. (2004) found that of a sample of 93 adults with developmental disabilities in a long stay hospital, associated disabilities included: cerebral palsy (5); visual problems (17); hearing problems (13); mobility problems (38); epilepsy (33) and; physical health problems (67). Furthermore, an 'additional disabilities' score (0-5) was calculated based on five areas (vision, hearing, mobility, physical health and epilepsy) and this was used in later analyses (Owen, et al., 2004). This method may give a guide to a person’s ability but does not test a person’s specific ability on the research task.

2.4.4 Summary

Physical disability, sensory impairment and epilepsy are more common amongst adults with LA than in the general population. They may also affect a person’s capacity to complete research tasks but there are mixed data on whether they are associated with mental ill-health. It is common for studies using samples with LA to record or screen for these but few record the results of task-specific screening or validity procedures.
2.5 Emotional processing

There is broad agreement about the importance of recognising or perceiving emotion in others for adequate social functioning (Rogers, Schroder & von Scheve, 2013) in everyday life as well as its extreme forms in psychopathology (Beck, 1976). Perception and expression of emotion is critical to cognitive models of anxiety and depression. The key components of human emotional processing are explored in this section beginning with the typical development of emotional recognition. Then the role of neural or brain functions is covered followed by the dimensional theory of emotions and then the role of faces in communicating emotion. As studies of emotion processing in the general population do not consider the impact of ability, a comprehensive review of emotion recognition studies in LA samples has been undertaken separately in Appendix B but will be summarised in the final portion of this chapter section followed by a summary of the section.

2.5.1 Typical development

Empirical studies of emotion recognition are extensive and longstanding in general population samples. Results showing that recognition of emotional expression matures throughout the developmental period but is influenced by task complexity. Brosgole, Gioia and Zingmond (1986) used a series of increasingly complex recognition tasks for three emotions (happy, sad, angry) with typically developing (TD) groups. Recognition increased in children from 5.2 to 5.8 years of age and then again in a 7-year old group. No further improvement was evident until 19 and was flawless on the same tasks in adults between 19 and 64 years (Brosgole, et al., 1986). Harrigan (1984) used photos of six emotions (happy, disgust, sad, angry, fear, surprise) with typically developing primary school children. Two levels of complexity were used with the first [emotion labelling (EL)] requiring the participant to say how the (depicted) person feels when a picture is presented. The second [emotion recognition (ER)] required the participant to choose the requested emotion from a set of three pictures. On the ER task, accuracy increased over 4 age points (3, 6, 9 and 12 years) and it occurred relatively evenly across the six emotions. The 3-year olds were different to the 6 year olds but there was no difference between 6 and 9 year olds or between 9 and 12 year olds though the eldest group performed significantly better than the youngest. Scores were higher on ER than EL for all groups but the 3-year olds were worse than the 6-year olds and 6-year olds.
were worse than 9-year olds though 9- and 12-year olds were not different (Harrigan, 1984). This suggests that less complex tasks mature at an earlier stage. More recently, Rosenberg-Kima and Sadeh (2010) used a computer based, game-like task incorporating faces that allowed for manipulation of difficulty in a number of ways. Their results confirmed that the processing of faces undergoes significant changes through the age period of 7 to 13 years with gender as well as age-related differences evident. Parallels between development of emotional recognition and attentional networks, particularly at the executive level are discussed in Chapter Five but neural functions associated with face processing are considered in the following sub-section.

2.5.2 Neural functions
Aspects of brain functioning appear to be important in the ways that emotion is processed. The amygdala for example, has a central role in the perception of negative emotion especially fear (Knyazev, Bocharov, Levin, Savostyanov & Slobodskoj-Plusnin, 2008). Despite its disabling effect when acute or chronic, fear or anxiety has important evolutionary importance and signals the need for an animal to freeze, escape or attack. Ohman and Mineka (2001) hypothesise that humans have evolved a module for fear elicitation and learning characterised by: preferential activation in aversive contexts by stimuli that are fear relevant; activation at an automatic level; resistance to cognitive control at the executive level and; origination in a dedicated neural circuitry centred in the amygdala. In fact, threat-elicited amygdala activation varies with the arousal, not valence, of emotional images. Furthermore, threat-elicited amygdala response was positively correlated with skin conductance response (Wood, Ver Hoef & Knight, 2014). The higher cognitive functions are closely involved in integrating and regulating negative as well as positive emotion (Roth, et al., 2014). Left-frontal activation is associated with positive emotions whereas negative emotions are linked with right-frontal activation and this has its corollary in the allocation of spatial attention. Independent of location, the presence of emotional faces leads to a shift in the direction of attention toward the left-side visual field and this shift appears to be greater for sad faces than happy ones (Armaghani, Crucian & Heilman, 2014) However, stable differences in emotional traits (e.g., anxiety) are associated with stable patterns of asymmetrical frontal activity (Knyazev, et al., 2008). Whilst some neuropsychological and specific neuro-developmental conditions are related to problems in emotion
recognition (Dodd & Porter, 2011b; Hanley, Riby, Caswell, Rooney & Back, 2013) it appears emotional state is related to speed of response to negative emotional but it does not influence recognition of faces (Cooper, Rowe & Penton-Voak, 2008).

2.5.3 Dimensional theory

Emotions exhibit dimensional differences that are important to understand. Whilst the perception and expression of emotion is essential to social functioning amongst all humans and is similar across cultures (Ekman, 1993), emotions and their correlates are difficult to study. They are usually short-lived (Levenson, 1992), occur in complex contexts (Ekman, 1993; Rogers, et al., 2013) and experimental research requires communication amongst humans. Central to the study of emotion are the separate but closely linked physiological and cognitive systems. The autonomic nervous system (ANS) is central to the physiology of emotion (Levenson, 2014) and has been extensively studied since Ax (1953) first used laboratory methods to differentiate the ANS patterns of fear and anger. Taking this work further, Ekman, Levenson, and Friesen (Ekman, Levenson & Friesen; 1990) found that actors, scientists and untrained tertiary students would generate the physiological correlates of relevant emotions whether they were asked to relive emotional experiences (imaginally) or contract particular facial muscles associated with specific emotions. Furthermore, their ANS responses between four negatively-valenced emotions (disgust, fear, sadness and anger) were different, as were those between negative and positively (happy, surprise) -valenced ones. In particular, whilst heart rate increases in both anger and fear, they differ in peripheral vascular function (i.e., colder fingers in fear). A later review confirmed these findings as well as observing: a lack of evidence for different ANS responses between positive emotions (happy, surprise); and that the face remains pivotal for expression and interpretation of all emotion (Ekman, 1992).

In similar investigations that used different methodology (Lang, Greenwald, Bradley & Hamm, 1993), tertiary students were asked to judge their emotional responses to a range of photographs (human and non-human images) (Lang, Bradley & Cuthbert, 2008). The stimuli were designed to illicit positive and negative responses of differing strengths. Movement of facial muscles was observed and ANS responses recorded with significant co-variance found between a respondent’s facial expression, their valence judgements
and ANS arousal. The facial and physiological responses supported the view that specific emotions have unique reaction patterns according to ANS arousal and valence of perceived emotion. As Lang et al. (1993) also recorded viewing time toward the images, some results have implications for attention. They found that looking time increased with arousal with either the pleasant or unpleasant pictures, although it should be noted that the sample was unselected or tested for emotional pathology.

The dimensional (arousal and valence) approach to explaining and measuring emotion is not the only theoretical perspective. The other main position is taken by Ekman who has suggested that the basic emotions are discreet and separate rather than merely different points on two or more dimensions (Ekman, 1992; Ekman, et al., 1983). In contrast to dimensional explanations, each emotion possesses its own discrete profile of experience, physiology and behaviour that will not necessarily relate to others in a dimensional manner. There is reasonable consensus though that an emotional response begins with appraisal of the personal significance of stimuli, or an event, followed by a response involving subjective experience, physiology and behaviour (Mauss & Robinson, 2009). The centrality of ANS arousal and valence in understanding the physiology of emotion and to a lesser extent the approach – avoidance dimension of behaviour is well agreed (Lang, 2014; Levenson, 2014). Furthermore, the valence and arousal dimensions do appear to explain the greater proportion of variance in emotional responses (Mauss, et al., 2009) and have been measured in studies of adults with ID (Bermejo, Mateos & Sanchez-Mateos, 2014; Gray, Fraser & Leudar, 1983; Levy, Orr & Rosenzweig, 1960). The role of cognitive appraisal of stimuli in relation to anxiety is considered further in Chapter Five but the role of faces in communication of emotion is considered next.

**2.5.4 Role of faces**

The role of the human face in communicating emotion has been thoroughly investigated with empirical evidence steadily accumulating through behavioural experiments and more recently, neuroimaging studies confirming its critical role. The use of techniques such evoked response potentials (ERPs) and functional magnetic resonance imaging (fMRI) give an immediate indication of the extent and location of cognitive processing during tasks. This evidence is more direct than what is generated by behavioural tasks.
(Larson, Clayson & Clawson, 2014; Righi, et al., 2012) and in some cases, additional to that gleaned from the latter (Eysenck, et al., 2011). Together, the data confirm that: discrimination between angry and happy faces as well as differential responses between emotions occurs as early as the first year of life (Harman, Rothbart & Posner, 1997; Martinos, Matheson & de Haan, 2012); preferential attending to faces over other visual stimuli amongst humans occurs across the lifespan (Bindemann, Burton, Langton, Schweinberger & Doherty, 2007; Michalowski, et al., 2009; Öhman, et al., 2001); faces without eyes take longer for 4-month old infants to process (Hoehl, 2015); faces are probably recognised and differentiated within the first 200-250 milliseconds (ms); after presentation (Knyazev, et al., 2008); semantic information is probably not a prerequisite for valence classification in emotion (Yiend, 2010); attendance to faces occurs even when there is high demand from other cognitive tasks via automatic level processing (Ikeda, Sugiura & Hasegawa, 2013b); emotional faces are selectively processed even without contextual visual information (Lee & Siegle, 2014; Theeuwes & Van der Stigchel, 2006); whilst profile view of emotional faces reduce intensity of perceived emotion, valence is still reliably detected (Guo & Shaw, 2015); face-expression processing improves with age (Rosenberg-Kima, et al., 2010); emotion differentiation may be impaired in some anxiety disorders (Kashdan & Farmer, 2014); and faces can be schematic or photographic but need to be complete for the valence to be detected (Weymar, Low, Ohman & Hamm, 2011).

A comprehensive review of emotion recognition studies using LA samples is detailed in Appendix B. This includes experimental studies as well more recent ones associated with cognitive studies. The conclusions include: that the number and type of emotions assessed in studies is highly variable, ranging from two to twelve; there is little evidence for the superiority of the type of stimuli (e.g., line drawings, cartoons, photographs); it is easier to choose an emotion (from visual stimuli) after hearing its name than it is to label an emotion when shown an array of stimuli and asked what each one is; emotion recognition is positively correlated with ability and specifically receptive language; happy is the most readily recognised emotion and angry the least - this pattern is present regardless of ability, age or task complexity; groups with severe ID make more mistakes than those with moderate and mild ID; the four basic emotions (sad, angry, happy and scared) are recognised by most people with severe ID as long as the visual cues are
sufficient in strength; and amongst adults with profound and multiple disability but little language, different patterns of physiological indicators (heart rate, breathing, skin conductance) are associated with different emotions.

2.5.5 Summary
The recognition of emotions matures with significant changes in pre-adolescent years. Valence and arousal dimensions have been measured for different emotions in samples with LA and emotions can be recognised and felt at a physiological level amongst adults with severe and profound ID. However, complexity of stimuli and task demands needs to be limited and emotions should only be the four basic ones of angry, happy, sad and scared. Recognition is related to receptive language though and accuracy will be lower amongst people with greater disability. Research tasks using the basic emotions should be feasible with a sample spanning the spectrum of LA but it may be necessary to use screening and validity procedures as well.

2.6 Ability and personality
In this section, the relationship between ability and personality is examined. Initially, the impact of ability on personality in general population studies is considered, both in terms of the specific trait of anxiety and in terms of the structure of the prevalent constructs of personality. Then the available literature on personality in samples with LA and ID in particular is considered with a summary concluding the section.

2.6.1 General population samples
The relationship between intelligence and personality has been of interest since psychometric testing in both these areas became widespread. Early studies showed inconsistent patterns across personality traits and particular areas of ability (Samuel, 1980; Turner & Horn, 1976). Later studies have found evidence that the factor structure of personality varies with general ability and that neuroticism may play a mediating role with ability in large data sets (Austin, Deary & Gibson, 1997; Austin, Hofer, Deary & Eber, 2000). The more specific thesis that general ability is related to trait anxiety, perhaps due to a greater range of coping strategies at higher levels of ability has also received some support (Austin, et al., 2000; Vassend, Watten, Myhrer & Syvertsen, 1994). For instance, Samuel (1980) found small negative correlations between general
anxiety and IQ amongst ‘black’ and ‘white’ school age North American adolescents ($n=832$). This was particularly the case for black males and Samuel (1980) quotes a number of other studies with results of similar size and direction. To consider the developmental course of both ability and personality, Ackerman and Heggestad (1997) reviewed theoretical literature as well as empirical studies. They concluded that these two domains, along with vocational interests, develop in tandem and are interactive in both developmental and adult years.

The largest review of data sets covering this area considered four large longitudinal studies of ageing (Austin, et al., 2002) and reached more definitive conclusions about the differential relationship between ability and trait adaptiveness. They found that traits considered socially and personally adaptive (internal locus of control, goal directedness, instrumentality) were positively correlated with intelligence and conversely, those considered maladaptive (emotionality, public self-awareness, social anxiety and depression) were negatively correlated with ability (Austin, et al., 2002). The most recent investigation of the impact of ability on the structure of personality recruited a group of Estonian adult volunteers ($n=154$) (Mottus, Allik & Pullman, 2007). Respondent and informant measures of the five-factor model of personality were completed and the authors found lower internal consistencies on both scales for the low ability group. However, the structure of personality was not significantly different to that of the high-ability group. A notable result was a significant negative correlation between ability and acquiescent responding. These results suggest that lower ability does not render current models of personality any less relevant although the authors did not specify the dimensions of their low ability group (Mottus, et al., 2007).

Reviews of large datasets suggest a differential effect of ability on adaptive and non-adaptive personality factors. These effects are not evident in smaller studies although small negative correlations between ability and general anxiety are. All of these studies used self-report personality inventories, which require a high level of literacy and thus limit the ‘floor’ of ability in samples. Also, studies provide few details of sample ability range (i.e., ‘floor’ and ‘ceiling’) so the extent to which conclusions can be extrapolated to samples with LA is unclear. Conceptual and communicative ability may also directly
affect the accuracy of a person’s account of their personality and this is an important consideration in the study of personality amongst adults with ID (Boyd, 2013).

2.6.2 Low ability samples
Personality and ID has been addressed in the literature but the earliest commentary had little empirical basis and was often paternalistic and scientifically ignorant (McCarver & Cavalier, 1983). Common attitudes still portray adults with ID as either ‘worry free’ due to the care and support they received or burdened with worry due to limited coping skills (Gullone, 1996). Confirmation of the power of attitudes over evidence is provided by Reiss, Levitan, and Szysko (1982b) from their studies of diagnostic overshadowing. Participants were given case scenarios of protagonists with and without ID to psychologists (Reiss, et al., 1982b) and psychology students (Alford & Locke, 1984). Features of emotional and personality disorder were more likely to be interpreted as inherent to the disability than to environmental factors or to mental ill-health as they were for the non-disabled. This has the effect of diminishing the significance of distress attributed to protagonists with ID. Participants’ attitudes did not change with their level of experience of the population (Reiss & Szysko, 1983). Similar attitudes were found amongst support staff and administrators in an institution (Robey, Beckley & Kirschner, 2006).

Whilst the empirical study of ID gained pace in the 1960’s much of the psychological research focused on aspects of cognition (Zeaman & House, 1963) as well as methods of teaching or changing behaviour (Ellis, 1969; Matson, DiLorenzo & Andrasik, 1983a) rather than mental illness or personality (Dingman, 1968). Personality was studied by searching for the common personality characteristics that people with ID possessed rather than testing the viability of established models of personality from the general population (Balla & Zigler, 1979; Zigler, 1969). The personalities of ‘mentally-retarded persons’ were seen to be affected by the same factors that influence the personalities of ‘non-retarded people’, but their common life experiences would lead to personalities with common characteristics (Hodapp, 2004; Zigler & Burack, 1989). For instance, Balla and Zigler (1979) proposed that the personalities of people with ID could be characterised by a set of personality-motivational characteristics. These include: a positive reaction tendency or over-dependency on others; a negative reaction tendency.
or wariness of interactions with others; low expectancies of success; outer-directed problem-solving or reliance on others for solving problems; and low self concept. Furthermore, these characteristics were said to be implicated in the high rates of mental ill-health amongst adults with ID (Hodapp & Zigler, 1997) and more recently the model was tested with an empirically tested instrument administered by informants (Zigler, Hodapp & Henrich, 2002).

There are still few published studies of personality in adults with ID, but these have focussed on either the personality profiles associated with particular genetic syndromes (Roy, Retzer & Sikabofori, 2015) or the disorders of personality, particularly in forensic populations (Flynn, Matthews & Hollins, 2002; Rayner, Wood, Beail & Nagra, 2015) with LA. This focus on the pathological extremes is at the expense of the explanatory value that empirical theories of personality bring to ordinary personal differences, regardless of ability.

A few studies have assessed personality or trait-like areas of skill and their correlates in samples of adults with LA. Simon, Rosen, Grossman, and Pratowski (1995) found that informant rated social skills did not correlate with IQ and or Vineland scales but informant rated social skills were found to be negatively correlated with informant rated depression (Benson, Reiss, Smith & Laman, 1985). Levine (1985) found a higher incidence of situational anxiety, measured on the Spielberger state anxiety scales (STAI-A) (Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983) amongst adults with ID exposed to situations requiring problem solving that they were unused to. However, more socially active and involved adults did not show this anxiety in the same situations. One other study used the ABS-RC:2 Part 2 as a proxy instrument for personality-related problems in an investigation of the relationship between these and mental disorders as well as general ability (Kishore, et al., 2005).

Two exploratory studies have shed light on the utility of mainstream personality theory by testing the five-factor model of personality. Lindsay, Rzepecka and Law (2007a) modified the NEO PI-R and found congruence in self and rater scores on the domains of neuroticism (N) and openness (O). However, there were significant differences between scores on conscientiousness (C), agreeableness (A) and extraversion (E). The largest
difference was on conscientiousness for which respondents rated themselves significantly higher than informants. Boyd (2013) used the informant version of the NEO PI-R Form R with a sample of 35 adults with ID and support staff who had known them for at least 3 months. Scores on the NEO PI-R facets were correlated with scores on the Reiss Profiles (Reiss & Havercamp, 1998) in the expected directions and the NEO PI-R predicted a greater proportion of variance in adaptive behaviour than did the Reiss Profiles. Whilst these two studies offer support for further examination of the five factor model, neither reported on ability levels in their samples nor did they co-vary ability with aspects of personality. Preliminary testing of two circumplex assessments of personality also showed promise for the theoretical structure but the researchers recommended care be taken in sample selection and data collection (Lindsay, et al., 2009).

2.6.3 Summary
Stable schemas or personality factors are implicated in the cognitive models of anxiety and depression, hence understanding any impact of ability on personality traits is important. General population research suggests that less adaptive aspects of personality might increase as ability declines and that acquiescence increases. A corollary of this might be an inverse correlation between ability and signs as well as symptoms, particularly of anxiety amongst adults with LA. The preliminary studies using models of personality traits validated in general population have not been able to answer this question though. The only evidence on the trait of anxiety is from the general population and suggests a small but significant inverse correlation with ability. There is support for the use of informant ratings of personality though but these may diverge from respondent ratings. Informant measures of socialisation and shyness on the ABS-RC:2 may prove useful as substitutes for measures of trait anxiety.

2.7 Including adults with intellectual disability in research
In this section, some of the barriers to research with adults who have LA, in particular those with severe and profound ID are considered. Initially, government resourcing is considered, especially outside developed nations and then the arbitrary exclusion of people with LA from cognitive research in the general population. Research ethics procedures are discussed, with, particularly reference to alternative consent-taking
procedures followed by some of the other practical challenges in recruitment and conducting research tasks. The main approaches to screening used in cognitive studies with LA samples are then considered followed by a brief consideration of chronological- and ability-based comparison groups. The section concludes with a summary.

2.7.1 Resourcing
There is consensus on the dearth of research amongst people with LA, especially the sub-population with ID across the world. Furthermore, what research there is emanates almost exclusively from high-income countries (Emerson, et al., 2008; Tomlinson, et al., 2009; WHO, 2011). Whilst people with ID have needs more alike than different to the general population their disability often increases the risks of: inequality related to discrimination in health care, employment, education and legal systems; violations of dignity; and denial of autonomy. Thus disability is easily seen as a human rights issue (Tomlinson, et al., 2014; WHO, 2011). A recent survey of 72 researchers in developmental disabilities across the world found that amongst other priorities, the need for early intervention and addressing preventable causes of poor health were critical (Tomlinson, et al., 2014). Furthermore, leading commentators have called for future health research to promote the involvement of people with disabilities and their families. This is seen as consistent with the United Nations Convention on the Rights of Persons with Disabilities and its articles that engender participation and inclusion in society (Emerson, et al., 2008; Tomlinson, et al., 2014; UN, 2006). Adequate funding priorities and policy settings would set a helpful platform for further important health research.

2.7.2 General population research
Although the scarcity of research for people in the sub-population with ID is an issue, so too is their routine exclusion from general population research. A recent review and author survey was undertaken of participation in 300 randomised control and clinical studies in the six highest impact medical journals (Feldman, Bosett, Collet & Burnham-Riosa, 2014). This showed that only 2% of studies clearly included people with ID and 90% were designed in ways that would automatically exclude them. Furthermore, the authors estimated that simple accommodations or minor procedural modifications could
have facilitated the participation of people with ID in 70% of the studies. Assumed or measured general ability is also the most common criteria for exclusion of participants with LA from cognitive studies in the general population of adolescents (Jolly & Dykman, 1994a), adults (Lamberton & Oei, 2008) and children (Waters, Mogg, Bradley & Pine, 2008c). Furthermore, ability of retained participants is hardly ever considered a variable to be analysed.

2.7.3 Ethics

Even when the necessary resources are available, planning and conducting studies in an ethical manner usually involves consideration of legislation and detailed negotiation with ethics committees. The most significant issue is that of consent and the contingencies for when a participant lacks capacity. Victoria ("Guardianship and Administration Act 1986 Version 063," 1986) along with other states and nations [e.g. United Kingdom ("Mental Capacity Act," 2005)] has statutory frameworks for consent and where necessary, substitute decision making about treatment and other life matters. The usual criteria for informed consent is: having sufficient information about the decision; having the capacity to make the decision and understand the consequences; and freedom from coercion. Capacity entails being able to understand, retain and weigh up information relating to the decision (Wong, Clare, Gunn & Holland, 1999).

For university research in Australia, it is the responsibility of the HREC to ensure research is carried out in a manner consistent with the National Statement on Ethical Conduct in Human Research (NHMRC, 1999, 2007 (updated May 2015)). Section 4.5 of the statement covers ethical considerations for people with an intellectual disability and specifies that (s4.5.5) where the participant cannot provide this, consent should be sought from the person’s guardian or a person or organisation authorised by law. The Victorian Guardianship and Administration act ("Guardianship and Administration Act 1986 Version 063," 1986) specifies who, other than a guardian can provide consent, but complications can still arise where no one from the specified list is available (Iacono & Carling-Jenkins, 2012).
2.7.4 Consent

Establishing capacity for consent is only truly determined on an individual basis and studies of consenting capacity have found it difficult to establish empirical criteria that would simplify this process (Arscott, Dagnan & Stenfert Kroese, 1998, 1999; Dye, Hare & Hendy, 2007). An example of the dilemma comes from the study by Arscott et al. (1999) where 40 participants with ID agreed to participate after being read the plain language statement yet none were able to answer all five questions to assess their capacity correctly. Dye et al. (2007) found that after asking a similar set of questions, only 5.9% of their sample satisfied a strict interpretation of criteria for capacity. However, Dye et al. (2007) found that 65% of their participants satisfied consent criteria used by other, similar studies (Arscott, et al., 1999; Wong, et al., 1999). In fact, only 12.9% of the sample understood the nature of the study described to them (Dye, et al., 2007). Hence, taking consent where potential participants do not have capacity becomes a significant ethical issue for negotiation with research and ethics committees particularly if participants have severe or profound disability.

The International Association for the Scientific Study of Intellectual Disabilities has endorsed a document that outlines the specific needs and interests of people with ID (Dalton & McVilly, 2004). Amongst many other things, this provides guidance on alternative procedures for consent and where this is not fully informed. It seems reasonable that as long as the study is ethical and there is benefit for the intended participants, alternative procedures should be used where capacity is not present. However, some researchers in Victoria have found Human Research Ethics Committees (HRECs) to be inconsistent and at times over-protective in their interpretations of guidelines and legislation (Iacono, 2006; Iacono & Murray, 2003). They argue that complex and legalistic procedures can effectively deny people with ID the opportunity to participate in research that might benefit them. This has generated debate about the type of alternative consent-taking procedures that could be used, specifically those termed ‘proxy’ or ‘substituted’ and ‘supported’ procedures (Iacono, 2006; McVilly & Dalton, 2006). There has also been some discussion of how researchers can relate to HRECs in promoting self-determination alongside a balance between risk and protection (McDonald, et al., 2009).
The perspectives of people other than those who lead the studies have recently enriched the discussion about research. Studies conducted with and by researchers with ID have recently been published (Blunt, et al., 2012) and people with a disability have told non-disabled researchers that if research is not ‘easy’ to understand then it can be hard to take part in (Crook, Tomlins, Bancroft & Ogi, 2015). People with an ID have also taken on the role of providing ‘easy’ information about research to potential participants (Goodwin, Mason, Williams & Townsley, 2015). Clinicians in the field of disability have endorsed the need for research but also voiced the concern that a lack of resources and support prevents them from conducting it (Crook, et al., 2015).

2.7.5 Practical challenges
There are a number of other barriers to cognitive research with adults who have ID and particularly in the profound or severe groups. Group sizes are small (Benson, et al., 1992; Helsel, et al., 1988) and recruitment is difficult for participants, researchers and carers alike (Crook, et al., 2015). Communication problems may render interviewing unviable (Vos, De Cock, Petry, Van Den Noortgate & Maes, 2010) especially where disability is profound and multiple, leaving alternative assessment (Adams & Oliver, 2011; Neerinckx, Vos, Van Den Noortgate & Maes, 2014; Petry & Maes, 2006) and intervention methods (Lancioni, Singh, O'Reilly, Oliva & Basili, 2005) the only options. Their successful inclusion in a few studies (Benson, et al., 1992; Helsel, et al., 1988; Joyce, Globe & Moody, 2006) suggests that at least some people with ability at this level can participate meaningfully. It may be though that screening procedures are excluding more adults at the lower levels than necessary.

2.7.6 Screening
Whilst there has been a steady increase in the investigation of cognitive concepts, symptoms and cognitions amongst adults with LA, most have only included participants with mild, moderate and borderline ID. Exclusion of potential participants with lower ability has usually been on the basis of arbitrary cut-off scores (including the instrument’s floor) on standardised measures of general ability. These include measures of IQ such as the Wechsler Abbreviated Scale of Intelligence (WASI) (Sams, et al., 2006) and receptive language scales, such as the British Picture Vocabulary Scale (BPVS) (Dunn, et al., 1982b) (Reed, et al., 1989), the British Picture Vocabulary Scale

Studies of sustained attention (Chakrabarti & Banerjee, 2013) and selective attention (Dodd & Porter, 2010; Dodd, et al., 2011b) also excluded the lowest ID groups even though the latter are the first studies using a visual-probe paradigm and emotional faces with samples of adults with ID. An alternative approach to screening saw all consenting participants included in the research tasks and then the data of those who did not validly complete the task excluded from analysis (Joyce, et al., 2006). This allowed the study to co-vary ability with valid task completion, thereby providing valuable data on how ability varied according to what participants could and could not do. The exclusionary approach to screening acts as a barrier then to potential participants in the lowest levels of ability. The presence of this barrier means little new data is gathered about whether potential participants who were excluded could complete the specific research task (s) or not.

2.7.7 Chronological- and ability-based comparisons
Zigler’s (1969) and colleagues (Hodapp, Burack & Zigler, 1998) promoted the practice of matching research participants with typically developing controls (usually with a much lower chronological age) on a measure of ability (so-called mental-age matching). This was intended to support the notion that adults with ID progressed through a similar developmental pathway though at a slower rate (Hodapp, et al., 1997). A detailed discussion of mental age (MA) matching and the ‘developmental approach’ it was intended to support can be found in Appendix D. Increasingly, studies are using applied research designs without MA controls to test cognitive concepts and therapies with a view to distilling what is helpful from theory and psychotherapy that is well proven in the general population.
2.7.8 Summary
Some of the barriers to investigating cognitive models of anxiety and depression amongst adults with ID have been examined in this section. A more inclusionary approach to research might be required, not only to increase the participation adults with severe and profound ID, but also to learn more about the level(s) of ability required for participation in cognitive research tasks. Such an approach might include all nominated potential participants who meet initial criteria for language use and then use screening and validity procedures to determine which data produced by participants is valid for analysis. By accounting for ability through screening and validity procedures, control groups matched on ability are not required. The next section examines screening and validity procedures for general and task specific abilities.

2.8 Screening and validity procedures
In this section, the existing use of screening and validity procedures used in studies with samples of adults with LA will be considered. Firstly, definitions will be established for screening and validity procedures. Then the existing evidence for their use in symptom and cognition interviews is considered followed by the evidence from studies using visual-probe tasks. The value of dimensional measurement of ability alongside validity and screening procedures will then be considered and a summary concludes the section.

2.8.1 Definitions
In studies using samples of adults with LA screening and validity procedures have been used in to detect: unreliable responses (Benson, et al., 1992; Payne, et al., 2004); inadequate receptive language (Dodd, et al., 2011b; Esbenson, et al., 2005; Esbenson & Benson, 2006; Esbenson, et al., 2007; Reed, et al., 1989); scoring ability (Sams, et al., 2006); and scoring response biases in interviews (Benson, et al., 1992; Glenn, et al., 2003; Nezu, et al., 1995). However, the results from these procedures are rarely published and the distinction between validity and screening procedures is often unclear. Furthermore, the few studies using procedures specific for their research tasks do not report their empirical properties as either dichotomous or dimensional measures.

Validity procedures usually refer to criteria employed in judging whether a research task has been completed to a predetermined standard. They can be applied during or after the
completion of the task and may rely on clinical judgement (i.e., clinician-observed responses to questions) or a criterion score (e.g. a certain number of correct trials). These determine whether the data from each participant on each task is analysed (Benson, et al., 1992). Screening procedures on the other hand refer to procedures administered prior to the research task or as part of the recruitment process. These may be informal questions (asked of an informant or respondent) or a more formal measure such as an IQ or receptive language measure (Esbenson, et al., 2007; Kazdin, et al., 1983).

2.8.2 Interviews

Self-report measures of cognitions and symptoms are almost always administered by interview to people with LA. Whilst this eliminates the barrier of literacy a valid, graded score in response to questions is still required. The importance of a participant’s scoring ability in cognitive research has been clear since the earliest commentary (Matson, 1983) and research (Helsel, et al., 1988; Kazdin, et al., 1983; Lindsay & Michie, 1988a; Reed, et al., 1989) with these variables. Understanding questions involves receptive language amongst other cognitive abilities (Finlay & Lyons, 2002). Identifying internal affect involves recognition and labelling of emotion in others (Rojahn, Rabold & Schneider, 1995b). Motivational factors such as social stigma (Heal & Sigelman, 1995; Stancliffe, Tichá, Larson, Hewitt & Nord, 2015) and dependence on carers (Finlay & Antaki, 2012; Finlay, et al., 2002) can also influence responses. Finlay and Lyons (2001) summarise the main challenges for researchers and clinicians as: the conceptual demands of question content (e.g. temporal and quantitative judgements); language processing dictated by phrasing of questions (e.g. modifiers and qualifiers); response format (e.g. yes-no, multiple choice); response biases (e.g. perseveration, acquiescence); and the psychometric properties of the instrument.

(2005) used the PPVT-III (Dunn, et al., 1997a) to screen a sample of 122 individuals with ID and exclude 37 with age equivalents below 5.0 with a final sample range raw score of 71-191 and a mean of 116.7 (SD=29.1). In a later study, Esbenson and Benson (2007) used a similar sample and found a mean standard score of 58.2 (SD=18) ranging from 40 to 104 on the PPVT-III. Reed and Clements (1989) excluded 28 potential participants who did not reach the ‘floor’ of the BPVS (Dunn, et al., 1982b). Of the remaining 55 participants, only 37 passed an ‘emotional awareness’ test. The BPVS range for the group who passed was 27-104 and for those who didn’t, 18-52.

Other studies have used procedures specific to the research task for screening. The most common task-specific measure is a set of questions with closed-end and nonsense items, often administered along with a visual scale (such as a histogram, graduated bars or flash cards) (Esbenson, et al., 2005; Glenn, et al., 2003; Helsel, et al., 1988; Kazdin, et al., 1983; Lindsay & Skene, 2007b; Nezu, et al., 1995; Powell, 2003). The visual scale has also been routinely used in interview administration allowing participants to say or point to their answers for a symptom (Esbenson, et al., 2007; Lindsay, et al., 2007b) or cognition (Glenn, et al., 2003). However, those screening negative are usually excluded from the study without administering the symptom or cognition measure (Esbenson, et al., 2005; Glenn, et al., 2003; Nezu, et al., 1995). Some studies have recorded the number of participants excluded [e.g. 37 of 132 (Esbenson & Benson 2007) and 5 of 112 (Nezu et al., 1995)] but none have allowed those screening negative to complete the measures to see if their responses were valid or not. This would allow the researcher to test the accuracy of the screening procedure for identifying valid and invalid responses. Furthermore, whilst some studies have described their procedures (Esbenson, et al., 2007; Helsel, et al., 1988; Payne, et al., 2004), published their questions (Glenn, et al., 2003) and their results (Esbenson, et al., 2005; Nezu, et al., 1995), none have published their procedure as a replicable dichotomous measure or reported on their empirical capacity to identify valid and invalid completion of research tasks.

Procedures for validating scoring responses in interviews are less common than screening procedures. This is despite acknowledged response biases such as acquiescence, recency and primacy effects commonly occurring amongst people with ID (Emerson, Felce & Stancliffe, 2013a). Benson and Ivins (1992) observed for such
effects during symptom and cognition interviews but did not investigate the predictors of biased or invalid responses. They found that general ability, in the form of disability category was not related to valid completion of self-report cognition (self-concept), symptom (depression) and emotion (anger) measures in a sample incorporating adults with severe, moderate and mild ID (Benson, et al., 1992). Finlay and Lyons (2001) as well as Heal and Sigelman (1995) offer some guidance on how response bias can be monitored in validity procedures.

2.8.3 Visual-probe tasks
The few relevant studies using a visual-probe paradigm and emotional (Dodd, et al., 2010, 2011b) or non-emotional (Chakrabarti, et al., 2013) stimuli excluded potential participants with ability below the category of moderate disability. The arbitrary exclusions based on general ability appear to be aimed at reducing the risk of invalid trials but specific validity criteria or procedures were not reported. One study used task-specific screening procedures entailing recognition of emotions used in the research stimuli along with the ability to read labels of the depicted emotions (happy, sad, angry, scared and neutral) (Dodd, et al., 2010). These were administered after the visual-probe task. The emotion recognition task generated a dimensional score with the patterns of recognition (i.e. recognition frequency for each emotion) across emotions recorded and compared with an ability-matched control group as well as a chronological age-matched group. Dodd and Porter (2010) found that the pattern of emotional recognition did not differ across groups yet the patterns of selective attention did. All participants were better at recognising happy than neutral but all scored worst with angry. No exclusions on the basis of screening procedure were reported and the results were not used to predict accuracy on trials.

A number of reviews show that general measures of ability are positively correlated with emotional recognition (Carvajal, Fernández-Alcaraz, Rueda & Sarrión, 2012; Moore, 2001; Rojahn, Lederer & Tassé, 1995a) and receptive language is positively correlated to linking cognitions, emotions, situations and behaviour (Dagnan, Chadwick & Proudlove, 2000; Joyce, et al., 2006; Sams, et al., 2006). Nevertheless, both historical studies and more recent ones vary enormously in their experimental paradigms, stimuli and scoring procedures (Carvajal, et al., 2012). Unfortunately, an existing screening
measure for recognition of the four basic emotions does not exist that would provide dichotomous (pass/fail) and dimensional scores.

Surprisingly, none of the visual-probe studies in the sub-population report using validity procedures. Many of the general population child studies use practice procedures with facial stimuli without time constraints (Waters, Kokkoris, Mogg, Bradley & Pine, 2010b; Waters, et al., 2012a) but none report subsequent exclusion of participants for this reason. These practice procedures may provide a useful basis for a validity procedure with adults who have LA and especially severe and profound ID. Exclusion from visual-probe studies is most common for children and usually due to disability of some kind. Waters and Farrell (2014b) excluded children due to ‘suspected IQ below 70 based on a telephone interview with parents’ as well as pervasive developmental disorder or learning disability. Waters, Mogg and Bradley (2012a) also excluded children based on developmental disorders, intellectual and learning disabilities.

2.8.4 Dimensional ability
Dimensional measurement of ability has occurred in some studies of cognitive variables in samples with LA (Dagnan, et al., 2004b; Esbenson, et al., 2005, 2007; Sams, et al., 2006). Other studies have used ability as a categorical (Benson, et al., 1992; Glenn, et al., 2003) variable but only a few report on its empirical relationship to performance on specific research tasks. Receptive language has been positively correlated with emotion recognition (Carvajal, et al., 2012; Joyce, et al., 2006; Reed, et al., 1989; Sams, et al., 2006) and with the ability to link cognitions with emotions and behaviour (Joyce, et al., 2006; Sams, et al., 2006). The only studies using visual-probe tasks with emotional faces amongst adults who have ID did not report on the relationship between ability and valid completion of tasks either (Dodd, et al., 2010, 2011b).

The relationship between general ability and emotion recognition has been investigated amongst samples of participants with LA but early studies used only categorical ability and rarely included groups with severe or profound ID. They also differed greatly in the type and number of emotions as well as the measurement paradigm (Moore, Hobson & Lee, 1997; Rojahn, et al., 1995a). More recent studies have used measures of receptive language to indicate general ability but paradigms and stimuli for establishing emotional
recognition still vary considerably between studies (Carvajal, et al., 2012; Moore, 2001). Thus its measurement is not consistent or reliable. Nevertheless, group differences based on receptive language have been found (Reed, et al., 1989; Sams, et al., 2006) as has a moderate and significant positive correlation (Dagnan & Proudlove, 1997b). Few studies have used a dimensional measure of emotional recognition and none have co-varied this with a dimensional measure of ability such as receptive language.

2.8.5 Summary
An increasing number of studies are using self-report measures of symptoms and cognitions with adults who have LA. Whilst screening procedures are not uncommon, validity procedures are rare. There is almost no data on whether screening procedures predict validity across the spectrum of LA though. It may be that using dichotomous screening and validity procedures would not only facilitate the participation of potential participants with the lowest levels of ability but would also provide data on the capacity of each screening procedure to identify valid performance on research tasks. Using task-specific procedures alongside measures of general ability may also allow comparison of their capacity to identify valid and invalid responses. If screening procedures were in a dimensional form they could also be co-varied with a range of other variables.

2.9 Conclusions
This chapter has established the context for a study of cognitive variables in a sample of adults with LA, the majority of which had borderline or ID. The first two sections covered aspects of the sub-population that locate it within society as well as the research literature. Whilst cognitive theory is more recent than the construct of general intelligence both are central to the study of cognitive variables amongst adults with LA. Reasonable consensus on concepts, terms, definitions and classification in the measurement of ability is important for comparisons with existing literature. Though the spectrum of ability below average is not readily identified, the subpopulation with ID is and doing so can help researchers to focus on their needs.

In the next three sections, important aspects of disability, emotional processing and personality traits were reviewed. Impairments and disabilities can occur with ID and
need to be accounted for in research. Emotional functioning varies with general ability but recognition of basic emotions is possible amongst adults with the lowest levels of ability. General population research suggests a small but significant correlation between trait anxiety and ability and this could have implications for symptoms of anxiety if also found in LA samples.

The next three sections addressed the barriers and solutions to these for the inclusion of adults from all levels of ability below average. The value of ‘mental age’-matched groups is eschewed in most contemporary cognitive research in LA samples in preference for the use of dimensional variables that analysed by correlational methods. There are certainly some barriers to including adults with severe and profound ID in research but an inclusionary approach might facilitate this. Task-specific screening procedures may be useful for predicting competence on cognitive research tasks and validity procedures could ensure those with the necessary specific abilities are not excluded.

**2.10 Rationale for the first aim**

**Aim 1**

The first aim of the present study was to recruit a unique sample across the spectrum of LA facilitated by task-specific procedures that could be useful in future research.

**Components**

There are three important components of the first aim of the present study.

1. An inclusionary approach to recruitment and retention of participants would help in enabling the participation of small groups with profound and severe ID. Potential participants with the least ability are often excluded from cognitive studies using samples with LA. Whilst adults with this level of ability are the least likely to be competent at cognitive research tasks, exclusion too often occurs on the basis of criteria that has not been empirically linked to competence. An inclusionary approach would allow all participants who used and understood short sentences to attempt each task but that screening and validity procedures would govern the analysis of data. Maximising
the sample breadth would enhance the applicability of its findings for theory and practice.

2. The use of dichotomous, task-specific screening procedures would allow their capacity to identify valid and invalid completion of research tasks to be tested. Some screening by general ability and task-specific procedures has been carried out in cognitive studies using samples of adults with LA screening. However, none document their procedures and report their predictive capacity against validity procedures in a sample spanning the spectrum of ability below average. Using dichotomous task-specific screening procedures may be more accurate in predicting pass or fail on research tasks and also more time efficient than screening by general ability.

3. The dimensional versions of these original screening measures would facilitate analysis of their relationships with a range of other variables in the study. The lack of dimensional measures of scoring ability and emotional recognition mean that these variables are rarely co-varied with other measures of ability, adaptive behaviour, life stressors, signs and symptoms of anxiety and depression as well as attentional responses to the visual-probe task. If the dimensional versions of the screening procedures were internally consistent then they could be co-varied with this range of variables for the first time. Co-varying the screening and validity procedures with the ABS-RC 2 domains of time and numbers as well as physical disability would also contribute to illuminating their empirical properties.
Chapter Three: Mental Health Problems And Life Stressors

3.1 Introduction
Chapter Three contains the background to investigations of signs and symptoms of anxiety as well as depression, including their prevalence and their relationships with life stressors. First of all, the nature and prevalence of these common mental health problems in the general population is considered. Second, the existing data on the impact of ability on mental health, particularly at the lower levels of the ability spectrum is discussed. The particular challenges of assessing anxiety and depression amongst adults with ID and the instruments used are considered next. Fourth, the limited prevalence data for signs and symptoms of anxiety and depression in low ability samples are then reviewed. The contrasting and concordant aspects of informant and respondent assessment instruments are then examined in the fifth subsection. Sixth, the available data are considered regarding the impact of cumulative and specific stressful life events on signs as well as symptoms of mental health problems is considered. A conclusion to the chapter is then followed by the rationale for hypotheses 1, 2, 3 and 4.

3.2 Anxiety and depression
The literature on anxiety and depression in the general population is considered in this section. Initially, the defining characteristics of each are considered followed by their shared and contrasting features. The personal and social burden associated with anxiety disorders and depression is then discussed. Subsequent consideration is given to the prevalence of these common mental health problems.

3.2.1 Defining characteristics
Anxiety is extensively studied as an emotion that is felt in response to perceived threat or uncertainty. It can be adaptive (Matthews, 1986; Öhman, et al., 2001) but debilitating when at elevated levels (Keogh, Bond & Flaxman, 2006; Mineka & Zinbarg, 2006). It is also considered a factor or trait in most models of personality (Mogg, et al., 2000a; Spinhoven, et al., 2011) that may influence the way a person views and responds to the world around them (Austin, et al., 2000; Rosenman & Rodgers, 2006). Disorders of
anxiety feature cognitive, physiological and behavioural characteristics that can be defined in the form of reliable diagnostic criteria (APA, 2013; WHO, 2005). Depression is not an emotion, although sadness is, but depression is more than just excess sadness or low mood. A set of criteria must also be present for depression to be diagnosed. Whilst both anxiety and depression can be present to a greater or lesser degree, their clinical disorders are diagnosed as syndromes rather than points on dimensions. That is, a certain set or cluster of symptoms must occur together at a certain level before a diagnosis is made. Anxiety and depressive disorders are generally explained by illness models and classified in the widely-used International Classification of Diseases and Health-Related Problems (ICD-10) (WHO, 2005) and the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (APA, 2013). Their symptom clusters are supported by empirical research and considered applicable across ‘western’ countries regardless of culture and race (Wittchen & Jacobi, 2005).

Assessment usually involves eliciting symptoms through clinical interview (e.g., mental status interview) or endorsement on self-report measures such as the Beck Anxiety inventory (BAI) (Beck, et al., 1988b) and Beck Depression Inventory-II (BDI-II) (Beck, et al., 1996b). Self-report measures allow clinicians and researchers to measure symptoms as dimensional variables. There are also certain signs of anxiety and depression that are observable to others and can contribute to the diagnosis. Classification systems do not explain the aetiology and the factors that maintain anxiety and depression. Theories such as Beck’s general cognitive model (Beck & Haigh, 2014) and disorder specific cognitive models for anxiety (Beck & Clark, 1997; Beck, Emery & Greenberg, 1985) and depression (Beck, 1967; Beck & Clark, 1988a) do provide such a framework. The cognitive models of anxiety and depression are discussed in detail in Chapter Four along with specific cognitive concepts associated with the models.

3.2.2 Common and contrasting features
Anxiety and depression often co-exist and the literature suggests that where this is the case, anxiety disorders often precede depression with the number and type of anxiety disorders increasing the risk of subsequent depression (Beesdo, et al., 2007). Their presence also increases the risk of more severe psycho-social impairment and the course
and duration of depression is affected (Erwin, Heimberg, Juster & Mindlin, 2002; Wittchen, Beesdo, Bittner & Goodwin, 2003). Anxiety and depression share some physiological (fatigue, sleep disturbance), cognitive (concentration, attention, unrealistic thinking, memory) and behavioural (avoidance) symptoms but whereas anxiety disorders involve a state of heightened unfocussed arousal, depression is related more to withdrawal and diminished activity (Beesdo, et al., 2007; Slade & Andrews, 2001). In terms of their onset, anxiety disorders usually occur somewhat earlier. Apart from generalised anxiety disorder (GAD) (particularly different from other anxiety disorders and more like depression), panic disorder and agoraphobia, the typical age of risk for developing a phobia is childhood or early adolescence (Beesdo, et al., 2007; Crome, et al., 2015; Grover, Ginsburg & Ialongo, 2005; Wittchen, et al., 2003). In contrast, major depression usually has its first onset considerably later in adolescence, early adulthood or even later in life (Wittchen, et al., 2003).

The disorders are also different in their course with that of anxiety disorders described as chronic with symptoms waxing and waning in severity and in type (Crome, et al., 2015; Ohayon, 2006). In depression, the course is commonly (especially in community cases) episodic and, at least in the first 30 years of life, chronic depression comprises a small proportion of cases (Wittchen, et al., 2003). Anxiety and depression are also associated with significant personal and societal burden (Wittchen, et al., 2005). For affective disorders, the largest proportion of health economic costs are ‘direct’ costs that relate to treatment and intervention. In contrast, the bulk of costs related to anxiety disorders are related to indirect costs such as lost productivity, disability and role impairment. This is usually attributed to their higher prevalence, earlier age of onset, more frequent chronic courses and the lower proportion of people receiving any treatment (Wittchen, et al., 2003; Wittchen, et al., 2005). Depression is associated with suicide and the need for acute care whereas anxiety disorders are often considered non-severe and the disabling effects go unrecognised. Anxiety is often recognised and treated in primary and secondary care when identified in conjunction with depression and people in treatment are often older than those found in epidemiological studies. Their co-occurrence of anxiety and depressive disorders makes diagnostic separation difficult and many clinicians don’t strictly classify with the DSM and ICD, preferring
instead to ‘lump’ anxiety and depression together (Henderson, Andrews & Hall, 2000; Wittchen, et al., 2005).

### 3.2.3 Personal and social burden

An analysis of mental disorder burden in Australian has shown that people with anxiety disorders alone reported an average of 2.1 days out of role in the previous 4 weeks whereas people with depression reported 2.7 days out of role (AIHW, 2003a; Henderson, et al., 2000; Mathers, Vos & Stevenson, 1999). If the burden of suicide and self-inflicted injury attributable to depression is included with the disability burden of depression, the total burden of depression rises to 4.9%, making it the third leading cause of burden of disease in Australia, after ischaemic heart disease and stroke. Anxiety disorders do not appear in the top 15 causes of burden of disease but depression was the leading cause of non-fatal disease burden in Australia, causing 8% of the total years lost due to disability (YLD) in 1996 (AIHW, 2003a; Mathers, et al., 1999; Slade, et al., 2001). Days out of role in the last 30 days were 6.2 for affective disorders and 4.4 for anxiety disorders (Slade, Johnston, Browne, Andrews & Whiteford, 2009).

### 3.2.4 Prevalence

Point prevalence and lifetime prevalence studies show that depression and anxiety disorders are the most common mental disorders amongst the general adult population of most western countries. A review of studies in the European Union found 12-month prevalence rates of 27% for any one mental disorder but 12% for anxiety and 9.1% for affective disorders (Wittchen, et al., 2005). Rates were similar in North America with only anxiety disorders (18.1%) significantly different to Europe’s (Kessler, Chiu, Demler & Walters, 2005b). The most recent 12-month prevalence survey in Australia confirmed anxiety disorders as the most common class of disorders with a 12-month prevalence of 14.4% and a prevalence figure of 6.2% for affective disorders. However, just one third of people (34.9%) used health services for mental health problems in the previous 12 months (AIHW, 2003a; Slade, et al., 2009). Lifetime prevalence rates are similar across North America and Europe with 28.8% for anxiety 20.8% for mood disorders and 46.4% with any disorder (Kessler, et al., 2005a). The lifetime prevalence of mental disorder in Australia is 45.5% (Slade, et al., 2009). These surveys used selected samples of the general population and conduct face-to-face or telephone
interviews but usually specifically excluded special groups such as those with an intellectual disability (Henderson, et al., 2000; Slade, et al., 2009).

3.2.5 Summary
Depression is a disorder though some of its features are dimensional but anxiety is mostly studied as an emotion and a trait, as well as a disorder. As an emotion and a trait, anxiety has significant implications for cognitive theory and along with depression its disorders are the most common mental health problems in the western world. Separately and together they are responsible for considerable burden but the impact of intellectual ability has rarely been considered in general population studies.

3.3 Ability, Anxiety and Depression
In this section of the chapter, the literature relating to the impact of ability on mental health is considered. Initially, general population studies examining the impact of intellectual ability in anxiety and depression are reviewed. Then the evidence from studies comparing typically developing children and adolescents with those who have low ability are considered. Studies of mental health problems in adults with low ability are then reviewed to establish the impact of ability on signs and symptoms.

3.3.1 Adult general population
There has been significant interest in the impact of intellectual ability on a range of health indicators in the last 10 years. For instance, large general population studies have found that higher childhood intelligence predicts better functional, subjective and physical health in adulthood (Wrulich, et al., 2013). It also predicts a lower risk for mortality, even when childhood socioeconomic status is controlled for (Wrulich, Stadler, Brunner, Keller & Martin, 2015). The impact of prior intellectual capacity on the risk of incidence and the outcomes for dementia, psychotic and mood disorders has also been studied (Barnett, Salmond, Jones & Sahakian, 2006; Koenen, et al., 2009) and more recently, its implications in the development of mental illness have been considered. The concept of ‘cognitive reserve’ refers to the way prior intellectual capacity can influence the risk for developing the illness, the expression of its symptoms as well as its outcome (Barnett, et al., 2006). The most instructive studies have been those using longitudinal methods following age cohorts (Batty, Mortensen &
Osler, 2005; Martin, et al., 2007) but methodological factors have limited the predictive capacity for mental health problems in some of these studies (Koenen, et al., 2009).

A Danish retrospective study linked psychiatric hospital admission records for middle-aged men with a single ability test conducted in primary school (Batty, et al., 2005). They found an inverse correlation between any diagnosis and ability that remained significant even when adjusting for paternal social class and birth weight. Of the studies examining anxiety disorders, Post-Traumatic Stress Disorder (PTSD) has had the greatest attention. Saltzman, Weems and Carrion (2006) reviewed the literature on the association between IQ and PTSD symptoms and found mixed results amongst studies of American war veterans. In their own cross-sectional study of children and adolescents who were selected for histories of trauma, they found that Full Scale (FSIQ) and Verbal IQ (VIQ) were correlated with the number of traumas, re-experiencing symptoms (PTSD cluster B symptoms) and functional impairment (PTSD criterion F). Performance IQ (PIQ) was only associated with functional impairment. Regression analyses showed that together, PTSD symptoms predicted FSIQ and VIQ but not PIQ and functional impairment was the single best predictor of IQ. In support of the cognitive reserve hypothesis, the authors suggest that higher levels of VIQ may serve as a pre-morbid protective factor against the development of re-experiencing symptoms (Saltzman, et al., 2006).

3.3.2 Child and adolescent general population

Studies linking childhood intellectual ability and other disorders of anxiety are scarce though (Koenen, et al., 2009). A North American retrospective study followed up members of a birth cohort with a Full Scale IQ of at least 80 that had been assessed at the age of 7. Clinical interviews at age 30 to 39 showed that a 15-point (1 SD) advantage in IQ was associated with a 50% reduction in risk of lifetime GAD even after adjusting for socio-economic status and parental mental health (Martin, et al., 2007). The most comprehensive study to date though, followed up a sample of 1,037 from a city in New Zealand for a full range of anxiety disorders at 32 (Koenen, et al., 2009). The sample had been assessed on the WISC-R at ages 7, 9 and 11 and then with the Diagnostic Interview Schedule (DIS) (Robins, Cottler, Bucholz & Compton, 1995) at ages 18, 21, 26 and 32. Lower childhood IQ (normally distributed between 50 and 145)
predicted increased risk of depression in adulthood as well as more persistent depression. It also predicted any anxiety disorder. There was no association between childhood IQ and simple phobia, panic disorder or OCD but lower IQ was a risk factor for GAD and social phobia as well as predicting increased risk of PTSD and agoraphobia. The associations between childhood IQ and adult mental disorder were not confounded by gender, childhood socioeconomic status, low birth weight, perinatal insults or childhood mistreatment. Childhood IQ was not associated with substance abuse or dependence at age 32 (Koenen, et al., 2009). The manner in which childhood IQ is associated with adult mental illness is still a matter of conjecture. Apart from marking possible biological vulnerability it may be that the association is through the psychosocial stress associated with curtailed adaptive skills, reduced education and work opportunities and unhelpful environment. Where low ability creates support needs that go unnoticed or unmet, particularly in the case of an ID, psychosocial stress is likely to be increased (Koenen, et al., 2009). If this is the case, then accurate identification of need and provision of support may ameliorate adult mental health problems in adults with low ability. Nevertheless, it appears that well-designed prospective research does implicate ability with the likelihood of mental health problems in adulthood.

Another approach to ascertaining the impact of ability on mental health has been to compare children and adolescents with low ability to those with typical development on measures of fear and anxiety. Age-related patterns of normal fear in typical development are fairly well documented (Gullone, 2000; Gullone & King, 1997; King, et al., 1989). There has also been some investigation of this pattern in samples of children and adolescents with ID (Gullone, 1996; Gullone, Cummins & King, 1995; King, Ollendick, Gullone & Cummins, 1990) as well as comparison of the two groups (Guarnaccia & Weiss, 1974; Gullone, 1996; Gullone, et al., 1995; Sternlicht, 1979). The earliest studies assessed the fears of children living with their families (Guarnaccia, et al., 1974) and in institutions (Sternlicht, 1979) and found the patterns of fears were similar to those of typically developing children though consistent with an earlier developmental stage than their chronological age would suggest.
More recent studies found similar results. Significantly higher state but not trait anxiety was found in a group of children and adolescents with mild and moderate ID when compared to a group with typical development. All normal fears were significantly higher, except for death and danger, and negative affect was inversely correlated with adaptive behaviour (Gullone, et al., 1995). In a further review of the literature, Gullone (1996) concluded that age has a less significant impact on the content and intensity of fears in youth with an ID. She proposed that the correlation between cognitive development and changes in normal fears might be less evident because cognitive development has slowed or plateaued. Thus, the fears distinguishing the two groups are those occurring in the typically developing groups at a younger age continuing at a more intense level. Authors note that differences in care and educational environments were not controlled in the early or recent studies (Gullone, 1996). Parenting and care styles have a powerful impact on children’s fears and development of anxiety disorders (Barrett, Rapee & Dadds, 1996) and it has been common for people with ID to be overprotected and thus not experience natural or assisted extinction of fears (Gullone, 1996; Gullone, et al., 1995). Interventions in educational and care settings may be helpful during the developmental period (King, Muris, Ollendick & Gullone, 2005; King, et al., 1990) but amongst some people with low ability, patterns of fear and anxiety in the developmental period may predispose them toward mental health problems in adulthood.

Whilst it is rare for general population studies to consider the impact of ability there is prospective and retrospective evidence that low ability is associated with enhanced vulnerability to depression and most anxiety disorders (Koenen, et al., 2009; Martin, et al., 2007). None of these studies have entirely controlled for the quality of care in the environment though. Similarly, the scope for environmental and individual interventions to ameliorate any psychosocial vulnerability and enhance resilience remains untested. Amongst studies using samples with low ability, some have considered the impact of ability on symptoms gathered from respondents. Others have studied the impact of ability on the signs of mental health problems observed by informants.
3.3.3 Adults with low ability

Assessment of the signs of mental health problems through informant measures is more likely where greater disability hampers the use of self-report and interview measures. Informant measures can be useful in: screening prior to a clinical interview (Cooper, Smiley, Morrison, Williamson & Allan, 2007); helping carers monitor severe mental illness (Edwards, 2002); and generating case-level indications of psychopathology in a number of areas with a single, multi-scale instrument (Matson, Kazdin & Senatore, 1984; Moss, et al., 1998; Prosser, et al., 1998b). However, concordance between informant and respondent interviews is mixed (Moss, Prosser, Ibbotson & Goldberg, 1996b). Furthermore, it is more difficult to identify psychopathology amongst adults with severe and profound ID so it is hard to know whether it is more prevalent or not (Matson, Smiroldo, Hamilton & Baglio, 1997; Moss, et al., 1996b).

The view that adults with the least ability are at the greatest risk of mental ill-health is widespread (Kerker, Owens, Zigler & Horwitz, 2004; Matson & Sevin, 1994; Matson, et al., 1997) but the empirical evidence for a relationship with ability is limited and mixed when informant measures are used. Iverson and Fox (1989) used the Psychopathology Inventory for Mentally Retarded Adults - Informant (PIMRA-I) with a total sample of 165 divided into three groups (mild, moderate, severe and profound) after a file review. Participants were unselected for mental disorders but significantly more cases with signs of mental ill-health were found as the categories of ability ascended [χ², (2, n=156)=9.7, p<.008]. No other variables, including living environment were related. On the other hand, Helsel and Matson (1988) used the PIMRA-I with groups who had borderline, mild, moderate and severe ID. They found that psychopathology did not correlate with dimensional receptive language on the Peabody Picture Vocabulary Test (Dunn, et al., 1981) measured proximal to the PIMRA rating. Helsel and Matson (1988) mention that ‘a number’ of their participants had ‘an emotional disorder’ but do not specify what these were and what proportion of the sample they comprised at the point of assessment. Kazdin, Matson and Senatore (1983) used the PIMRA-I with a sample of 110 adults in the same ability groupings as Helsel and Matson (1988). Despite 67.3% of the sample having a ‘psychiatric diagnosis’, which for the majority was schizophrenia, there was no relationship between IQ and the PIMRA-I.
In a Norwegian study of 96 adults receiving at least minimum care, participants were unselected for mental health problems. They were assigned to similar-sized groups according to estimated IQ (moderate, severe and profound ID) by their carers. A single psychologist then administered the Mini PAS-ADD using carers as informants (Holden & Gitlesen, 2004). They found that the total number of signs as well as the number of cases to meet threshold increased as ability increased. That is, the Mini PAS-ADD signs were more frequent in the moderate group than in both the severe and profound groups. These group differences were strongest for depression and anxiety which Holden and Gitlesen (2004) state was significant at \( p<.01 \) using a chi-square test but they did not publish the calculation. Psychosis was the only other Mini PAS-ADD disorder where the difference was significant, at \( p<.05 \). They argue that this is evidence of higher prevalence in the moderate group rather than a difficulty in detecting signs in the severe and profound groups. Evidence for a relationship between ability and signs of anxiety and depression is clearly mixed but it may be that the higher the quality of information gathered the greater the chance of obtaining a result. Using the Mini PAS-ADD as an interview administered by a clinician may have facilitated this.

One of the difficulties lies with the fact that ability is not always used as a variable in studies using samples of adults with ID (Yoo, Valdovinos & Schroeder, 2012). When it is, studies will often use file records of dimensional or categorical ability rather than objectively establish ability proximal to the research task (Buckles, Luckasson & Keefe, 2013; Glenn, et al., 2003; Yoo, et al., 2012). Because intellectual disability is almost always diagnosed in the developmental years, that is when ability is assessed. Given the resources involved, most large studies using informant measures do not assess ability (Hatton & Taylor, 2008; Taylor, Hatton, Dixon & Douglas, 2004a) although Allen, Lowe, Mathews, and Anness (2012) reported a small correlation \( (r=.09, \ p<.05) \) between total score on the PAS-ADD Checklist and the total score on the Adaptive Behaviour Scale 2nd Edition (ABS-RC:2) (Nihira, et al., 1993) in a large sample \( (n=707) \) of adults selected for challenging behaviours. There are no studies of unselected community-based samples that assessed signs of mental health problems and made an objective, proximal measure of ability.
Studies of symptoms amongst adults with low ability have considered the impact of ability, either as a categorical or dimensional variable and most have focused on depression. Benson and Ivins (1992) found that, the category of ID was not related to the frequency of symptoms on a self-report measure of depression in a sample of adults categorised with borderline, mild, moderate and severe ID. Where ability has been measured dimensionally, the results are mixed. Helsel and Matson (1988) found that receptive language was not correlated with symptoms of depression in a sample with groups who had borderline, mild, moderate and severe ID. Their symptom measures included the Zung Depression Scale (ZDS) (Zung, 1965) and a shortened form of the Beck Depression Inventory (BDI short form) (Beck, Ward, Mendelson, Mock & Erbaugh, 1961) both modified for a previous study (Kazdin, et al., 1983). The sample for Helsel and Matson’s (1988) study was drawn from a variety of settings but the proportion of participants with an existing mental disorder diagnoses was not stated. Dagnan and Sandhu (1999) also found that the ZDS was not related to dimensional ability using the British Picture Vocabulary Scale-Short Form (BPVS-SF) (Dunn, et al., 1982a) amongst 43 adults with ID recruited from day activity centres. On the other hand, Kazdin et al. (1983) used a sample with the same levels of disability as Helsel and Matson (1988) but half of the sample lived in the community and half in an institution. Furthermore, 67% had existing diagnoses of mental disorder with the majority being schizophrenia. Medium-sized negative correlations were found between IQ and both the modified ZDS ($r=-.47, p<.001$) and BDI short form ($r=-.42, p<.001$).

Two other studies found negative relationships between symptoms of depression and ability. In a sample of 73 adults with moderate to borderline ID, Esbenson and Benson (2005) found small-sized negative correlations between receptive language raw score on the Peabody Picture Vocabulary Tests-III (PPVT-III) (Dunn, et al., 1997a) and symptoms on the Self-Report Depression Questionnaire (SRDQ) (Reynolds & Baker, 1988) ($r=-.24, p<.05$) as well as cognitions on the Automatic Thoughts Questionnaire (ATQ) (Hollon & Kendall, 1980) ($r=-.27, p<.05$). Although adults with schizophrenia were excluded from their sample, 45% of the 73 had an existing mood disorder diagnosis, mostly depression. Amongst 84 adults with mild ID, Mileviciute and Hartley (2015) found a small to medium-sized negative correlation between IQ and the affective items on the SRDQ ($r=-.31, p<.05$) and a small negative correlation with the affective items.
items on the self-report Glasgow Depression Scale (GDS) (Cuthill, Espie & Cooper, 2003) ($r=-.28$, $p<.05$). The cognitive and somatic items from these scales were not correlated with IQ and neither were items from any of the three subscales on the GDS informant supplement (CGDS). There were 35.7% of this sample that had existing diagnoses and current symptoms of depression. Of those not meeting criteria for a depressive disorder, 34% had a non-affective mental disorder. These negative relationships between ability and symptoms of depression are not strong and probably enhanced by the presence of clinical cases in the samples. The direction of the correlation raises the issue of whether symptoms are more prevalent as ability diminishes or it is just more difficult to detect due to communication difficulties. Existing data are not conclusive on this as Benson and Ivins (1992) as well as Helsel and Matson (1988) included ability to the severe level without finding a correlation yet Kazdin et al. (1983) had a similar sample and found the strongest relationship of any study examining ability and symptoms.

Despite a number of studies testing the relationship between symptoms of depression and ability, only one used the most common symptom measure in the general population, the BDI. More surprising though is the almost complete lack of research interest in the relationship between symptoms of anxiety and ability in the subpopulation with LA despite the evidence from general population studies. No studies could be found that used the BAI though a Dutch study used a translation of the GAS-ID (Hermans, Wieland, Jelluma, Van der Pas & Evenhuis, 2013) with a sample of adults over 50 years ($n=195$). Category of ability was used (borderline, moderate and mild ID) but this was determined by file review with Hermans et al (2013) reporting no correlation with scores on the GAS-ID though they did not publish the calculation.

Studies using structured interviews have also examined the relationship between symptom frequency and ability. Patel, Goldberg and Moss (1993) found that case detection using the PAS-ADD increased with respondent IQ when either the informant or respondent was used and Moss (1997) found small correlations between IQ and anxiety ($r=.22$, $p<.05$), depressive ($r=.22$, $p<.05$), and total symptoms ($r=.22$, $p<.05$) but not with psychotic symptoms. They suggest that detection becomes more difficult with diminishing ability and remains a challenge for diagnostic instruments and classification.
systems. This is especially so with complex diagnoses involving psychosis where an individual’s symptoms rather than just signs must definitely be present (Moss, Prosser & Goldberg, 1996a; Moss, et al., 1997c). In the large Scottish study using the Psychiatric Present State – Learning Disabilities (PPS-LD) (Cooper, 1997), Cooper (Cooper, et al., 2007; Cooper, et al., 2007) found higher rates of any kind of mental ill-health in their group with profound ID than in the other levels of their sample (Cooper, et al., 2007). However, they included problem behaviours, autism, pica and Attention Deficit Hyperactivity Disorder (ADHD) in their diagnoses. Comparisons across ability categories showed that it was in fact these latter diagnoses that were more prevalent rather than anxiety, depression and psychotic illness. They concurred with Patel et al. (1993) and Moss et al. (1996b) on the difficulty of diagnosing psychosis in people with ability at this level (Cooper, et al., 2007). In the separate analyses of anxiety and depression from this sample across mild, moderate, severe and profound groups, ability was related to the likelihood of an anxiety diagnosis \( \chi^2 = 8.78, p = .03 \) (Reid, Smiley & Cooper, 2011) but not of depression (Cooper, et al., 2007).

Amongst studies of adults with ID, the evidence for a relationship between ability and anxiety as well as depression is equivocal. Major review papers also find it difficult to distil the impact of variables such as the type and level of support or residential placement, the type of mental illness and the levels of disability included in studies (Buckles, et al., 2013; Yoo, et al., 2012). The most comprehensive of these concluded that sampling has the biggest influence with most studies based on administrative samples reporting higher rates of mental health problems amongst more able participants and those using population-based samples finding the opposite (Kerker, et al., 2004).

**3.3.4 Summary**

Large longitudinal studies show inverse relationships between ability measured in childhood and psychiatric hospital admission, a full range of anxiety disorders and depression in adulthood. Normal fears and phobias are more prevalent amongst children and adolescents with ID but it is not known whether this predicts later anxiety disorders and interventions have not been documented. Whilst the relationship between ability and the signs and symptoms of anxiety as well as depression has been examined, studies
have been beset by methodological problems such that some studies show positive correlations and others, negative correlations between ability and mental health problems. As yet there is no study measuring signs as well as symptoms of anxiety and depression in a community sample of adults with the full low ability spectrum that also objectively measures ability proximal to the research tasks.

3.4 Assessment
In this section, methods for assessing the signs and symptoms of anxiety as well as depression amongst adults with low ability are considered. Firstly, the challenges involved in assessment of mental health across the low-ability spectrum are discussed. Then the informant-measures of signs are reviewed. Finally, measures that elicit symptoms of anxiety and depression from respondents are considered.

3.4.1 Challenges in assessment
There are many challenges in assessing mental health problems amongst adults with LA. It can be difficult for people with ID to conceptualise and express their subjective experience using language-borne concepts (Finlay, et al., 2001; Matson, et al., 1997) and the probability of case detection appears to decrease with ability even on the most comprehensive instruments (Costello, et al., 1997; Moss, et al., 1997c). Written or spoken formats need simplifying when used in interviews (Moss, et al., 1996b; Prosser & Bromley, 1998a) and practised response patterns can obscure a person’s thoughts and feelings (Finlay, et al., 2001, 2002; Heal, et al., 1995). Although behaviours can be signs of ill-health (Horovitz, et al., 2011; Matson, et al., 1997), challenging behaviour does not necessarily signify mental illness (Allen, 2008; Moss, et al., 2000; Pruijssers, van Meijel, Maaskant, Nijssen & van Achterberg, 2014). Adults with ID usually rely on others to seek help for them (Campbell & Malone, 1991) and when assessment does take place a reliable informant who knows the person well is often required (Moss, Emerson, Bouras & Holland, 1997a; Sturmey, 1999). The quality of information provided by an informant is also important (Mileviciute, et al., 2015) and whilst carers have good day-to-day knowledge (Cummins, 2005), they may not be familiar with the clinical frameworks involved in assessment and diagnosis (Moss, et al., 1998). Informants are more likely to notice external signs than the internal symptoms
experienced by a person with ID (Harper & Wadsworth, 1993; Matson, et al., 1997; Moss, et al., 1996b) and may have conflicting roles (Finlay, et al., 2012).

Clinicians often find the task of assessing adults with LA challenging (Prosser, et al., 1998a). Few have adequate training or experience and attitudes can affect the prospect of a diagnosis. Diagnostic overshadowing has been found amongst psychologists with (Reiss, et al., 1983) and without (Reiss, et al., 1982b) experience as well as their students (Alford, et al., 1984) and support staff in accommodation services (Robey, et al., 2006). Anxiety disorders in particular are under-diagnosed by clinicians (Matson, et al., 1997; Patel, et al., 1993; Raghavan, 1998; Reid, et al., 2011; Sovner & Hurley, 1983) and under-recognised by services (Moss, et al., 1997c; Reid, et al., 2011). Confusion also occurs between service systems for ID and Mental Health over clinical approaches to assessment (Edelstein & Glenwick, 2001; Edwards, 2002; Sturmey, Lindsay & Didden, 2007). In addition, there is a dearth of valid and reliable assessment instruments for assessing anxiety and depression in theoretical and clinical research (Finlay, et al., 2001; Sturmey, et al., 2007). The process of assessment and diagnosis usually takes longer and there is some suggestion that ICD-10 and DSM-IV may under-identify mental disorders in this population (Cooper, et al., 2007).

3.4.2 Informant measures

One way of addressing the challenges of assessment is to collect informant data from a carer who knows the person well. The three main ways this occurs are through a structured diagnostic interview producing diagnostic-level certainty, an unstructured interview producing a case-level indication and as an alternative or additional method, a screening checklist that focuses on problem-level signs. There are two structured interviews that can produce comprehensive diagnoses and each can use data from an informant(s) as well as the respondent. The Present Psychiatric State for Adults with Learning Disabilities (PPS-LD), (Cooper, 1997) produces diagnoses in DSM-IV-TR (APA, 2000) and ICD-10 as well as a classification system specifically developed for use with people with moderate to profound disability - the Diagnostic Criteria for Psychiatric Disorders for use with Adults with Learning Disorders (DC-LD) (Cooper, et al., 2007; RCP, 2001). The interview can be completed with the respondent alone, with the informant and respondent together or with the informant alone. It produces
diagnoses of mood and anxiety disorders, and adjusts for intellectual level in anxiety disorders by removing the requirement for interviewees to understand that their fear is excessive or unreasonable (insight) (Bailey & Andrews, 2003). Data has been reported on all anxiety disorders except specific phobias (Cooper, et al., 2007).

The Psychiatric Assessment Schedule for Adults with Developmental Disability 10 (PAS-ADD 10) interview is based on the Schedules for Clinical Assessment in Neuropsychiatry (SCAN) (Costello, et al., 1997). The respondent version has good validity for psychotic and depressive disorders when compared with opinions of expert psychiatrists (Moss, et al., 1997c) and can be used on its own or alongside the informant version (Moss, et al., 1996b). It does not cover post-traumatic stress disorder (PTSD) or obsessive compulsive disorder (OCD) and the authors suggest that in relation to panic and phobias in particular, the two versions should be used together (Costello, et al., 1997; Moss, et al., 1996b). The PAS-ADD 10 and PPS-LD are anchored to accepted systems of classification and their validity and reliability is well established. As well as providing a diagnostic-level of certainty they differentiate between the disorders of anxiety so they are useful in the clinical setting and in prevalence research following screening with another instrument (Cooper, et al., 2007; Deb, et al., 2001). Despite this, they require a high level of training and time to administer. Furthermore, they do not generate dimensional scores and hence are limited in their application to cognitive research.

Unstructured interviews have been constructed specifically for collecting informant data in the sub-population with ID. These typically possess multiple scales and establish a case-level indication of psychopathology that warrants referral for diagnostic clarification where scores are over a certain threshold. The most comprehensive of these multi-scale measures incorporate anxiety and depression subscales amongst a total of: eight in the Psychopathology Instrument for Mentally Retarded Adults (PIMRA) (Matson, et al., 1984), seven in the Mini PAS-ADD (Moss, et al., 2002; Prosser, et al., 1998b); 13 in the Assessment for Dual Disability (ADD) (Matson, 1998); 13 in the Diagnostic Assessment for the Severely Handicapped-II (DASH-II) (Matson, 1995; Sturmey, Matson & Lott, 2004); and five in the Anxiety, Depression And Mood Scale (ADAMS) (Esbenson, Rojahn, Aman & Ruedrich, 2003). The most widely used of
these are the PIMRA and the Mini PAS-ADD. A large study using the PIMRA found its factors to be sound and detection of anxiety and depression valid against the clinical opinion of psychologists (Balboni, Battagliese & Pedrabissi, 2000; Masi, et al., 2002). The Mini PAS-ADD has also demonstrated good reliability and validity against the clinical opinion of psychiatrists (Deb, et al., 2001; Prosser, et al., 1998b) and the Brief Symptom Inventory (Beail, Mitchell, Vlissides & Jackson, 2015). It has been used to establish the prevalence of anxiety and depression (Holden, et al., 2004) as well as pre-treatment symptom levels prior to cognitive therapy (Hassiotis, et al., 2013) and symptoms at entry to a service (Hall, Parkes, Samuels & Hassiotis, 2006). It was also used to assess the mental health knowledge of support staff (Quigley, Murray, McKenzie & Elliot, 2001). However, these multi-scale schedules are limited in their reliability at the scale level (Beail, et al., 2015; Myrbakk & von Tetzchner, 2008), especially on the anxiety scales (Balboni, et al., 2000; Prosser, et al., 1998b), and are most reliable for indicating a case-level of general psychopathology. They have not been widely used in prevalence studies though and may not provide superior data to screening checklists which are less time demanding although they cover a more restricted range of disorders.

Screening checklists are the easiest and most time-efficient way of establishing problem-level signs of mental ill health. Their brevity minimises intrusion into the lives of participants and logistical difficulties involved in clinical interviews. The most widely used are the multi-scale PAS-ADD Checklist (Moss, et al., 1998), Developmental Behaviour Checklist (DBC) (Einfeld & Tonge, 2002), Aberrant Behaviour Checklist (ABC) and Reiss Screen for Maladaptive Behaviour (RSMB) (Reiss, 1988; Sturmey, Jamieson, Burcham, Shaw & Bertman, 1996). The ABC and RSMB are longstanding instruments that, like the DBC, contain items on challenging behaviour as well as signs of mental health problems. The DBC-A (Mohr, Tonge & Einfeld, 2005) is a recent, adult version of a checklist originally developed for use with children and adolescents (Einfeld, et al., 2002). There is also an informant version of the single-scale Glasgow Depression Scale (Cuthill, et al., 2003) but its companion scale—the GAS-ID (Mindham & Espie, 2003) does not have an informant version. The PAS-ADD Checklist is derived from items contained in the PAS-ADD 10 (Costello, et al., 1997). There were 29 items in the first (Moss, et al., 1998) and 25 in the revised version
organised into five subscales (including anxiety and depression) and three scales (organic, psychotic and the affective/neurotic) that have threshold scores. It also has a life events section that records significant events in the last 12 months. The PAS-ADD Checklist has been widely used as a pre-interview screening schedule of common mental health problems (Cooper, et al., 2007). It has also been used in studies of challenging behaviour and mental health problems (Allen, et al., 2012; Moss, et al., 2000) as well as studies of the impact of life events on mental ill-health (Owen, et al., 2004; Tsakanikos, Bouras, Costello & Holt, 2007). Its psychometric properties have also been adequately examined (Hatton, et al., 2008; Moss, et al., 1998; Sturmey, Newton, Cowley, Bouras & Holt, 2005).

There are limitations to using checklists though. The informant screening checklists reviewed have all been developed for use with people who have ID and consequently have not been validated with adults in the upper range of LA. They tend to be overly inclusive and thus sacrifice some specificity for sensitivity to possible positives (Moss, et al., 1998; Sturmey, et al., 2005) and they do not generate case-level or diagnostic-level certainty. Some, like the ABC and DBC-A are not aligned to current classification systems (Mohr, et al., 2005; Sturmey, et al., 1996) and many have limited data on reliability and validity in regard to signs of anxiety and depression (Charlot, Deutsch, Hunt, Fletcher & McIlvane, 2007; Esbenson, et al., 2003; Mindham, et al., 2003; Tenneij & Koot, 2007). Most contain challenging behaviour items as well as signs of mental ill-health (Aman & Singh, 1985; Esbenson, et al., 2003; Mohr, et al., 2005; Moss, et al., 1998; Reiss, 1988) and they do not distinguish between state and trait anxiety (Mindham, et al., 2003) or between anxiety disorders (Cooper, et al., 2007). Whilst the PAS-ADD Checklist suffers the limitations of other checklists it does have reasonable internal consistency (Moss, et al., 1998; Sturmey, et al., 2005), good inter-rater agreement on threshold cases (Moss, et al., 1998) as well as adequate sensitivity and specificity (Sturmey, et al., 2005). It also has an established factor structure for anxiety and depression (Hatton, et al., 2008) and norms by gender, age band and residential setting.
3.4.3 Respondent measures

A second method of dealing with assessment barriers amongst adults with low ability is to tailor respondent measures to enhance the reporting of symptoms across the spectrum of LA. This can involve constructing respondent measures specifically for the population or adjusting existing ones used with the general population. Both the PAS-ADD 10 respondent version (Costello, et al., 1997; Moss, et al., 1997) and the PPS-LD (Cooper, 1997), used in conjunction with the DC-LD (RCP, 2001) are comprehensive structured interviews that have been constructed for use with participants across the spectrum of LA (Cooper, 1997; Moss, et al., 1993b). These facilitate DSM-IV-TR or ICD-10 diagnoses for adults at all levels of disability and where necessary can be supplemented by informant data. They still differ though in comparison to the main structured comprehensive interviews used in the general population clinical and prevalence studies, such as the Anxiety Disorders Interview Schedule (ADIS-IV) (Brown, Campbell, Lehman, Grisham & Mancill, 2001; Brown, Di Nardo, Lehman & Campbell, 2001), the Composite International Diagnostic Interview (CIDI) (Komiti, et al., 2001; Spinhowen, Drost, de Rooij, van Hemert & Penninx, 2014) and the Structured Clinical Interview for DSM-IV (First, Spitzer, Gibbon & Williams, 1996). The PPS-LD and PAS-ADD 10 provide the highest level of diagnostic certainty amongst respondent instruments as well as differentiation of anxiety disorders. However: they may cover more diagnostic categories than necessary for some research; do not generate the dimensional scores required for investigations into cognitive theory; and organising as well as administering these interviews can be time consuming.

Existing self-report measures used with adults in the general population have also been modified for use with adults who have low ability. Their modification and administration poses similar challenges to those faced by the clinical interviewer as most self-report measures are read to participants. Finlay and Lyons (2001) have articulated some of the challenges in areas such as question content, question phrasing and response formats. In relation to question content, consideration should be given to a person’s capacity to respond to: quantitative judgments and time concepts; direct comparison of internal states or with other persons; abstract concepts and generalised judgments; socially reflexive questions requiring empathy or perspective taking; content that is unfamiliar; and content that may be sensitive for the person in some way. In
terms of question phrasing, the specific areas of concern are: negatively-worded questions and modifiers; subject-object confusion; passive phrasing; and the presentation of examples. In terms of response format and answer scoring: acquiescence; leading questions; multiple-choice formats; open-ended questions; and answers that appear irrelevant, can present difficulties (Finlay, et al., 2012; Finlay, et al., 2001, 2002). The use of validity procedures can help manage acquiescence (Finlay, et al., 2002) and other response biases in interviews (Heal, et al., 1995).

Few self-report measures for depression and anxiety have been used consistently in research with adults in the low ability spectrum. A modified version of the Zung Depression Scale (ZDS) (Zung, 1965) was first used by Kazdin et al. (1983) in a sample \( (n=110) \) borderline, mild, moderate and severe taken from an outpatient mental health clinic and psychiatric hospital. The ZDS has also been used in unmodified form with a non-clinical sample from the general community \( [n=21] \) with mild intellectual disability and no validity problems were reported (Prout & Schaefer, 1985). Helsel and Matson (1988) \( (n=99) \) borderline, mild, moderate and severe used the modified ZDS and Lindsay, Michie, Baty, Smith and Miller (1994) modified the Zung Anxiety Scale (ZAS) (Zung, 1971), then used both with two cases of cognitive therapy (Lindsay, Howells & Pitcaithly, 1993) and a non-clinical sample of 67 adults (mild and moderate ID) being prepared for de-institutionalisation (Lindsay, et al., 1994). Lindsay et al (1994) found convergence between the ZDS and other measures of depressive symptoms as well as between the ZAS and other measures of anxiety. Correlations were also found between anxiety and depression and a measure of neuroticism (Lindsay, et al., 1994). Masi et al. (2002) used both the ZDS and ZAS with 50 adults (mild and moderate ID) referred for psychiatric screening (Masi, et al., 2002). Powell (2003) compared the administration and psychometric properties of the ZDS and Beck Depression Inventory (BDI-II) in a sample of 120 adults in the mild, moderate and severe ranges of ID. Powell (2003) found that both inventories were easily administered, and positively correlated, but the BDI-II had superior psychometric features. However, internal reliability of the ZDS has been reported as poor in a range of ID and non-disabled groups (Payne, et al., 2004).
The ZDS and BDI have also been used in their unmodified form with a non-clinical sample of adults with mild ID ($n=21$) living in the general community and no validity problems were reported for either instrument (Prout, et al., 1985). The Beck Anxiety Inventory (BAI) (Beck, et al., 1988b) and BDI-II have been widely used in general population research to establish symptom prevalence (Crawford, Cayley, Lovibond, Wilson & Hartley, 2011), test aspects of cognitive models of anxiety and depression (Clark, Beck & Brown, 1989; Greenberg & Beck, 1989) and establish symptom cut-off levels for treatment referral (Arnau, Meagher, Norris & Bramson, 2001). Versions of the Beck Depression Inventory (Beck, et al., 1996b; Beck, et al., 1961) have also been used in samples with low ability. A shortened form of the BDI with 13 questions was used in a number of studies (Helsel, et al., 1988; Kazdin, et al., 1983; Matson, Senatore, Kazdin & Helsel, 1983b; Nezu, et al., 1995) using samples with ability ranging from borderline to severe ID. The BDI-II has been used unadapted (Ailey, 2009; McGillivray & Kershaw, 2015) in studies that excluded people with ability below moderately disabled and has been used with item 21 deleted but the original wording retained for the remaining 20 items (McGillivray & Kershaw, 2013; McGillivray & McCabe, 2007; McGillivray, McCabe & Kershaw, 2008). The unadapted BDI-II shows good specificity and sensitivity against the PAS-ADD 10 (Ailey, 2009) when used with adults who had mild and moderate ID.

The BAI has had much less use in samples with low ability and this is consistent with the neglect of anxiety research with this sub-population. Lindsay, Neilson and Lawrenson (1997) have illustrated its use with two men who had mild ID (BAI scores = 50 & 40) and with a case from a cohort of 15 clients who had also been assessed but whose ability level was not reported (Lindsay, 1999). It was used in an experimental investigation of cognitive-content specificity for anxiety ($n=46$ with moderate, mild or borderline ID) by Glenn et al. (2003) but was not paired with the BDI-II. The youth versions of the BAI and BDI-II (Beck, Beck & Jolly, 2005) were used by Hassiotis (2013) in a randomised controlled trial of cognitive-behavioural therapy with a sample of adults ($n=32$) who had mild and moderate ID. The BAI was used to determine the criterion related validity of the GAS-ID (Mindham, et al., 2003) though the sample completing the two instruments was small ($n=19$). Spearman’s correlations were large
in analyses with \((\rho = .72, p < .001)\) and without \((\rho = .75, p < .001)\) overlapping items, suggesting reasonable validity.

The BAI and BDI-II have been used together with some modification of questions to simplify language, with administration by interview and scoring with visual aides (Lindsay & Lees, 2003). Lindsay and Lees (2003) used these modified forms with 16 sex offenders with mild ID and borderline functioning who were matched with the same number of non-offenders who had similar levels of functioning. They found high test-retest correlations for both instruments and significantly lower levels of anxiety and depression than in controls. A larger study using a sample of 108 drawn from a specialist clinic investigated the empirical qualities of the two modified inventories (Lindsay, et al., 2007b). Cases included referrals for treatment of depression \((n = 17)\), and anxiety \((n = 28)\), offending males, including sex offenders \((n = 64)\) as well as other male referrals \((n = 16)\). The resultant factor analysis found the structure was similar to that in the general population (Lindsay, et al., 2007b). The BAI and BDI-II are commonly used in prevalence research (Crawford, et al., 2011) and investigations of cognitive models (Greenberg, et al., 1989; Jolly, et al., 1994a) in the general population. In their modified forms, the BAI and BDI-II have the most comprehensive validity and reliability data of symptom measures for adults with ID and their factor structures have been replicated in this subpopulation (Lindsay, et al., 2007b). The simplified language of the modified versions may lend them to use with adults who have severe and profound ID and whilst not intended as a norm sample, Lindsay and Skene’s (2007) validity study also provides mean scores for their group referred with clinical anxiety (BAI: 29.41 - BDI-II: 16.17) and group referred with clinical depression (BDI-II: 31.84 – BAI: 22.42).

### 3.5 Prevalence of anxiety and depression

In this section, the prevalence of anxiety and depression in the sub-population with low ability is considered. Firstly, an overview of prevalence studies, their shortcomings and general findings is provided. Secondly, the available evidence from informant screening checklists is discussed before the data on symptoms of depression and anxiety gathered with respondent measures is outlined. A summary follows.
3.5.1 Overview

The idea that people can suffer emotional problems regardless of their ability is relatively recent. Whilst cases of people with ID with psychotic illness and anxiety or depression (Feldman, 1946) were reported prior to the 1960’s and 1970’s, it was rare (Sarason, 1953). The dichotomous nature of the institutional service system meant people were seen as either psychiatrically ill or mental defective (Feldman, 1946; McCarver, et al., 1983). With the diagnosis of ID made in the developmental years it was generally seen as the sole explanation of a person’s difficulties throughout life. Even with the burgeoning study of ID in North America during this time, the main focus was on cognitive function and methods of training or education (Ellis, 1963a, 1969; Leland, 1969). Publications focussed on proving the existence of mental illness in the sub-population (Gardner, 1967; Menolascino, 1965; Szymanski, 1977) and the need for suitable community-based mental health services (Eaton & Menolascino, 1982; Reiss, Levitan & McNally, 1982a) rather than its epidemiology. The systematic study of severe mood disorders (Sovner, et al., 1983), anxiety (Chiodo & Maddux, 1985; Jackson, 1983; Lindsay, Baty, Michie & Richardson, 1989; Matson, 1981) along with depression and its cognitive correlates (Benson, et al., 1985; Matson, 1983; Matson, et al., 1983b) had its origins in the 1980’s. The concept of diagnostic overshadowing (Reiss, et al., 1982b) gave a name to the phenomena of diminishing a person’s emotional experience just by assigning a label of ID. It helped explain the reluctance of professionals (Reiss, et al., 1982b) and those in training (Alford, et al., 1984), regardless of experience (Reiss, et al., 1983) to acknowledge the existence of mental health problems amongst people with ID. These attitudes still exist amongst carers, professionals and administrators more than 20 years after the original findings (Robey, et al., 2006).

There have been many attempts at establishing the prevalence of mental disorders amongst adults with LA but early studies had significant shortcomings. Reviews of early prevalence studies show extensive use of convenience or administrative sampling (Buckles, et al., 2013) and significant diversity in definitions of mental disorders and diagnostic methods (Kerker, et al., 2004; Whitaker & Read, 2006). Confusion between problem-level symptoms and case-level disorder was common and the inconsistent inclusion of so-called ‘behaviour disorders’ further confused results (Campbell, et al.,
The measurement or classification of ability is often unclear (Whitaker, et al., 2006; Yoo, et al., 2012) and some studies merely reviewed files or records to establish diagnosis (Eaton, et al., 1982; Jacobson, 1990). There is also debate about the linkage between challenging behaviour and mental health problems. Challenging behaviours commonly occur in the subpopulation with ID (Allen, 2008; Emerson & Einfeld, 2011) and the rates are higher amongst people with more severe disability (Cooper, et al., 2007; Moss, et al., 2000). Challenging behaviours can occur alongside mental health problems (Moss, et al., 2000; Pruijsers, et al., 2014) but some studies classify them as psychopathology (Cooper, et al., 2007) although some of the behaviours are related to other conditions such as the autism spectrum disorders (ASDs) (Hemmings, Gravestock, Pickard & Bouras, 2006; Murphy, 2005). They are not equivalents for depression (Sturmey, Laud, Cooper, Matson & Fodstad, 2010; Tsiouris, Mann, Patti & Sturmey, 2003) although irritability and aggression may be correlated with depression (Hemmings, et al., 2006). Self-injurious challenging behaviours in particular appear to be related to anxiety (Cooper, et al., 2007; Emerson, 2001; Matson, et al., 1997; Moss, et al., 2000; Murphy, 2005; Pruijsers, et al., 2014) though.

Whilst depression has been fairly extensively studied, anxiety was either not included (Corbett, 1979; Jacobson, 1990; Lund, 1985; Raghavan, 1998) or the classification system was confusing (Farmer, Rohde & Sacks, 1993; Whitaker, et al., 2006). Of these early studies only one gives a figure (5.2 %) for a differentiated group of anxiety disorders (Gostason, 1985; Whitaker, et al., 2006). Many studies have just given estimates for psychopathology that were undifferentiated for disorder (Whitaker, et al., 2006) and few have specified whether point- or period- prevalence was reported in their design (Yoo, et al., 2012). In a rare study focussed on anxiety disorders, Stavrakaki (1997) found that 27% of 257 adults attending a community mental health clinic for people with ID were diagnosed with a DSM-IV (APA, 1994) anxiety disorder. Anxiety disorders were the most prevalent of mental health problems in the sample.

Much improvement is still required in the methodology of prevalence studies with this sub-population, particularly in the areas of sampling, consistency of diagnostic definitions and assessment tools (Buckles, et al., 2013). There has been some increase in
the use of population-based sampling in more recent studies but different diagnostic classification systems still result in large variations of prevalence rates. For instance, a point prevalence study of 70.6% of adults with an ID in a geographical area of Scotland used the PAS-ADD Checklist to screen participants then a psychiatrist interviewed them using the PPS-LD. The PPS-LD generated diagnoses according to: the psychiatrist’s clinical opinion; the DC-LD; the ICD-10-DCR (WHO, 1993) and the DSM-IV-TR (APA, 2000) classification systems. Using psychiatrist’s clinical opinion alone and including diagnoses of problem behaviours as well as ASD, the rates for total mental disorders were 40.9%. This reduced to 22.4% when ASD and problem behaviours were excluded. In contrast, the rates were 15.7% for total disorders and 13.9% without ASD and problem behaviours when DSM-IV-TR criteria were used (Cooper, et al., 2007). Using the same data set, similar variation was found in the point-prevalence of depression with clinical opinion diagnosing (4.6%) and DSM-IV-TR (2.1%) (Cooper, et al., 2007). The most comprehensive study of differentiated anxiety disorders to date was also generated from this sample (Reid, et al., 2011). Diagnosis by psychiatrist’s clinical opinion yielded 4.5% for anxiety disorders (including OCD but not specific phobias) but by DSM-IV-TR it was 2.6% (Cooper, et al., 2007).

Whilst rates are higher for all disorders amongst the subset of adults with profound ID (n=184) the inclusion of ASD and problem behaviours make an even greater difference than it does with the whole sample. Point prevalence for all disorders diagnosed by clinical opinion was 52.2% but without ASD and problem behaviours the rate dropped to 19.6%. Using the DSM-IV-TR, rates dropped from 11.4% and 7.1% (Cooper, et al., 2007). Furthermore, the point prevalence for affective disorders was 3.3% by clinical opinion, 2.2% by DC-LD and 1.1 % by ICD-10-DCR or DSM-IV-TR. Rates of anxiety were also lower than the main sample with 2.2% (clinical opinion), 1.6% (DC-LD), .5% (ICD-10-DCR) and 1.1% (DSM-IV-TR). Strengths of this large study include the diagnostic-level assessment and differentiation of anxiety disorders. However, identification of clients relied on GP referral and this may have biased the sample towards adults with greater support or more physical health needs. Also, it is not clear how ability was adjudged and adults with borderline ID were reported as excluded (Cooper, et al., 2007; Cooper & van der Speck, 2009). It does appear though that whilst rates of all disorders are higher amongst adults with the greatest disability, the relative
proportions of different disorders are also quite different. The rates of anxiety and depression are not only lower than adults with less disability but also lower than those in the general population.

The PPS-LD was also used with a smaller sample \((n=121)\) comprised only of adults with moderate, severe and profound ID (Bailey, 2007) randomly chosen from clients of disability services in an English district. Rates of depression and anxiety were substantially higher than the Cooper studies (Cooper, et al., 2007; Cooper, et al., 2007) yet similar disparity was found between diagnostic systems in relation to prevalence of anxiety and depression. Rates of depression were 7.4% using clinical opinion or DC-LD and 0% using the DCR-10 or DSM-IV-TR. For anxiety disorders (excluding specific phobias) there was even greater variation with clinical opinion diagnosing 30.6%, DC-LD; 35.5%, ICD-10-DCR; 14.9% and DSM-IV-TR just .8% (Bailey, 2007). Only a single psychiatrist conducted assessments in this study though, raising the possibility of systematic bias in addition to the effects of classification systems. In contrast, the PAS-ADD 10 was also administered by a single psychiatrist to a community-based sample of adults with mild and moderate ID \((n=90)\) (Deb, et al., 2001). The researcher found that 2.2% had depression, 2.2% an anxiety disorder but 4.4% had a phobic disorder.

Progress has also been made in study design in Australia. The state case registers for ID and for psychiatric illness in Western Australia were linked to show that 31.7% of people with ID had a dual diagnosis. Furthermore, schizophrenia and not depression was over represented compared to the adults without ID who used psychiatric services (Morgan, Leonard, Bourke & Jablensky, 2008). ASD was more prevalent among people with dual diagnosis than amongst people with ID alone. Despite the innovative design of this study, the authors acknowledge its limitations. In all states of Australia, only people with the highest level of need use both of these systems, skewing the sample towards more severe and chronic diagnoses with the result that estimates are low (Morgan, et al., 2008). Also based on a population study, White, Chant, Edwards, Townsend and Waghorn (2005) conducted secondary analysis of the Australian Survey of Disability, Ageing and Carers (Statistics, 1993). They found that 1.3% had ID and of these, there was a 6-month prevalence of 1.3% for psychotic disorder, 8% for depressive.
disorder, and 14% for anxiety disorder. These rates for anxiety and depression are almost identical to the most recent general population rates (Slade, et al., 2009).

The scope and methodological quality of prevalence studies has markedly improved in the last decade facilitating more accurate comparisons between samples with low ability and general population studies. The use of diagnostic-level assessment has also enabled the differentiation of anxiety disorders and comparisons between groups with differing levels of ability. However, there has only recently been some consideration of the common mental health problems of anxiety and depression in unselected community samples (Buckles, et al., 2013). This is despite the extent of these disorders amongst the general adult population, the associated disability (Henderson, et al., 2000), the proportion of mental health expenditure that these disorders consume (AIHW, 2003b) and the attention they receive at the primary health care level (McIntosh, 2004; Sullivan, et al., 2007). Traditionally, most prevalence data on anxiety and depression in low ability samples has been gathered by informant checklists and these data still form the largest pool of prevalence data.

3.5.2 Informant data

Many informant measures have generated prevalence data for signs of mental ill-health but the PAS-ADD Checklist is the most widely used. As well as an Affective/Neurotic Scale with depression and anxiety sub-scales, it has scales for Psychosis and for Organic Disorder. Studies have investigated psychometric qualities such as: factor structure (Hatton, et al., 2008; Moss, et al., 1998; Sturmey, et al., 2005); validity (Moss, et al., 1998; Sturmey, et al., 2005) and reliability (Allen, et al., 2012; Gerber & Carminati, 2013; Moss, et al., 1998; Zeilinger, Weber & Haveman, 2011).

There are a range of prevalence studies that have used the PAS-ADD Checklist to gather data on signs of anxiety and depression. There are methodological differences between studies though, primarily relating to sample characteristics such as the participant’s ability, residential environment and the presence of challenging behaviour. A number of studies have recruited samples with challenging behaviour. In a study of 320 registered adult support service users in a geographic area of England the PAS-ADD Checklist was administered to two groups, one comprising people who had
previously exhibited challenging behaviour \((n=234)\) and one with those who didn’t \((n=86)\) (Moss, et al., 2000). The group with challenging behaviour lived in staffed care, with family and on their own whereas the control group lived in staffed care. In the total sample, 15.4% were above the threshold for depression and 9.1% for anxiety but the presence of challenging behaviour was related to higher rates of depression; higher anxiety was particularly related to self-injurious behaviour. The only measure of ability was the amount of speech and those with less ability were more likely to demonstrate self-injury (Moss, et al., 2000).

A Norwegian study of 119 adults also recruited state-registered service users from a geographical area but details aren’t given about residential setting. Ability levels were mild, moderate, severe and profound and all exhibited challenging behaviour. The PAS-ADD Checklist was completed by staff informants and showed that 10.1% reached threshold for Organic Disorder, 24.4% for Affective/Neurotic Disorder and 18.5% for Psychotic Disorder (Holden & Gitlesen, 2008). A larger study \((n=707)\) also recruited adults with challenging behaviour but recruited more broadly than just ID registers. Participants were drawn from health and welfare as well as disability agencies although only those with challenging behaviour and ID were included. The majority of their participants (68%) were also in staffed housing with 9.6% with family and 8.2% in public housing (Allen, et al., 2012). A total of 16.7% reached threshold on one or more of the scales with 6.5% on the Affective/Neurotic scale, 0.7% for possible Organic Disorder and 4.2% on the Psychotic scale.

Other studies have not selected for participants with challenging behaviour. One recruited 127 adult service users attending a general health check with their general practitioner and administered the PAS-ADD Checklist to each participant and a carer. They found 33% of participants scored above one of the scale thresholds and 19% above threshold for the Affective/Neurotic threshold (Roy, Martin & Wells, 1997). A Scottish population-based study of 1023 adults used the PAS-ADD Checklist as the screening step only, in a prevalence study with respondent and informant interview as the second, lowering the threshold for selected items to maximise its sensitivity but they did not report on the percentage reaching the PAS-ADD scale threshold(s) (Cooper, et al., 2007). A German-language norming study used a quota sampling method to gather a
representative sample \((n=190)\) for age, gender, living conditions and level of ID. The overall prevalence of cases reaching threshold on any subscale was 11.5%. Cases reaching threshold on individual subscales were: Affective/Neurotic Disorder 7.4%; Psychotic Disorder 6.3%; and possible Organic Disorder 3% (Zeilinger, et al., 2011).

The largest English language prevalence study \((n=1155)\) using the checklist provides norms for both mean symptoms on the three subscales as well as the proportion of cases that meet or exceed the scale thresholds (Taylor, et al., 2004a). These can be further broken down across the three residential settings, age bands and gender. The largest proportion of participants lived in their own residence or with family (45%), 34.63% lived in community-based staffed residences and 19.74% in a large institution and a carer completed the checklist. No data are provided on ability levels though it may be reasonable to assume that the three levels of residential placement are consistent with independence and adaptive behaviour. A total of 20.1% in the whole sample reached threshold on any scale with 14% for Affective/Neurotic, 10.2% for Psychotic Disorder and 3.9% on possible Organic Disorder. The authors ascribe their high rate of psychosis to the significant proportion of the sample in specialist hospitals (19.74%) where prevalence on this subscale was proportionally higher. Rates for signs on the most common scale, Affective/Neurotic, were similar across hospital residents, those living in staffed community housing (34.63%) and participants living with family or independently (45.62%).

The PAS-ADD Checklist sacrifices some specificity for sensitivity (Moss, et al., 1998; Sturmey, et al., 2005) but this to be expected for problem-level checklists (Buckles, et al., 2013; Kerker, et al., 2004). Whilst a number of studies generate prevalence data, rates of signs and threshold cases are affected by methodological differences. Selection for challenging behaviour elevated the prevalence of threshold disorders in two studies (Holden, et al., 2008; Moss, et al., 2000) but a third (Allen, et al., 2012) had significantly lower rates. The highest rates were generated when the PAS-ADD Checklist was used as a respondent interview (Roy, et al., 1997) but the recruitment of all participants via GP referral probably enhanced these rates (Cooper, et al., 2007, 2007). The most carefully constructed sample (Zeilinger, et al., 2011) produced the lowest threshold rates but the large study by Taylor et al. (2004a) produced the most
detailed and probably most useful norms, providing for age, gender and residential settings.

In Australia, the DBC (Einfeld & Tonge 2002) informant checklist and its adult version, the DBC-A (Mohr et al. 2005) have been used in a longitudinal cohort study tracking children to adulthood (Einfeld et al., 2006). Whilst not directly comparable with the more widely used PAS-ADD Checklist studies it has the benefit of yielding data on change in signs of mental health problems between the ages of 5 and 19.5 in four data waves. The DBC-A anxiety scale was lower in the older participants and decreased more slowly in this group. Signs of anxiety decreased less in girls than boys over time and it decreased less amongst those with severe and profound ID than those with mild ID (Einfeld et al., 2006).

There are many reasons for collecting data from problem-level informant checklists but they will always be limited by the fact they are based on the observations of other people, not the subjective experience of the participant. Whilst measuring the signs of mental health problems contributes to the diagnostic process, they are unlikely to ever substitute for the symptoms that can be gathered from an interview or self-report measures.

3.5.3 Respondent data
There are no large-scale prevalence studies of self-reported symptoms in samples with low ability. The most extensively reported measures of these are the Beck inventories for depression: the BDI (Beck, et al., 1961); the BDI-II (Beck, et al., 1996b); a shortened, 13-item version of the BDI (Kazdin, et al., 1983); and modified versions of the BDI (Lindsay, et al., 2003) and BDI-II (Lindsay, et al., 2007b). In contrast, the BAI has had little use, probably due to a combination of the same factors that set the priorities for mental health research in the general population and the lack of interest in self-reported symptoms in the sub-population with LA. A significant advantage of using the BDI-II and BAI in cognitive research is the comparison with studies in the general adult population. This incorporates studies of cognitive constructs as well as symptom prevalence and threshold levels for clinical groupings. Early studies using the shortened, 13-item version of the BDI are of limited use for prevalence comparisons but have
helped establish useful screening and scoring procedures (Helsel, et al., 1988; Kazdin, et al., 1983; Nezu, et al., 1995) as well as its viability with groups from borderline to severe ID (Helsel, et al., 1988; Kazdin, et al., 1983). In the first study to use the short version, Kazdin et al. (1983) asserted that rates are higher in their sample than the general population on the same instruments though their sample was selected for psychopathology.

The first study to use a complete version the BDI (Beck, et al., 1961) with adults who had low ability did so with 21 participants in urban North America (Prout, et al., 1985). They had mild ID, were unselected for psychopathology, attended community activity or day programs and lived in staffed or supervised residences. The inventory contained all original items with wording un-modified and was read aloud to the participants in an interview. Compared with the available general population norms for adults, the sample’s mean symptom level was significantly higher ($p<.01$) higher and at 19.43 was above the cut-off score of 17 for clinical attention recommended by the scale’s authors (Beck, et al., 1961). In fact, a total of 52% of the sample scored above this threshold (Prout, et al., 1985). The largest study using this first version of the BDI used a North American sample of 120 adults, the majority of whom lived in staffed homes and institutions (Powell, 2003). The mean IQ was 53 and participants had ability in the mild, moderate and severe ranges. Although they were not selected for psychopathology, 41% had a recorded diagnosis of mental disorder (28% mood disorder, 20% psychosis, and 7% anxiety disorders). Mean BDI symptom rate for the sample was 12.38 and 34 % had either moderate or severe depression although Powell (2003) believed that participants were minimising their distress.

The largest study ($n=151$) to use the more recent BDI-II (Beck, et al., 1996b), with un-modified wording was an Australian study of adults with mild and moderate ID (McGillivray, et al., 2007). The BDI-II was administered without item 21 on sexual interest to a sample of mildly and moderately disabled participants who were not selected for psychopathology. Whilst the whole sample mean symptom rate was not published, only 10.6% were reported to score in the moderate or severe range (McGillivray, et al., 2007). Two other studies at a similar location used the same version of the BDI-II with samples selected for signs of depression by support staff.
(McGillivray, et al., 2013; McGillivray, et al., 2008). Mean scores were 17.85 and 16.2 respectively in samples of 82 and 49 participants and these two studies only contained participants with mild ID. All three recruited from similar community-based day activity and employment services.

The BDI-II has also been used with all 21 items and un-modified wording. Ailey (2009) found a mean score of 10.2 amongst a sample of 75 adults with mild and moderate ID living in the community with the most common missing data (14.9%) being for item 21. However, McGillivary and Kershaw (2015) used a sample of 70 adults with mild ID that had been selected for signs of depression and found a mean symptom level of 15.98 (n=70) with 19% above a general population threshold of 19 (Beck, et al., 1996b) for moderate or severe depression. The majority of their sample lived with family or independently.

The wording was simplified on a 21-item version of the BDI and used alongside the BAI that had been similarly modified in a Scottish study by Lindsay and Lees (2003). The sample comprised 16 sex offenders and a control group of 16 participants who attended a day placement due to challenging behaviour. All had mild ID and were not selected for other psychopathology. Mean scores differed greatly between groups with 8.14 for the sex-offending group on the BAI and 20.62 for controls, thereby yielding a significant difference (t=3.77, df=1, 16, p<.01). The mean score on the BDI was 16.21 for the sex offenders and 32.03 for the controls with the difference also significant (t=4.79, df=1, 16, p<.001).

In a larger study, Lindsay and Skene (2007b) used the modified second edition BDI (-II) with 20 items alongside the modified BAI with a segmented sample of 108 adults. Their groups comprised: those with clinical-level anxiety (n=28); those with clinical-level depression (n=17); men who were sexual offenders (n=33); and men whose offences were not of a sexual nature (n=31). All participants had mild ID with a sample mean IQ of 67.1 and all had been referred to a university clinic for intervention. Whilst the mean symptom level for depression in the whole sample was 14.06 and for anxiety 12.84, rates varied according to groups. As expected, those referred for anxiety treatment had higher BAI (29.71) than BDI-II scores (16.17) and those referred for depression
treatment higher BDI-II scores (31.84) than anxiety scores (22.42). Of the other three groups, sex offenders scored the lowest on both the BAI (9.09) and BDI-II (11.10). There was a significant difference between the clinical anxiety group and the rest of the sample ($t=5.7$, $df=106$, $p<.001$) as well as between the clinical depression group and the rest of the sample ($t=6.48$, $df=106$, $p<.001$). The primary purpose of the study was empirical validation of the inventories amongst adults with ID and given the sampling method it is not surprising that the authors cautioned against using the rates as norms. Nevertheless, it is the first major study to use the BAI and BDI-II with a low ability sample and provides divergent reference rates for clinical samples of anxiety and depression (Lindsay, et al., 2007b). Furthermore, the modifications of language enhance the chances of its viability with groups who have moderate, severe and profound ID.

The BAI has had much less use in samples with low ability but the prevalence of self reported anxiety symptoms and their relationship to depression has had little attention in the sub-population with low ability. Apart from its use in case studies (Lindsay, 1999; Lindsay, et al., 1997) and the larger studies above, the BAI has not been used alongside the BDI-II. Glen et al. (2003) used the BAI with a sample ($n=46$) of adults with borderline, mild and moderate ID intellectual disability who attended a day activity program and lived in supervised apartments. It was used in unmodified form and adults were not selected for psychopathology but 19 (41%) had a current or previous diagnosis of depression. The sample BAI mean was 19.61 (Glenn, et al., 2003). Hassiotis et al. (2013) has used the more recent versions of the BAI-Y and BDI-Y in the form of the Beck Youth Inventories (Beck, et al., 2005) in a sample ($n=32$) of adults with mild and moderate ID from inner London. They were screened positive for depression on the Mini PAS-ADD (Moss, et al., 2002) and treated in a trial of cognitive behaviour-therapy. The youth versions are not directly comparable to the adult versions due to scoring differences but 85% of the sample had mild or moderate symptoms on the BAI-Y and BDI-Y (Hassiotis, et al., 2013) at the trial entry point.

None of the studies using self-report measures of anxiety and depression symptoms purport to establish prevalence in the subpopulation with low ability and none use population-sampling measures. Furthermore, there have been no studies using both the BAI and BDI-II in an unselected sample with low ability. The earliest study showed a
higher rate even with a sample unselected for depression (Prout, et al., 1985) and more recent ones show similar rates only when participants have been selected for depression (Glenn, et al., 2003; McGillivray, et al., 2015; McGillivray, et al., 2013; McGillivray, et al., 2008). However, even those studies reporting the lowest levels of symptoms (Ailey, 2009; Lindsay, et al., 2003; Powell, 2003) are higher than those found in a large sample \((n=729)\) of adults in the general population of Australia (Crawford, et al., 2011). In this representative sample, the mean BAI score was 6.16 and the mean BDI was 6.25. These norms for unselected general population samples also contrast with those from general population studies of cognitive variables. For instance, in a sample of 1553 referrals to a cognitive therapy clinic in North America, the mean BAI score was 16.52 and the mean BDI score was 18.34 (Clark, Steer, Beck & Snow, 1996). In Australia, a sample of 135 community-based adults selected for depression contained 60% with a current diagnosis of major depression (Lamberton, et al., 2008) and found a mean BDI of 22.67 and BAI of 14.34.

A cut-off level for clinical attention in a primary care population has been recommended as 18 (Arnau, et al., 2001), which is the threshold for moderate depression on the BDI-II. Whilst none of the studies discussed had sample means exceeding this, the means in identified clinical groups well exceeded it (Lindsay, et al., 2007b). Whilst still not a norming sample, Lindsay and Skene’s (2007) study is the only one to yield means for the BAI and BDI-II with a low ability sample, their mean scores for both instruments are mid-way between the highest and lowest scores of studies using low ability groups. Furthermore, they define two divergent groups referred for treatment of primary anxiety and depression, the mean scores for which are useful reference scores. The modifications to the inventories themselves suggest they could be used with a range of abilities.

Sampling methods and size of sample are obvious explanations for the contrast in rates with general population studies. It is more difficult to gauge the impact of other differences though. These include administration of the measure by interviewer as opposed to it being completed by the participant privately, modifications to wording, number of items and inventory editions. Interview-based assessment incurs interpersonal influence and this may generate response biases such as acquiescence or
minimisation. Whilst the frequency of such biases amongst adults with ID have been discussed along with procedures for managing them (Finlay, et al., 2012; Finlay, et al., 2001, 2002) there has been no investigation of the effect of this on the scores of symptom measures.

There is also the matter of how support level and place of residence influence the prevalence of signs and symptoms. Adults with higher and/or multiple support needs are generally more likely to receive higher support levels (Adams, et al., 2011; Matson, et al., 1997) and adults with LA and severe mental illness appear to benefit more from intensive support than do adults with normal IQ (Hassiotis, et al., 2001; Hassiotis, et al., 1999). It may also be that adults with LA and mental health problems are more likely to require residential care (Horovitz, et al., 2011). The specific contribution of mental health problems to the person’s support needs is difficult to discern though and conversely, to what extent high-level residential care impacts on mental health. There is clear evidence people with LA are more likely to experience negative life events during the developmental period (Hatton & Emerson, 2004) and as adults in when residential care (Hamilton, Sutherland & Iacono, 2005; Hastings, Hatton, Taylor & Maddison, 2004; Owen, et al., 2004). Residential care and service support are only part of the broader social and economic context that affects general and mental health amongst people with LA and in particular, those with ID (Emerson & Jahoda, 2013b; Jahoda, Dagnan, Stenfert Kroese, Pert & Trower, 2009a).

It might also be that the combination of greater independence and participation in meaningful daytime activities has a protective effect on mental health. There is emerging evidence that adults with ID who live at home experience greater social support and that increased self-efficacy is associated with higher levels of support (Payne, et al., 2004). It may be that the quality of relationships experienced (McGillivray, et al., 2007) rather than the level of contact that is important. Nevertheless, the interpretation of support is heavily influenced by the prior perceptions of loneliness held by the person with ID (Lunsky & Benson, 2001).
3.5.4 Summary

The design of large-scale prevalence studies using low ability samples has improved considerably in recent years. With appropriate sampling, high rates of psychotic illness were found amongst adults with ID (Morgan, et al., 2008) using specialised mental health services (Morgan, et al., 2008) but for adults with ID living in the community, rates of anxiety and depression were almost identical to the general adult population. It is also clear that the most sensitive form of data collection, the clinical interview, gathers the richest symptom data (Bailey, 2007; Cooper, et al., 2007, 2007) regardless of how classification systems codify it. There is adequate norm data on the PAS-ADD Checklist to meaningfully compare samples on the basis of informant signs and the modified BAI and BDI-II show promise as self-report instruments for establishing the prevalence of anxiety and depression. The few available studies show mean symptom rates on the BAI and BDI-II are higher than general population rates but they permit comparison with a wide range of prevalence studies and theoretical investigations of cognitive models of depression and anxiety.

3.6 Informant and respondent ratings

In this section, the relationship between informant and respondent measures is examined. First of all, some studies of concordance on measures of depression in the general population will be examined. Then the limited data on concordance for psychopathology, including anxiety and depression in samples of adults with low ability will be considered. Finally, the emerging area of concordance between proxy and respondent data on subjective well-being amongst adults with low ability is reviewed, a summary concludes the section.

3.6.1 Ratings in general population samples

The study of concordance between different raters in the general adult population dates to the early years of self-report assessment of anxiety and depression (Prusoff, Klerman & Paykel, 1972). Studies have focussed mainly on depression and informants are usually clinicians rather than carers with the majority of samples drawn from acute treatment services. Comparing a clinical interview based on the Hamilton Rating Scale for Depression (HAM-D) (Hamilton, 1960) and self-administered checklists, Prusoff et al. (1972) found mixed results with a sample of 220 adults who had been diagnosed...
with depression at a hospital inpatient and outpatient service. The interview and checklists were not item-matched but for total scores a medium-sized correlation ($r = .36$, $p$ not reported) was found in the acute phase. In recovery phase, 10 months later, the correlation was large ($r = .81$, $p$ not reported). Examination at the item level revealed a pattern to the disparity in the acute phase. Correlations on item clusters related to cognitions, somatic complaints and physiological disturbance were above the mean of $r = .41$ and significant, but correlations across measures on items related to mood were lower than the mean and non-significant.

Where measures have matched content, concordance appears to be higher. In a sample of 64 depressed inpatients, Corruble, Legrand, Zvenigorowski, Duret and Guelfi (1999) found large correlations between the total scores on clinician (IDS-C) and self-report (IDS-SR) versions of the Inventory for Depressive Symptomatology (IDS) (Rush, et al., 1986). The versions were item-matched and clinicians completed theirs following a standardised interview. Despite agreement at scale level, there was a significant difference between item groups with high agreement on groups of items containing physiological and somatic content (i.e. weight, appetite, sleep, energy) and low agreement on those containing mainly mood related items (i.e. diurnal variation, enjoyment, reactivity of mood). In fact, at an item level there was high agreement on somatic items that the authors adjudged as being objectively determined but low agreement on mood items that they nominated as being subjectively determined (Corruble, et al., 1999).

Other studies have investigated the individual participant characteristics that influence these differences. In a study of 48 adults diagnosed with non-psychotic depression during hospital admission, clinicians and participants completed non-matched measures (HAM-D and BDI) following an interview. Participants also completed measures of personality characteristics (Domken, Scott & Kelly, 1994). Whilst total scores on symptom measures were correlated ($p < .01$), scores on the respondent measure were significantly higher. Domken et al. (1994) note this finding in similar studies and in their study attributed it to: type of depression, higher levels of neuroticism, dysfunctional attitudes and low self-esteem. Differences in individual psychopathology were also found to explain higher respondent scores amongst a sample of 94 outpatients.
with diagnoses of depression (Enns, Larsen & Cox, 2000). Whilst a correlation was obtained \((r=0.40, \ p<0.001)\) between the non-matched measures (HAM-D and BDI), disparities were explained by depressive sub-type, high neuroticism and low agreeableness.

Studies of concordance between respondent and informant ratings in the general adult population focus almost exclusively on depression and do not consider ability as a variable. Medium to high levels of concordance are attainable, at least on total scores, when using item-matched measures, clinical samples and clinician ratings based on an interview. Nevertheless, analysis of item groups revealed lower agreement on subjective mood-related content and higher agreement on objectively-judged somatic and psychomotor content. This suggests that even under optimal conditions, the subjective aspects of depression may be elusive to even the most skilled informants with maximum information. Studies of respondent and informant ratings in adults with low ability are sparse and have encountered the particular challenges of assessment in this subpopulation.

3.6.2 Ratings in low ability samples

Informant measures are widely used for collecting data on mental health at the problem, case and diagnostic levels (Deb, et al., 2001; Holden, et al., 2004; Moss, 2002; Moss, et al., 1998; Prosser, et al., 1998b). They are used alongside or instead of respondent methods and may be the only viable method when communication problems prevent assessment by interview (Kamstra, van der Putten & Vlaskamp, 2015; Petry, et al., 2006). Despite their widespread use there has been little investigation of their concordance with respondent methods.

Studying concordance between different raters on measures of psychopathology, including anxiety and depression, amongst adults with low ability poses quite different challenges compared with the general population. Where clinical samples are used: the diagnoses are usually mixed; measures are less likely to be specific for anxiety or depression; few measures contain matched informant and respondent items; and concordance for general psychopathology is of interest as well as anxiety and depression. Importantly, family or paid staff are more likely to act as informants than
clinicians are. Whilst they potentially have the benefit of familiarity, they do not have the skill or the opportunity to interview in the way a clinician does. Sample sizes are similar to general population studies and the disorder-specific focus is usually on depression.

The earliest study focused on a sample of 110 adults with borderline, mild, moderate and severe ID from outpatient and inpatient mental health services (Kazdin, et al., 1983). Of these, 67% had been given diagnoses of mental disorder, though the majority had schizophrenia, six had depression and one, an anxiety disorder. Respondent measures were the BDI short-form, ZDS and MMPI depression scale (Hathaway & McKinley, 1967) (all with modified language) and the PIMRA Depression (D)-Self (S). Informant measures were the HAM-D and the PIMRA (D)-Informant (I). The PIMRA was developed for this study and the authors noted that the two versions are the same except for complexity of wording and sentence structure. Whilst the PIMRA (D)-S correlated with the BDI short form \((r=.33, p<.001)\) it did not correlate with the other respondent measures (ZDS, MMPI). The BDI correlated with the ZDS \((r=.59, p<.001)\) and the MMPI \((r=.25, p<.01)\) though. The PIMRA (D)-I correlated with the other informant measure (HAM-D) \((r=.74, p<.001)\) but most importantly did not correlate with the PIMRA(D)-S. The scores for total psychopathology (PIMRA-S and PIMRA-I) did correlate though at \(p<.05\) (Kazdin, et al., 1983). These results show that established self-report measures were inter-correlated as were the informant measures, but that a correlation is only found across formats on total psychopathology.

A study by Helsel and Matson (1988) assessed depression in a sample of 99 adults with borderline, mild, moderate and severe ID. Participants were recruited from day activity placements, an institution and a mental health clinic but the proportion of those with mental disorder was not reported. The authors found that respondent measures correlated with each other \([\text{BDI-ZDS}; r=.35] \quad \text{(BDI-PIMRA(D)-S; } r=.38] \quad \text{(ZDS-PIMRA(D)-S; } r=.26)\] as well as the PIMRA-S \([\text{PIMRA-S-BDI; } r=.40] \quad \text{(PIMRA-S-PIMRA(D)-S; } r=.67] \quad \text{(PIMRA-S-ZDS; } r=.39)\]. Similarly, the informant measures were correlated together \([\text{HAM-D-PIMRA-(D)-I; } r=.49] \quad \text{as well as the PIMRA-I } [(\text{HAM-D-PIMRA-I; } r=.64] \quad \text{PIMRA-(D)-I-PIMRA-I; } r=.71)\]. Whilst the PIMRA-S and PIMRA-I were correlated \((r=.46)\), the depression-specific scales of PIMRA (D)-I and PIMRA
(D)-S were not correlated. Furthermore, the other informant scale (HAM-D) was not correlated with the BDI short form or the ZDS.

The level of psychopathology was also not reported in a larger study by Benson and Ivins (1992). However, they used specific measures of depression, self-concept and anger with broadly-matched items. Of the sample of 130 adults with borderline to severe ID, some had been assessed at a diagnostic clinic but no details were reported on psychopathology. Self-report measures of depression, self-concept and anger that had been designed for children were shortened and the language simplified. These measures were further shortened to generate informant versions. A correlation was found between informant and respondent ratings of depression ($r=.26, \ p<.01$) and of self-concept ($r=.23, \ p<.01$) but not between informant and respondent ratings of anger.

Rojahn, Warren and Ohringer (1994) found no correlation between the informant completed Reiss Screen-depression scale (RSMB-d) (Reiss, 1988) and two interview based assessments, the SRDQ and Diagnostic Interview for Children and Adolescents (DICA) (Reich, Shayka & Taibleson, 1992) in a sample of 38 adults with mild ID recruited from day activity centres. This was despite the participants being selected for high depression scores. The authors cited the small number of items on the RSMB-d scale and its limited specificity for depression as limitations but also observe that the respondent interviews did not correlate either. Furthermore, they noted a low level of agreement for informant and respondent measures with a single psychiatrist’s clinical opinion, something they explained as due to diagnostic overshadowing (Rojahn et al., 1994). Bramston and Fogarty (2000) recruited a larger sample of 147 adults with a mild or moderate ID. They were recruited from day activity placements and not selected for depression. They used three non-matched methods to assess for depression: the interview-based Children’s Depression Inventory (CDI) (Kovacs, 1985); informal ratings by a support worker; and a clinical interview conducted by a psychologist. Correlations between informant and self-ratings were small though significant ($p<.05$) but somewhat larger between self-ratings and psychologist’s interview. The authors question the accuracy of informants in their judging of the presence of emotions such as fear, guilt and loneliness (Bramston, et al., 2000).
A more recent study using two multi-scale measures assessed 109 adults referred to a university psychology clinic (Beail, et al., 2015). The Mini PAS-ADD informant interview (Moss, et al., 2002) and the Brief Symptom Inventory respondent interview (Derogatis, 1993; Kellett, Beail, Newman & Hawes, 2004) give case-level indications on scales of which they have four in common (depression, anxiety, OCD and psychosis) (Kellett, et al., 2004; Myrbakk, et al., 2008). The depression, anxiety and psychosis scales correlated with their counterparts \( p < .01 \) but OCD didn’t. There were also a high number of correlations between different scales within and across measures, suggesting a lack of specificity for disorder. Whilst both measures appear to be sensitive enough to identify case-level psychopathology they do not appear to be able to differentiate disorders the way single-scale measures such as the BDI, ZDS, ZAD, GDS and SRDQ can.

Another recent study using the ZDS used a non-clinical sample of 74 adults with mild ID recruited from community support services (Gordon, Shevlin, Tierney, Bunting & Trimble, 2007). The authors modified the language of the ZDS to create an informant version for support staff to complete. Each had three item groupings of physiological (e.g. sleep, appetite, weight), psychological (e.g. hopelessness, irritability, rumination) and pervasive affect (e.g. sadness, low, crying) along the lines of Zung’s (Zung, 1965) original structure. The versions were broadly item-matched and produced a total score as well one for each grouping. Comparing the total scores on the two versions across two informants at two times produced large-sized inter-correlations \( r = 0.48 \) to \( r = 0.76 \) and respondents reported higher rates than informants. Relationships between versions on symptom groupings were mixed though. Both the informant and respondent versions of the physiological \( r = 0.34, p < .005 \) and psychological \( r = 0.52, p < .001 \) groupings were correlated but pervasive affect was not. The pervasive affect group included the mood related items and the authors surmised that their features are not as directly observable as behaviours associated with the other two groupings (Gordon, et al., 2007). However, the factor structure of the ZDS has not been well supported for adults with ID in larger samples (Powell, 2003) and Gordon et al. (2007) did not examine this.

The most recent comparison of ratings also reported mixed results for item groupings using item-matched versions of a measure developed specifically for assessing
depression in adults with ID (Mileviciute, et al., 2015). The sample of 84 adults with mild ID were recruited from disability support services, all had received diagnostic assessment prior to the study resulting in 35% being diagnosed with a current depressive disorder. Participants were administered the GDS and the SRDQ by interview and support staff completed the CGDS. Each of the three instruments yielded a cognitive, affective and somatic domain as well as a total score. Large correlations were found between the two respondent measures (SRDQ and GDS) on the total score as well as the three domains but not between the SRDQ and CGDS on total score or their domains. Whilst the total score on the GDS and CGDS were correlated ($r=0.45$, $p<0.01$) they were correlated only on the affective domain ($r=0.30, p<0.01$). All domains on the three measures, except for GDS somatic domain, distinguished the depressed group from the non-depressed group. Participants also reported a higher frequency of affective and cognitive symptoms than staff did. Mileviciute and Hartley (2015) suggest that either, participants have trouble describing their thoughts and feelings to staff, or it is difficult for staff to recognise the signs of these. Regardless of the barrier, it is clear that concordance on depression is difficult to obtain and that a person’s subjective perspective is only accessible through them.

Harper and Wadsworth (1993) used non item-matched measures of loss and grief with 37 with a group of adults with intellectual disability who had recently experienced significant loss and their careers. Respondents reported mainly emotions (such as loneliness, anxiety, sadness, depression, dislike of the new residential place, worry about not being able to locate the grave) rather than behaviours. In contrast, carers and professionals who were asked how people with intellectual disability cope and respond to grief reported mainly behaviours or somatic symptoms (crying; sleep problems; hostility toward others passivity and poor hygiene) and few emotions. (Harper, et al., 1993).

The only study to investigate congruence of informant and respondent ratings of depression and anxiety at the diagnostic level used both versions of the PAS-ADD 10 (Moss, et al., 1996b). They found good agreement on depressive and psychotic item groups but not on panic/phobia in a sample recruited from psychiatric services (Moss, et al., 1997c). This may have been explained by the low rates of anxiety cases referred to
the study by psychiatric services as anxiety disorders were the most common in their community sample (Patel, et al., 1993) though they were not referred by carers (Moss & Patel, 1993a). It might also be that the item groups are less robust than those for panic/phobia. This may result in anxiety disorders being missed if both versions of the measure are not used with people who have difficulty communicating. At the item level, there were more groups of items where respondents gave higher scores than groups with the reverse order. For instance, items relating to subjective feelings such as: autonomic (e.g., heart rate, churning stomach); somatic (e.g., subjective health, psychomotor slowing) and some psychotic phenomena (voices commenting on actions, ideas of thoughts being read) were rated more frequently by respondents than informants. By contrast, informants more frequently reported behaviour that was more easily interpretable such as concentration difficulties, loss of interest and social withdrawal (Moss, et al., 1996b). Whilst the subjective phenomena have an impact on observed behaviour, the cause of the behaviour can be hard for informants to discern. Conversely, objective signs or behaviours are more readily recognised and noted.

It is more difficult to establish concordance between raters when assessing mental ill-health amongst adults with low ability than in the general population due in large part to the challenges generated by ability. Whilst optimising study conditions increases the likelihood of concordance, especially on the total scores of informant and respondent measures, the pattern of discordance is remarkably similar to that found in general population studies. More specifically, there is rarely complete concordance on the strength and nature of items rated, even under optimised conditions. This supports the concept of an informant’s observations of the signs of mental ill-health diverging in some ways from the respondent’s experience of them. Furthermore, the importance of obtaining a respondent’s subjective perspective in research or clinical practice is emphasised. The vast majority of this research has been with depression but the little published on anxiety in this subpopulation suggests similar trends. Data is also collected from others to establish subjective well-being and quality of life using proxy ratings.

3.6.3 Subjective well-being
The salience of informant data about adults with low ability has been considered in areas other than psychopathology, such as discerning states of pleasure or displeasure
(Petry, et al., 2006) and determining subjective well-being or quality of life (QOL) (Emerson, et al., 2013a; Vos, et al., 2010). People with profound intellectual disability and multiple disabilities are inevitably reliant on family or professional carers to mediate communication (Kamstra, et al., 2015; Nakken, et al., 2007). Whilst there are problems with both informant and respondent methods for facilitating effective communication (Petry, et al., 2006) for adults at the end of the ability spectrum, new and innovative methods may assist in eliciting and enhancing this communication (Lancioni, et al., 2005; Petry, et al., 2006; Vos, et al., 2010). The term ‘proxy’ is generally used for a person answering a QOL questionnaire and their information is slightly different to those answering questionnaires about psychopathology. For QOL they are asked to answer in the way they think the person they represent would but for mental ill-health they are asked for their opinion of the person’s behaviour, thoughts or feelings. Doubts have been raised about the validity of proxy data on subjective issues (Emerson, et al., 2013a). In a review of proxy ratings of quality of QOL, Vos et al. (2010) reports that some researchers had found strong disagreement between these and self-reports (Cummins, 2002; Cummins, 2005; Perry & Felce, 2002; Stancliffe, 2000) especially with regard to emotional experiences and personal preferences. Others have found concordance though, in samples of borderline to severe ID (Stancliffe, 1999) and mild ID (McVilly, Burton-Smith & Davidson, 2000). Whilst the importance of close and regular contact with the respondent is emphasised along with a standardised approach to QOL (McVilly, et al., 2000), proxy ratings are not proposed as replacements or substitutes for self-rating (Matson, et al., 1997; McVilly, et al., 2000; Stancliffe, 1999; Sturmey, et al., 2010; Tsiouris, et al., 2003).

3.6.4 Summary
Concordance between self-report and clinician-administered symptom measures has been readily obtained at the total score level for depression in general population studies. At the subscale and item levels, optimising study conditions by using clinician informants, clinical samples and item-matched measures improves the chances of concordance in relation to depression. However, divergence is still consistently found for affective and physiological items. Studies amongst adults with LA show that carer-informant and respondent measures of general psychopathology are usually correlated and this can be attained on specific measures of anxiety and depression when study
conditions are optimised and carers have high familiarity with the person. Correlations are not large though and on mood and somatic items of depression as well as autonomic items of anxiety, concordance is minimal or non-existent. Whilst informant measures are an important part of many assessments it is clear they do not replicate a person’s own report of anxiety or depression. Many of the informant measures used with adults who have low ability are only intended to yield problem or case-level data anyway. Regardless of the level of symptom data required, cognitive models of anxiety and depression emphasise the importance of the individual’s unique perspective as the gateway to generating emotional change. It follows then that regardless of how good the informant data is, gathering a person’s subjective experience should be gathered where possible.

3.7 Life stressors, signs and symptoms

In this section, evidence for the impact of life events (LEs) on mental health is reviewed. To commence, key features of the general population literature are considered including the differential distribution and effect of LEs in society. Studies investigating the effect of accumulated LEs on signs as well as symptoms of mental ill health in samples with low ability are then discussed. Disorder-specific relationships between loss-related LEs and depression as well as danger-related LEs and anxiety have been considered in the general population and a few have used samples with low ability. These are reviewed prior to a summary.

3.7.1 General population studies

The general population research draws heavily on the work of Holmes and Rahe (1967) and Rahe, McKeen and Arthur (1967) who found a propensity for stressful LEs to precipitate mental ill-health. This is more likely when LEs cluster together or accumulate and the illness is more serious when clusters contain more serious events (Rahe, et al., 1967). Negative life events also appear to have an independent effect on the diagnosis and course of symptoms in depression and to a lesser extent anxiety even when sociodemographic and personality characteristics are controlled (Spinhoven, et al., 2011). An analysis of the distribution of LEs in society shows that vulnerability to stressful events is linked to social disadvantage, specifically membership of lower socio-economic (SES), racial/ethnic minority and younger adult groups. This
vulnerability is related not just to income but education and occupational status as well, which in turn are related to ability (Hatch & Dohrenwend, 2007). A large meta-analysis shows that not only are people with low SES more likely to experience stressful events than those who are more advantaged, but that they are more strongly affected emotionally by most kinds of LEs. This is true for both psychological and psychophysiological symptoms and there is some evidence that individual characteristics (e.g. resilience, self-esteem, self-efficacy) as well as social support can mediate this effect (McLeod & Kessler, 1990). Extending these findings is research comparing SES-stratified groups; not only is SES associated with more frequent reporting of stressful events but also more emotion-focussed and less problem-focussed coping strategies (Lever, 2008). Given the low SES of many adults with ID, the impact of accumulating and specific LEs is an important area of study.

Most of the literature on accumulating LEs and mental health in adults with low ability is relatively recent but the handful of early studies found similar effects to those in the general population (Hulbert-Williams & Hastings, 2008). In a small prospective study (n=27) of adults living with their families, an increase in cumulative or total LEs (measured on the Holmes and Rahe scale (Holmes, et al., 1967)) over a 6-month period was correlated with a deterioration in behaviour and self-care (Monaghan & Soni, 1992). A review of records from a specialist mental health clinic showed that 48% of adults with ID referred for assessment had experienced LEs in the 12 months prior to referral (Ghaziuddin, 1988). Recent research has found that cumulative negative LEs can affect the efficiency of executive functioning (EF) in people with low ability and developmental disabilities. Heyman and Hauser-Cram (2015) found that response time (RT) slowed on common tests of EF in general and attentional inhibition in a longitudinal study of 30 participants.

LEs are distinguished from stressors by the discrete and objectively identifiable nature of the event, usually within a certain time frame. Some investigation of perceived stressors amongst adults with ID in comparison to general population groups has been instructive though. Bramston, Fogarty and Cummins (1999) found that a sample of adults with mild and moderate ID identified many similar stressors to university students but there is a particular group of related stressors involving negative
interpersonal relationships that seem to be a particular problem for people with ID. Social support is another allied factor that may influence mental health. Reiss and Benson (1985) found there was a significant negative correlation between social support and depression. In addition, depressive affect varied only as a function of negative social interactions rather than the amount of positive practical or emotional support, thereby suggesting that valence is important (Lunsky, et al., 2001; Nezu, et al., 1995)

3.7.2 Studies of accumulated LEs in low ability samples

The extent of the literature on LEs and mental health amongst adults with low ability is limited but growing. In contrast to general population studies, most using samples with low ability gather data from informants about LEs as well as mental health. Some have used self-report measures to ascertain symptoms but only a few have asked participants to rate the subjective valence of LEs. Regardless of whether studies focus on signs or symptoms of mental health problems, there has been almost no consideration of the impact of LEs on anxiety.

Evidence for relationships between accumulating LEs and signs of mental ill-health has been found in studies of children, adolescents and adults with low ability, despite diversity in methodology and measures (Hulbert-Williams, et al., 2008). A secondary analysis of data from the British Mental Health of Children and Adolescents survey compared a sample of 264 children who had ID with 10, 438 children who had typical development (Hatton, et al., 2004). They used a 10-item checklist (Meltzer, Gatward, Goodman & Ford, 1992) for LE data as well as an informant interview (carer) and questionnaire (teacher) (Goodman, Ford, Richards, Gatward & Meltzer, 2000) for data on emotional and behavioural disorders. Amongst all children, there was a strong association between the number of LEs and disorders, most marked for emotional disorders. Children with ID were more likely to experience a greater number of stressful life events than those without ID and this difference was partly accounted for by family SES (Hatton, et al., 2004). More diverse results were gained from a large study of 624 adults with ID from staffed or family homes in Victoria, Australia (Hamilton, et al., 2005). Informant data was gathered for mental ill-health using the DBC-A (Mohr, et al., 2005) and for LEs in the previous 2 years on the Life Quality and Health for Adults with Developmental Disabilities checklist (MUARID, 1999). People in staffed
accommodation experienced more LEs than those living with family, usually associated with changes in carers, co-residents and routines. The correlation between total LEs and the DBC-A total score was small but significant and the pattern was similar between LEs and the DBC-A sub-scales. However, the relationship between LEs and signs of mental ill-health was stronger for adults with mild rather than moderate or severe ID (Hamilton, et al., 2005).

One of the few prospective studies (Esbenson, et al., 2006) used the self-report Life Experiences Survey (LES) (Sarason, Johnson & Siegel, 1978) with 104 participants with severe, moderate, mild and borderline ID to identify the occurrence and impact of LEs. An informant then indicated the valence (positive, neutral, negative) of the LE for the participant as well as rating the person at 4-month intervals on the ABC (Aman, et al., 1985), the ADAMS Depression subscale (ADAMS-D) (Esbenson, et al., 2003) and the Assessment of Dual Diagnosis (ADD) (Matson, 1998). Small but significant correlations were found between total LEs and the total scores on the ABC but medium-sized correlations were evident with the depression subscales on the ADAMS and ADD. The association was strengthened with the ABC and the ADAMS-D when using only negative LEs. Positive LEs were also independently correlated to scores on the ADAMS-D suggesting a cumulative effect of any LE on mood (Esbenson, et al., 2006).

The most commonly used measure of LEs (over prior 12 months) amongst adults with low ability is the PAS-ADD Checklist (Moss, et al., 1998) or PAS-ADD Checklist-Revised (Moss, 2002). It is the only measure to collect informant data on LEs (part 1) as well as signs of mental ill-health (part 2) simultaneously. In a study of 127 adults referred for general health assessment, the PAS-ADD Checklist was administered to each participant and an informant by interview (Roy, et al., 1997). The authors state that amongst the 33% reaching any of the scale thresholds, a correlation (size and significance not reported) was found between total LEs and scale score (Roy, et al., 1997). Only the part 2 of the PAS-ADD Checklist was used along with the study’s Life Events List (LEL) with a sample of 93 adults with developmental disabilities living in a long-stay institution (Owen, et al., 2004). The relationship between PAS-ADD Checklist signs and LEs was examined by comparing the below and above threshold groups on two of the scales. The group with above-threshold signs on the
Affective/Neurotic scale had been exposed to significantly ($p<.05$) more LEs than the group that did not reach threshold. This relationship wasn’t found for the psychotic scale though (Owen, et al., 2004). A follow-up to the Owen et al. (2004) study recruited 68 adults who had been part of the original study at Time 1 (Hulbert-Williams, Hastings, Crowe & Pemberton, 2011). The LEL was transformed into the Bangor Life Events Schedule for Intellectual Disabilities – Informant (BLESID-I) to allow informant rating of the impact for each LE. Those still in the hospital at Time 2 (3.5 – 4.0 years later) experienced significantly ($p<.002$) more LEs than those who had been resettled into community housing. Furthermore, the LEs measured at Time 2 predicted signs of mental ill-health on both the Affective/Neurotic and Psychotic scales of the PAS-ADD Checklist but neither LEs nor signs at Time 1 did (Hulbert-Williams, et al., 2014).

The largest study of LEs and signs of mental health problems used both parts of the PAS-ADD Checklist with a sample of 1155 adults who had ID (Hastings, Hatton, Taylor, & Maddison, 2004). Most lived in community-based staffed accommodation or with their families but 19.74% lived in institutional care. For the whole sample, LEs significantly increased the odds of Affective/Neurotic, but not Organic or Psychotic disorders. However, participants living in institutional care were more likely to be exposed to LEs. To extend their analysis, sex, age and place of residence (hospital vs. community) were entered as independent variables as the first step in hierarchical logistic regression. Whilst these variables together predicted Affective/Neurotic Disorder, the addition of LEs added significant unique variance (Hastings, et al., 2004).

The relative frequency patterns of specific LEs is also worthy of note and on this there is convergence between a number of the major studies. In the largest study using part 1 of the PAS-ADD Checklist, 46.3% of the sample had experienced one or more LE in the last 12 months and of the specific LEs, the most common were: move of house or residence (15.5%), serious illness of close relative/friend (9%), serious problem with close friend, neighbour or relative (8.8%) and serious illness/injury (8.5%) (Hastings, et al., 2004). These LEs were also the most frequently reported in other major studies using the PAS-ADD Checklist (Hastings, et al., 2004; Hulbert-Williams, et al., 2011; Owen, et al., 2004; Tsakanikos, et al., 2007) or PAS-ADD interview (Martorell, et al., 2009). The same was also true for the least common LEs (retirement, separation, laid
off work) and a number of studies (Cooper, et al., 2007; Hulbert-Williams, et al., 2011; Martorell, et al., 2009; Owen, et al., 2004; Tsakanikos, et al., 2007) found the likelihood of experiencing an LE was increased through living in institutional care (Cooper, et al., 2007; Owen, et al., 2004).

The signs of mental ill-health, especially depression, appear to be related to accumulated LEs but correlations are generally small in size except where ratings of LE valence were accounted for. Despite this there is remarkable consistency in the frequency patterns of LEs across studies. There is diversity in checklists used for collecting data on both LEs and signs of mental ill-health but most are only designed to collect problem-level data and this feature means they are quick and easy to use when administered to informants. The PAS-ADD Checklist is the most commonly used in large studies to date and has the advantage of combining both functions. Whilst an informant’s rating of LE valence is only an approximation of the participant’s interpretation, it suggests that a greater understanding of a person’s perspective will yield a better reckoning of the LEs’ impact on mental health.

Those studies investigating the impact of LEs on symptoms have focused mainly on depression with some eliciting symptoms by interview and others by self-report. In a study of 281 adults with ID referred for psychiatrist interview, informants completed the PAS-ADD Checklist part 1 (Tsakanikos, et al., 2007). Logistic regression models with exposure to one, two and three LEs as dependent variables showed that significant variance was predicted by a diagnosis of depression in each model. Anxiety did not explain significant variance in any of the models (Tsakanikos, et al., 2007). In another study, the self-report version of the BLESID (BLESID-SR) and the BSI were administered to 38 adults assumed to have ID. Participants rated each LE as ‘good’, ‘bad’ or ‘in the middle’ during the interview (Hulbert-Williams, et al., 2011) and large-sized correlations were found between total LEs and depression as well as with anxiety. Correlations between negative LEs and both types of symptoms were slightly larger. This level of association is much larger than studies using informant measures (Hamilton, et al., 2005; Owen, et al., 2004) probably due to the self-labelling of LE valence and self-reporting of symptoms. Of note though is the finding that social
support did not mediate the relationship between LEs and symptoms (Hulbert-Williams, et al., 2011).

Part 1 of the PAS-ADD Checklist was also used for screening a large study of 1023 adults with ID in a geographical area of Scotland who were then interviewed by a psychiatrist using the PPS-LD (Cooper, et al., 2007). Experiencing an LE in the previous 12 months was associated with an odds ratio of 2.7 (95% CI, \( p<.007 \)) for a diagnosis of depression in a logistic regression analysis and was bettered only by smoking status for the amount of variance contributed (Cooper, et al., 2007). Similarly, experiencing LEs in the previous 12 months was responsible for an odds ratio of 2.29 (95% CI, \( p<.02 \)) for a diagnosis of anxiety disorder. LEs contributed more independent variance than previous institutionalisation but slightly less than having no daytime occupation (Reid, et al., 2011). However, in a slightly smaller study (\( n=121 \)) with a similar methodology to Cooper et al (2007) and Reid et al. (2011), Bailey (2007) found no relationship between LEs and diagnosis of anxiety or mood disorders.

Symptoms were gathered from participants using the PAS-ADD 10 and LEs from informants with the PAS-ADD Checklist in a Spanish study of 177 adults with mild and moderate ID attending a day activity centre (Martorell, et al., 2009). The life-span trauma history screen (Allen, Huntoon & Evans, 1999) was also completed with the informants, of whom 95% were parents (carers). The most prevalent disorders were mood and anxiety conditions, LEs and trauma experiences (TEs) were correlated (\( r=.28, p<.05 \)) and both variables accounted for significant variance with odds ratios of 1.4 (95% CI, \( p<.05 \)) and 1.8 (95% CI, \( p<.01 \)) respectively for any ICD-10 disorder. When entered together into logistic regression models though, only TEs contributed unique variance but the analysis was not specific for anxiety and depression (Martorell, et al., 2009). Studies could not be found that explored the relationship between PAS-ADD Checklist LEs and self-reported symptoms of anxiety and depression in a community-based sample that was unselected for mental health problems. The only study to correlate LEs with either the BDI-II or BAI used a sample of adults not previously screened for symptoms and ascertained cumulative LEs on the Social Readjustment Rating Scale (SRRS) (Holmes, et al., 1967). Experiencing LEs in the previous 6 months was one of 5 variables contributing to a multiple regression model that accounted for
55% of the variance in BDI-II symptoms but it made the smallest contribution with a beta weight of .14 but probability was not significant (McGillivray, et al., 2007).

Studies testing the impact of LEs on diagnoses generally found a relationship where symptoms are gathered by diagnostic-level interviews yet these studies still gathered LEs from informants. The common pairing of PAS-ADD Checklist part 1 and part 2 are also usually related. The strongest relationship was found between self-reported symptoms on the BSI and self-reported LEs that were rated for valence by participants. It is likely that participants’ rating of valence added to their predictive potency. No studies used self-report measures of anxiety or depression, such as the BAI and BDI-II nor did any combine these with the PAS-ADD Checklist.

3.7.3 Disorder-specific relationships
Studies of the effects of specific LEs on anxiety and depression in the general population are not common but their results are convincing. In their landmark cross-sectional study of 164 young women in England and Australia, Finlay-Jones and Brown (1981) found that severe loss was a causal factor in depression and severe danger was a causal factor in anxiety disorders diagnosed by a psychiatrist’s clinical interview. However, the link between danger and anxiety was only specific within 3 months before onset and both danger- and loss- events were associated with co-morbid depression and anxiety (Finlay-Jones & Brown, 1981). In an English retrospective twin study, Eley and Stevenson (2000) interviewed 90 pairs of children (aged 8-16) from a sample of 529 who screened high or low on self-report measures of anxiety and depression. They distinguished specific LEs from chronic stressors and tested the high and low groups for differences in both. Specific loss events (and family as well as friendship relationship stressors) differentiated the high and low depression groups but not the anxiety groups. Threat events differentiated the high and low anxiety groups but not the depression groups (Eley & Stevenson, 2000). Most recently, a large prospective study of a community sample (n=2304) of adolescents and young adults (aged 14-24) in Germany has confirmed these linkages (Asselmann, Wittchen, Lieb, Höfler & Beesdo-Baum, 2015). The sample was unselected for mental health problems and participants were assessed by researchers on a German version of the Composite International Diagnostic Interview (M-CIDI) (Wittchen, Lachner, Wunderlich & Pfister, 1998) and the 74 LE
Munich Event List (MEL) (Maier-Diewald, Wittchen, Hecht & Werner-Eilert, 1983) up to four times over 10 years on. They found that loss-events predicted depression but not anxiety whereas danger events predicted anxiety and depression. Furthermore, mixed events predicted anxiety, depression and their co-morbidity (Asselmann, et al., 2015; Spinhoven, et al., 2011).

The impact of specific loss- and danger- LEs on particular symptoms of mental ill health remains virtually unexplored with low ability samples. No studies have previously examined the predictive power of specific (loss and danger) LEs on signs or symptoms of anxiety and depression in samples with LA. Early work on the impact of bereavement on problem behaviour may have initiated some interest though. Hollins and Esterhuyzen (1997) found problem behaviours were more common in a group (n=50) of adults with ID who had lost a parent in the preceding two years than a control group matched for age, gender and ability who were not bereaved. These measures were taken up to 2.1 years after the death but when readministered in a five-year follow-up, they were not longer significantly elevated (Bonell-Pascual, Huline-Dickens, Hollins, Esterhuyzen et al., 1999). Interestingly, only a quarter of the original sample had received any recognised bereavement support but for the six who had been included in funeral procedures, there was significant improvement. This raises the important issue of whether carers recognise the significance and effects of loss amongst adults with LA.

Two available studies have generated some relevant findings though. In their study of 281 adults with ID assessed with a psychiatrist interview, Tsakanikos et al. (2007) found that some specific LEs on the PAS-ADD checklist were related to a clinical diagnosis of depression. Three items ‘serious problem with close friend, neighbour or relative’, ‘death of first degree relative’ ‘laid off sacked from work’ yielded small size correlations (Spearman’s) (\(\rho=.20; \rho=.12; \rho=.12\)) correlations, all significant at \(p<.05\), with a diagnosis of depression generated by psychiatrist’s clinical interview. Whilst none of the LEs correlated with a diagnosis of anxiety disorder, three LEs, (‘alcohol problem’, ‘something valuable lost or stolen’ and ‘separation or divorce’) were correlated with adjustment reaction (\(\rho=.15, p<.05; \rho=.25, p<.01; \rho=.21, p<.01\)).
A prospective study of 99 adults with mild to moderate ID tested the impact of LEs rated by the BLESID-I (Hulbert-Williams, et al., 2014) and BLESID-SR (Hulbert-Williams, et al., 2011) on trauma symptoms. These were measured by the Lancaster and Northgate Trauma Scales – self-report (LANTS-SR) and Informant (LANTS-I) (Wigham, Hatton & Taylor, 2011) versions over a 6-month time frame. They found that adverse LEs in the previous 6 months predicted symptoms on the LANTS-SR and LANTS-I at the Time 2 measurement point. Furthermore, the LANTS-SR at Time 1 predicted LANTS-SR scores at time 2 and this relationship was stronger than between Time 2 self-report LEs and Time 2 trauma (Wigham, Taylor & Hatton, 2014). Nevertheless, informant trauma at Time 1 did not predict trauma at Time 2. The authors do not claim that items on the LANTS represent symptoms of Post-Traumatic Stress Disorder or any anxiety disorder nor were any specific LEs on the BLESID chosen for the predictive capacity. Social support did not predict informant trauma and did not moderate the relationship between self-report LEs or informant LEs and trauma (Wigham, et al., 2014).

There is no research that has set out to test the predictive capacity of specific LEs and symptoms of anxiety and depression using self-report measures in a sample with low ability that was unselected for mental health problems. This is despite well-proven methodologies and results of general population studies (Asselmann, et al., 2015; Eley, et al., 2000; Finlay-Jones, et al., 1981). However, Tsakanikos (2007) found that three LEs on the PAS-ADD Checklist part 1 were correlated with psychiatrists’ diagnosis of depression/adjustment disorder. The study by Wigham et al. (2014) shows that total LEs and specific signs/symptoms of trauma can be ascertained and are independently related to later signs and symptoms of trauma. In order to advance this neglected area of research it may be best to test the predictive capacity of loss- and danger-related LEs for signs and symptoms using proven and widely-used informant measures. This strategy might give some indication of whether further, more detailed research is worthwhile.

### 3.7.4 Summary

In this section, the impact of LEs on mental health has been considered. The general population research confirms that cumulative LEs affect mental health and that lower
SES confers greater vulnerability for their incidence and consequences. Studies of LEs and signs of mental health problems using a variety of measures show correlations with depression of varying strength but this is strongest where participants are asked to rate the impact of LEs. Large-sized correlations between LEs and depression as well as anxiety were obtained when a self-report measure was used for symptoms and participants rated the valence of LEs. However, the impact of LEs has not been tested yet on the BAI and BDI-II in samples with low ability. Whilst the specific effect of loss-related LEs on depression and danger related LEs on anxiety is well proven in the general population this needs to be further investigated in samples with low ability using measures that are valid in the sub-population and allow comparison with those testing cognitive models in the general population.

3.8 Conclusions
In this chapter, a range of variables associated with anxiety and depression in the sub-population of adults with LA, have been considered. Anxiety and depression are the most prevalent mental health problems across western societies and associated with considerable burden though the sub-population with low ability is rarely incorporated in general population studies. These studies show clear evidence that ability affects the risk of anxiety and depression in adulthood but studies of signs and symptoms in low-ability samples have not systematically addressed this issue. Despite the challenges of assessing for mental health problems in adults with low-ability, there are prevalence reference studies for both signs and symptoms of anxiety and depression. Self-report measures have rarely been used amongst groups with profound, severe and moderate disability though and this has hindered the investigation of cognitive models of anxiety and depression. Concordance between raters of depression in the general population is good for the total score but inconsistent on more subjective items and in low ability samples concordance between informant and respondent raters is patchy. This highlights the difficulty of ascertaining the subjective experience of adults with low ability concerning anxiety and depression. The role of accumulated LEs in the incidence of anxiety and depression in the general population is well proven but is less certain in studies of signs and symptoms of mental health problems in samples with low ability even when participants self-report their symptoms and valence of LEs. The specificity of loss and danger related LEs for depression and anxiety has not been specifically
investigated in low ability samples but studies have been hampered by the lack of self-report measures that are comparable with those used with the general population.

3.9 Rationale for hypotheses 1 - 4

**Aim 2**

The second aim of the present study was to establish the prevalence of anxiety and depression and the relationship between these and ability as well as between life events and anxiety and depression. Longstanding assumptions in the field suggested an inverse correlation between ability and anxiety as well as between ability and depression and that psychopathology was more likely as ability decreased.

Hypotheses 1 to 4 address the prevalence of signs and symptoms of mental ill-health; the relationship between ability and mental ill-health as well as that between stressors and mental ill-health.

**Hypothesis 1:**
*That the prevalence of signs (PAS-ADD Checklist) and symptoms (modified BAI and modified BDI-II) of mental ill health in the sample would be similar to established reference samples.*

Rationale: There have been significant improvements in the scope and methodology of prevalence studies in this subpopulation over the last decade. Prevailing rates of mental disorders have been established for adults with low ability in a range of different samples but the most common of these, anxiety and depression have only recently received attention. Informant checklists have generated most of the prevalence data at problem level with the PAS-ADD Checklist the most widely used across different residential settings. Although Zeilinger et al. (2011) used the most representative sample, the much larger sample of Taylor et al. (2004a) was designed as a norming study with the sample taken from a range of residential settings. One limitation of the Taylor et al. (2004a) study is that they did not publish prevalence data for the anxiety factor identified by Hatton and Taylor (2008). On balance it is the most suitable reference study for a community-based sample unselected for mental ill-health.
Self-report symptom measures of anxiety and depression are widely used in studies of
cognitive theory and cognitive-behavioural therapy and prevalence norms are available
for the general population. A number of studies have used versions of Beck’s BDI for
depression in samples with low-ability but only few have used its companion, the BAI
for any kind of study. Lindsay and Skene (2007b) modified both the BAI and BDI-II to
facilitate its use across the low-ability spectrum and published the largest study to date
using both inventories in this subpopulation. Whilst it is a validation not a norming
sample it does give means for clinical groups with anxiety and depression. Despite its
shortcomings as a prevalence study it is the most suitable reference study, at least for
clinical groups in a community-based sample. Comparisons will also be made with
general population community (Crawford, et al., 2011) clinical (Clark, et al., 1996) and
theoretical research (Lamberton, et al., 2008) samples in the general population.

**Hypothesis 2:**
**That measures of ability (ESP, SAP, PPVT-4) would be related to each other but
not to signs (PAS-ADD Checklist) or symptoms (modified BAI and modified BDI-
II) of mental ill-health.**

**Rationale:** There is considerable evidence that the ability to recognise emotion
expressed in facial stimuli is correlated with general ability and in particular, receptive
language. Specifically, more recognition mistakes are made especially with more
complex emotions as ability diminishes. The ability to report a valid, calibrated score on
self-report measures of symptoms or cognitions appears to be related to general ability
but empirical evidence is rare. Screening and validity procedures for scoring ability and
emotional recognition are common but there is little empirical data on the relationship
between general ability and these two specific areas together. This is compounded by
the routine exclusion of adults with severe and profound ID without the use of task-
specific screening.

The few studies to assess the relationship between ability and signs of mental ill-health
have found conflicting results using problem-level checklists. Larger studies often do
not account for ability and no studies measured ability dimensionally and proximal to
checklist rating with the PAS-ADD Checklist. There is some evidence that assessment
at the case level shows increased prevalence of signs as ability increases but this has not been investigated across the whole spectrum of low ability. Given the absence of definitive findings and the use of an unselected sample, it was hypothesised that the ability measures would not be related to signs of mental health problems.

General population studies considering ability and mental health problems show that ability may have a protective effect against fears amongst children and mental health problems amongst adults. Similarly, trait anxiety may be negatively correlated with ability. Few studies of anxiety and depression symptoms using samples of adults with low ability have investigated their relationship with ability using dimensional measurement proximal to assessment and none have used both the BAI and BDI-II. An early study (Helsel, et al., 1988) did not find a correlation between the PPVT-R and a shortened BDI-II but more recent ones have found small and significant ones. Many of these studies include significant numbers of adults with existing mental disorder diagnoses so it was hypothesised that ability would not be related to symptoms in an unselected sample.

**Hypothesis 3:**

*That the number of life events (12-month prevalence on PAS-ADD Checklist Part 1) would be significantly correlated with signs (PAS-ADD Checklist Part 2) and symptoms (BAI and BDI-II) of mental ill-health.*

**Rationale:** There is considerable evidence in general population studies that cumulative negative LEs predict anxiety and depression, especially where social disadvantage is present. Studies using LA samples show small relationships between cumulative LEs and signs with the Mini PAS-ADD Checklist widely used to gather both forms of data. However, this relationship is stronger where LE valence is accounted for. The strength of relationship between symptoms and LEs is similar but both case-level diagnosis and ascertainment of LE valence enhance it. No studies have used the BAI and BDI-II but a relationship between cumulative LEs and symptoms as well as between LEs and signs was expected.
Hypothesis 4:
That loss-related life events would be significantly related to depressive signs and symptoms and trauma-related events to anxiety signs and symptoms.

Rationale: There are large and longstanding studies linking loss-events and depression and danger-events and anxiety in general population samples. However, disorder specific relationships are virtually unexplored in samples of adults with low ability. However, Tsakanikos et al (2007) found three LEs on the PAS-ADD Checklist part 1 were correlated with psychiatrists’ diagnosis of depression and Wigham et al. (2014) found that LEs were related to symptoms of trauma. The evidence is strong in the general population but thin in the subpopulation with low-ability but disorder specific relationships were expected.
Chapter Four: Cognitive Content and Specificity for Anxiety and Depression

4.1 Introduction
In this chapter cognitive theory, the cognitive models of anxiety and depression it underpins and therapies that are based on them are examined. Initially, behavioural theory and the interventions it informs are considered, followed by a discussion of cognitive theory, the cognitive models of anxiety and depression and their component concepts. The impact of ability on the relevance of cognitive theory is considered in the next section followed by a review of cognitive-behavioural therapies for anxiety and depression, particularly the evidence for their use with adults who have low ability. Evidence for the cognitive content-specificity hypothesis is then examined in detail followed by a conclusion and the rationale for Hypotheses 5, 6, 7 and 8.

4.2 Behavioural theory and intervention
In this section, behavioural theory and its interventions are discussed. Initially, the general principles of behavioural theory are considered before discussion of behavioural treatments used in the general population. The use of behavioural interventions with adults who have ID is then reviewed across the fields of skill instruction, challenging behaviour and treatment of mental health problems. A summary concludes the section.

4.2.1 Behavioural theory
Behavioural theory rests on experimentally-derived laws or conditions that govern behaviour. Its roots are generally traced to John Watson and later, Pavlov (Rachman, 2015) who were reacting to the introspective psychology of the early 20th Century. They ignored so called ‘private events’ and focussed on observable behaviour as well as the respondent conditioning that shaped it. The operant conditioning of B. F. Skinner (1985) ushered in the prospect of changing behaviour by managing its consequences and laboratory studies were used to test the ‘laws’ or concepts of reinforcement, extinction and punishment, firstly with animals and then with humans. These concepts learnt in the laboratory were operationalised for work with people in the practice of behaviour modification (Bandura, 1969; Martin & Pear, 1988; Rachman, 2015). More
recent behavioural theorists (Jones, Miller, Williams & Goldthorpe, 1997; Sturmey, 2006b) have adopted the term ‘radical behaviourism’ and acknowledge the role of genetics and physiology in behaviour as well as the importance of language in differentiating humans from animals. Their focus is still firmly on the observable behaviour though, as well as the environment that shapes it.

It is not necessary for the behaviour in focus to be part of a syndrome or disorder as behavioural explanations of anxiety and depression rest on the same set of laws as for other habituated behaviours. Functional analysis of target behaviours discerns extrinsic factors (e.g., avoiding feared stimuli or tangible gains) that might motivate the person. These are subsequently amenable to change through manipulation in the environment using contingent reinforcement and stimulus control strategies (Emerson, et al., 2011; Martin, et al., 1988). Behaviour driven by intrinsic factors such as physical (pain) or psychological (delusional thinking or distorted thinking) is more difficult to analyse via observation and consequently harder to treat by behavioural means. The first behavioural psychotherapies were for the treatment of fears (Jacobson, 1938; Wolpe, 1958) and emphasised the role of conditioned associations arising during early learning that drove behaviour independently of conscious beliefs (Lisek, et al., 2005; Mineka, et al., 2006). Fears are also learned vicariously, and lead to the same changes in cognitive, behavioural and physiological anxiety response systems as well as attentional bias to the source of threat (Reynolds, Field & Askew, 2014). Whilst individuals can be aware of the stimuli that produce the emotional reaction, they are usually unaware of the rules that govern the association and consequent habitual responses (Brewin, 1996). Changing behaviour depends on a high level of control over the environment around the person and not necessarily on the subject’s insight or willing participation. The content of a person’s thoughts or cognitions is incidental for clinical purposes with radical behaviourists explaining these as ‘internal or mental behaviour’ to be influenced by the same laws as apply to observable behaviour (Jones, et al., 1997; Skinner, 1985; Sturmey, 2006b).

### 4.2.2 General population intervention

In the general population, behavioural treatments that involve exposure remain important in the treatment of anxiety disorders (Butler, Chapman, Forman & Beck,
2006; Mineka & Oehlberg, 2008; Ohayon, 2006). They are also components (Hollon, Stewart & Strunk, 2006; Jacobson, et al., 1996) or, or form independent treatments for, depression (Dimidjian, Martell, Addis & Herman-Dunn, 2008; Zeiss & Jones, 1983). Behavioural methods are also incorporated into health-related behaviour change programs (Ragin, 2015) and conditions involving circumscribed avoidance problems (Mineka, et al., 2006). Changing specific challenging behaviours is typically part of care provision in schools, prisons, aged care and families as well as support services for people with ID (Scotti, Evans, Meyer & Walker, 1991; Sturmey, 2006b).

4.2.3 Intellectual disability and skill instruction

For many years, behavioural interventions have been used to teach and increase adaptive behaviour amongst adults with ID (Matson, et al., 1983a). The earliest studies applied the findings of Skinner’s laboratory studies with animals to adults with severe and profound ID within large institutions (Matson, et al., 1983a). These studies applied operant principles to teaching skills such as toileting (Edwards & Lilly, 1966; Lohman, Eyman & Lask, 1967), dressing (Ellis, 1963b) as well as feeding (Edwards, et al., 1966). Programs like this helped make the move from institutions to smaller community-based accommodation possible for people with ID (Matson, 1981; McCarver, et al., 1983). Later interventions focussed on the acquisition of social skills (Matson, et al., 1983a; Simon, et al., 1995) as well as cognitive self-regulation and emotional control (Williams & Jones, 1997a). It was reasoned that acquiring these skills would facilitate integration of people into the community and they often served as replacement behaviours for maladaptive ones (LaVigna & Willis, 2005; Matson, et al., 1983a).

4.2.4 Intellectual disability and challenging behaviours

Changing challenging behaviours amongst adults with ID has also been a focus of intervention for behavioural methods. These behaviours are not necessarily associated with a mental illness but behavioural interventions have proven efficacy with adults as well as children with ID (Emerson, 2001; Emerson, et al., 2011; Sturmey, 2005, 2006b; Williams, et al., 1997a) and people with autism (Trudgeon & Carr, 2007). The earliest approach was termed ‘behaviour modification’ (Martin, et al., 1988) and focussed on eliminating or reducing target behaviour using aversive methods as well as contingency
management (Didden, Korzilius, van Oorsouw & Sturmey, 2006; Scotti, et al., 1991). A review of early studies found that the methodologies employed were, however, of patchy quality (Matson, et al., 1983a). More recent approaches based on applied behaviour analysis (ABA) focus on ascertaining the function(s) of the challenging behaviour then teaching or increasing acceptable alternative behaviours as well as decreasing unacceptable ones (Allen, 2009; Allen, James, Evans, Hawkins & Jenkins, 2005; LaVigna, et al., 2005). Attention is also paid to the quality of social environments and the enhancement of quality of life (McVilly & Rawlinson, 1998). This requires particular observational skill when working with people who have severe and profound intellectual and multiple disabilities (Lancioni, et al., 2005; Matson, Mayville, Lott, Bielecki & Logan, 2003; Pruijssers, van Meijel, Maaskant, Keeman & van Achterberg, 2015; Vos, et al., 2010). On the other hand, legislation (Victoria, 2006), state regulation (D.H.S., 2011) as well as professional ethical guidelines (APS, 2011) limit the use of aversive methods. Most challenging behaviour intervention studies have been conducted with children, but of those with adults, almost all are evaluated with single-case designs (Didden, Duker & Korzilius, 1997; Didden, et al., 2006), making comparison with group-designs (Campbell, Robertson & Jahoda, 2014) difficult. Nevertheless, effect sizes are acceptable amongst people with mild (Didden, et al., 1997), moderate, severe and profound ID (Didden, et al., 1997), especially where reliable recording, generalisation procedures, internally valid designs and most particularly, functional analysis is widely used (Didden, et al., 1997; Didden, et al., 2006).

Relying solely on behavioural interventions with adults who have ID can be problematic: aversive methods can be over used (Pruijssers, et al., 2015); behaviours can have multiple functions varying according to ability level (Medeiros, Rojahn, Moore & van Ingen, 2014); the behaviour may be a sign of mental illness (Moss, et al., 2000; Ranzon, 2001) or might overlap with one (Allen, 2008) that requires appropriate treatment; and the assessor may miss the person’s unique view of the situation or miss harnessing the individual’s own goals and motivation, instead imposing on the person the values of others (Harper, et al., 1993; Jahoda, et al., 2009a; Stenfert Kroese, 1997).
4.2.5 Intellectual disability mental health problems

Specific fears and phobias were the earliest mental health problems amongst adults with ID to be recognised and treated with behavioural methods (Matson, 1981). However, these treatments were not systematically studied until the 1980s (Jackson, 1983; Matson, 1981; Ollendick & Ollendick, 1982). Matson (1981) noted the probable heightened need for treatments given the increased “exposure to many new and stressful life events…that could result in fear, avoidance and failure” (p.101) that would accompany an increasing use of community residential placement. Others theorised that a high level of avoidance was actually intrinsic to the personality of all people with ID (Zigler, et al., 1989). Early studies were almost exclusively single-case designs but with minimal scientific method: none used formal diagnoses from the mental disorder classification systems and no studies of agoraphobia or social phobia could be found (Jackson, 1983; Matson, 1981; Ollendick, et al., 1982). Matson (1981) found only three treatment studies for fears (rats, high places and riding in a car) but a more comprehensive review by Jackson (1983) found 15 reports of phobia treatments, all of which used behavioural methods. None incorporated cognitive methods yet the treatments were similar to those used with the general population and all of those using in-vivo exposure were successful (Jackson, 1983).

The literature was in a similar state almost a decade later when King, Ollendick, Gullone and Cummins (1990) reviewed assessment and treatment studies for children with ID. They found that exposure-based interventions had been successfully applied in the treatment of a variety of simple and social phobias and that similar to behavioural treatment of other disorders in children, caregivers played a crucial role in desensitisation, modelling and reinforcement. Nevertheless, a number of methodological issues were noted. First, although many case reports attested to the success of behavioural methods with children who had ID, very few controlled evaluations had been reported (either as single-subject experimental analyses or group outcome comparisons). Hence, little was known about the long-term effectiveness of fear reduction procedures in the sub-population. Second, treatment interventions had been restricted to those based on conditioning principles (operant and respondent). King et al (1990) recommended investigation of behavioural methods combined with cognitive and self-control procedures.
The identification of, and behavioural treatment for anxiety had become more common in community samples during the 1980’s. However, Allen (1989) concluded that the relative paucity of anxiety research in comparison to the general population was due to intentional ‘neglect’ by mainstream psychology. Of the 17 studies reviewed, most were poorly designed, although there was some evidence for benefit from behavioural interventions. Subsequently, studies with greater empirical integrity produced evidence of efficacy for behavioural methods in adults who had severe, moderate and mild ID (Lindsay, et al., 1989; Lindsay, Michie, Baty & McKenzie, 1988b). In one of these, Lindsay et al. (1988b) treated two women with mild and moderate ID with phobias of dogs. They gave subjective ratings of fear and were observed taking ‘behavioural tests’ with the dogs which were video recorded and assessed by independent raters using (i) a six-point scale Rating of Overall Fear and Anxiety and (ii) frequency of positive approaches to the dog, (iii) negative approaches to the dog and (iv) the number of times the subject asked for removal of the dog. Good inter-rater agreement was obtained between trained raters with two subjects suggesting exposure treatment was effective. In the other study, Lindsay et al. (1989) compared the impact of two behavioural relaxation techniques on anxiety in a sample of 50 adults with severe and moderate ID. Anxiety was rated before, during and after the intervention, showing the superiority of behavioural relaxation training as an individual and group intervention on behavioural ratings but not on a pulse rate measure.

The overwhelming foci of behavioural treatments for adults with low ability have been with anxiety and specific fears in particular. Most have been delivered as part of ABA or instructional interventions to enhance adaptive functioning (Lindsay, et al., 1989; Williams, et al., 1997a; Willner, 2005) but some have been delivered within a psychotherapeutic relationship (Lindsay, et al., 1997). Behavioural interventions have been less common for depression but a recent feasibility trial of behavioural activation (BA) indicates it may be worthy of further research in a controlled trial (Jahoda, et al., 2015). It is a behavioural treatment for depression with evidence for efficacy in the general adult population that is delivered as a psychotherapy where a therapist and client decide together on activities, goals and monitoring (Cuijpers, van Straten,
Anderson & van Oppen, 2008; Dimidjian, et al., 2008). In Jahoda et al.’s trial (2014) with adults who had mild, moderate and severe ID a support person was recruited to work with the person on implementing the therapy.

4.2.6 Summary

Behavioural theory is well grounded in experimental research and its consequent interventions are widely used for changing specific observable behaviour as well as treating anxiety and depression in the general population. There is also a long history of behaviour modification and ABA for specific challenging behaviours as well as treating some anxiety problems, particularly fears, amongst adults with LA. However, their neglect of the client’s inner world can lead to problems. Use with vulnerable clients without adequate assessment, with inaccurate formulation or overuse of punitive methods leads to violations of personal rights. Neglecting the client’s world also risks misaligning client and therapist goals that can undermine the clinical process.

Cognitive models, however, account not only for variation in individual psychopathology but also for the features of different disorders and an alliance between therapist and client is central. Despite broad validation of cognitive models of anxiety and depression in the general population, there has been little consideration of the impact of ability on their utility. This is particularly the case for adults with LA and the dearth of theoretical and clinical research is resounding. Some of the key concepts of cognitive theory and an overview of therapies are considered in the next section.

4.3 Cognitive theory

In this section of the chapter, theory relating to cognitive models of depression and anxiety is considered. An overview of cognitive theory and information-processing is initially provided, followed by a discussion of the importance of schemas in cognitive theories of psychopathology. The relationship between content of cognitions and symptoms of anxiety and depression is then considered followed by a summary of the section.
4.3.1 Cognitive theory and information-processing

While behavioural theory seeks to explain observable behaviour, cognitive psychology is concerned with unobservable mental processes behind observable behaviour. Internal processing or cognition is not seen as important for generating emotion (Zajonc, 1980) or behaviour (Mineka, et al., 2006; Skinner, 1985) in behavioural theory but in cognitive models of anxiety and depression it is central (Beck, et al., 2014; Rachman, 2015). As the influence of behaviourism diminished, experimental psychologists in the 1950s began studying cognitive processes as part of a revolutionary shift in the science of human behaviour (Merluzzi, Rudy & Glass, 1981). Cognitive psychology emerged with information-processing theory as a central framework for the experimental study of the cognitive processing of information (Frank, et al., 2015; Harre’, 2002; Rachman, 2015). The processing of emotional and non-emotional information is generally considered to occur through the stages of attention, interpretation and memory. Information-processing theory has been applied to the processing of normal as well as abnormal emotion (Eysenck, 1992; Mathews & MacLeod, 1987). Ellis (1962) and Beck (1967) both considered cognitive processing central to emotional problems and they implicated biases in information-processing in their schema-based models of anxiety and depression. (Beck, et al., 2014).

4.3.2 Schemas and psychopathology

In Beck’s cognitive theory, schemas are relatively enduring representations of prior experience and knowledge that guide the processing of information (Beck, 2005; Beck, et al., 2014). In psychopathological states, schemas are over-inclusive and concrete causing distorted processing of information (Beck, 2005; Beck, et al., 1988a; Beck, et al., 1997). These maladaptive schemas are activated by external events and responsible for selective processing of schema-congruent information and the automatic evaluative thoughts or cognitions that contain inferential errors. Individual differences in the operation of the maladaptive schema and automatic thoughts underlie vulnerability to emotional disorders (Beck, 1967, 1976; Beck, et al., 1985).

Variability in individual schemas has received recent attention in the theoretical (Young, Rygh, Weinberger & Beck, 2008) and clinical (Young, 2003) literature but the biases they generate in the stages of information-processing have long been central to
the cognitive theory of psychopathology (Beck, 1976; Beck, et al., 1988a). Some aspects of information-processing are said to be automatic in nature, occurring with limited intent or conscious awareness such as some features of attention. Other aspects are seen as more strategic or reflective, such as interpretation and memory. Biases can be disorder-specific, with for instance, particular biases of attention related to anxiety disorders and memory biases to depression. A meta-analysis of 172 studies (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg & van IJzendoorn, 2007) supports the presence of attentional biases related to anxiety and a number of theories explain it (Mathews, et al., 1987; Mogg, et al., 1998). Evidence also exists for biases toward storing and recalling loss or failure in depression (Beck, et al., 1988a; Beck, et al., 1997).

4.3.3 Cognitive content

In Beck’s cognitive theory of psychopathology, unhelpful automatic thoughts or cognitions in response to a triggering event are said to be the product of biases in information-processing that are underpinned by maladaptive schema. The distorted content of these can be elicited in the clinical setting and is the target for change through verbally mediated therapy. Therapy focuses on enhancing problem solving during the later stages of processing and reducing bias in the early stages (Beck, et al., 1997). One of the central concepts of Beck’s cognitive theory is that the content of cognitions is largely specific for anxiety and for depression. For anxiety, the content of cognitions is considered to be related to threat, danger and/or uncertainty. For depression, content is related to worthlessness, incompetence, failure and/or pessimism (Beck, 2005; Beck, et al., 1988a) in line with another central concept for depression, that of the negative cognitive triad (Beck, 1976). According to the cognitive content-specificity hypothesis, the symptoms of the respective disorder are predicted by the relevant cognitions (Beck, et al., 1987; Beck & Perkins, 2001).

In addition to the central cognitive content-specificity hypothesis for depression and anxiety, cognitive content can also be specific for individual disorders of anxiety (Beck, et al., 2001; Woody, Taylor, McLean & Koch, 1998). For example, Cho and Telch (2005) as well as Clarke (2001) found social anxiety is associated with cognitions about scrutiny and public evaluation. Ehlers and Clarke (2000) found post-traumatic stress
disorder (PTSD) associated with cognitions about threats to life. Following a recent review and meta-analytic analysis of anxiety disorder research, Gallagher, Bentley and Barlow (2014) have suggested an additional vulnerability factor that could be trans-diagnostic for anxiety disorders. As well as cognitions specific to the anxiety disorder, they found large effect sizes suggesting that perceived control was empirically linked to anxiety disorders.

Beck’s general cognitive model (Beck, et al., 2014) has provided the basis for his cognitive therapy (CT) of depression (Beck, 1967, 1976) and anxiety (Beck, 2005; Beck, et al., 1985). Although Beck denotes his therapy as CT, others have described it, and disorder-specific variants, as cognitive-behavioural therapies (Hollon, 1984; Rush & Shaw, 1983; Young, et al., 2008) containing divisible cognitive and behavioural components (Jacobson, et al., 1996; Rachman, 2015). Regardless of how they are described these therapies are still based on cognitive models of anxiety and depression, which contain the essential ingredient of cognition. Cognition is essential, but not sufficient on its own, for generating maladaptive emotion and behaviour. Cognitive models of anxiety and depression remain the most extensively researched of explanatory models as Beck and Haigh (2014) found in their recent review.

Empirical investigations of cognitive theory have relied mainly on carefully designed behavioural experiments (Cornoldi, 2006; Rachman, 2015) for many years, but the advent of neuro-scientific techniques such as imaging and electrophysiology has forged new avenues of investigation (Frank, et al., 2015). The unique evidence of neural functioning that is produced has supported and extended cognitive theory in the areas of depression (Singh & Gotlib, 2014), and anxiety disorders (Milad, Rosenbaum & Simon, 2014).

4.3.4 Summary
Beck’s cognitive theory of psychopathology, the associated models of anxiety and depression, as well as key concepts such as cognitive content-specificity are supported by extensive empirical research in the general population. Consequently, they form a solid foundation for cognitive-behavioural therapies for specific disorders including
anxiety and depression. However, the impact of ability on the viability of cognitive models, particularly with adults who have low ability needs further investigation.

4.4 Ability and cognitive theory
In this section, the impact of ability on cognitive theory is considered. First, the general population studies addressing the impact of ability on cognitive models of anxiety and depression are considered. Second, the data from the studies testing concepts related to cognitive theory amongst adults with low ability are discussed and a summary follows.

4.4.1 General population studies
Few general population studies have considered general ability as a variable relevant to the viability of cognitive theories of anxiety or depression and none could be found that extended their sample into the spectrum of ID. On the other hand, the specific cognitive functions implicated in models of anxiety and depression hypothesised by Beck and others have been extensively studied (Beck, et al., 1997; Gotlib & Joormann, 2010). Dysfunction in memory and attention are common in depression (Gotlib, et al., 2010; Gotlib, Krasnoperova, Yue & Joormann, 2004b) and attention is a particular area of dysfunction in anxiety (Bar-Haim, et al., 2007; Gotlib, et al., 2004a; Gotlib, et al., 2004b), whereas distorted thinking is associated with interpretation (Mogg, Bradbury & Bradley, 2006; Wenzel & Lystad, 2005). The presence of disorder-specific dysfunction is seen as supporting rather than threatening the viability of cognitive models and recent research shows some have a prospective role in depression (Letkiewicz, et al., 2014) and anxiety (Grimshaw, Foster & Corballis, 2014; Hakamata, et al., 2014). The specific aspects of attention affected in anxiety are considered in more detail as part of Chapter Five. The present discussion is focussed on whether general rather than specific ability affects the viability of cognitive explanations of anxiety and depression and therefore the utility of cognitive-behavioural therapies.

The fact that little is known about the relationship between ability and cognitive models of anxiety and depression in the general population is compounded by the arbitrary exclusion of adults (Lamberton, et al., 2008), adolescents (Jolly, et al., 1994a) and children (Waters, et al., 2008c) with low ability or learning difficulties from cognitive
studies. Nevertheless, some general population studies have tested the relationship between cognitions associated with anxiety and depression and measures of ability.

Early theorists and clinicians questioned the possibility of adults with low ability benefitting from cognitive-behavioural therapy. Ellis (1983) (p.165) emphasised the intellectual demands of his rational emotive therapy (RET) in the persistent use of reason, logic and scientific method, “consequently it ideally requires intelligence, concentration and high-level, consistent self-disputation and self-persuasion” (Ellis, 1983). Rush and Shaw (1983) (p.219) stated that “patients with IQs in the 80-95 range do have difficulty relating beliefs to cognitions in a logical manner”. Hollon (1984) suggested it was unlikely clients with ‘grossly subnormal levels of intelligence’ could manage cognitive-behavioural therapy. However, all three commentators acknowledged the lack of conclusive evidence for ability diminishing the benefits of cognitive-behavioural therapy (Ellis, 1983; Haaga, Stewart, Beck & DeRubeis, 1990; Haaga & Davison, 1989; Hollon, 1984; Rush, et al., 1983). In fact, two counterbalanced with evidence to the contrary. Rush and Shaw (1983) gave a case excerpt to demonstrate how a young woman with an IQ of 82 was able to link a series of behaviours to a particular idea and also cautioned therapists about the intellectualising (reporting content without feeling) style of some people with high intelligence. Hollon (1984) recorded his impression that a client’s motivation may be a more powerful mediator of success, specifically, whether they have a history of actively pursuing what they want.

General population studies addressing the effect of ability have done so in two main lines of enquiry. The first is concerned with the impact of ability on a client’s comprehension of the therapeutic model as well as the effectiveness of cognitive-behavioural interventions. Miller and Kassinove (1978) administered an RET intervention to 96 primary school children who had been allocated to groups according to IQ and found that ability was not related to treatment effectiveness on four dependent measures. They noted the effect of limited sample variance though, with the lowest IQ being 85, yet the mean of the lower group was 102 (Miller, et al., 1978). Lipsky, Kassinov and Miller (1980) used another RET intervention with 50 adults seeking outpatient psychotherapy whose IQs ranged from 80 to 125 with potential participants with IQ below 80 excluded. They found there was no difference between the high and
low ability groups on treatment effectiveness as measured by anxiety and neuroticism. but the depression measure showed a significantly greater improvement \((p<.02)\) by the low IQ group. Furthermore, both groups comprehended and acquired the principles and concepts of the RET model. They cited similar sample variance limitations to the study of Miller et al. (1978) with low and high group means of 94.3 and 110 respectively and a range of 80 to 125 for the whole sample. Neither study included participants with ID and correlational analysis may have been more helpful in illuminating any ability effect. As they are, neither study supports a negative impact of ability on effectiveness of cognitive-behavioural interventions or the acquisition of their principles and concepts. Even some years later, Haaga and Davison (1989) noted that the empirical evidence had not accumulated to support the idea that RET was best suited to people with high ability and despite its superficial plausibility. Evidence had accumulated for the impact of motivational and personality variables though.

Another line of enquiry is the relationship between ability and cognitions related to anxiety and depression. Jolly and Dykman (1994) assessed cognitions and recorded reading level in a sample of 162 adolescents admitted to a psychiatric ward with diagnoses of mood, anxiety and behaviour disorders. Those below grade three on the Wide Range Achievement Test – Revised [WRAT-R; (Jastak & Wilkinson, 1984)] were excluded from the study with the remainder reading and completing the Cognitions Checklist Anxiety (CCL-A) and the Cognitions Checklist – Depression (CCL-D) (Beck, et al., 1987) independently. No correlation was found between reading level and scores on either subscale of the CCL. Haaga, Stewart, Beck, and DeRubeis (1990) assessed a clinical sample of 162 adults referred for cognitive therapy at a university clinic. All had a principal diagnosis of either major depression, panic disorder, generalised anxiety disorder or dysthymia on the SCID for DSM-III (Spitzer & Williams, 1985). They were tested on a vocabulary test (WAIS-Cla  rke) (Paitich & Crawford, 1970) and the Shipley Abstract Reasoning test (Shipley, 1940) yielding means of 22.1 on the CCL-D, 17.6 on the CCL-A, 20.5 on the BDI and 19.5 on the BAI. Scores on the CCL-D were not correlated with the WAIS-Cla  rke or the Shipley but a small negative correlation \(r=-.16, p<.05\) was found between the CCL-A and each of the ability tests. Controlling for the effects of these tests did not affect the strength of association between the CCL-D and BDI or between the CCL-A and BAI (Haaga, et al., 1990). The CCL (A and D) scores
in that study were in significant contrast to those of a one-clinical control group of 25 adults (CCL-A; 5.8, CCL-D; 4.48), but similar to a group \( n=1,263 \) of clinic outpatients (CCL-A; 15.87, CCL-D; 20.19) and \( n=53 \) depressed inpatients (CCL-A; 20.02, CCL-D; 26.92) found by Clark, Steer, Beck and Snow (1996).

A further study by Crandell and Chambless (Crandell & Chambless, 1986) used a clinical sample comprised of 212 adults who were depressed \( n=81 \), non-depressed but with other psychiatric diagnoses \( n=51 \) and without any psychiatric diagnosis \( n=80 \). Groups with psychopathology were clients of a university psychology clinic and community mental health centres. Crandell and Chambless (1986) used their own measure of depressive cognitions (Crandell Cognitions Inventory CCI), and found a small \( r=-.23, p<.05 \) negative correlation between frequency of cognitions on the CCI and a score on the Shipley Vocabulary test (Pringle & Haanstad, 1971) across the clinical and control groups. However, there was a large \( r=.79, p<.001 \) correlation between the CCI and BDI that changed little \( r=.69, p<.001 \) when ability was controlled. A large negative correlation \( r=-.51, p<.001 \) was also found between depressive cognitions and years of education, possibly suggesting the effect of opportunity as well as ability. As expected, the two clinical groups endorsed significantly higher rates of depressive cognitions than the control groups \[ F (2,52) = 176.8, p<.0001 \].

Despite the questions raised by early cognitive theorists and cognitive-behavioural clinicians, there has been little empirical consideration of the impact of ability on cognitive models of anxiety and depression in general population studies. The limited data shows small negative correlations between verbal ability and anxiety-related cognitions in clinical samples but even then, the relationship between cognitions and symptoms is not diminished. The range of ability is not stated for these general population samples and no study could be found that covered all levels of ability below average. This further highlights the way in which ability divides both clinical and theoretical research. Rather than being studied as a dimensional variable, it creates a classification chasm for researchers with general population research on one side and research with people who have ID on the other. Most disappointing is the active exclusion from general population studies of potential participants with low ability due
to untested assumptions about competence on research tasks. This has the effect of depriving general population studies of the lower part of the normal curve and leaving the investigation of mental health amongst those excluded to a small group of researchers facing the significant challenges of research with small samples of people defined as having ID.

4.4.2 Low ability studies

In the sub-population of adults with LA, the literature dates to the mid-1980s. Initial case reports of cognitive-behavioural interventions (Chiodo, et al., 1985; Lindsay, et al., 1993; Lindsay & Kasprowicz, 1987) and self-report measures of symptoms (Helsel, et al., 1988; Kazdin, et al., 1983) preceded the first empirical investigations (Benson, et al., 1992; Dagnan & Chadwick, 1997a; Nezu, et al., 1995) and reviews of cognitive theory and therapy (Lindsay, 1999; Lindsay, et al., 1997; Stenfert Kroese, 1997).

This early literature highlighted three key issues to be considered in the viability of cognitive theory and therapies for anxiety and depression amongst people with low ability. The first of these is communication challenges, especially related to language-borne concepts. These challenges have been well articulated in the literature (Finlay, et al., 2001, 2002; Heal, et al., 1995) and discussed in Chapter Three. The recommended strategies for managing language complexity (Finlay, et al., 2012; Finlay, et al., 2001; Prosser, et al., 1998a) have been incorporated into self-report measures (Lindsay, et al., 2007b) as well as the treatment for anxiety (Lindsay, et al., 1997) and depression (Lindsay, et al., 1993). Suitable task-specific screening and validity procedures (Finlay, et al., 2002; Heal, et al., 1995) are discussed in Chapter Two. The second issue is the impact of emotional functioning. The extensive experimental and applied research on emotional recognition is reviewed in Appendix B showing that patterns of recognition for basic emotions (fear, anger, sadness, happy) are similar across the low ability spectrum though processing takes longer as ability declines and the capacity with more subtle or complex emotion does also.

The third issue is the impact of general intellectual ability and that is the main focus in this section of the current chapter. Cognitive models involve dysfunction in a person’s cognitive processing of information (attention, interpretation and memory) in the cause
and maintenance of anxiety as well as depression. The interpretation stage of processing is generally considered responsible for dysfunctional or distorted cognitions and hence the focus of therapy. Early theorists made the assumption that dysfunctional cognitive processing could be remedied by therapy and thereby relieve distressing emotion (Beck, et al., 1988a; Ellis, 1962). They did not stipulate a required level of pre-existing general ability for mastering the tasks involved in therapy and general population research since then has shed little light on what pre-requisite level of general or specific cognitive abilities and in fact, emotional functioning might be required.

Given the lack of direction from general population research, testing the viability of cognitive models in LA samples has involved a mixture of empirical and practice-based research methods covering three main areas. Firstly, practice-based and empirical strategies have been used to test for the capacity to experience and communicate cognitions relating to distressing emotions and symptoms. Secondly, empirical methods have been used to test specific concepts associated with cognitive models and thirdly, they have been used to test the capacity to complete key tasks (emotion recognition, emotion-situation matching and cognitive mediation tasks) required for cognitive-behaviour therapies. Evidence from these methods will be considered in turn but first of all, the benefits of cognitive explanations and their consequent therapies are discussed.

Cognitive models are based around an individual’s interpretation of events and this can be missed when an over-reliance is placed on someone else’s analysis of their behaviour (LaVigna, et al., 2005; Lindsay, 1999) or the interpretation of family and carers (Harper, et al., 1993; Stenfert Kroese, 1997). Cognitive models also emphasise the importance of a person’s agency or self-determination through a collaborative relationship between client and therapist in setting goals and implementing plans. Hence, there is an assumption that the client is motivated and able to engage in this process (Stenfert Kroese, 1997). For adults with low ability, there is also the important issue of what opportunities they have for self-determination, within their immediate world of family and support staff as well as the broader world of community and society (Jahoda, et al., 2009a; Stenfert Kroese, 1997; Stenfert Kroese, et al., 2014).
Early studies used practice-based methods to confirm that adults with mild and moderate ID experience and communicate cognitions relating to emotions by verbal report, dramatic rehearsal or endorsement of schedule items. In two case studies of cognitive-behavioural therapy for anxiety problems, Chiodo and Maddux (1985) reported on therapist modelling and client rehearsal of critical as well as assertive self-evaluative statements and the client’s reflection on the relative effects of each statement on emotions. Lindsay and Kasprowicz (1987) elicited client reports of evaluative thoughts during role-plays as part of a group social skills program and Lindsay et al. (1997) used role-play and interview to gather cognitions from two men with mild ID who were treated for anxiety problems. Reversed role-plays also elicited cognitions in two case studies of cognitive behaviour for depression (Lindsay, et al., 1993). Finally, a case study showed how a man with moderate ID could rehearse and rescript the story in his nightmare, then recount the corresponding change in emotions (Willner, 2004).

In the first large empirical study, Benson and Ivins (1992) found a sample of 130 adults with borderline, mild, moderate and severe ID was able to endorse cognitions on a self-concept scale (McDaniel & Piers 1973) at interview (Benson and Ivins 1992). In another large study, Nezu et al. (1995), found that adults with mild ID reliably endorsed items on modified versions of the Automatic Thoughts Questionnaire (ATQ) Hollon and Kendall (1980) the Hopelessness Scale for Children (HSC) (Kazdin, Rodgers & Colbus, 1986), the Frequency of Self-Reinforcement Questionnaire (FSRQ) (Heiby, 1983) and the Social Support Network Inventory (SSNI) which is composed of three scales; Negative Social Support (SSN) Practical Social Support (SSP), and Emotional Social Support (SSE) (Flaherty, Gaviria & Pathak, 1983) These were also administered by interview to a sample of 107 people (Nezu, et al., 1995). Adults in a sample of adults with borderline, mild and moderate ID endorsed cognitions on the CCL-A and CCL-D as well as the ATQ in an interview as part of a research study (Glenn, et al., 2003). The only study to test the relationship between ability and disorder-related cognitions found a small negative correlation between the PPVT-III and the ATQ ($r=-.27$, $p<.05$) (Esbenson, et al., 2005).

Other empirical studies have tested specific concepts related to cognitive models of anxiety and depression. These are mainly related to evaluative cognitions of self and are
assessed on self-report measures along with symptoms. In Benson and Ivins’ (1992) study, self-rated depression was negatively correlated with participants’ ratings of self-concept (r=.64, p<.0001). In the other early study of cognitive concepts, Nezu (1995) found that the short-form BDI was positively correlated with the ATQ (r=.61, p<.001), the HSC (r=.36, p<.001) and the SSN (Flaherty, et al., 1983) (r=.28, p<.01) but negatively with the FSRQ (r=-.58, p<.001). Similarly, in a sample of 43 adults with mild and moderate ID, Dagnan and Sandhu (1999) found that symptoms of depression on the Zung Depression Scale (ZDS) (Zung, 1965) were negatively correlated (r=-.41, p<.01) with scores on the negative subscale of the Rosenberg Self-Esteem Scale (RSES) (Rosenberg, Schooler & Schoenbach, 1989), which was in turn correlated with the rank and achievement subscale of the Social Comparison Scale (SCS) (Gilbert & Allan, 1994) (r=.57, p<.01). Social self-efficacy is another cognitive concept associated with depression in the general population (Sherer, et al., 1982) and tested by Payne and Jahoda (2004) in a sample of 38 adults with borderline and mild ID. A positive correlation (r=.42, p<.05) between self-rated depression on the SRDQ and the Glasgow Social Self-Efficacy Scale (GSSSES) was the opposite polarity to that found in the general population samples. But a negative correlation (r=.43, p<.05) with informant’s rating of social communication skill lends support to the argument that ratings of self and others represent different perspectives.

Dagnan and Waring (2004b) found that amongst a sample of 39 adults attending day centres and employment programs, self-rated cognitions about social stigma (Svivos, 1993) were correlated (r=.55, p<.05) with negative evaluative beliefs (Chadwick, Trower & Dagnan, 1999) and negatively correlated (r=-.40, p<.05) with self-rated social comparison (Gilbert, et al., 1994). A more recent study of 151 adults with mild and moderate ID found that scores on an unmodified BDI-II were negatively correlated with scores on self-rated measures of self esteem (r=-.60, p<.01) (RSES) and social comparison (r=-.30, p<.01) (SCS) (McGillivray, et al., 2007). The sample was recruited from similar settings to Dagnan and Waring’s (Clark, et al., 1996; 2004a) and both samples were unselected for depression.

Esbenson and Benson (2007) examined the relationship between depression on the SRDQ and self esteem on the Piers-Harris Self Concept Scale (PH-SCS) with 73 adults
with moderate, mild and borderline ID. There were 22 participants with a recorded
diagnosis of a mood disorder and 40 had no diagnosis; the group with depression were
matched with control participants within the sample who had no diagnosis. Two other
key concepts related to cognitive theory of depression were examined in Esbenson and
Benson’s (2007) study. One was Beck’s triad of negative cognitions (Beck, 1967). This
was tested using the Cognitive Triad Inventory for Children (CTI-C) (Kaslow, Stark,
Printz, Livingston & Tsai, 1992) that yields higher scores for more positive views of
self, world and future. The other concept was Abramson’s hopelessness theory of
depression (Abramson, Metalsky & Alloy, 1989) that was assessed using the
Hopelessness Scale for Children (HSC) (Kazdin, et al., 1986). For the whole sample,
there were negative correlations between the SRDQ and the self (r=-.44, p<.01), world
(r=-.42, p<.01) and future (r=.34, p<.05) subscales of the CTI-C. Similar sized negative
correlations were found between the HSC and CTI-C total scale, (r=.42, p<.05), world
(r=.33, p<.05) and future (r=.40, p<.01) subscale scores. Differences were found on the
RSDQ between the depressed group and non-depressed control group as well as on the
CTI-C total scale and self subscale scores. The differences were only significant at
p<.05 level and were not found for the world and future subscales (Esbenson, et al.,
2007). These results suggest that further research is required to test the viability of
Beck’s cognitive triad (Beck, 1967) and Abramson’s hopelessness theories of
depression (Abramson, et al., 1989).

Esbenson and Benson (2007) also considered the relationship between receptive
language and the cognitive triad. The PPVT-III was correlated (r=.36, p<.05) with CTI-
C scores suggesting higher receptive language was associated with more positive
cognitions. The PPVT-III was also entered into the first step of a hierarchical regression
model to predict CTI-C score at the second measurement time. Although receptive
language accounted for a significant portion of the variance (beta=.34, p<.05), the CTI-
C score at the first measurement time accounted for a greater portion in the final model
(beta=.50, p<.01)

Some studies have used empirical methods to investigate the capacity of participants to
complete the key cognitive tasks involved in cognitive-behavioural therapies (Willner,
2006). Dagnan and Chadwick (1997) developed a five step process based on their own
and others work (Dagnan, et al., 1997b; Reed, et al., 1989; Safran, Segal, Vallis, Shaw & Samstag, 1993) to test capacity for participation in RET. The process included an emotional recognition task, one requiring the choice of an emotion to fit a situation and two cognitive mediation tasks. They illustrated the process with a case study from a sample of 27 adults with mild and moderate ID (Dagnan, et al., 1997a) then reported empirical results from a sample of 40 adults who had a mean BPVS raw score of 64.0 in a later paper (Dagnan, et al., 2000). Of the latter sample, 75% could correctly link an emotion (happy or sad) to a verbally-presented scenario. However, fewer made enough correct choices on the cognitive mediation items to pass the tasks. Overall, 10% could give an emotion when the situation and cognition were offered, though more were successful when the situation and cognition were congruent (the situation and cognition were the same valence) than when they were incongruent (the situation and cognition were of different valence). Overall, 25% of participants identified enough correct cognitions when they were offered a scenario and emotion. Again, more were successful when these were congruent. Dagnan et al. (2000) concluded that accuracy on the tasks was related to receptive language and therefore, capacity with cognitive tasks involved in therapy was related to general ability.

Joyce, Globe and Moody (2006) conducted the same cognitive mediation tasks with a sample of 50 adults with a mean of 12.87 on the British Picture Vocabulary Scale short-form (BPVS short-form) (Dunn, et al., 1982a), which was equivalent to a language level of 5 years and 5 months compared to 6 years and 11 months in Dagnan and Chadwick’s (1997a) study. About a third of the sample were able to link emotions to scenarios though less could manage the cognitive mediation tasks, Large-sized correlations were found between the BPVS short-form and ability to identify emotions ($r=0.54$, $p<0.01$) and label them ($r=0.74$, $p<0.01$) (Joyce, et al., 2006). A similar set of tasks devised by Quakley, Coker and Reynolds (2004) was used by Sams, Collins and Reynolds (2006) with 59 adults with mild ID. These tasks required participants to discriminate between thoughts, feelings and behaviour in story sentences. They found that 18.6% of participants identified all six thought sentences, 16.9% all six behaviours and 6.8% all six feeling sentences. The BPVS-II (Dunn, et al., 1997b) was correlated with the total score on all tasks ($r=0.53$, $p<0.01$) as well as the score on behaviours tasks ($r=0.50$, $p<0.05$).
Receptive language was not correlated with scores on the thoughts tasks or the feelings tasks though.

Each of these studies found receptive language correlated with emotional recognition and, on the whole, with the linking and mediating tasks. However, the percentage of participants demonstrating capacity on the linking and mediating tasks was low. Given the case reports of successful cognitive-behaviour therapy (Lindsay, et al., 1993; Lindsay, et al., 1997) with adults who had a similar level of ID (mild), this is surprising. It may be that the majority of people with ID do not have the capacity for cognitive-behaviour therapy but it is more likely that other factors are tapped in these studies. First, they were experimental studies so no ‘teaching’ of the model occurred as happens in cognitive therapy. This did occur within a standardised time frame in an applied study (Miller, et al., 1978) and in individualised time frames in clinical cases (Lindsay, et al., 1997). Second, participants were not seeking or receiving clinical assistance so there may have been low rates of current distress-related thoughts, feelings and behaviours (Lipsky, Kassinove & Miller, 1980). Third, general population studies cite motivational and trait-related factors affecting suitability for therapy rather than ability-related factors (Beck, Epstein & Harrison, 1983; Ellis, 1983; Hollon, 1984; Rush, et al., 1983). These may also affect the person’s capacity and willingness to form a relationship with the therapist but they have had little attention in the nascent research with the low ability subpopulation. Fourth, no empirical studies have addressed the issue of how capacity for mediation is related to the viability of therapy or the extent of modifications to therapy for it to succeed. It may be that future research with this subpopulation needs to ask theoretical as well as clinical questions.

4.4.3 Summary
A number of approaches have been taken to establishing the impact of ability on the viability of cognitive theories of anxiety and depression. Amongst general population studies, the handful addressing the issue are inconclusive and most others have routinely excluded adults with LA. In the subpopulation with LA, practice and empirical evidence suggests that many adults with moderate, mild and borderline ID experience and can express cognitions. These can be linked with emotions and with situations that are congruent for content. However, few participants in experimental studies appear to the
have the capacity for the more complex cognitive mediation of thoughts, emotion and situations. Consequently, it is not clear what level of mediation is essential to benefit from therapy and in turn, the extent to which the therapy process itself can be adapted to cater for this. Self-report measures show that cognitive concepts are related to symptoms of depression but most studies have not measured ability as a dimensional variable and similar studies have not considered cognitive concepts related to anxiety. There remains a dramatic lack of evidence about the impact of ability on cognitive models of anxiety and depression. Cognitive-behavioural interventions were built on cognitive theory and as part of its formation, theoretical research was conducted in experimental as well as clinical studies. It is time this process was strengthened for adults with low ability. Before examining the evidence for Beck’s cognitive content-specificity hypothesis for anxiety and depression, a review of the current state of cognitive-behavioural therapies with adults who have low ability is warranted.

4.5 Cognitive therapy
In this section, psychotherapies based on cognitive models will be reviewed with particular emphasis on those treating anxiety and depression. Initially the significance of cognitive-behavioural therapies for anxiety and depression in the general population will be outlined. Then early attitudes to the use of cognitive-behavioural therapies with adults who have low ability are considered followed by a discussion of the initial cognitive-behavioural therapies used with this subpopulation. The arguments for and against cognitive-behavioural therapy as opposed to behavioural therapies for this subpopulation are then considered along with a review of the most recent empirical studies of efficacy for cognitive-behavioural therapy for anxiety and depression in this subpopulation. A summary concludes the section.

4.5.1 Cognitive-behavioural therapy in the general population
The cognitive therapies of Ellis (1962) and Beck (1976) have a prime focus on remedying dysfunctional cognition as an essential but not sufficient step in changing emotions and behaviour. Although Ellis’s RET has been used with a wide range of emotional problems (Haaga, et al., 1989), Beck’s acclaimed theoretical work has underpinned the widespread use of his cognitive therapy with depression (Beck, 1963, 1964; Beck, 1967) and anxiety (Beck, 2005; Beck, et al., 1988a; Beck, et al., 1985).
Beck uses the term Cognitive Therapy (CT) but, as identified earlier, his therapy contains behavioural as well as cognitive components that can each produce similar effects to his original CT for depression (Jacobson, et al., 1996). Consequently, therapies with these components have been termed cognitive-behavioural (Butler, et al., 2006; Young, et al., 2008). Reviews and meta-analyses show them to produce large effect sizes for unipolar depression and a range of anxiety disorders (Beck, 2005; Butler, et al., 2006) and that these effects are enduring (Beck, 2005; Hollon, et al., 2006). Cognitive-behaviour therapies are the first line treatments for anxiety disorders in the United Kingdom (Harvey & Gumport, 2015; National Institute for Health and Care Excellence, 2014) and for both anxiety and depression in the USA (Brown, et al., 2014; Harvey, et al., 2015). Cognitive-behaviour therapy is also recommended by guidelines in Australia, for depression (Jorm, Allen, Morgan, Ryan & Purcell, 2013) and anxiety (ACPMH, 2007; Kyrios, Moulding & Nedeljkovic, 2011).

4.5.2 Early attitudes
Despite the evidence for efficacy of cognitive-behavioural treatments for anxiety and depression in the general population, adults with ID have generally been ignored as a population worth offering cognitive-behavioural treatment to (Arthur, 2003; Bender, 1993; Lindsay, et al., 1997) or dismissed as candidates for any kind of psychotherapy (Beail, 2003; Hurley, 1989; Sinason, 1992). Early psychodynamic therapists were blunt about the viability of psychotherapy with adults who had low ability, particularly those with ID. According to Sarason (1953) (p.263) “The inability of such an individual to control or delay emotional expression, to seek and to accept socially appropriate substitute activities in the face of frustrations and restrictions…have been considered the liabilities of the defective individual which make it difficult for him to comprehend and adjust to the purposes of the psychotherapeutic interview”. However, they probably over-generalised about all people with ID based on their experience with the most disabled adults living in institutions (Hurley, 1989; Lynch, 2004; McCarver, et al., 1983).

Early exponents of Beck’s CT (Hollon, 1984) and Ellis’s RET (Ellis, 1962; Miller, et al., 1978) were not so categorical. Hollon (1984) and Ellis (1962, 1983) pointed out that a range of personality and trait characteristics influence a person’s suitability and
indeed, can threaten the viability of therapy. Furthermore, Prout and Strohmer (1998) observed that failures of therapy in general population studies are attributed to therapeutic technique but with adults who have ID, they are more likely to be attributed to ability. Early therapists of the cognitive-behavioural modality did offer some hope that the most likely effect of ability is on the pace and conceptual complexity of therapy (Ellis, 1983; Rush, et al., 1983). Ellis (1962) (p.372-373) illustrates this ambivalence well: “highly intelligent patients…improve more quickly and more significantly with almost any kind of psychotherapy, including RT… However, the rational-emotive therapist can accept patients of relatively low I.Q. and minimal educational background who could not possibly be helped by classical analysis and most other schools of psychotherapy…as long as he is content with limited goals with such patients, he can teach them some of the basic theories and practices of RT”.

These opinions raised the possibility that cognitive-behavioural therapy might be different rather than redundant when ability is limited but there has been little research in the general population to explore this possibility (Haaga, et al., 1989). Researchers and psychotherapists working with adults who had LA took the lead and recommended adaptations to existing psychotherapeutic modalities to account for LA (Hurley, 1989; Lindsay, et al., 1987; Nezu & Nezu, 1994; Prout, et al., 1998). Case studies illustrating such adaptations to cognitive-behavioural therapy for anxiety and depression represent the first evidence with this subpopulation.

**4.5.3 Early low ability cognitive-behavioural therapy**

Early case studies demonstrated that cognitive-behavioural treatments could be used but in a modified form. Chiodo and Maddux (1985) used cognitive components of RET with two clients who had mild ID. Cognitive ‘self-statements’ were combined with in-vivo desensitisation and physiological feedback to generate a reduction in an adolescent’s observed anxiety. Self-statements that alternated between critical and helpful were also used in a role-play with an adult who was anxious and unassertive. The client was able to link the statements with emotions and practise them in therapy as well as her workplace with reported effect. Lindsay et al. (1993) reported on two cases of treatment for depression using a modified version of Beck’s CT (Beck, Rush, Shaw & Emery, 1979). They retained the structure of CT but simplified the steps of agenda
setting, isolating negative cognitions, eliciting underlying assumptions, testing cognitions and generating alternatives, monitoring thoughts and feelings, role playing and basic homework. Monitoring was enhanced by the use of a visual analogue scale for mood and anxiety. The first client’s ZDS scores were 17 prior to therapy, 9 at completion of therapy and 6 at 6-week follow up. The second client’s ZDS scores were 27 prior to therapy, 12 after 35 weeks treatment and 10 at 6-week follow-up. Anxiety on the ZAS was also measured and showed a similar pattern of change but not as marked as on the ZDS (Lindsay, et al., 1993).

Lindsay et al. (1997) used the same structure and modified steps with two adults with mild ID who had clinical-level anxiety. As well as the previous modifications, they noted a greater use of role-play, including role reversal and a de-emphasis on disputing of thoughts. Whilst the accuracy of cognitions was tested with simple evidence, alternative thoughts were formulated by the therapist and offered to the client to practice. Lindsay et al. (1997) also questioned whether clients could abstract the beliefs underlying their automatic cognitions. These were also developed by the therapist through inference and used to develop replacement cognitions. Case 1 had a BAI of 50 at pre-treatment, and 20 post-12 months of treatment with gains maintained at 18-months follow-up. In case 2, scores were 40 at pre-treatment and 8 post-3 months of treatment and these were maintained at a 3-month follow up. Both cases showed more improvement in BAI than BDI scores but scores on the latter were also maintained at follow up. In a further paper, Lindsay (Lindsay, 1999) reported using the same therapy with a further 15 clients treated for anxiety and five for depression though symptom scores and treatment length were not quoted. Khreim and Mikkelsen (1997) also reported on the successful exploration and disconfirmation of beliefs with a man who had mild ID and panic, as well as with a woman with moderate ID and generalised anxiety disorder.

Cognitive methods have also shown promise as part of interventions in areas that are not specifically related to anxiety and depression. There is evidence for their use in teaching cognitive self-regulation of independence, emotional control and behavioural self-management (Williams, et al., 1997a; Willner, 2005). Problem-solving and social skills training have been effective (Nezu, et al., 1994; Willner, 2005) as has treatment of
offenders (Lindsay & Hastings, 2004; Lindsay, et al., 2003). Evidence has also accumulated for cognitive methods of anger management (Novaco & Taylor, 2015; Taylor, Novaco, Guinan & Street, 2004b; Willner, et al., 2013).

4.5.4 Cognitive-behavioural versus behavioural

The early case studies raised interest in psychotherapy across a range of modalities for different treatment issues. This coincided with a number of literature reviews within a few years covering the North American and British literature. However, these found few empirical studies where psychological therapies of any modality were used to treat anxiety or depression. Hatton (2002) found only three studies reporting cases of cognitive-behavioural therapy for depression and four for anxiety. Prout and Nowak-Drabik (2003) found 92 studies for meta-analysis that they deemed to have used psychotherapy of any modality between 1968 and 1998. Methodological limitations were present in most of them but an overall moderate degree of change was achieved. There were 12 studies using a cognitive-behavioural modality but neither the focus of treatment or efficacy data was reported for this subset. Beail (2003) noted that the cognitive-behavioural literature for anxiety and depression was still comprised of case studies but that this modality had been used in a number of studies to treat offending behaviours, as well as teach problem-solving and self-regulation of anger through individual and group programs. Benson (2004) reported on one case series of cognitive-behavioural treatment for sleep problems but found that methodology in psychotherapy studies was still lacking across modalities. She did note some progress in the accuracy of assessment and the reliability of diagnosis of mental health problems in the subpopulation. Willner (2005) suggested that despite the poor quality of evidence at the time, it supported the used of cognitive methods. He advocated giving consideration to the complexity of the intervention required and the specific referral issue to be addressed when planning therapy.

The increased attention to psychotherapeutic methods and the cognitive-behavioural modality in particular, reignited debate about cognitive versus behavioural theory, as well as the quality of evidence for treatments of either kind. Sturmeys’s (2004) selective review of cognitive interventions made a number of critical points about the existing reviews. Firstly, that the evidence was weak for the cognitive treatment of depression
but promising for offending and anger management. Secondly, that few controlled studies were available and thirdly, that a number of the interventions contained both behavioural and cognitive components, therefore confounding the evidence for cognitive methods (Sturmey, 2004). Sturmey broadened his criticism to the literature on all modalities of psychotherapy but singled out the review of Lynch (Clark, et al., 1996; 2004) and meta-analysis of Prout and Nowak-Drabik (2003) in a further article. Sturmey (2005) asserted that the nine controlled studies reviewed by Prout and Nowak-Drabik (2003) were predominantly behavioural training programs and hence their claim for the efficacy of psychotherapy and Lynch’s quoting of it was incorrect. Along with a more detailed explication of ABA, Sturmey advocated the radical behaviourist theoretical position that cognitions are internal behaviour subject to the same laws as observable behaviour rather than the cause of observable behaviour. Along with his previous assertions about evidence for ABA and lack of it for cognitive methods, he claimed that arguing for cognitive therapy based on equity of access is false. Based on evidence alone, he argued that treatments for problem behaviours and mental health problems should be based on ABA (Sturmey, 2006a).

This stance was widely rebutted by researchers of cognitive (Lindsay, 2006; Taylor, 2005), behavioural (Emerson, 2006), psychodynamic (Beail, 2005), and less specific modalities of psychotherapy (Hurley, 2005; King, 2005; Taylor, 2005). Lindsay (2006) took the cognitive theoretical position of the centrality of cognitions in understanding emotion and behaviour as well as questioning Sturmey’s (Sturmey, 2004, 2005) distinction between cognitive and behavioural methods. Whilst Taylor (2005) and Emerson (2006) confirmed the support for ABA with challenging behaviours, they noted the lack of evidence for its narrow approach with a number of emotional and behavioural problems. Beail (2005) and Hurley (2005) also pointed out that psychotherapies address mental health problems such as anxiety and depression whereas ABA does not. Each of the respondents acknowledged the limited evidence base but also the importance of continuing to offer therapies already proven in the general population. As King (2005) suggested, it was a matter of proceeding with compassion whilst awaiting the evidence. The next 10 years saw significant progress in commentary and empirical research of cognitive-behavioural treatment of depression and to some extent anxiety, with this subpopulation.
4.5.5 Recent outcome studies

In the past 10 years, the literature has increased substantially with the publication of reviews and theoretical papers (Dagnan & Jahoda, 2006; Davis, Saeed & Antonacci, 2008; Hastings, 2013; Prout & Browning, 2011; Taylor, Lindsay & Willner, 2008; Vereenooghe & Langdon, 2013; Willner, 2006; Willner & Hatton, 2006b) as well as publication of treatment case studies (Stenfert Kroese & Thomas, 2006; Willner, 2004; Willner, et al., 2006a). A recent edited publication (Taylor, Lindsay, Hastings & Hatton, 2013b) features a comprehensive coverage of theoretical and applied (Lindsay, Jahoda & Willner, 2013a; Lindsay, Jahoda, Willner & Taylor, 2013b) research as well as commentary on factors that influence the provision of cognitive-behavioural therapies (Taylor & Knapp, 2013a). Most significant has been the publication of empirical studies using control as well as intervention conditions. Most of these have featured group interventions for depression but some have used individual interventions.

Ghafoori, Ratanasiripong and Holladay (2010) reported on a pilot group cognitive-behavioural program for mood management. The program was administered to eight young adults with borderline and mild ID in 9 sessions by a registered and a trainee psychologist. Significant improvement was noted between pre- and post-ratings on six symptom areas of the Symptom Checklist-90-Revised (SCL-90-R) (Derogatis, 1994) including anxiety and depression and these were maintained at follow up. However, there was no control condition. Another pilot study used a structured mindfulness-based cognitive therapy with a group of 15 adults with borderline, mild and moderate ID who had experienced depression or generalised anxiety (Idusohan-Moizer, Sawicka, Dendle & Albany, 2015). Seven participants attended with a carer and 10 completed all of 10 sessions. Symptoms on the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) were significantly lower for anxiety [t(11)=3.29, p<.01, r=-.70] and depression (z=-2.36, p<.05, r=-.68) post intervention but only anxiety remained statistically lower at 6-week follow up. Compassion and kindness for self and others increased significantly (z=-2.20, p<.02, r=-.64) post intervention with the gains remaining at follow up.

A cluster of larger group intervention studies recruited samples of adults living in the community and attending metropolitan day activity services. The first of these randomly
allocated adults with mild and moderate ID to a control ($n=15$) group and an intervention group ($n=34$) who were administered a five-session group program for depression. Compared to controls, the treatment group showed significant improvements in depressive symptoms (BDI-II) and cognitions (ATQ) as well as feelings about self, which were maintained at 3 months (McCabe, McGillivray & Newton, 2006). A further study used support staff to deliver the intervention for depression to 47 adults with mild ID. Support staff were given 2 days of training then led 12 sessions of about 2 hours each with groups containing five to six participants who were compared with a control group containing 27 adults. Significant improvement was found on the BDI-II and ATQ with this remaining at 3-month follow-up (McGillivray, et al., 2008). In another study, McGillivray and Kershaw (2013) trained support staff to identify signs of depression amongst adults with mild ID and make supportive referrals for treatment by either general medical practitioner only, group cognitive-behavioural program only or both. The 82 participants with mild ID were distributed across the three groups but only those two receiving psychological treatment showed significant improvement on the BDI-II and ATQ (McGillivray, et al., 2013).

The most recent in this cluster of studies of group treatment for depression was the first to investigate the efficacy of separate behavioural and cognitive interventions as well as a combined intervention. The separate conditions were expanded versions of the behavioural and cognitive components in the ‘Think happy, Feel happy, Be happy’ program used in the researchers’ previous intervention trials (McCabe, et al., 2006; McGillivray, et al., 2013; McGillivray, et al., 2008). The sample of 70 adults with mild ID had been screened positive on a checklist of depression signs by support staff after which a therapist assessed symptoms (BDI-II) and thoughts (ATQ) by self-report. Groups were decided according to the three agencies making referrals but all participants received a 12-week program delivered by a single therapist. There was a significant improvement in symptoms between pre- and post-assessment for each group but there was not a significant difference between the groups. However, the combined cognitive-behavioural strategies group did show a significant reduction in depressive cognitions at post-test that was maintained at follow-up whereas the other groups did not (McGillivray, et al., 2015).
The results of these group intervention studies are promising for further investigation of individualised treatments of anxiety and depression. The naturalistic sampling methods used in this cluster of studies maximise the engagement of support agencies and their staff as well as the number of people receiving the intervention. Despite their benefits, these sampling methods pose some drawbacks in empirical research as recent studies illustrate. McGillivray and McCabe (2007) recruited a sample of 151 participants from vocational and supported employment services and did not select for depression. They found that 60.9% scored below 10 on the BDI-II and in contrast, only 1.3% were in the severe range. McGillivray and Kershaw (2015) on the other hand, recruited 73 adults from similar settings who had been deemed ‘at risk’ for depression by staff. Using Beck’s severity categories on the BDI-II (Beck, et al., 1996b), 34% of the sample were minimally depressed (0-13), 40% mildly depressed (14-19), 19% moderately depressed (20-28) and 7% severely depressed (29-60). Consequently, 74% had BDI-II scores below the general population level: for referral from primary to specialist care (BDI-II: 18-19) (Arnaud, et al., 2001); for mean symptoms of cases treated in a cognitive therapy clinic (BDI-II: 18.34) (Clark, et al., 1996); and mean symptoms of a sample with a clinical diagnosis of major depression (BDI-II: 22.67) (Lamberton, et al., 2008). Similarly, this is below the mean of a sample referred for treatment of depression (BDI-II: 31.84) at a specialist clinic for adults with ID and mental health problems (Lindsay, et al., 2007b). The limited symptom range limits the amount of statistical variance available in the study. Furthermore, the low number of clinical level cases restricts the inferences that can be drawn about the effect of treatment on clinical level depression and about the viability of cognitive models of anxiety and depression in this subpopulation.

The first randomised, controlled trial of an individual cognitive-behavioural treatment for anxiety and depression used a manualised trans-diagnostic intervention with a sample of 32 adults with mild and moderate ID (Hassiotis, et al., 2013). The research assistant carrying out assessments was blinded to allocation but language ability determined the extent to which homework materials and behavioural experiments were individualised. The program comprised a manual with related homework materials developed specifically for the study and was delivered in 16 weekly 1-hour sessions. Symptoms were measured on the self-report Beck Depression and Anxiety Inventories-
Youth (Beck, et al., 2005) at the start, finish and at 6-month follow-up. Results showed no significant differences between the intervention arm \( (n=16) \) and treatment as usual arm \( (n=16) \) at either post-treatment or at follow-up although a non-significant effect in favour of the intervention arm had developed by 6 months (Hassiotis, et al., 2013).

The most recent trial of an individual intervention also used a manualised trans-diagnostic intervention for symptoms of anxiety and depression with adults who had a mild ID (Lindsay, et al., 2015). They used 32 participants referred to two separate services with one providing the treatment trial, matched with adults on the waiting list of the other. The treatment involved five modules administered over 8-14 sessions and symptoms were measured on the Brief Symptom Inventory (BSI) (Derogatis, 1993) as well as the Glasgow Anxiety Scale (GAS-ID) (Mindham, et al., 2003) and Glasgow Depression Scale (GDS) (Cuthill, et al., 2003) at pre- and post-treatment as well as follow-up. Results showed significant differences between groups on the post-treatment BSI Global Severity Index (GSI) of the BSI but not the BSI Anxiety and Depression indices. For the treatment group, all measures except the BSI depression showed significant improvement from pre- to post-treatment and were maintained at follow-up (Lindsay, et al., 2015).

With the increase in empirical evaluation of treatments, studies have also started to consider the client’s experience of cognitive-behavioural therapy. Clients may not be clear about the reason for referral or feel engaged in the process, especially when initiated by family or support staff, despite having positive expectations of therapy (Kilbane & Jahoda, 2011). Fifteen adults with borderline and mild ID treated for anxiety, depression and anger found the supportive aspects of therapy important (Pert, et al., 2013). Transcripts of interviews from 15 cases were analysed to find that power was relatively equally distributed between therapist and client from session four onward in cognitive-behavioural therapy for anxiety and depression (Jahoda, et al., 2009b).

A more sophisticated consideration of the client’s social world is also important. In the broader world, stigma and prejudice may cause the very symptoms that are treated and further ecological research may be required to ascertain whether successful treatment of symptoms leads to greater self-determination and better relationships (Emerson, et al.,
In their more immediate world, support staff may feel excluded from the process even though they perceive the therapy as helpful to their clients, thereby raising the question of whether to include them as therapeutic team members or maintain the therapeutic relationship as separate from the support relationship (Stenfert Kroese, et al., 2014).

The methodological rigour of studies testing cognitive-behavioural interventions for anxiety and depression amongst adults with low ability has improved but they still have empirical limitations. Sample sizes are small, only one manualised program adjusted for ability (Hassiotis, et al., 2013), only two included participants with moderate ID (Hassiotis, et al., 2013; McGillivray, et al., 2015) and one used a task-specific screening procedure rather than arbitrary non-selection by ability category. Naturalistic sampling leads to limited symptom variance and few cases with diagnostic-level or clarity of symptoms thus limiting the clinical and theoretical findings. Also, depression is still the most frequent focus of intervention studies with none of the recent studies targeting anxiety on its own. The improved methodologies and useful evidence they yield is welcome but more is needed and not without similar progress on theoretical research. It is particularly surprising that the relationship between cognitions and symptoms has not been further investigated given the increasing interest in cognitive-behavioural treatment for both anxiety and depression in this subpopulation.

Whilst the exclusion of adults with severe and profound ID from treatment studies is an issue affecting theoretical as well as clinical research, it is increasingly highlighted in the literature. Ross and Oliver (2003a) raised conceptual issues related to mood and its assessment (Ross & Oliver, 2003b) amongst people with this level of ability. Lancioni et al. (2005) reviewed indices of happiness, Adams and Oliver (2011) reviewed the expression and assessment of internal states, and Walton and Kerr (2015) reviewed the methods of assessment for depression in this group. The fact remains though that most theoretical and clinical cognitive research excludes adults with this level of ability without task-specific screening.
4.5.6 Summary
Despite the success of Beck and Ellis’s cognitive-behavioural therapies in large empirical studies there is little evidence of their adjustment for low ability in general population studies of treatments for anxiety and depression. Early case studies and case series conducted with clinical level anxiety and depression showed that modified forms of therapy have produced significant improvement amongst adults with low ability. Despite the increased use of cognitive methods, behavioural intervention remains important for changing specific behaviours, either through ABA or as part of psychotherapy. As well as efficacy for anxiety and depression, cognitive-behavioural treatments are delivered in a power-neutral relationship and help maximise self-determination. The recent increase in quality and amount of empirical research on cognitive-behavioural treatment of depression is a welcome development despite the need for much more, especially with anxiety. There is strong and consistent advocacy for further clinical research (Hastings, 2013; Lindsay, et al., 2015; Vereenooghe, et al., 2013) but the lack of synchrony between clinical and theoretical research progress must also be addressed. In particular, the cognitive content-specificity hypothesis has been well researched in the general population but its viability remains virtually untested in the subpopulation. The evidence for this important foundation concept for cognitive-behavioural therapy of anxiety and depression is summarised in the following section.

4.6 Specificity of cognitive content and symptoms
In this section, the concept of cognitive content-specificity for symptoms of anxiety and depression is examined in detail. Initially, the available evidence from studies of adults in the general population is considered and then studies with children and adolescents are discussed. Few studies have considered the relationship between cognitions and symptoms of anxiety as well as depression in low ability samples, but these are discussed along with the data on the predictive capacity of cognitions in this subpopulation. A summary concludes the section.

4.6.1 Adult studies
The cognitive content-specificity hypothesis dictates that depressive thoughts will be the sole predictors of depressive symptoms. The content of these are self-deprecatory in relation to a person's past and future. Similarly, anxious thoughts will be the sole
predictors of symptoms of anxiety and these cognitions are threat- or harm-related (Beck, et al., 1985). Significant research support has accrued for the hypothesis amongst adults in the general population (Beck, 2005). In his initial test of the hypothesis, Beck (Beck, et al., 1987) used a sample of 618 psychiatric outpatients with diagnoses of primary anxiety or depressive disorder. Participants had been diagnosed on the Structured Clinical Interview for DSM-III SCID (Spitzer, et al., 1985) and rated on the Hamilton Depression Scale (HAM-D) (Hamilton, 1960) and Hamilton Anxiety Scale (HAM-A) (Hamilton, 1959). The self-report CCL with subscales for loss and failure (CCL-D) as well as threat and danger (CCL-A) had been created for this study and they found confirmatory results in two important areas. Firstly, although both the CCL-A and CCL-D subscales correlated with both the HAM-A and HAM-D, the relationship was significantly stronger between the affect-congruent pairs (i.e.: CCL-A - HAM-A and CCL-D - HAM-D) than the affect-incongruent pairs. Secondly, significant differences were also found between the two diagnostic groups based on the CCL-A and CCL-D scores.

Some studies have used two separate measures of cognition, such as the Anxious Self Statements Questionnaire (ASSQ) (Kendall & Hollon, 1989) and the Automatic Thoughts Questionnaire (ATQ) (Hollon, et al., 1980) rather than the CCL that combines two subscales. Evidence for content-specificity has been found with the separate measures in clinical (Jolly & Kramer, 1994b) and non-clinical groups (Safren, et al., 2000) and also, for a strong factor of negative cognition and affect which shares features of anxiety and depression. Clark et al. (1996) diagnosed clients with the DSM-III-R SCID (Spitzer, Williams, Gibbon & First, 1988) and participants completed the CCL, HADS, BDI and BAI. The sample comprised groups of: psychiatric inpatients; physically-ill hospitalised inpatients; and a control group. Results showed that the specificity of cognitions for symptoms appears to vary as a function of the underlying severity of disorders. That is, there is less specificity for cognitions as the strength of symptoms in the disorder diminishes (Clark, et al., 1996).

In a review of the earlier studies, Clark et al. (1996) found them generally supportive of the Beck et al. (1987) finding but where uncertainty exists, it is in relation to the link between threat/danger cognitions and anxiety rather than loss/failure cognitions and
depression (Greenberg, et al., 1989). Discrimination between disorders appeared to be enhanced: when clinical (diagnosis by clinician as part of treatment) groups are compared rather than non-clinical (meets criteria on self-report measures) groups (Steer, Beck, Clark & Beck, 1994); where cognitions are measured by self-report checklists of endorsed statements rather than self-generated thoughts; and where group comparisons are between primary anxiety and primary depression (Clark, et al., 1989).

A larger review and meta-analysis of 13 studies between 1950 and 1998 came to similar but stronger conclusions (Beck, et al., 2001). Six studies used nonclinical populations and the remaining seven were clinical in nature. Most of these studies used Clark and Beck’s measurement paradigm of the BDI and BAI for symptoms and the CCL (A and D) for cognitions (Clark, et al., 1989) but those that did not were modified for comparison. Across the 13 studies, depressed and anxious symptoms shared a significant portion of their variance with both anxious and depressed cognitive content. Despite this overlapping variance, the depressive cognitions were significantly more strongly related to depressive symptoms than to anxious symptoms. This content-specific relationship was not, however, present for anxious cognitions and symptoms (Beck, et al., 2001). Beck and Perkins (2001) suggested two possible explanations for the lack of specificity for anxious cognition. First, the theoretical construct and the measurement of anxious cognitive content may not be accurately distilling the relevant core cognitions. There may not be a set of cognitions that are common across all anxiety disorders and can tap the emotional, cognitive and physiological correlates of anxiety. Second, it may be that that treating cognitive content relating to anxiety and depression as simply ‘either or’ is inappropriate. In fact, measures need to separate cognitive and affective variables that are unique to anxiety and depression from those that are shared.

Later studies show greater diversity in measurement paradigms, analysis approaches and theoretical questions, yet show similar results to earlier studies. Many have used a correlational approach where depressive and anxious cognitive and symptom states are treated as continuous variables rather than relying on categorical diagnoses of anxiety and depression. They are measured via self-report measures allowing content specificity to be tested in mixed as well as, or instead of, primary diagnostic states. Specificity for both anxiety and depression in samples with mixed symptoms has been found through
correlational analysis (Jolly, et al., 1994a; Lamberton, et al., 2008) and structural equation modelling (Cho, et al., 2005) with a number of these recent studies adding to the theoretical breadth of the hypothesis. Using open-ended questions about imagined future outcomes, Ghahramanlou et al. (2007) found depressed and anxious participants differed in their expected emotional reactions to future events. Cho and Telch (2005) found that positive affect self-statements were common to social anxiety and depression, but both positive and negative statements were unique to social anxiety whereas negative depressive statements were specific to depressive symptoms. Furthermore, a later large twin study that took cross-sectional analyses through the developmental period, found both disorder-specific and shared cognitive concerns relating to anxiety and depression (Brown, et al., 2014). Brown et al. (2014) argued that this finding strengthens the hypothesis and also the case for targeting interventions according to stated cognitive concerns.

4.6.2 Child and adolescent studies
Support for content specificity amongst children and adolescents is mixed. Laurent and Stark (1993) screened 720 mid-to-late primary school students with self-report symptom measures as part of a study of non-clinical children (had not presented for treatment). They then used an interview to diagnose 63 primary school students as (1) anxious, (2) depressed or (3) as displaying mixed symptoms of depression and anxiety. Self-report cognition measures designed for children (ATQ for children) and the Thought Checklist for Children-Anxiety (TCC-A) as well as Thought Checklist for Children-Depression (TCC-D) did not significantly discriminate between the anxious and depressed groups. The depressed and mixed groups did endorse slightly more negative items than the anxious group (Laurent & Stark, 1993). Garber, Wiess and Shanley (1993) used adult self-report measures of cognition (ATQ, ASSQ, CCL-L, CCL-D) and for symptoms, the BDI and Spielberger State-Trait Anxiety Inventory for children (STAI-C) (Spielberger, 1973) with a non-clinical sample of 688 secondary school students. Measures were administered in groups and individually but not accompanied by interview. They found large correlations between depressive symptoms and depressive cognitions on the CCL-D \((r=.66)\) as well as between the CCL-A and anxiety symptoms \((r=.62)\). However, the correlations between cognitions and their incongruent symptoms were also large \([(CCL-D-STAIC: r=.69) (CCL-A-BDI: r=.53)]\).
There was no association between age and the strength of thoughts though (Garber, et al., 1993).

Studies using samples with greater diagnostic definition and more severe pathology have found greater specificity. Sood and Kendall (2007) used a group of 68 7-13 year olds treated at a clinic who were diagnosed with either GAD or social phobia (SP) with the ADIS-IV for children and parents (ADIS-IV C/P). A measure of anxiety-related cognitions (Negative Affectivity Self-Statement Questionnaire-Anxiety Scale (NASSQ-A) was specifically correlated with anxiety symptoms and not depressive symptoms (Sood, et al., 2007).

Jolly and Dykman (1994) used a sample of 162 hospitalised inpatient adolescents (mean age=14.6) admitted with primary diagnoses of depression (47%), anxiety (2%), conduct problems (17%), oppositional (14%), adjustment problems other than depression (6%) and other problems (13%). They completed the CCL (A and D), Children’s Depression Inventory (CDI) and the BAI as long as they had at least third-grade reading ability. The primary anxiety-only group was small and those with anxiety secondary to depression were only 11%. No significant relationships were found between the CCL scores and age or reading level. A principal factor analysis of the CCL showed that anxiety and depressive cognitions consisted of three factors accounting for 85.9% of variance. These comprised a general cognitions factor (68.8%), an anxiety cognitions factor (11.4%) and a depressive cognitions factor (5.7%). Regression analysis employing these three factors was then used to establish the relationship between cognitive content and the non-cognitive (N-C) symptoms of each disorder. Self-reported non-cognitive depressive symptoms were significantly predicted by general cognitive content and specific depressive cognitions. Specific anxiety cognitions did not. General cognitive content significantly predicted non-cognitive anxiety symptoms, as did specific anxiety cognitions whereas specific depressive cognitions did not. Jolly and Dykman (Jolly, et al., 1994a) suggested these data support not only the cognitive specificity thesis but also the tripartite model of depression, which includes a general distress or internalising condition. It appears that, similar to studies with adults, greater symptom severity might be linked with greater cognitive specificity in adolescents but it is not yet clear if the less differentiated pattern of psychopathology often found in
children (Alfano, Beidel & Turner, 2006; Rao, et al., 2007) explains the lack of support for specificity in some studies.

Overlapping variance between cognitions and symptoms has been consistently found in general population studies. Nevertheless, depressive cognitions are significantly and more strongly related to depressive symptoms than anxious cognitions are to anxiety symptoms (Beck, et al., 2001). Specificity of cognitions and symptoms is more likely though when clinical groups with primary diagnoses of anxiety and depression are compared (Clark, et al., 1989; Steer, et al., 1994). Cognitive content-specificity for both anxiety and depression has also been found in samples with mixed symptoms through correlational analysis (Jolly, et al., 1994a; Lamberton, et al., 2008) and structural equation modelling (Cho, et al., 2005). However, the evidence is less clear amongst child and adolescent samples (Laurent, et al., 1993; Sood, et al., 2007). Surprisingly, there are negligible data on cognitive content-specificity in samples with low ability, despite the concerns of early cognitive theorists about the capacity of adults with ID to participate in cognitive-behavioural therapies (Ellis, 1983; Hollon, 1984; Rush, et al., 1983) and the rise interest in these therapies (Taylor, et al., 2013b).

The case for a connection between disorder-specific thoughts and symptoms is strong in the general population, particularly where symptom levels are high and especially for depressive thoughts and symptoms in adults. Little consideration has been given though to how differing abilities might affect this relationship. Ability of any kind is rarely considered a variable in general studies and special studies of adults with low ability such as adults with ID are scarce. A few studies have investigated the correlation between cognitions and symptoms of depression with samples of adults with low ability but only one has considered anxiety. Despite the wealth of research on cognitive content-specificity for anxiety and depression in the general population, only one study has tested this in a sample with low ability.

4.6.3 Low ability studies

Whilst studies have investigated a number of cognitive concepts related to depression in low ability samples, there is still little empirical data about whether cognitive content is related to symptoms of anxiety and depression. A number of studies have investigated
this relationship using correlations but only two have tested the predictive capacity of cognitions. Of the studies investigating correlations, only one to date has used the CCL (A & D), but the scoring was contracted on both this and the ATQ from five points to four (Glenn, et al., 2003). The sample used by Glen et al. (2003) consisted of 46 adults with borderline, mild and moderate ID. All lived in supervised accommodation and 41% had a current or previous diagnosis of depression. Nevertheless, they found large correlations between the CCL-A and BAI \((r=.81, p<.001)\) as well as the CCL-D and the self-report Reynolds Child Depression Scale (RCDS) (Reynolds, et al., 1988) \((r=.76, p<.001)\). They also found that the ATQ was correlated with the RCDS \((r=.89, p<.001)\).

Correlations between cognitions and incongruent symptoms were also high though \((ATQ-BAI; r=.74; CCL-A-RCDS; r=.73; CCL-D-BAI; r=.62)\), suggesting that multiple regression would be required to test the content-specificity hypothesis. The first study to use the ATQ, Nezu et al. (1995), used it unmodified and found it was correlated \((r=.61, p<.01)\) with the short-form BDI amongst 107 adults with mild ID. In that study, adults with psychotic, organic or personality disorders were excluded but 16% had major depression and 29% had other mood disorders listed on file BDI-R (short-form).

Esbenson and Benson (2005) also modified the ATQ scoring and found it was correlated \((r=.75, p<.01)\) with symptoms of depression on the SRDQ as well as existing diagnosis. Their sample of 73 adults with borderline, mild and moderate ID lived independently with support (88%), in staffed housing or with family. Although potential participants with schizophrenia were excluded from the sample, 45% of those remaining had an existing mood disorder diagnosis, mostly depression. Other studies have found correlations between the ATQ and depressive symptoms in low ability samples. McGillivray and McCabe (2007) used an abbreviated ATQ with three-point scoring on the ATQ amongst 151 adults with mild and moderate ID not selected for depression and found a correlation with the BDI-II \((r=.72, p<.01)\). McGillivray et al. (2008) used a 15 item three point ATQ and found a group treatment lowered symptoms on BDI-II and cognitions on the ATQ in a sample \((n=49)\) with mild and moderate ID that were screened positive for depression.

Studies of cognitions in LA samples are hampered by similar challenges to those of symptom prevalence studies. Adults with severe and profound ID are still routinely
excluded without task-specific screening and clinical samples are more difficult to assemble. It is also more difficult to combine theoretical research with clinical practice because cognitive-behavioural therapy is simply not provided on a large scale. The size of samples in studies of the LA subpopulation is smaller too. The largest of these studies had sample sizes of 151 (McGillivray, et al., 2007), 107 (Nezu, et al., 1995) and 73 (Esbenson, et al., 2005). In comparison, general population studies boast clinical samples of 618 (Beck, et al., 1987) and 1,907 (Steer, et al., 1994) as well as non-clinical samples with sizes such as 290 (Steer, et al., 1994) 277 (Beck, et al., 2001), with many of the studies conducted in combination with routine cognitive-behavioural therapy.

Only two studies using LA samples have tested the predictive capacity of cognitions. McGillivray and McCabe (2007) recruited 151 adults with mild and moderate ID from vocational support services who were unselected for mental health problems. They found that together, measures of social comparison, self-esteem, social readjustment, perceived quality and frequency of social support and the ATQ accounted for 58.1% of the variance in symptoms of depression on the BDI-II ($p<.001$). The ATQ accounted for the largest portion of the variance (beta=.55), followed by quality of social support. This study used an abbreviated ATQ with truncated scoring and neither anxious cognitions nor symptoms were measured. General ability was not measured or controlled either, and no adults with severe or profound ID were included.

The other study addressing cognitive content-specificity assessed cognitions and symptoms of anxiety, as well as depression. The study by Glen et al. (2003) used the CCL (A & D) and ATQ with all items but truncated the scoring and instead of accompanying the BDI-II with the BAI, used the RCDS for depression. Results show uniformly large intercorrelations amongst all cognition and symptom measures. In regard to symptoms of depression, Glenn et al. (2003) reported that both the CCL-A and CCL-D made significant ($p<.01$) contributions to a regression model accounting for 64% of variance in symptoms of depression. Hence the CCL-D was not unique in its prediction of variance, and although it did account for marginally more than the BAI, the difference was not tested for significance. When the ATQ was introduced into the regression model, it suppressed the effect of both the CCL-A and CCL-D to negative and non-significant. Although the second model explained 79% of the variance, only
the two subscales of the ATQ made significant ($p<.05$) contributions. In relation to symptoms of anxiety, only the CCL-A made a significant ($p<.01$) contribution to the 66% of variance in the first regression model and it remained that way even when the ATQ was introduced to the regression with the CCL-D contributing significant negative variance ($p<.05$).

Glenn et al. (2003) do report a relatively high rate (15%) of current treatment for depression and a further 15% with a previous diagnosis. However, no participants were currently diagnosed or treated for an anxiety disorder and the rates of anxiety and depression consonant with other community based samples reported in Chapter Three. No rationale is provided for measurement selection and whilst Glenn et al. (2003) used a screening procedure for scoring ability and provided some ‘additional structure’ to reduce response biases in interview, they do not report excluding anyone due to validity procedures in interviews. Perhaps most importantly though, Glenn et al. (2003) did not concurrently measure any aspect of ability and consequently cannot eliminate this as a possible predictor of symptom variance. This is of particular concern given the empirical evidence for a small but significant impact of ability and anxiety (Haaga, et al., 1990). It is difficult to explain the large inter-correlations amongst variables in the Glenn et al. (2003) particularly when specificity of cognitions for symptoms is only demonstrated for anxiety. However, it is the first study to explicitly test the cognitive content-specificity hypothesis. Consequently, further investigation with control over ability and self-report validity.

### 4.6.4 Summary

Adults with borderline to severe ID can report, model and endorse cognitions related to symptoms in clinical and research settings. When depressive cognitions are measured on the CCL-D and versions of the ATQ they are positively correlated with symptoms of depression and can predict those symptoms. Conversely, cognitions relating to self-concept, self-esteem and social comparison are negatively related to symptoms. Whilst strong evidence exists for cognitive content-specificity with symptoms of depression in the general population, it is not so strong for symptoms of anxiety with a significant portion of variance shared between the two types of cognitions. Only one study has investigated this relationship for anxiety cognitions, and whilst symptoms of anxiety
were uniquely predicted by anxious cognitions, symptoms of depression were not uniquely predicted by depressive cognitions. Ability was not controlled in the Glenn et al. (2003) and whilst the BAI was used, the BDI-II was not. This is surprising given the mixed data on the impact of ability on symptoms, especially anxiety. No studies to date have used the established assessment paradigm of BAI and CCL-A as well as BDI-II and CCL-D to investigate cognitive content-specificity for anxiety as well as depression amongst adults across the spectrum of low ability. Furthermore, results of task-specific screening are often not published and the use of validity procedures is variable.

4.7 Conclusions
There is strong evidence for interventions based on behavioural theory for changing specific behaviours as well as treating aspects of anxiety and depression. In the general population behavioural methods are frequently used within a psychotherapeutic relationship but for adults with low ability, particularly those with more severe ID, behaviour modification and ABA have been widely used without a client's collaboration. Beck’s schema-based theory supports cognitive models of anxiety and depression that place unobservable cognitions at the centre of emotional problems rather than just observable behaviour. Substantial evidence from general population studies support these theoretical models and the few studies considering ability found it had little effect on the relationship between cognitions and symptoms. Evidence from subpopulation studies suggest that cognitions are related to symptoms but that cognitive mediation is more difficult. Given the challenges of research with LA samples it is not surprising that no studies have attempted to replicate general population research designs with a full spectrum of low ability as well as controlling for ability and response validity. A glaring example is the lack of cognitive theoretical research on the viability of the cognitive content-specificity hypothesis.

Cognitive models of anxiety and depression underpin cognitive-behavioural therapies that harness a client’s motivation to change thinking, emotions and behaviour within a collaborative relationship intended to maximise self-determination. Despite early scepticism about the viability of these therapies in the subpopulation with low ability, there is some evidence that they can change symptoms of anxiety and depression in adults with borderline, mild and moderate ID. The quality and size of the research base
is improving, but there is still little understanding of what adjustments should be made as ability diminishes. If the impact of ability on cognitive models is to be understood and cognitive-behavioural therapies are to help in the way they do for the rest of the population, then the need for further theoretical as well as clinical research is urgent. Of recent times, theoretical research has fallen behind the latter but in future we may need to see studies asking theoretical as well as clinical questions.

4.8 Rationale for hypotheses 5 -7

Aim 3
The third aim of the present study was to test the key concept of cognitive content-specificity that underpins cognitive models of anxiety and depression. Whilst cognitive content-specificity is well established for depression and to a lesser extent anxiety in the general population, only one study has examined this concept with anxiety and depression in a low ability sample.

Hypothesis 5:
That measures of ability (PPVT-4; SAP; ESP) would be correlated with each other but not with the frequency of cognitions (CCL-A & CCL-D).

Rationale: There is considerable evidence from subpopulation studies that the ability to recognise emotion expressed in facial stimuli is correlated with general ability and in particular, receptive language. Specifically, studies using samples of adults with ID have found more recognition mistakes are made, especially with more complex emotions as ability diminishes. Many general population studies have not found a relationship between ability and emotion recognition though. The ability to report a valid, calibrated score on self-report measures of symptoms or cognitions appears to be related to general ability but empirical data are rare. Screening and validity procedures for scoring ability and emotional recognition are common, but there is little empirical data on the relationship between general ability and these two specific areas. Most studies of cognitions in samples with low ability have arbitrarily excluded potential participants with severe and profound levels of ID without measuring general or task-specific ability. The scant published evidence suggests these three areas would be intercorrelated. Only one study using a LA sample (borderline, mild and moderate)
measured receptive language as well as cognitions, finding a small but negative correlation between ATQ and BDI-II in a sample with a significant proportion of depression diagnoses. The few general population studies comparing cognitions and ability used mainly clinical samples and found small negative correlations between ability and anxiety cognitions, yet this did not affect the strength of relationship between cognitions and symptoms. Given that the present study did not select the sample for mental health problems, cognitions were not expected to correlate with general ability.

Hypothesis 6:
That disorder-specific cognitive content (measured by the CCL-A & CCL-D) would be correlated with disorder-specific symptoms when measured by self-report inventories of anxiety and depression (BAI & BDI).

Rationale: The overwhelming evidence from adult studies with clinical and non-clinical samples is that anxiety and depression related cognitions are correlated with their disorder-specific symptoms. Intercorrelations are also common across disorders and between cognitions. In studies using LA samples, cognitions related to a range of cognitive concepts have been correlated with symptoms of depression and some have found this with specific depression-related cognitions on the ATQ. However, none have used Beck’s assessment paradigm of the CCL-A, CCL-D and BAI, BDI-II or measured ability as well. Only one study has used the BAI, but not in conjunction with the BDI-II, though it found large sized correlations between anxiety and the CCL-A as well as the CCL-D. Most studies using LA samples included significant proportions with diagnoses of depression but despite the present study using a sample that was not selected for mental ill-health, correlations between cognitions and disorder-specific symptoms were predicted.

Hypothesis 7:
That anxiety-related cognitive content (measured by the CCL-A) and not depression-related content (measured by CCL-D) would exclusively predict anxiety symptoms (measured by BAI).
Rationale: The evidence for prediction of anxiety symptoms by anxiety-related cognitions is mixed in large general population studies though specificity is more likely where clinical samples are used or a particular anxiety disorder is targeted. Significant amounts of variance are shared between anxious and depressive cognitions in all available studies. The only study using a LA sample to test for the specificity of anxious cognitions found a high correlation between the CCL-A and CCL-D but only the CCL-A predicted symptoms of anxiety. That had some methodological limitations with the most significant of these being that ability was not measured nor co-varied with measures of signs and symptoms. The present study aimed to confirm this finding by using Beck’s assessment paradigm and with ability and response validity controlled in a non-clinical sample comprised of all levels of ability below average.

**Hypothesis 8:**
That depression-related cognitive content (measured by the CCL-D) and not anxiety related content (measured by the CCL-A) would exclusively discriminate the symptoms of depression (measured by BDI-II).

Rationale: There is strong evidence for the unique prediction of depression symptoms by depressive cognitions in general population studies with adults and to a large extent with children and adolescents, especially in clinical samples. A number of studies with LA samples have found correlations between cognitions and symptoms of depression. But only one tested the relative capacity of anxious and depressive cognitions to predict symptoms. That study did not use Beck’s assessment paradigm, nor was ability controlled, and it used the CCL-D as well as the ATQ. There was a large-sized correlation between the CCL-A and CCL-D. However, the CCL-D was not unique in its prediction of variance as the CCL-A also predicted a significant portion of the variance. The present study aimed to replicate the exclusive prediction of unique variance in depressive cognitions found in the general population using Beck’s assessment paradigm with ability and response validity controlled in a non-clinical sample, with all levels of ability below average.
Chapter Five: Anxiety and Attention

5.1 Introduction
In this chapter the cognitive theory and experimental research relating to attention and anxiety is examined. There is extensive experimental research carried out with adults within the general population into the impact of emotional stimuli on attentional responses but a dearth of data on how adults with low ability are affected. First, the three stages of information-processing theory are explained along with its implications for the cognitive processing of pathological and non-pathological emotion, particularly anxiety. The second section focuses on the initial stage of information-processing, attention. The key elements of current neuropsychological models as well as theoretical explanations of the impact of feared emotional stimuli in general population samples is explained. Third, the typical development of the orienting and executive levels of attention is considered and in the fourth, the existing literature on attention and neuro-developmental disorders is discussed. The empirical data on the impact of feared emotional stimuli on the direction of attention amongst adults with diagnosed disorders and high trait anxiety are then considered in fifth section. The issue of whether ability influences the speed or attentional bias is considered in the sixth section and this is followed by a conclusion. The rationale for the fourth aim and Hypotheses 9, 10, 11, 12, 13 and exploratory analyses are then discussed.

5.2 Information-processing and the cognitive model of anxiety
Anxiety is experienced as a normal emotion in the face of threatening situations, a personality trait and as a clinical disorder where symptoms meet criteria. The cognitive model of anxiety is outlined in this section. Initially, some key concepts associated with the model are explained and then the central component of information-processing theory is outlined. The concept of biased information-processing and pathological anxiety is discussed before a summary concludes the section.

5.2.1 The cognitive model
Key cognitive concepts gathered empirical support through experimental findings in the 1960s (Merluzzi, et al., 1981; Rachman, 2015) as cognitive theories were used to
explain normal as well as abnormal emotion, particularly in the area of anxiety (Eysenck, 1992; Mathews, et al., 1987; Mogg, et al., 1998). Theories have also been developed to account for the cognitive differences between anxiety and depression (Mogg, et al., 2006; Mogg, et al., 1998; Mogg & Bradley, 2005). A central component of cognitive models of anxiety and depression is that specific biases in three areas of information-processing play a critical role in causing and maintaining schemas and cognitions associated in these areas of psychopathology (Beck, 2005; Beck, et al., 1988a; Beck, et al., 1985). In relation to anxiety, distortions are predicted to exist in attention (attending to feared rather than neutral or positive stimuli) interpretation (inaccurate interpretation of ambiguous stimuli) and memory (an over-emphasis on storage and retrieval of feared material) across the anxiety disorders (Beck, et al., 1988a; Beck, et al., 1997).

5.2.2 Information-processing

Results from experimental research contributed to the development of information-processing theory and the incorporation of key concepts about automatic and strategic processing of stimuli (Beck, et al., 1988a; Beck, et al., 1997). The classic distinction between strategic and automatic processing presented the latter as essentially involuntary, not requiring awareness or making demands on cognitive resources and insensitive to voluntary control (Bargh, 1989; McNally, 1995; Shiffrin & Schneider, 1977; Wells & Matthews, 1994). This was contrasted with strategic processing which was seen to be under greater conscious and voluntary control requiring greater cognitive resources or effort (McNally, 1995). However, whether processing tasks in the social world could be so simply dichotomised in this way or are dimensional or indeed a composite of both has been contentious in the theoretical literature (Beck, et al., 1997; Eysenck, 1992; McNally, 1995). Some theorists view these systems as overlapping and others see automatic and effortful processing as two ends of a continuum (Tomporowski & Tinsley, 1997).

In linking information-processing and other aspects of cognitive theory to explain pathological anxiety and underpin his cognitive therapy, Beck (Beck, et al., 1985) conceptualised the processing of threat-related stimuli as a series of stages. These stages involved a blend of automatic and strategic processing with anxious individuals
directing their attention toward threatening stimuli in the early, automatic stage of processing but directing it away in later more strategic stages (Beck, et al., 1997; Williams, Watts, MacLeod & Mathews, 1997b). Whilst the earlier automatic processing is difficult to access, and verifiable primarily through experimental research, the more strategic processing of later stages is more accessible and hence amenable to reflective consideration. One of the main aims of treatment then is to deactivate the earlier threat-related biases and strengthen more constructive strategic processing through cognitive and behavioural strategies. Attention is an essential component of these controlled cognitive functions that are important not only in remediation of emotional disorders but effective social interaction (Manera, Samson, Pehrs, Lee & Gross, 2014). Furthermore, verbal mediation is seen as a necessary but not sufficient condition for this treatment (Beck, 2005; Beck, et al., 1988a; Beck, et al., 1997). Without an understanding of how verbal ability affects information-processing, the evidence base for adapting cognitive behavioural therapy for adults with LA remains tenuous.

5.2.3 Biased information-processing

Empirical support for information-processing bias has steadily accrued for groups with clinically diagnosed anxiety disorders as well as those with high anxiety related to personality traits yet who do not have a clinical disorder. In relation to attention, vigilance toward perceived threat was found in groups of adults with generalised anxiety disorder (Mathews & MacLeod, 1985; Mathews, et al., 1987) and social anxiety (Mogg, Philippot & Bradley, 2004c) as well as groups with high trait anxiety (Ioannou, Mogg & Bradley, 2004; MacLeod, Mathews & Tata, 1986) when compared with non-anxious control groups. Biased interpretation of social stimuli has been found in adult groups with high non-clinical social anxiety (Garner, Mogg & Bradley, 2006; Schofield, Coles & Gibb, 2007), generalised anxiety (Mogg, Baldwin, Brodrick & Bradley, 2004a) and anger (Wenzel, et al., 2005), as well as those with diagnoses of social anxiety disorder (Mohlman, Carmin & Price, 2007; Stopa & Clark, 2000). Investigation of memory bias has been a more recent development. In their review of memory bias studies in social anxiety, Hirsch and Clark (2004) conclude that bias toward negative information does exist where the information processed is associated with threat or related to evaluations of the public self. Furthermore, less information is remembered during social encounters. A similar bias for threatening information has been found in
high trait-anxiety individuals (Saunders, 2013) and those persons with generalised anxiety disorder (Coles, Turk & Heimberg, 2007). Recent studies using event-related potentials (ERPs) also confirm that a bias in encoding and retrieval occurs with fearful but not other faces and that furthermore, this endures even when the initially fearful face is seen again with a different expression (Righi, et al., 2012).

Despite convincing findings of bias in each stage of processing, Beck’s original theory has not been able to explain the differential patterns of bias across the stages of information-processing that exist for different disorders (Mogg, et al., 1998; Yiend, 2010). For instance, an attentional bias has not been found in depression (MacLeod, et al., 1986) nor has a memory recall bias been found in anxiety (Mathews, et al., 1987; Mogg, Mathews & Weinman, 1987). In the case of anxiety, attention is the stage of information-processing that has had most empirical investigation. Specific theories have been developed to account for the findings of biased response to threat (Frewen, Dozois, Joanisse & Neufeld, 2008a; Mogg, et al., 1998; Yiend, 2010).

5.2.4 Summary
Information-processing theory underlies the cognitive explanation of anxiety and biases in this processing are central to cognitive models of depression as well as pathological anxiety. In relation to anxiety, attention is the stage of processing where most evidence of bias exists. The next section outlines current models of attention and the associated sub-functions.

5.3 Models and theory of attention
Attention is the most extensively examined stage for biased information-processing in anxiety amongst general population studies. This section begins with an explanation of the neuropsychological concept of attention and the dominant model of explanation. Theoretical explanations of attentional processing of normal and pathological emotion are then discussed followed by a consideration of attentional control theory. Following this, the concept of attentional capacity is discussed with a summary concluding the section. The major experimental paradigms and emotional stimuli used in the assessment of attentional responses are discussed in detail in Appendix C.
5.3.1 Neuropsychological explanation of attention

Attention is important in the processing of emotional and non-emotional stimuli but its description is hampered by differences in terminology. It is widely seen as a multidimensional area of cognitive functioning (Soo & Bailey, 2006) that is influenced by a range of external (e.g., stimulus characteristics) and internal variables (e.g., attentional control) (Sternberg & Sternberg, 2011). Posner’s neuropsychological model of attention has been supported by his own extensive research, and more recently by data from the field of neuroscience (Anderson, 2008; Posner & Peterson, 1990; Posner & Rothbart, 2000). This model describes three different attention networks, which are underpinned by specific cortical systems. These carry out the functions of alerting, orienting and executive control and some evidence supports the relative independence of these networks (Fan, McCandliss, Sommer, Raz & Posner, 2002).

Alerting is defined as achieving and sustaining an alert state, orienting is the selection of information from sensory input and executive control resolves attentional conflict between thoughts, feelings and responses or priorities among cognitive resources. According to Posner’s model, orienting is accomplished by three operations (disengaging from one location, moving to another and then engaging with the new) through the relatively reactionary posterior attentional system. Once the information is engaged it is facilitated and transmitted to the anterior attentional system located in the frontal regions and providing a more voluntary executive control over attention (Derryberry & Reed, 2002; Posner, et al., 1990). Terms used for the components or sub-functions of attention commonly identified with the posterior system or orienting network are selective attention and the associated spatial shifting. Terms commonly associated with the anterior or executive system and the sub-functions of attentional control are shifting, divided attention and inhibition.

Whilst regional specialisation for orienting and executive levels of functioning is widely accepted, it is also broadly agreed that both levels function in an integrated manner with primacy given to executive-level control (Anderson, 2008; Larson, et al., 2014). An allied concept is that of capacity, which refers to the available amount of attentional resources. Automatic-level processing is thought to be less demanding on attentional capacity by automatic than effortful processing. On one hand, information-processing
resources are influenced by the conditions and stimuli of the task, which are thought to place greater demand on resources if it has emotion rather than non-emotional content. On the other hand, capacity is often depleted in psychopathology. This is because higher levels of emotion are assumed to consume more resources, which then influences task performance and the exercise of attentional and emotional control (Yiend, 2010). Deficits related to capacity limitations and subsequent impact on control of emotion processing is in fact a key feature of some theories of executive attention (Eysenck & Calvo, 1992b; Eysenck & Derakshan, 2009; Eysenck, et al., 2007; Mathews & Mackintosh, 1998).

5.3.2 Cognitive-motivational analysis

Cognitive theories of anxiety and attention have been tested by a substantial amount of experimental research in the past two decades. Some theory was developed in an attempt to explain pathological anxiety and to enhance the application of a clinical intervention in the form of cognitive therapy (Beck, 1976; Beck, et al., 1988a; Beck, et al., 1997; Beck, et al., 1985). Beck’s theory emphasises the importance of emotional schemas that lie at the core of biased processing in each stage of information-processing. Bias at attention, interpretation and memory stages can be the focus of clinical interventions for individuals with emotional disorder.

Specific theories have been constructed to explain attentional processing of emotional stimuli in the presence of state and trait anxiety and to some extent anxiety disorders. These theoretical models account for the valence of emotional stimuli, the amount of anxiety and the automatic and well as controlled levels of processing (Mathews, et al., 1998; Mogg, et al., 1998; Williams, et al., 1997b; Williams, Watts, MacLeod & Mathews, 1998). Mogg and Bradley’s cognitive-motivational analysis (1998) also explains the impact of depression on attention (Mogg, et al., 1998). All these models have reasonable empirical support from experimental studies, with strong similarities but also points of divergence (Yiend, 2010). Each incorporates a two-stage system with early appraisal or evaluation of stimuli for threat value (valence), a process that is influenced by trait differences. Potentially threatening stimuli result in increased automatic selective attention and processing resources being allocated, particularly where trait anxiety is high. The second stage or processing function is involved in
prioritising and directing attentional resources. A key feature of the Mathews and Mackintosh (1998) model as well as Mogg and Bradley’s (1998) cognitive motivational analysis model, is the emphasis on early evaluation or appraisal being the key influence on individual differences in attention to emotional material. However, the former focuses only on the impact of anxiety with the latter accounting for depression as the disengagement from external goals. This explains the absence of attentional bias in orienting to negative stimuli (Mogg, et al., 1998; Yiend, 2010).

Mogg and Bradley’s (1998) model proposes that a valence evaluation system (VES) is responsible for assessing stimulus threat value. Stimulus appraisal involves not only the rapid analysis of basic stimulus features (e.g. shape and colour) but also the integration of more detailed data such as context and the individual’s stored experience. Therefore, it is not just the characteristics of the stimulus that affects the VES output but its context, internal data about arousal level and prior experience. In people high on the personality trait of anxiety, this system is more sensitive and likely to evaluate stimuli as threatening. The goal engagement system determines the allocation of processing resources and in the latter case would interrupt ongoing activities and allocate resources toward the threat. If the stimulus is tagged as having little or no threat then it will inhibit any further processing and maintain a focus on current goals (Mogg, et al., 1998; Mogg, et al., 2000b).

5.3.3 Attentional control theory

Other models of attentional processing focus on the impact of anxiety on cognitive performance at the executive or controlled level of functioning. Initially called processing efficiency theory (Eysenck, et al., 1992b; Eysenck, et al., 2009), the most prominent of these theoretical models is now titled attentional control theory (Eysenck, et al., 2011; Eysenck, et al., 2007). Attentional control theory addresses executive or top level attentional functioning and this equates with that of Posner’s anterior attentional system (Posner, et al., 1990) and with broader theories of cognitive control (Larson, et al., 2014). Three major functions are ascribed to the executive system by attentional control theory. The first is inhibition, which involves deliberately inhibiting the dominant or automatic responses that are irrelevant to the task and may interfere or disrupt. The second is shifting which refers to shifting back and forth between multiple
tasks, operations or mental sets. Updating is the third and involves updating and monitoring of working memory representations. In terms of underpinnings, attentional control theory rests on two key tenets: Firstly, the presence of anxiety is associated with cognitive efficiency or cognitive speed problems. These lead to poorer ability to inhibit task-irrelevant information, attention shifting and memory updating. The underlying causes of the deficits are not explained but may be associated with the development of anxiety. Secondly, these deficits are supposed to effect efficiency but not accuracy on behavioural tasks requiring attentional control (Berggren & Derakshan, 2013; Eysenck, et al., 2009).

5.3.4 Attentional capacity
What exactly constitutes attentional or information-processing capacity in attentional control theory and how it can be measured is difficult to discern (Berggren, et al., 2013). Early research into the relationship between attention and intelligence focussed on a narrow range of attentional sub-functions, especially divided attention. Studies took a deterministic approach and produced mixed results, about whether individual differences in attentional resources did (Navon, 1984) or did not (Stankov, 1989) underpin differences in intelligence.

More recent studies have considered a range of attentional sub-functions and taken a more sophisticated statistical approach to the relationship. Schweizer, Moosbrugger and Goldhammer (2005) found small- to medium- sized, positive correlations between ability, measured by the Raven’s matrices, and range of attentional sub-functions (sustained, focussed, switching and divided attention) though overlap existed. Further structural equation modelling using variables of attention predicted 32% of variance in intelligence (Schweizer, et al., 2005). The role of other executive level functions in the control of emotion and behaviour also features in the research (Bishop, 2007; Frewen, et al., 2008a; Reinholdt-Dunne, Mogg & Bradley, 2009). Not all executive functions are closely related to global intelligence though (Brydges, Reid, Fox & Anderson, 2012; Friedman, et al., 2006) but it is the executive level that is usually accredited a role in resolving competition for attentional resources (Larson, et al., 2014). Capacity may in fact be multiply determined with cognitive ability (global and specific) as well as
executive functioning playing a role. However, the impact of variance in general ability on attentional capacity has not been considered in general population studies.

5.3.5 Summary
Neuropsychological models of attention propose dual but integrated systems, a feature mirrored by the automatic and strategic systems of information-processing theory. The specific neural networks underlying attention have been more rigorously demonstrated in neuropsychological models though. They provide an explanatory anchor for attentional functioning in general and in particular, responses to emotional stimuli amongst adults in the general population. However, they do not address the developmental pathway for attention or the possible impact of low global or verbal ability on attentional functioning and the consequent impact of feared stimuli in the subpopulation with LA. However, these models are a departure point for the extensive research into the impact of emotional stimuli on attention where either high trait or disorder level of anxiety is present. The development of attentional networks is addressed in the next section with consideration given to differential development of sub-functions and their stability over time as well the possible impact of ability.

5.4 Development of attentional networks
This section examines the development of attentional sub-functions across the lifespan. First, the emergence of attentional sub-functions in typical development is considered and then the progress of executive functions through the lifespan is discussed. The available studies of attention through the developmental period for people who have LA is then considered followed by the importance of adequate visual processing for attentional responses. A summary concludes this section.

5.4.1 Emergence of attentional sub-functions
Whilst differences in terminology, specification and measurement of sub-functions still complicate research into attention, the fact that these mature during the developmental period is beyond doubt (Anderson, Anderson, Northam, Jacobs & Catroppa, 2001; De Luca & Leventer, 2008; Gomez-Perez & Ostrosky-Solis, 2006).
Overlap exists between executive attention and the executive functions of working memory, planning, switching, inhibitory control and attention with attention comprising sub-functions at both the level of control and the more automatic orienting level. The limited data on the typical trajectory of attention are derived from cross sectional studies, focussing mainly on executive sub-functions though the impact of emotional stimuli on the regulatory system is increasingly accounted for (Posner, et al., 2000; Roth, et al., 2014; Rueda, Posner & Rothbart, 2005).

In the early years, attentional management is principally exercised by the orienting network. In the first year it appears to act as a distress regulator (Harman, et al., 1997) with a transition to the executive network by 3-4 years of age. Genetic as well as parental factors influence this transition though (Rothbart, Sheese, Rueda & Posner, 2011). The use of ERPs has enabled the more recent study of infants at an early stage of attentional development. In a sample of infants aged 3.6–13.2 months shown pictures of angry and happy faces, all showed faster orienting to the angry ones. However, those children rated by parents as having greater regulatory control showed greater amplitude ERPs in the area most associated with executive attentional control (Martinos, et al., 2012). This suggests that the executive system may be already emerging in infants, at least in relation to recognition of facial representation of emotion and regulation of attentional response to positive and negative emotion.

5.4.2 Typical development of executive attention

Executive control of attention appears to develop rapidly prior to puberty. In typically developing children aged 7, responses to behavioural tests for resolving attentional conflict between competing non-emotional visual stimulation showed similar consistency of performance (accuracy) to those of adults on the same tasks. However, RTs were longer and ERPs of the children completing these tasks showed greater amplitudes and were dispersed across the brain rather than localised around predictable areas as amongst the adults (Rueda, et al., 2005). These results suggest that whilst performance (accuracy) of children on such attentional tasks reaches adult level prior to puberty, the brain circuitry underlying executive functions continues to mature and become more functional with efficiency (speed) continuing to improve into adolescence.
Rates of development have been tested in a number of executive functions. Ikeda, Okuzumi, Kokubun and Haishi (2011) found differential development of accuracy and speed using word-based stroop tasks with non-emotional stimuli to assess inhibition. Participants with typical development (TD) aged between (9-12), adolescents (13-20) and young adults, (21-30) showed similar accuracy for word reading, colour naming and incongruent colour naming across age groups. However, RT for word reading and colour naming was longer for children than adolescents but the latter was similar to adults. On the more demanding incongruent colour-naming task though, RT was faster for adolescents than children and faster again for adults with a significant difference between means of the adult and other groups. These data add evidence for the differential development of speed and accuracy in executive functions. This is consistent with earlier research by Brewer and Smith (1989) who found that control over speed of responding on a range of tasks had stabilised by 7 and for accuracy by 9 on a range of visual tasks.

Testing of auditory attention control suggests that accuracy and efficiency on attentional tests improves significantly between 7 and 9 years and is then relatively stable until the age of 15 when a further growth spurt in efficiency occurs (Anderson, et al., 2001). Three tests tapping selective and sustained attention were used with a sample of children aged 11 to 18 years from the general population and verbal ability was measured with Verbal IQ on the Wechsler Intelligence Scale for Children-III (Wechsler, 1991). Correlations were positive and significant between verbal IQ and scores on two out of three of the attentional tasks but negative and significant between verbal IQ and errors as well as time taken on the three tasks.

Further evidence about the development of visual attention in this period comes from a study of 134 TD children asked to respond to balloons. Some simply displayed different colours and others depicted faces that were differentiated for gender and emotions (happy, sad and neutral). Significant increases in speed and accuracy of processing were found between ages 7 to 13 but processing of coloured balloons was faster and more accurate than either gender or emotion (Rosenberg-Kima, et al., 2010). This suggests some impact of human presence, especially emotion, on speed. Furthermore, this effect appears independent of age related development in accuracy and speed.
Experimental studies of accuracy in emotional recognition show a similar trajectory to attentional control through development. Brosgole, Gioia and Zingmond (1986) used five recognition tasks of incremental complexity and found that accuracy increased between 5 years, two months and five years, eight months. Further gains were seen at 7 years, then no changes were evident until 19 years when participant’s performance was flawless on the same tasks. A similar pattern was found by Harrigan (1984) on two incremental tasks with children and early adolescents. On the easier task, accuracy improved between 3 and 6 years but it had plateaued in the 6 to 9 and 9 to 12 year old groups. On the more difficult task, the plateau did not occur until nine years (Harrigan, 1984). Least errors occurred for happy in each of these studies though angry and surprise produced the most errors. Accuracy increased relatively evenly across the emotions. Responses were not timed for either of these studies so concurrent development of processing speed could not considered.

When all the executive functions are considered together, their development appears to slow considerably in late childhood and adolescence. Viewed separately though, there is evidence of differential rates of change between functions. Attentional control and processing speed stand out with their further development in later adolescence (Anderson, et al., 2001) and the few lifespan studies of multiple functions suggest some functions continue to develop into the third decade of life (De Luca, et al., 2008). In particular, strategic planning and the organisation of goal-directed behaviour reach their peak in the 20–29 year age bracket. In a study of 194 TD participants aged between 8 and 64 years the only attentional sub-function covered was set shifting. This showed rapid pre-pubertal development to adult-level of accuracy and no age-group related differences thereafter (De Luca, et al., 2003). A larger study of 521 participants aged 6 to 85 found that selective and sustained attention as well as executive attention showed rapid improvement in childhood that continued into adolescence. This contrasted with executive functioning in verbal memory that peaked much earlier. Furthermore, the attentional functions remained relatively stable in the adult sample but the verbal memory functions were sensitive to age effects in the latter years (Gomez-Perez, et al., 2006). However, neither of the lifespan studies examined accuracy as well as efficiency nor were the tasks used necessarily comparable with those used in the developmental period studies.
Whilst executive functioning as a unitary concept is closely related to both fluid and crystallised intelligence, their connections with its divisible functions are variable (Brydges, et al., 2012). For instance, a strong correlation has been found between working memory and intelligence (Cornoldi, et al., 2014) yet correlations with inhibition and shifting are low (Friedman, et al., 2006). Similarly, significant but moderate correlations have been found between the executive sub-function of shifting and intelligence (Brydges, et al., 2012) and between the cognitive function of processing speed and intelligence (Cornoldi, et al., 2014). The few studies of attention amongst adults with neuro-developmental disabilities of differing aetiologies are considered in the next section including comparisons with general population controls.

5.4.3 Development of executive attention in low ability samples
The investigation of executive functioning in children with LA is relatively recent. Few studies include executive attention or attentional sub-functions and most use a cross-sectional design. However, Van der Molen, Henry and Van Luit (2014) found inhibition continued to develop between the ages of 9 to 15 amongst children with mild to borderline ID and Gligorovic and Durovic(2014) found that inhibitory control was correlated with a number of domains (e.g. independent functioning, speech and language functioning, numbers and time) on the Adaptive Behaviour Scale-School (ABS-S:2) (Lambert, Nihira & Leland, 1993) in children aged 10 to 14 years with mild ID. Danielsson, Henry, Messer and Ronnberg (2012) investigated a range of executive functions including inhibition and attentional switching amongst children with ID. Control groups matched for age and for ability were used for comparison. The group with ID performed at a lower level than age-matched controls on both executive tasks but was similar to the ability-matched group on attentional switching and below it on inhibition. Danielsson et al. (2010) interpreted this to signify a specific profile of executive functioning for children with ID.

Memisevic and Sinanovic (2014) also investigated multiple executive functions but compared results with a test norm sample. A sample of 90 special school children aged between 7 and 15 years were divided into three groups according to aetiology (1. Down syndrome, 2. other genetic cause or organic brain injury and 3. unknown aetiology) and categorised as either mildly or moderately intellectually disabled. Teachers completed a
multi-scale instrument assessing executive functioning including inhibition and shifting. Results for children with ID were significantly lower than the norm sample on all scales and the moderately disabled group had significantly less ability than the mildly disabled. From the limited data executive attentional sub-functions continue to develop through childhood, albeit on a lower plane. The suggestion of an ability related profile or pattern of strengths and weaknesses requires further evidence.

5.4.4 Visual processing

The orienting network relies on higher visual-processing functions and these can be impaired even with normal or corrected visual acuity. It is only recently though that research has been published on these functions amongst people with ID (van Splunder, Stilma, Bernsen & Evenhuis, 2006; Warburg, 2001). Functions such as form recognition, motion detection and spatial orientation are associated with attentional orienting. Therefore, confirmatory data on the accuracy or efficiency on these functions amongst adults with low ability is important. Only one study has investigated this, using a sample of 127 children with ID (2-14) with intellectual ability in the mild, moderate, severe and profound ranges of disability (Boot, Pel, Vermaak, van der Steen & Evenhuis, 2013). Children were matched on age with a TD group and visual orienting responses measured using an infra-red eye tracking system in response to three separate visual stimuli. The majority of children in the ID group showed longer RTs than the typically developing group across the three stimuli but latencies were greater in response to a moving cartoon of a person or animal than a constant form or moving form (Boot, et al., 2013). None of the stimuli were emotional in nature and there are no studies with adults so it is difficult to know whether such delays remain constant into adulthood for people with ID. However, it provides some evidence of adequate orienting functioning in all levels of ID and also that, human presence taxes visual processing resources at the automatic level.

5.4.5 Summary

A number of conclusions can be drawn about attention from the limited data available from cross-sectional studies of its development across the lifespan. First, the orienting system has primacy in the early years of development but initial signs of the executive system are evident in the first year. Second, the executive system appears to develop
rapidly just prior to puberty and then shows another surge at about 15 years but adult-
level accuracy on selective attention tasks is reached prior to processing efficiency.
Third, the attentional function may be more resistant to age than other executive
functions. Fourth, emotional stimuli in the form of faces tax the attentional systems.
Fifth, Verbal IQ may be positively correlated with accuracy and negatively with errors
on tasks as well as time taken, at least in children. Sixth, children with borderline or
intellectual disability appear less able with executive functions in general than age-
matched peers at least up until adolescence. Finally, very recent evidence suggests that
orienting responses may be slower amongst children especially to human stimuli. The
orienting network is established at an early stage and appears to operative across the
spectrum of ID. The next section considers the research on attention amongst adults
with neuro-developmental disorders including those with low ability.

5.5 Attention and neuro-developmental disorder
A number of neuro-developmental disorders are associated with impaired attention
though not necessarily low global or verbal functioning. This section examines three
areas of neuro-developmental disorder and the different attentional impairments
associated with them. The first contains the disorders of attention deficit hyperactivity
disorder (ADHD) and autism spectrum disorder (ASD) as well as schizophrenia. These
are reviewed because they involve specific attentional impairment that is not usually
associated with low global intellectual functioning. The second group is comprised of
specific neuro-pathologies, with genetic origins such as Down syndrome and Fragile X
syndrome. These are chosen because they usually confer low ability and are often
studied for their range of syndrome-specific cognitive and physical characteristics. The
third is the most widely-researched group of adults with impaired attention and low
ability, where the aetiology of the low ability is unknown or not specified. Reviewing
the available research on attention in these three groups will help establish the usual
attentional functioning of adults with LA with and without specific neuro-pathologies.

5.5.1 Schizophrenia, ADHD and ASD
In first-episode psychosis, attentional deficits exist when age and intellectual
functioning are controlled and even those deemed ‘at risk’ of psychosis perform less
well on tests of sustained attention than normal control subjects (Francey et al., 2005;
Unlike psychotic illness, ADHD and ASD are diagnosed in the early years with specific aspects of attentional functioning already affected. Matched with controls on the Vocabulary subtest of the Wechsler Intelligence Scale of Children-Third Edition (WISC-III) ADHD children had more difficulties in the areas of sustained attention and response inhibition (Manly et al., 2001; Soo & Bailey, 2006). Deficits in joint attention and divided attention are present in children with Autism Spectrum Disorders (ASDs) and may play a part in delayed acquisition of language and development of social skills (Bruinsma, Koegel, & Koegel, 2004). An ASD also diminishes social functioning in disproportion to intellectual ability (San Jose Caceres, Keren, Booth, & Happe, 2014). Differences in attention between people with ASDs and control groups have recently been examined with a range of paradigms and stimulus complexity appropriated from research on attention in the general population (Fletcher-Watson, Leekam, Benson, Frank, & Findlay, 2009; Freeth, Ropar, Chapman, & Mitchell, 2010) but sometimes show conflicting results (Ames & Fletcher-Watson, 2010). This may in part be due to small sample sizes (Uljarevic & Hamilton, 2013) and lack of methodological control over ability (Fink, de Rosnay, Wierda, Koot, & Begeer, 2014).

The type of task involved also seems important. For instance, adults with high functioning ASD, tested using a dot-probe paradigm have been shown not to preferentially attend to facial as opposed to non-facial stimuli on an attentional allocation task when compared with non-autistic controls matched on full scale IQ (Moore, Heavey, & Reidy, 2012). However, studies using emotion recognition tasks with: adolescents with low ability and matched on FSIQ (Jones et al., 2011); children with high functioning ASD matched on verbal ability (PPVT) (Fink et al., 2014) and; children and adolescents matched on verbal IQ (Loveland, Bachevalier, Pearson, & Lane, 2008) with TD control participants, showed that ability accounted for most or all of the variance in discrimination of basic emotions.
Although facial recognition may not vary significantly after verbal ability is taken into account, there is evidence that ASD is associated with different attentional processing. Using eye-tracking measures, children with ASD were more likely to select multiple visual image regions and continue to scan images after first presentation when compared with typically developing peers (Amso, Haas, Tenenbaum, Markant, & Sheinkopf, 2014). Another study compared children with ASD and children with a typical development profile using a ‘flicker’ visual search paradigm. Emotional pictures slowed the RTs of both groups but the children with ASD were quicker to detect changes in the objects of peripheral interest but less accurate than their peers with typical development when pictures were negative (Maccari et al., 2014). Together these data suggest that the children with ASD had difficulty inhibiting extraneous stimuli when social stimuli was encountered and thus rely on ‘bottom-up’ or automatic rather than ‘top-down’ or purposeful processing especially with negative emotional stimuli.

These studies provide evidence for group-specific attentional impairments in neurodevelopmental disorders. Only amongst the ASD studies was ability controlled in samples that incorporated participants with low global or verbal ability. Consequently, little light is shed on how ability affects these specific attentional impairments. It is clear though that attentional functioning can be impaired in the developmental period when global ability or verbal ability is not.

### 5.5.2 Genetic-based syndromes

Fragile X syndrome is the most common inherited cause of LA, Down syndrome the most common genetic cause and Williams syndrome another genetic condition associated with LA (Cornish, Scerif & Karmiloffsmith, 2007). Specific physical characteristics have long been associated with each but more recent research has highlighted particular profiles of cognitive functioning including the attentional sub-functions. For instance, deficits in selective and sustained attention in both verbal and visual-spatial modalities were found amongst children with Williams syndrome when they were compared with a TD group matched for global ability. However, the shifting sub-function was relatively unimpaired with materials in the verbal modality (Menghini, Addona, Costanzo & Vicari, 2010). As well as differing from typical peers, adolescents with Williams syndrome differ from Down syndrome when matched for global IQ and
age, with significantly different patterns of strength and weakness on memory sub-functions (Edgin, Pennington & Mervis, 2010). In a cross-syndrome (Down, Fragile X and Williams) study with children and adolescents, differences were found, not only in patterns of attentional functioning between syndrome groups when age-matched, but also in terms of trajectories of development across childhood and adolescence (Cornish, et al., 2007). Interestingly, selective attention performance remained stable with age across both syndromes whereas on inhibition and sustained sub-functions, individuals with Down syndrome continued to improve with age whereas those with Fragile X did not.

Studying syndrome-specific groups provides control over the aetiology of global and specific abilities including attentional sub-functions. This control affords some methodological advantage when comparing the special group with the general population on attentional responses to emotional stimuli. However, whilst the proportion of people with known causes of low ability has increased from approximately 50% in the United States of America (McLaren & Bryson, 1987) to 78% in Australia over 20 years (AIHW, 2008), identifying and recruiting suitable community samples is unlikely to be viable. These recruitment issues would add to already significant challenges relating to methodology (Roeleveld, et al., 1997) and obtaining ethics approval to conduct research with this group (Iacono, et al., 2012; McDonald, et al., 2009).

5.5.3 Non-specific intellectual disability

The majority of studies addressing attention amongst adults with low ability have used samples where aetiology of ability was unknown or not specified. The study of specific cognitive functioning in this sub-population bloomed with the rise of cognitive psychology and information-processing theory (Crosby, 1972; Nettelbeck & Wilson, 1997; Tomporowski, et al., 1997). Many of the early studies fed a debate between the ‘defect’ (Brewer & Smith, 1984; Saccuzzo & Michael, 1984; Weiss, Weisz & Bromfield, 1986) and ‘developmental’ (Hodapp, et al., 1998; Iarocci & Burack, 1998; Nettelbeck, et al., 1997) theorists with evidence accruing for both positions during the last four decades of the 20th Century. Reviewing information-processing research over this period, Nettelbeck and Wilson (1997) found that practice, training and the use of
strategy improved the processing speed of adults with ID. However, they were slower in their reaction times on a range of experimental tasks, than similar age peers without ID. Despite the moderate correlations between processing speed and IQ in the general population (Cornoldi, et al., 2014), this relationship has not been calculated in studies with adults who have ID as current ability is rarely measured as a dimensional variable in this sub-population (Nettelbeck, et al., 1997).

Early studies of attention focussed on sustained attention and distractibility, as deficits in these areas were thought to be central features of ID (Crosby, 1972; Crosby & Blatt, 1968; Zeaman, et al., 1963). Tomporowski and Tinsley (1997) reviewed studies of attentional functioning in adults with ID covering the previous 30 years. These investigated a range of attentional sub-functions within an information-processing framework, using group-based comparisons. Whilst group differences were evident, people with ID performed similarly to those from the general population where tasks made little demand on the effortful or executive attentional system. Differences were amplified though as tasks became more complex and executive level processing demands increased (Tomporowski, et al., 1997). Similarly, Iarocci and Burack (1998) reviewed 26 comparative studies but through the lens of the ‘developmental’ approach. Marked differences were found in the group with ‘organic’ ID but these were diminished when groups deemed as ‘familial’ ID were compared with ability matched but chronologically younger groups. Iarocci and Burack (1998) cite this as support for their thesis that the latter group develop along a similar path to the general population except more slowly and to a lower ultimate level. These reviews highlighted some significant limitations of the early literature though. Ability is not measured or reported dimensionally, thus precluding the use of correlational analysis and little focus is given to selective attention. More importantly, no studies are reported which measure the impact of emotional stimuli on selective attention or processing speed.

For adults with the most severe ID, just measuring the extent of joint and shared attention is a worthy empirical goal (Neerinckx, et al., 2014). Amongst those with profound intellectual and multiple disabilities (PIMD) measurement is conducted solely by independent observation (Neerinckx, et al., 2014; Vos, et al., 2010). Enhancing functioning of the alerting system would be a reasonable focus in this group with little
or no language (Munde & Vlaskamp, 2014). However, most studies have used samples with mild or moderate ID and examined attentional sub-functions in the executive system and a minority have addressed the orienting system or both. Amongst adults with low ability, sensory (visual, auditory) and physical (fine and gross motor) impairments are highly prevalent compared with typically developed adults (Nakken, et al., 2002; Warburg, 2001). The prevalence and impact of physical, sensory and neurological impairment on cognitive research are discussed in Chapter Two but perhaps the most important in attentional research is visual impairment (van Splunder, et al., 2006). The prevalence of visual impairment appears to rise as ability diminishes (Warburg, 2001), highlighting the need for measuring and or controlling sensory and physical impairments.

Adequate functioning at the sensory level (acuity) is a criterion for visual perception and the perceptual processing associated with attentional functioning that could affect performance on a visual-probe task. In early studies, both adolescent and adult groups with ID gained lower scores than age-matched controls on an instrument comprising five sub-tests. However, discrepancies between groups varied across the sub-tests with form constancy (FC) showing the greatest discrepancy (Kroeger, Rojahn & Naglieri, 2001; Saviolo-Negrin, Soresi, Baccichetti, Pozzan & Trevisan, 1990; Silverstein, Ulfeldt & Price, 1970). A differential effect of IQ on sub-test scores was evident with a greater effect on FC than eye-hand co-ordination (EHC). Consequently, participants with very low IQ displayed EHC scores equivalent to or higher than IQ matched non-disabled controls but had lower FC scores (Silverstein, et al., 1970; Yokkaichi, 1992). However, the selective sampling of adults with Down syndrome limits the extent to which two of these early studies can be generalised.

Two recent studies address this issue using the same five sub-test instrument. The first took a group of 38 adults without a known chromosomal cause for ID and in the second, 11 adults with Down syndrome were matched with age controls and ability controls. Visual acuity was adequate or had been corrected with glasses in groups with mild, moderate and severe ID (Ikeda, et al., 2013a). The results were similar to earlier studies, showing lower scores than age-matched controls on all sub-tests. Scores on the FC sub-test were below ability-matched peers and EHC scores were constant across ability
levels so that mildly to moderately disable groups performed below their ability-matched controls yet the severely disabled group performed above these controls. The hypothesised reason is that this area of ability places lower demand on frontal lobe processing (Ikeda, et al., 2013a). This limited research on visual orienting and visual perception amongst adolescents and adults with ability in the ID range appears to support the general proposition that times taken for tasks requiring perceptual processing are likely to be slower in this population. However, those tasks relying less on frontal processing and are sensory or motoric in nature may be less affected by global ability. It follows that adults of quite low ability might master these aspects of the visual-probe task even though the higher-level processing may be slowed. Furthermore, perceptual processing is likely to be adequate for the attentional demands of the task as well.

Probably the largest literature on neuropsychological functioning amongst adolescents and adults has examined executive cognitive functioning. Of particular interest are those studies addressing the inhibition sub-function. Cognitive inhibition of distractor stimuli reduces the consequent interference and facilitates more efficient processing and conversely, reduced inhibition produces slower RTs. It is also an important sub-function of selective attention. Behavioural inhibition is often associated and can have consequences for social functioning.

A meta-regression of 28 studies comparing ID participants with age-matched TD controls on inhibition tasks found effect sizes varied according to the type of inhibition. The effect size was smaller for cognitive inhibition and larger for behavioural inhibition (Bexkens, Ruzzano, Collot D' Escury-Koenigs, Van der Molen & Huizenga, 2014) and is consistent with latent variable analysis showing these areas load on different factors (Friedman, et al., 2006). This would support the view that cognitive inhibition occurs at a more automatic level and behavioural inhibition at a more executive level thus requiring greater attentional capacity. Amongst studies of groups with IQs below 70, ability does not seem to moderate effect sizes, yet in studies where groups have IQs above 70 IQ is related to inhibition. Evidence for this differential relationship between IQ and executive functions can be found in studies with participants with verbal ability and IQ under 70 (Willner, Bailey, Parry & Dymond, 2010a, 2010b). Studies reviewing
IQ and inhibition in the general population found similar results (Shamosh & Gray, 2008). Another of Bexkens et al.’s (2014) findings was that age did not moderate effect size. Given that the studies were across child and adulthood, this might support a view that inhibition is an EF that whilst impaired in people with ID follows a parallel path of development to the general population (Bexkens, et al., 2014).

Only two longitudinal studies of EFs in adults with low ability could be found. In the first, a group with developmental disabilities (including ID) were recruited as children and followed to adulthood (Heyman, et al., 2015). The authors used a common test (Fan, et al., 2002) of EF to examine the impact of negative life events (NLEs) on EF (Heyman, et al., 2015). Cumulative NLEs were found to generate a significant slowing effect on RTs for general executive functioning and inhibition in particular. In the second study, a sub-sample of adults ($n=46$) with intellectual disability (IQ under 70) were matched for age, gender, level and years of education with controls who had IQ above 85 (Danielsson, et al., 2010). The sub-sample and control group were drawn from a large prospective cohort study and assessed 5 years apart. Although most executive functions were impaired in the ID group, including set shifting, inhibition was the least affected. There was however, no difference in decline between the two groups across the time periods (Danielsson, et al., 2010). Whilst it is not surprising that EFs are impaired in populations with LA when compared to their age peers it is notable that it may follow a similar trajectory, at least into adult years and that it may not be moderated by ability in ID samples. Furthermore, there may be less difference on cognitive tasks at a more automatic than executive level. Interestingly, no group differences have been found on inhibition and shifting between adults with mild to borderline ID who had ASD and those who didn’t have an ASD (Roelofs, et al., 2015).

Selective attention operates at the orienting and executive levels and cognitive inhibition of distracting information is as important as selecting target information. A small but important group of studies has investigated selective attention in adults with ID at the automatic and executive levels. Early studies show greater interference in higher-level visual selective attention than age-matched typically developed peers. However, functioning was similar to controls when ID groups were matched for ability on the PPVT amongst community samples of children with moderate and mild ID.
(Hagen & Huntsman, 1971; Mosley, 1980). In a lower level or more automatic task though, responses were similar across the three groups using a visual cue paradigm (Mosley, 1980). Another study found group differences amongst mild and moderately disabled adults in the ability to restrict focal attention in the visual field (Merrill & O'Dekirk, 1994b; Mosley, 1980). Yet another group of studies used the negative priming visual cue paradigm commonly used in general population research. The paradigm is similar to the dot probe used in anxiety and attention research and involves presenting software-derived visual displays with one target stimulus (a letter) and one distractor stimulus (also a letter) with participants identifying the target and not responding to the distractor over a series of trials. Then a distractor in one display becomes a target in the next display, typically producing slower RTs from participants. It is presumed that the processes used to select a target stimulus in one display reduce performance in the selection of the target in the next, causing the 'negative priming effect' (Merrill, 2006).

Investigations using the negative priming effect with adults who have ID show mixed results. On a localisation task, groups with ID show similar negative priming to age-matched non-disabled older adolescents (Merrill, Cha & Moore, 1994a). The localisation task involves presentation of displays that include both a target and distractor, each of which can appear in one of several possible locations. The RTs are generally slowed when the target of one display appears in the same location as the distractor of the previous display as a probe. Negative priming has been likened to Posner’s inhibition of return (Posner & Cohen, 1980 cited in Merrill 2006) and hypothesised to reflect a relatively automatic attraction of attention to new novel objects and locations. A review of the existing studies show that people with ID demonstrate inhibition of return at similar magnitude to age matched controls (Merrill, 2006).

However, a more complex task using the same paradigm is based on the identity of the stimulus (i.e. the colour of the letter) rather than its location and on this, age-matched controls exhibited negative priming but the mildly ID participants did not (Merrill, et al., 1994a). When this procedure was used with mildly disabled adolescents matched with age and ability (IQ) controls the ID group showed greater interference, less inhibition and consequently no negative priming effects even compared to ability-
matched controls (Merrill, McCown & Kelley, 2001). It was hypothesised that the failure to exhibit negative priming on the more complex selective attention tasks is probably a processing strategy activated under cognitive load (Merrill, 2006). Stimuli in this group of studies were non-emotional though, so any additional effect of fearful stimuli could not be measured.

There is adequate evidence from these studies of adults and adolescents with heterogeneous aetiology of intellectual disability that selective attention and associated cognitive inhibition functions are likely to be adequate at the orienting or automatic level for the visual-probe paradigm and emotional face stimuli. It is also probable that attentional functioning will slow as tasks become more complex due to difficulty in inhibiting distraction caused by limitations in executive functioning associated with lower ability. There are a number of limitations to the current research though. Firstly, only a few studies included participants with ability below the moderate ID range or participants within the borderline or low-normal range, thus limiting the potential variance in ability. Secondly, many used categorical groupings rather than dimensional measurement of either IQ or verbal ability, subsequently limiting potential correlations between ability and attentional functioning. The third and most important is that none of the research studies looked the effect of emotion-laden stimuli on attention.

5.5.4 Summary

A number of points can be drawn from the examination of the studies in this section. It is clear that attention can be impaired in the developmental period even amongst groups who do not have low ability. There is also evidence of syndrome-specific differences in both profile and developmental trajectory when compared with adults and adolescents in the general population. Furthermore, the genetic syndromes associated with these specific features are often accompanied by low global ability. Despite relatively few studies of selective attention and the related sub-function of inhibition it does appear that evidence exists for intact functioning at the automatic level amongst adults with non-specific causes of ID. However, efficiency slows as cognitive load increases. There are significant limitations to the existing studies due to restricted ranges of ability and methods of measurement but most importantly there is a lack of research with emotional stimuli. Consequently, whilst it appears that ability does affect attentional functioning it
is not clear what impact feared stimuli might have on attention in the sub-population of adults with low ability, especially where anxiety is elevated. The next section will examine the data on anxiety and attention in the general adult population.

5.6 Anxiety and attention
The empirical data on selective attention and anxiety in the general adult population is now extensive, particularly amongst groups with high trait anxiety and diagnosed anxiety disorders. Four key themes from this literature will be reviewed in this section. First, the impact of emotional stimuli on the direction of attention in both anxiety and depression will be considered. Second, the extent to which the directional bias is related to engagement with the feared stimuli or disengagement from it will be discussed. Third, the impact of individual differences in cognitive functioning on responses to feared stimuli as opposed to group differences related to anxiety will be considered. Fourth, the impact of emotional stimuli on the speed of attentional processing and response accuracy will be addressed and the section will conclude with a summary.

5.6.1 Directional bias
The direction of attention in response to threatening stimuli amongst anxious subjects has received by far the most empirical investigation (Bar-Haim, et al., 2007; Williams, et al., 1997b; Yiend, 2010). The orienting of attention either away or toward the stimuli is calculated by comparing the RT to the threatening stimuli with the RT to the neutral stimuli. A bias toward is signified when the former is faster and a bias away when it is slower. The implication of this is that anxious individuals make an automatic, rapid and preferential allocation of attention to the threat-related stimuli rather than the neutral or non-threatening stimuli that follows or accompanies it. Theory suggests that the initial automatic allocation (prior to 500ms) serves to enhance the individual’s anxious state but subsequent avoidance (after 500ms) prevents more elaborative processing that could defuse the threatening value of the stimuli and consequently reduce anxiety (Mogg, et al., 1998; Mogg, Bradley, Miles & Dixon, 2004b; Williams, et al., 1997b, 1998).

In most samples, the bias disappears at exposures between 500ms and 1000ms (Bar-Haim, et al., 2007; Ioannou, et al., 2004; Mogg, et al., 2004c). A slightly larger effect is produced with subliminal exposures (< 500ms.) at which the attentional system is
generally considered to be operating automatically or in a reflexive manner. At longer, supraliminal (> 500ms.) exposures, attention is seen to be under greater strategic control of the executive system (Frewen, et al., 2008a; Reinholdt-Dunne, et al., 2009). A bias away from threatening stimuli has been found in some anxious groups including children and this literature will be discussed in the next section of the chapter.

In a key meta-analysis of 172 empirical studies, Bar-Haim et al. (2007) concluded that the bias toward is robust and reliably produced with different experimental paradigms under a variety of experimental conditions. Both word-based and pictorial (usually emotional faces) stimuli are successful but the latter is associated with a larger effect in subliminal exposures and with children. It is present regardless of whether depression is co-morbid with anxiety but although depression is often noted, research designs rarely control for it. The bias is shown in between-subjects methodologies with clinical (diagnosed and seeking treatment) or non-clinical (high scoring on self-report state and trait measures) subject groups against non-anxious groups across gender, age group and type of anxiety (Lee & Knight, 2009; MacLeod, et al., 1986; Mogg, Bradley, De Bono & Painter, 1997; Puliafico & Kendall, 2006; Sass, et al., 2010; Waters, Henry, Mogg, Bradley & Pine, 2010a).

Traits other than anxiety can affect attention to emotional stimuli as well. (Eysenck, 1997; Mogg, et al., 2000a). An investigation of trait defensiveness as well as anxiety shows that only those in the high anxious group who also exhibited low defensiveness displayed vigilance for threatening faces. Those with both high anxiety and defensiveness did not show this bias but instead, showed bias toward happy faces (Ioannou, et al., 2004).

Whilst the impact of threatening stimuli on the direction of attentional processing amongst groups with high trait, state or clinically disordered anxiety is fairly clear, its effect on non-anxious groups is less so. This has been investigated empirically and addressed by theory but results have not been as clear (Mogg, et al., 1998). Two studies of low anxious adult groups have found a bias away from mild threat, unlike the high anxious comparison groups, which were vigilant toward it. The groups were the same though in showing vigilance toward a high threat stimulus (Mogg, et al., 2000b; Wilson
& MacLeod, 2003) supporting the proposal that the trait-related differences account for the greater sensitivity to mild threat. At least one study found bias toward threatening pictures in a low-trait anxious group, but at just 100ms (Cooper, 2006). This had reversed by the 500ms sampling time used by Mogg et al. (2000) and Wilson and Macleod (2003). A similar pattern of threat avoidance has been noted in clinical-control groups of studies examined in Bar-Haim et al.’s large meta-analysis (2007). This is consistent with the vigilance-avoidance hypothesis associated with the cognitive-motivational analysis model that suggests non-anxious individuals show a pattern of initial (adaptive) avoidance to mild threat followed by vigilance that increases with stimulus intensity. What sets individuals with high-trait or disordered anxiety apart is the sensitivity of their initial evaluation of threat, the intensity of which produces vigilance evident at 500ms.

Other findings in the general population include gender effects (Sass, et al., 2010) as well as a heightened sensitivity when negative emotional stimuli are of particular concern to the individual. This specific sensitivity can occur even when diagnosable psychopathology is not evident. For instance, earthquake survivors have displayed attention bias towards related cues compared with a control group despite not showing symptoms of post-traumatic stress disorder (Zhang, Kong, Han, Najam Ul Hasan & Chen, 2014). In fact, there is clear evidence that biased attention is strongest toward material matching the concerns of the individual. This appears more powerful than the valence (positive or negative) of the material itself (Yiend, 2010). Emotional pictures as opposed to neutral ones will still capture attention in peripheral vision but women are more affected by threatening ones than men (Calvo, Gutierrez-Garcia & Del Libano, 2015).

5.6.2 Bias in depression
Evidence for attentional bias in depression is mixed but the robust bias toward fearful stimuli in the early stage of attentional processing present for anxious groups is not found in depressed groups (Mathews, et al., 1987; Mogg, et al., 2005). Far fewer investigations have been carried out and those with clear findings have controlled for co-morbidity of disordered or high-trait anxiety as well as using longer exposures of 1000ms. The limited results do suggest some mood-congruent results though.
Depressed adults showed bias toward sad rather than angry or happy faces in comparison to participants with GAD (Gotlib, et al., 2004b). Furthermore, daughters of depressed mothers showed bias toward sad faces but lacked the bias toward happy ones found in controls (Joormann, Talbot & Gotlib, 2007). Attention was biased away from positive pictures and words but biased toward depressive words in dysphoric adults compared with controls (Shane & Peterson, 2007).

A bias toward negative words was also found in clinically depressed adults that was related to trait rumination (Donaldson, Lam & Mathews, 2007). Interestingly, attentional processing of emotional information in social anxiety disorder was found to override the potential influence of co-occurring major depression (Kircanski, Joormann & Gotlib, 2014). Some executive functions appear specifically linked to depression though. A prospective study found that shifting, inhibition and working memory play an active role in the onset and maintenance of depression (Letkiewicz, et al., 2014). Whilst the literature is more limited for information-processing biases in depression than it is for anxiety, some conclusions can be drawn. These results suggest that information-processing biases associated with depression are more likely to be in the interpretive and memory stages than the attention stage.

5.6.3 Engagement or disengagement

As well as bias in attentional orienting to the feared stimuli, some studies have investigated the degree to which anxious participants are able to disengage attention from feared stimuli. In Posner’s model of attentional orienting, disengagement occurs prior to shifting and engagement of attention with stimuli. Using a visual cueing paradigm in a range of experiments with visually-presented words and faces, Fox, Russo, Bowles and Dutton (2001) found that threat-related stimuli affected dwell time and the disengagement component of attention for those with high levels of state rather than trait or disordered anxiety. This line of enquiry suggests that it is the disengagement of attention and hence the length of dwell time on feared stimuli that is the key attentional feature that serves to generate and support anxious responses rather than the capture or orienting of attention.
Further experiments with high trait-anxious participants showed that of happy, neutral and angry faces, only the latter disrupted attentional return or disengagement (Fox, Russo & Dutton, 2002). Furthermore, they propose that this exaggerated dwell time may represent a subtle cognitive form of freezing, a common behavioural response observed in animals (Le Doux, 1996) mediated by the amygdala that may remain in humans in a subtle form (Fox, et al., 2001). In addition to this, Yiend and Mathews (2001) used a modified exogenous cuing program and found high trait-anxious students had more trouble disengaging from threatening pictures than a low trait-anxious group though there was no difference in their engagement with the pictures. Similar results were found in students with social phobia when words were used instead of pictures (Amir, Elias, Klumpp & Przeworski, 2003). Young people with borderline personality disorder compared with controls were not only faster to respond to frightening faces during automatic processing (30ms) but slower to disengage from the stimuli resulting in slower processing of the same stimuli at a later stage (500ms) (Jovev, et al., 2012). The effects were independent of state anxiety and the slowed processing compared with controls existed across stimulus types (angry, happy and neutral). This might support the diminished capacity for regulation of emotion in this clinical population (Jovev, et al., 2012).

Studies have also used ERPs to facilitate more precise measurement of responses to look for disengagement effects in groups displaying specific phobias. A spider-phobic group responded more quickly than controls to fear-relevant but also standard emotional (pleasant, unpleasant, neutral) pictures than controls in early stage (750ms) responses in a visual-probe task (Michalowski, et al., 2009). However, they showed preferential processing of only the phobia-related pictures in later stages (1000ms & 1250ms) (Michalowski, et al., 2009) A similar study using a visual search paradigm and shorter RTs (160-200ms) also found that a spider-fearful group were not only more vigilant for fear-specific stimuli than the non-fearful group, but their attention was captured by both the fearful and the background stimuli (Weymar, Gerdes, Low, Alpers & Hamm, 2013). This suggests the fearful group displayed not only a heightened sensitivity but also difficulty in disengaging from fear-relevant objects (Weymar, et al., 2013). It may be that once the participant is expecting potential threat, there is an initial vigilance to all stimuli.
More recent research has moved to disentangle and clarify these two effects. Some studies have attempted to resolve the matter using modified measuring procedures. For instance, two versions of the visual-probe task were used with university students: the detection task (i.e., is there a probe?) and the differentiation task (i.e. what sort of probe is it?) using threatening words in a dot probe task (Salemink, van den Hout & Kindt, 2007). Results were only marginally significant but indicated slowed disengagement rather than speeded engagement amongst high anxious students compared with low anxious students. Furthermore, the disengagement index and not the engagement index was correlated with anxiety (Salemink, et al., 2007). Another attempt at modified measurement used an exogenous cueing task with neutral, highly and mildly threatening pictures at three separate presentations times. The high-trait anxious participants showed both enhanced engagement and disengagement at 100ms and then attentional avoidance of threat at 200ms and 500ms (Koster, Crombez, Verschuere, Van Damme & Wiersema, 2006). This raises the possibility that both effects exist but differ in temporal sequencing.

Yet other studies have questioned whether the disengagement effect exists or is fact an artefact of the slowed processing in the face of threat (Mogg, et al., 2008). Or alternatively, whether in fact the tasks employed to measure the purported disengagement can actually do this (Clarke, Macleod & Guastella, 2013). The most recent attempt at resolving this issue addressed theoretical and methodological issues and concluded that previous methodologies had not been adequate in differentiating the two types of bias. With a modified dot-probe and threatening pictures used with groups of high and low trait-anxious adults, speeded engagement and delayed disengagement were associated with high-trait anxiety (Rudaizky, et al., 2014). Furthermore, these proved to make independent contributions to anxiety vulnerability and may in fact be linked to different forms of vulnerability The debate about the relative importance of biased attention and delayed disengagement underlying group differences (i.e., high- and low- trait anxiety) in attentional responses is likely to continue (Rudaizky, et al., 2014). However, there has also been recent interest in the impact of individual differences in cognitive functioning and their influence attentional responses to threat. These are considered in the next sub-section.
5.6.4 Individual versus group differences

Whereas in most studies, participants are grouped by dimensional or categorical measures of anxiety (e.g. high or disordered anxiety versus low anxiety) to quantify emotional reactivity, it may be that differences in functions such as attentional control (in either orienting or executive skills) might be implicated. Developing control of attention assists with the regulation of responses to emotional stimuli and both these aspects are related to the temperamental dimension of self-regulation (Frewen, et al., 2008a; Reinholdt-Dunne, et al., 2009). Evidence suggests emotional processing is determined by multiple mechanisms supported at the cortical and sub-cortical level (Bishop, 2007; Frewen, Dozois & Lanius, 2008b). Evidence from developmental neuropsychology and neuroscience supports the existence of individual differences in emotional reactivity and attentional control. These differences may apply to positive as well as threat-related information (Li, Zhong, Chen & Mo, 2013; Posner, et al., 2000; Rueda, et al., 2005; Wang, Liu & Yan, 2014).

One study found attentional bias to threat at 250ms in adult participants with high-trait anxiety but the bias was moderated by attentional control when measured again at 500ms (Derryberry, et al., 2002). The bias was still present amongst those with poorer control at the second measurement point, suggesting that those with good control were able to disengage from the stimuli more effectively. Lonigan and Vasey (2009) gathered self-reports of attentional control and the temperament of negative affectivity from primary and secondary school students. They then used a probe-detection strategy with threat-related words as stimuli and found that only participants with low levels of attentional control and high negative affectivity showed an attentional bias to threat. Neither grade nor age had a moderating effect on threat bias though (Lonigan, et al., 2009). In a group of infants (3.6–13.2 months) rated for temperament by parents and then shown emotional faces, all showed faster orienting to the angry faces (Martinos, et al., 2012). Despite this universally faster automatic orienting to threat, those rated higher on self-regulation made a greater effort to control attention as evidenced by greater activity in ERPs from the relevant functional area (Martinos, et al., 2012). Another adult study used one emotional stroop task with faces (threatening, fearful and happy) and one with words in conjunction with a trait-anxiety measure and an objective measure of attentional control (Reinholdt-Dunne, et al., 2009). Results were similar to
the Derryberry and Reed (2002) study in that high anxiety and low attentional control was associated with cognitive interference but differed in that the effect occurred for all emotional faces (in comparison to neutral). It was not evident in adults with high attentional control and high anxiety, or individuals with low anxiety (Reinholdt-Dunne, et al., 2009).

Evidence is also emerging from studies of the impact of stable individual variables on the capacity to respond to threatening information at the more elaborated stages of information-processing. Howell, Crosier and Shepperd (2014) proposed the concept of ‘threat management resources’ to explain the capacity of individuals to learn about and process information that might be personally threatening. Using indicators of social and emotional characteristics, they found that adolescents and adults with lower resources were more likely to learn about potentially threatening health information (Howell, et al., 2014). It might also be that individual differences in relatively stable implicit motives moderate sensitivity to angry faces (Wang, et al., 2014). Clarke, MacLeod and Shirazee (2008) found that early plasticity in a young adult’s susceptibility for acquiring a bias toward threatening stimuli in a laboratory setting predicts later acquisition of the bias under ‘natural’ stressful conditions. This small group of studies suggests that individual trait-related differences in attentional control and emotional reactivity appear to have an interactive effect on responses (biased selective attention on the dot probe and naming interference on the stroop test) to emotional stimuli including those related to threat.

Recent developments in attentional bias research show that bias can be ‘induced’ as well as removed or ‘modified’ by using the same threatening stimuli to train attention away or toward them. Most importantly, the change causes a concordant increase or decrease in anxiety levels (MacLeod, Rutherford, Campbell, Ebsworthy & Holker, 2002; Mathews & MacLeod, 2002). Recent studies show attentional bias modification (ABM) protocols have significant potential for changing clinical and sub-clinical anxiety (Amir, Beard, Burns & Bomyea, 2009a; Amir, et al., 2009b; MacLeod & Mathews, 2012). It also appears that ABM causes independent change in attentional control as well as directional bias (Chen, Clarke, Watson, MacLeod & Guastella, 2015).
5.6.5 Speed of processing

The effect of emotional stimuli, particularly threatening ones on the direction of attention has a strong empirical research base and is well supported by theories such as Mogg and Bradley’s (1998) cognitive-motivational theory. Another effect of emotional stimuli is on speed of processing. Processing speed is not an executive function but a cognitive mechanism studied extensively for its association with intelligence. Whilst in its general sense it is moderately correlated with intelligence (Cornoldi, et al., 2014) it is most usefully studied in the context of a specific task such as the variation of RT to a series of stimuli. The ‘trade-off’ between speed and accuracy on tasks is also seen as a differential under some individual control, something that may be enhanced with greater intellectual capacity (Nettelbeck, et al., 1997). Control over this trade-off has also been extensively investigated amongst samples with ID although only with non-emotional stimuli (Brewer & Smith, 1982). The effect of anxiety on processing speed may occur independently of the visuo-spatial direction effect. Mogg, Holmes, Garner and Bradley (2008) found that RT was significantly slowed by threatening stimuli in a high- but not low- anxious group of adults whereas happy stimuli slowed RT in both high- and low-anxious groups (Mogg, et al., 2008). Using only threatening pictures with adults, Yiend and Mathews (2001) found that high trait-anxious adults were slower than controls in responding to threatening pictures. Whilst both groups slowed as threat level increased, the high-anxious group was the slowest.

A series of experiments with non-anxious adults has also separated the effect of emotional words from the classic Stroop effect. Reading, lexical decision and colour naming were all slower when threatening words were used and the delay was absent with neutral words indicating a threat-specific slowdown rather than the selective attention mechanism associated with the classic Stroop effect (Algom, Chajut & Lev, 2004). Studies using the visual-probe paradigm have also found slowed RTs amongst non-clinical adults using threatening pictures (Koster, Crombez, Verschuere & De Houwer, 2004). It may be that threatening stimuli produces not only a significant allocation of attentional resources but also a motor-related ‘freezing’ response to threat (Fox, et al., 2001; Koster, et al., 2006; Mogg, et al., 2008). Very recent evidence suggests that individual trait-related neural processing asymmetries in the frontal-
parietal and left-right matrix may predict attentional bias to threat in top-down processing (Grimshaw, et al., 2014).

Whilst cognitive-motivational theory does not address processing speed, attentional control theory does address it as a product of cognitive processing efficiency that is affected by anxiety. In this model of attentional processing, anxiety affects the efficiency of goal-directed or executive attentional system and increases attention to threat-related stimuli and reliance on the orienting or stimulus-driven attentional system (Eysenck, et al., 2007). The executive level attentional sub-functions placed under greater load by threatening stimuli are inhibition and shifting, which amongst anxious people leads to impaired efficiency or speed rather than effectiveness or accuracy (Eysenck, et al., 2011). There is evidence that some psychological disorders are underpinned by deficits in executive attentional inhibition that slows processing speed in general rather than just to threatening emotions. An ERP study of adults with obsessive-compulsive disorder found this (Fan, et al., 2014) as did Waters and Farrell (2014b) in a behavioural study with children diagnosed with the disorder. Anxiety is associated with cognitive slowing even where attentional bias is not found (Mogg, et al., 2008).

Considerable evidence is cited by Eysenck and Derakshan (2009; 2007) from behavioural studies in support of attentional control theory but more recent neuroscientific studies have also generated supportive data. High trait-anxious participants made greater use of the inhibition function to disengage from angry faces than did the low trait-anxious group (Telzer, et al., 2008). Imaging from fMRI studies showed trait anxiety to be positively associated with right dorsolateral prefrontal cortex activation during trials reflecting bias toward angry faces. Trait-anxiety was also positively associated with right ventrolateral pre-frontal cortex activation on trials with face stimuli, regardless of their content. Emotional content appears to impair response inhibition due to prioritisation of emotional content processing (Yang, et al., 2014), especially angry faces and in high anxious individuals (Knyazev, et al., 2008). These data appear to support the proposal that emotional stimuli place greater demand on the executive attentional system resulting in slowing of speed. The other side of this ‘trade-off’ is accuracy and it is discussed in the next subsection.
5.6.6 Response accuracy

Evidence for the maturation of performance or accuracy at an earlier stage than efficiency or speed has already been examined. Processing speed has been extensively studied but accuracy less so, especially in visual-probe studies investigating directional bias. Many studies have published the number of inaccurate responses to trials and some have recorded the number of outlier responses in the sample. A study of general population children using emotional stimuli recorded 1% outliers and 5% inaccuracies (Waters, et al., 2010a) but some studies report a composite of the two. Two studies using a visual-probe and emotional stimuli with adults who had mild and moderate ID (Dodd, et al., 2010, 2011b) reported this composite tally. The first study (Dodd, et al., 2010) reported 4.86% removed for a group of adolescent and adults participants with Williams syndrome and 4.25% removed for a control group matched by age. However, 7.55% were removed for the control group that was matched on IQ but chronologically younger. In their later study (Dodd, et al., 2011b) removed 5.5% from a group with Williams syndrome that included adults with mild and moderate ID. Interestingly a study using university students (Mogg, et al., 2004b) recorded less inaccuracies (3.2%) and more outliers (4.3%) than the Waters et al. (2010a) study but yielded a higher composite score than both of the Dodd and Porter studies. This is consistent with other studies using this paradigm and stimuli with adults though (Ioannou, et al., 2004). Some studies have excluded individual cases where rates of inaccuracies or outliers were significantly higher than the rest of the group (Bradley, et al., 1998; Mogg, et al., 2008; Waters, et al., 2012a). These studies and the calculation of outliers as well as inaccuracies are discussed in Chapter Six.

5.6.7 Summary

In this section, the general adult population literature on anxiety and attention has been reviewed. Consequently, it is clear that attention is disrupted by emotional stimuli, particularly of negative valence and furthermore, that engagement with, disengagement from and speed of processing of threatening stimuli is influenced. These effects are reliably found in participants with high-trait and disordered anxiety and have neuroscientific bases as well as theoretical underpinnings. Individual differences in cognitive functioning and personality also have an impact on the processing of negative emotional information and it appears that depression is associated with biases in the interpretive
and memory stages rather than the attention stage of information-processing. There is still debate about the significance of attentional engagement versus disengagement and to some extent the significance of processing in the early orienting stage versus the later, executive-level stage where more elaborative processing occurs. Whilst this section presents a coherent picture of basic and applied research into anxiety and attention amongst adults in the general population, it suffers from serious limitations. First, there is a lack of investigation into the impact of general or verbal ability on attentional direction and speed of response to negative emotional stimuli amongst anxious adults. Second, research into the responses of adults with low ability and anxiety to these stimuli is also lacking. The next section considers what evidence there is for these questions in more detail.

5.7 Ability, attention and anxiety

In this section, the available evidence for the impact of ability on attentional responses to emotional stimuli, particularly amongst those with anxiety is reviewed. Three main areas of research will be considered. First, what might be learnt from investigations of attention and anxiety with children and adolescents in the general population. Second, the limited data from studies in the general population that have accounted for ability in some way. Third, the few studies that have specifically addressed the matter of attentional responses and anxiety in the groups with low ability. A summary concludes the section.

Despite many studies of the impact of emotional stimuli on attention amongst anxious participants in the general population, reviews and meta-analyses show that issues of general or verbal ability, sensory impairment, physical disability and epilepsy do not receive consideration (Bar-Haim, et al., 2007; Cisler, Bacon & Williams, 2009; Jovev, et al., 2012; MacLeod, et al., 2012; Waters, Bradley & Mogg, 2014a; Yiend, 2010; Yiend, Mathews & Cowan, 2005). Similarly, attentional functioning has been studied in groups with low ability but the impact of emotional stimuli has not been specifically considered for anxious or non-anxious participants (Bexkens, et al., 2014; Brewer, et al., 1984, 1989; Crosby, et al., 1968; Danielsson, et al., 2012; Danielsson, et al., 2010; Willner, et al., 2010a).
5.7.1 General population child and adolescent studies

Theoretical models for explaining the development and differentiation of anxiety disorders and personality characteristics amongst children and adolescents are not well advanced (Barrett, 2000; Ferdinand, et al., 2006). There is however, an increasing interest in information-processing during the developmental period (Hadwin, Garner & Perez-Olivas, 2006; Kindt, Bogels & Morren, 2003; Kindt & van den Hout, 2001) as well as the developmental trajectory of particular attentional sub-functions (Anderson, et al., 2001). Whilst it is important not to assume broad cognitive equivalence when comparing adults with LA with children who have TD (see Appendix D), evidence considered in Section 5 of this chapter confirms that the typical pathway for attention during the developmental period can intersect with mature functioning of adults with low general ability. Hence the impact of anxiety on the direction of attentional responses to emotional stimuli during TD may give some insight into its effect with adults who have LA and in particular ID.

Emotional faces have been used with children and adolescents within a variety of experimental paradigms, but have yielded greater variation in attentional responses than in adult studies, especially with younger children. For instance, graded expressions of anger based on the Ekman (Ekman & Friesen, 1976) series generated attention toward threat in non-clinical children (10-11 years) with high-trait anxiety at 500ms compared to controls in a modified stroop design (Richards, French, Nash, Hadwin & Donnelly, 2007). However, children (grades 4-6) with social anxiety had a bias away from fearful and angry faces from the same stimuli series (Stirling, Eley & Clark, 2006). Lau and Viding (2007) also found that children aged 10-11 years with high levels of anxiety learnt to avoid a masked angry face from the Ekman series. High depressive symptoms were not associated with the same effect though (Lau, et al., 2007). Contrasting results also came from groups with abuse histories. Physically and emotionally abused children (7-13 years) who had been diagnosed with post traumatic stress disorder and been removed from their homes showed attention away from angry faces from the Bradley et al. (1998) set within a visual-probe paradigm when compared to controls (Pine, et al., 2005). In a more recent ERP study, children with physical abuse histories showed increased voluntary and automatic attention toward visual anger cues, especially from their mother’s faces and this increase was related to anxiety (Shackman, Shackman &
Pollak, 2007). Adolescents (9-17 years) with generalised anxiety disorder showed attention away from angry faces whilst in an fMRI scanner using faces from the Bradley et al. (1998) set in a dot-probe paradigm (Monk, et al., 2006).

A number of studies have found selective attention bias in non-anxious as well as anxious children (Kindt, et al., 2001; Waters, Wharton, M.J. & Craske, 2008a; Waters, 2004) and biases toward happy as well as angry faces have been found in some studies (Waters, et al., 2014a; Waters, et al., 2010a; Waters, et al., 2008c). Some reviewers have suggested that attentional bias to threat exists in all young children from very early in life and is adaptive. These biases are moderated by cognitive, social, emotional and temperamental development factors that lead to most children gaining greater cognitive control over them with maturity (Field, Hadwin & Lester, 2011; Kindt, et al., 2001). Accordingly, those for whom trait anxiety emerges remain susceptible to learning contingencies associated with fear including vicarious learning (Reynolds, et al., 2014).

Support for the roles of both maturation and trait factors in attentional and emotional control comes from a study using emotional faces within a novel go/no-go paradigm (Cohen Kadosh, Heathcote & Lau, 2014). Younger adolescents but not older adolescents had more difficulty with visual attentional disengagement in the presence of emotional faces and particularly threatening ones when compared on RTs. Across groups however, adolescents with higher trait anxiety showed an attentional avoidance of all faces despite no differences in task accuracy (Cohen Kadosh, et al., 2014). Although the role of maturation in enhancing regulation of fear response has become clearer there has been little examination of the other factors that might act for or against more adaptive functioning.

Other important findings relevant to developmental stage are that: it is not until 6-7 years of age that children have the conceptual ability to manage a Stroop-like task reliably with 4-year olds attaining 53 % and 4.5 year olds 80 % correct (Diamond, Kirkham & Amso, 2002); and increased anxiety in late childhood may be associated with limited ability to discriminate gradients of facial expression (Richards, et al., 2007). A bias toward threat amongst clinically anxious children and non-clinical children has been found with most paradigms and stimuli (Field, et al., 2011; Waters, 2004). However, emotional faces within a visual-probe paradigm have produced the
most consistent anxiety-specific results (Stirling, et al., 2006; Waters, et al., 2008c) and are probably more effective with children than the Stroop (Dalgleish, et al., 2003; Waters, et al., 2010b).

Some studies have investigated the implications of bias direction amongst clinical groups of children. Waters, Bradley and Mogg (2014a) divided a sample of 435 children aged between 5 and 13 years according to disorder using Clark and Watson’s (2006) model of internalising disorders. This structural model denotes the emotional disorders of depression, generalised anxiety disorder and dysthymia as ‘distress disorders’ and social anxiety, panic and agoraphobia as ‘fear’ disorders. A number of factors mediate the relationship between the two categories including trait experiential avoidance (Spinhoven, et al., 2014). Waters et al. (2014a) found that those with a principal ‘distress’ disorder (GAD) showed bias toward threatening pictures whereas those with ‘fear’ disorders (specific phobia, social phobia or separation anxiety disorder) showed bias away from threat. A later study of clinically anxious children found that threat-avoidant anxious children might be more reactive physiologically to novel cues and to stimuli that become associated with threat. This may then interfere with the extinction learning associated with treatments (Waters & Kershaw, 2015).

The study of emotional stimuli and attention in children and adolescents is not as comprehensive as with adults. Whilst the results are less definitive and the pattern is different, some clear themes emerge. The visual-probe paradigm with emotional face stimuli is the most common and robust pairing of assessment paradigm and emotional stimuli. Attentional bias is often found in all subjects not just trait- and disordered anxious groups, it naturally exists in all children from an early age and can be towards happy faces as well as angry ones. Internalising emotional disorders can produce attentional bias in either direction with children diagnosed with distress disorders directing their attention away from threatening stimuli and those with fear disorders directing it toward these stimuli.

These results suggest that processing of emotional stimuli is influenced by developments in the executive attentional system along with developments in regulatory control of emotion and behaviour (Derryberry, et al., 2002). Executive attentional
functioning appears to plateau during puberty in TD and it may be that under-developed inhibition makes bias more likely until the next surge at around 15 years of age that produces greater attentional efficiency and executive control (Anderson, et al., 2001). This may leave children and adolescents more vulnerable to attentional bias to threat as not only cognitive ability but also personality traits and adaptive independence are developing (Puliafico, et al., 2006). There is not enough directly comparable evidence and theory from children’s studies to develop hypotheses for adults with intellectual disability but the possibility of a group-wide attentional bias for threat, either away of toward stimuli should be considered. In the next section, the few studies to consider the impact of general or verbal ability on attentional responses to feared stimuli in anxious adult participants is reviewed.

5.7.2 General population adult studies
A search using the Web-of-Science database was undertaken to establish whether studies of attention and emotional stimuli in the adult general population had accounted for general or verbal ability. Firstly, the terms “attention”, “anxiety” and “ability”, were used, generating 675 records with only three containing all three terms within the title and abstract. On review of titles and abstracts, 10 were kept for full review. Then the terms “attention”, “anxiety” and “intelligence”, yielded 218 records with one containing all three terms but on review of titles and abstracts, no additional records were kept. Given the breadth of literature on anxiety and attention it is surprising that ability has not been more extensively considered as a factor in attentional responses to emotional stimuli. Some specific non-attentional areas of ability (Davis, et al., 2011; Mathews & MacLeod, 2005) and personality (Eysenck & Graydon, 1989) have been shown to influence susceptibility to anxiety and anxiety affects some specific cognitive functions (Eysenck & Byrne, 1992a; Matthews, 1986) but stimuli in these studies have been primarily non-emotional.

One study did assess university student (mean age 22.3 years) participants on neuropsychological tests, symptom and trait anxiety measures as well as replicating MacLeod et al.’s (1986) dot-probe task with emotional words (Hakamata, et al., 2014). General ability was assessed with a battery of 12 subtests grouped in five domains: immediate memory, visuo-spatial/construction, language, attention, and delayed
memory. The second assessed visuo-perceptual speed and set-shifting ability (Hakamata, et al., 2014). They found attentional bias was significantly negatively correlated ($r=-.28$, $p=.005$) with (only) the attentional domain of the first test and multiple regression indicating it accounted for 16% of the variance ($\beta=-.26$, $p=.006$). Partial correlation of its two sub-tests showed the one associated with visuo-perceptual speed accounted for most of the variance. Performance on the other test of visuo-perceptual speed was positively correlated with bias but trait anxiety was not. The researchers also cited neuro-imaging studies that suggest that attentional bias and visuo-perceptual facets of attention might share neural underpinnings. This suggests that where ability or capacity is compromised, selective visual attention might be biased toward negative emotional information. The authors claim this as the first investigation of the impact of general ability on attention to emotional stimuli and they note the result from their previous study that years of education was positively correlated with attentional bias on the same visual-probe task (Hakamata, et al., 2013).

There are some other findings that accounted for some aspect of ability. Whilst past child abuse predicted accuracy of emotion recognition, only verbal ability mediated the relationship between emotional processing and abuse amongst adults (Young & Widom, 2014). Social anxiety was associated with face recognition, poorer recognition correlating with an increase in social but not general anxiety although not with non-verbal ability (Davis, et al., 2011). A review of relationships between intelligence and symptoms found that adults with low ability may experience more psychosocial stress, higher intelligence may have an anxiety-reducing effect and low verbal intelligence may be associated with decreased expressive capacity (Kingma, Tak & Rosmalen, 2009). Whilst studies have also shown links between ability and personality (Ackerman, et al., 1997; Austin, et al., 2002; Austin, et al., 2000) as well as between ability and mental health problems (Kingma, et al., 2009; Koenen, et al., 2009; Vassend, et al., 1994) further evidence of the effect of ability on attentional responses to emotional stimuli could not be found. In the next subsection, studies with adults who have LA that used emotional stimuli are considered.
5.7.3 Low ability studies

Three Web-of-Science data base searches were undertaken for studies of attention and anxiety in populations with LA. The terms “attention”, “anxiety” and “intellectual disability” were used in the first search to generate 80 records but none contained all three terms. Review of titles and abstracts resulted in none being retained. Secondly, the terms “attention”, “anxiety” and “mental retardation” generated 133 records, none of which contained all three terms and none of which were kept after review of titles and abstracts. Thirdly, “attention”, “anxiety” and “learning disability” were used generating 150 records, none of which had all three terms. Only one study directly addressed the selective attention to emotional stimuli in the context of low ability and anxiety (Dodd, et al., 2011b). In another, the impact of emotional stimuli on sustained attention was examined in a group of 30 adolescents and adults subdivided into each category of ability from moderate disability to average IQ (Chakrabarti, et al., 2013). Stimulus cards were used with emotional expressions and non-emotional objects to show that increasing the complexity of non-emotional cards diminishes attention span in all groups and emotional stimuli inhibits cognitive performance in all categories. The difference between these two measures was statistically significant for all groups except the average IQ and the moderately disabled. They hypothesise that participants in the moderately disabled group were less affected by the nature of the stimulus because of better rote memory that was unaffected by distraction (Chakrabarti, et al., 2013). It should be noted that category numbers were small, age range varied considerably and there was little control over level of education. More significantly though, anxiety was not a variable.

The only study that addressed the specific issue of attentional responses to emotional stimuli amongst adults with low ability and anxiety used a group of 16 adolescents and adults (13-34) with Williams syndrome and mild or moderate ID (Dodd, et al., 2011b). Attentional responses to threatening non-social images (animals, natural disasters and medical procedures) from the IAPS system were measured with a visual-probe task. Ability was assessed using a test of general cognitive ability and participants with scores below the moderate category of ID, standard score of 48 or “age equivalent” of 6.5 years were excluded. Anxiety was assessed on a children’s self report scale (Dodd, et al., 2011b). The visual-probe procedure was similar to that used previously with
adults and children (e.g. (Mogg, et al., 2004c; Waters, Mogg, Bradley & Pine, 2012b)) with a fixation cross followed by images displayed either side for 500ms. and a probe appearing in congruent and non-congruent positions relative to the side of the preceding image.

The authors had previously conducted a study using emotional faces from the Karolinska (Lundqvist, Flykt & Ohman, 1998) series in a dot-probe paradigm task with a similar group (Dodd, et al., 2010) although there was an absence of bias toward angry faces despite one toward happy faces (Dodd & Porter, 2011a). An information-processing bias in Williams syndrome toward social stimuli without discrimination of valence is thought to underlie this (Muñoz, et al., 2010) along with atypical eye gaze toward faces (Hanley, et al., 2013). These unique features of neuropsychological functioning probably explain the low rates of social anxiety amongst adults with Williams syndrome despite the high rates of other anxiety disorders (Dodd & Porter, 2009).

In Dodd and Porter’s (2011a) study, participants were matched to control groups for chronological age and attentional control ability. A significant bias toward the threatening images was found in the Williams syndrome group, a significant one (yet smaller) away in the age matched group and no bias in the attention matched group. When anxiety was controlled, there was no difference between groups and within the Williams syndrome group. Those with an anxiety disorder diagnosis had a significantly higher bias than those without though. It is difficult to disentangle the specific effects of Williams syndrome on information-processing from those of general ability and of anxiety from these data only. However, it seems clear that threatening emotional stimuli do draw the attention of adolescents and adults with intellectual disability and particularly amongst those with heightened anxiety. The experimental paradigm matches one widely used with children and adults. Furthermore, whilst not addressing selective attention and anxiety, visual cuing and visual search paradigms have been used with ID (mild) in the work of others (Merrill, et al., 2001; Merrill, et al., 1994b), most recently in samples with mild and moderate (Dodd, et al., 2010, 2011b; Heyman, et al., 2015).
No other studies using visual-probe tasks with emotional stimuli could be found that used a sample with LA. However, there are some findings related to the recognition and expression of emotion across levels of ID as well as the impact of emotion on attention in adults with profound intellectual and multiple disabilities (PIMD). These are reviewed in detail in Appendix B but some key points are relevant here. Bermejo, Mateos and Sanchez-Mateos (2014) found that adults with mild and moderate ID made higher valence judgements on pictures of positive animals, people and objects, made lower judgements of negative pictures and had greater variability in their scores than a control group with TD that were matched for general ability. The authors concluded that the variance in valence judgments was related to emotional regulation rather than perception. They also found that the adults with ID showed greater arousal than TD adults (Bermejo, et al., 2014). Valence and arousal have also been investigated in a small sample with PIMD who did not have language (Vos, et al., 2010). They made extensive used of behavioural as well as physiological measurement to confirm emotional valence and arousal. Waters and Kershaw (2015) also used a physiological measure (skin conductance) of arousal with children. They found that breathing pattern differentiates valence of expressed emotions and behavioural codings predicted the breathing changes associated with different emotions. Sympathetic nervous system was activated during positive emotions and parasympathetic nervous system was activated during negative emotions. Heart rate was also higher when emotion intensified. They concluded that the lowered arousal during negative emotion was due to attentional avoidance as an attempt to regulate emotion (Vos, et al., 2010).

5.7.4 Summary
In this final section, the impact of ability on attentional responses to emotional stimuli has been considered, particularly with anxious participants. An attentional bias to threatening material or angry faces is common, particularly in younger children across experimental and control groups. A bias away from threat also occurs in some anxious groups and the direction of bias may indicate the type of emotional disorder as well as signalling the likelihood of response to treatment. A bias toward happy faces is also frequently found in children. It also appears that executive functioning development
influences the maturation of attentional control during adolescence but it is not clear what role developing personality and independence has on attentional responses. The dot-probe paradigm with emotional faces, particularly the Bradley (Bradley, et al., 1998) series is well established with children even of primary school age.

The lack of interest in general or verbal ability in the adult literature is remarkable but it is difficult to know whether researchers believe it theoretically unimportant or that it is cumbersome to control. The fact that most research, at least with trait-related anxiety is carried out with university students using self-report surveys does mean variance in ability is likely to be limited. Nevertheless, low ability is of enough interest for some researchers to arbitrarily exclude potential participants with ID (2012; Monk, et al., 2006; Waters, Craske, Bergman & Treanor, 2008b) and learning disabilities (Eldar, et al., 2012). Emotion recognition studies confirm the detection of stimuli valence and arousal across the spectrum of LA. Expressed responses have also been measured even where participants have no language. Attentional responses to stimuli of both valences have also been detected but have only been measured on the visual-probe amongst groups with mild and moderate ID (Dodd, et al., 2010, 2011b). However, the samples in these studies all had Williams syndrome, there was limited consideration to the variable of anxiety and ability was not covaried. Consequently, there is significant scope for investigation of the impact of ability on attentional responses to emotional stimuli amongst adults with low ability and particularly those who are anxious.

5.8. Conclusions
Cognitive models of psychopathology have long proposed biases in the cognitive processing of disorder congruent emotional stimuli. Specific theories of attention predict that amongst people with high-trait and disorder level anxiety, feared stimuli draw disproportionate responses from the attentional system compared with non-emotional stimuli. There is substantial evidence from adult studies that the initial automatic or orienting level of attentional response to these stimuli is faster and disengagement is slower. Thus a directional bias toward feared stimuli is commonly found in adult samples, consistent with Mogg and Bradley’s cognitive motivational
analysis, it plays a role in causing and maintaining anxiety. The later or executive level of attentional processing is also affected with the increased demand on attentional capacity affecting speed rather than accuracy of response to the emotional stimuli. This is consistent with Eysenck and Derakshan’s (Eysenck, et al., 2009, 2011) attentional control theory. Despite the concordance of theory and evidence for the impact of emotional stimuli on attention in the general population, there has been little investigation of the impact of dimensional ability on attentional functioning and no investigation of how it affects attentional responses in anxious adults with LA.

The detection and expression of valence and arousal has been found in adults across the LA spectrum and attentional responses have been observed. However, they are frequently neglected in experimental and clinical research. Studies of the typical development of attention to emotional stimuli show the orienting system supplemented by the executive system, which matures in processing speed more slowly than accuracy with concomitant impact on emotional regulation. Attentional functioning has been investigated in groups with neuro-developmental disorders and genetic disorders conferring high rates of low ability and in samples with categorised ID of heterogeneous origin. These suggest that attentional functioning at the orienting and executive levels is likely to be slowed amongst adults of low ability but that sensory, motor and visual orienting will probably be adequate for investigation with a visual-probe task at quite low levels of ability.

The impact of emotional stimuli on attention in children and adolescents has been investigated with the same paradigm and stimuli as adults but findings have diverged from those with adult groups. A bias toward happy faces is often found as has a common effect of feared stimuli on anxious and non-anxious groups. The reaction to feared stimuli has been a bias toward in some groups of children and away in others. This diversity in results may be influenced by the maturation of emotional differentiation and regulation as well as the development of attentional control. Recent data suggests that the direction of bias in anxious children may be congruent with discernible patterns of psychopathology. Children show mastery of the dot probe paradigm in early years and recognition of fearful faces in the first few months. When those with ID are matched on ability with children in the general population they show
similar attentional development into puberty but when compared with same aged peers slower processing. Comparing the cognitive functioning of adults who have ID with that of normally developing children is tenuous but early mastery of the paradigm and recognition of stimuli lends support to the viability of the task.

5.9 Rationale for hypotheses 9 - 13

Aim 4

To test for the effects of anxiety and ability on attentional responses to emotional stimuli with those participants who mastered the visual-probe task.

Rationale: Extensive support exists for spatial bias toward and away from feared stimuli in anxious children and toward them in anxious adults. This is explained by the cognitive-motivational theory of Mogg and Bradley (1998) but the experiment has never been undertaken with a sample from the lowest levels of ability. Evidence also exists for an inverse correlation between ability and speed of response as well as slowing due to feared emotional stimuli in anxious adults. Attentional control theory (Eysenck, et al., 2011; Eysenck, et al., 2007) asserts that feared stimuli will impair speed rather than accuracy and has not been tested in a low ability sample before.

Hypothesis 9.

That the majority of participants would be able to pass the screening (ESP & Legible writing) and mastery procedure as well as completing at least one block with a minimum of 60% correct trials.

Rationale: General population studies rarely exclude participants for inaccuracies and outliers. Whilst practice procedures are often used in children’s studies, they do not use these or other procedures to screen participants. Of the two studies using a visual-probe with samples of adults with ID (Dodd, et al., 2010, 2011b), one (Dodd, et al., 2010) used an emotional recognition task but does not report on any exclusions. Given that no studies have used the visual-probe with adults who have ability at the lowest levels it was important use a screening procedure (ESP) as well as a validity procedure (mastery) and then record inaccuracies and outliers. Amongst studies which excluded cases based on rate of inaccuracies are Waters, Mogg, and Bradley (2012a) who set their threshold
for exclusion 38% error rate. Hence, the rate of 60 % correct was adopted for the present study. Whilst the groups with the lowest levels of ability were expected to have difficulty, the majority of the whole sample was expected to succeed.

Hypothesis 10
That a bias toward or away from angry faces would be demonstrated in those with problem-level anxiety as indicated on either informant or respondent measures.

Rationale: Extensive research supports a directional bias toward and away from feared stimuli in anxious children and toward them in anxious adults. This is accounted for by the cognitive-motivational theory of Mogg and Bradley (1998) but the only experiment to examine directional bias in adults with LA did not control anxiety and used a sample whose bias appeared to be specifically related to Williams syndrome (Dodd, et al., 2011b). Furthermore, the task has never been undertaken with a sample from the lowest levels of ability. The present study attempted to replicate the most common paradigm and emotional stimuli whilst ensuring emotion recognition and mastery of the task was adequate in the sample. Hence, replication of the widespread findings of a directional bias toward angry faces amongst high anxious participants was expected. Findings of a common bias in children and biases toward and away in anxious child groups were considered possible in the present sample as was a bias toward happy faces. The emotional face stimuli would be exposed for 500ms in a visual-probe paradigm.

Hypothesis 11
That verbal ability (PPVT-IV standard score) but not emotional (ESP), scoring (SAP) or motor-related ability (Physical Disability Domain (PDD) of ABS-RC: 2) would be negatively correlated with RTs to emotional faces [measured by combined RTs to emotional (congruent and non-congruent trials) face stimuli].

Rationale: The impact of ability on processing speed has been widely proven amongst adults in the general population and the subpopulation with LA. However, no study has used emotional face stimuli in the subpopulation or used a visual-probe in all levels of ability below the norm. The areas of emotional, scoring and motor ability have not been co-varied with response speed either. Given the well-supported relationship between speed and ability, it was expected that this would be found in the present sample.
Hypothesis 12
That groups with high self-rated anxiety (BAI) would show slower responses to angry faces than the low anxiety groups [RTs to all angry stimuli (congruent and non-congruent trials)].

Rationale: The slowing effect of anxiety on responses to threatening stimuli is well proven in the general population with child, adolescent and adult samples but not with adults who have LA. This effect is associated with the orienting system but is also one of the key tenets of Eysenck and Derakshan’s attentional control theory (Eysenck, et al., 2011; Eysenck, et al., 2007). If the emotional stimuli produce a slowing effect and accuracy remains relatively unaffected then there may be support for attentional control theory. Given the evidence for the slowing effect at orienting and executive levels in the general population, it was expected this would be found in the present sample.

Hypothesis 13
That inaccuracy rates would be similar to studies of the general population and studies of adults with ID. Also predicted was a negative correlation between inaccuracies and ability (PPVT–4).

Rationale: Attentional control theory addresses the effect of anxiety on responses to threatening stimuli at the executive level. Whilst supported in the general adult population it has not been investigated in LA samples. Despite the lack of existing data from studies in samples with LA it was predicted that inaccuracies and outliers would be present in similar proportions to general population samples. Furthermore, inaccuracies were predicted to correlate negatively with verbal ability. If attentional control theory is supported in a LA sample, then interventions to enhance attentional control may be viable.

Exploratory Analyses
1. The relationship between bias score (RT) symptoms of anxiety before probe (BAI), signs of anxiety (PAS-ADD anxiety & PAS-ADD A-N) and anxiety (BAI) after the probe was explored using Pearson’s correlation. This is because although there is a substantial amount of data supporting the impact of anxiety on attentional responses to
threatening stimuli, there is little evidence for the differential impact on anxiety before and after the visual-probe.

2. The relationship between combined angry RTs (congruent and incongruent) and Life Events (loss, trauma, change and all LEs) was explored. Cumulative LEs are related to mental ill-health in the adult general population (Fried, Nesse, Guille & Sen, 2015) and the subpopulation with LA (Wigham, et al., 2014). Deficits in executive functioning have been linked with depression in general population (Letkiewicz, et al., 2014) and a recent study found that cumulative LEs have a prospective impact on executive functioning amongst adults with developmental disabilities. Heyman and Hauser-Cram (2015) assessed LEs for participants at 5, 10, 15 and 18 years in a sample with various developmental disabilities who had received early intervention services in childhood. They found that cumulative LEs was a significant predictor of RT on a common test (Fan, et al., 2002) of executive functioning in general and inhibition in particular (Heyman, et al., 2015). The effect was also found in the group with Down syndrome and ID. Evidence suggests that compromised EF can be implicated in vulnerability to mental ill-health. Given the vulnerability of the sample in the present study examining the impact of LEs on EF is warranted despite the limited existing findings.
Chapter Six: Method

6.1 Sample

6.1.1 Support services
Adults aged 18 and over were recruited from two support services (Table 3). The first was a centre based day activity and employment support agency from which 65 participants (92.9% of the sample) were recruited. The service provided daytime activities and employment opportunities to adults with physical, intellectual and psychiatric disabilities. The second provided outreach support to clients with physical, intellectual and psychiatric disabilities living in community based (public and private) accommodation and only five participants or 7.1% of the sample were recruited from this service. There was no catchment overlap as each support service operated in a different city. The study sample and procedure is summarised in Figure 1.

6.1.2 Demographics
A total of 70 adults signed the consent forms to participate in the study and of these, 38 were male and 32 female comprising 54.3% and 45.7% respectively and the mean age for the sample was 35.69 (Table 2). The majority of participants (65.7%) did not have an intimate relationship, 19 (27.1%) did but were not co-habitating and only five (7.1%) lived with a partner. Most participants (64.3%) lived with a relative, 18.6% lived independently with help from family or a support service and only 11.4% lived in staffed care.

6.1.3 Support level
The first service had a rating for the level of support provided to each client that was measured in ascending levels of intensity (Appendix F). In determining this, the service accounted for a range of needs (physical, intellectual, behavioural, psychiatric) before assigning a rating for each client between one and six. The largest groupings received level 3 (45.7%) and level 4 (27.1%) with only 4.3% assigned level 1 support (Table 3). Only one participant had a level 6 rating and this was due to the need for supervision of specific illegal behaviour. The second agency did not have a rating system for determining level of support.
Flow Chart for Study Sample and Procedure

70 of the adults who could speak in sentences and were nominated by staff in support services signed consent forms for respondent and informant interviews

38 Male
32 Female
65.7% single
64.3% live with relative

69 Respondent interviews
receptive language (PPVT-4)
Standard scores 20-120 (m=63.09)
Age equivalents 2.10-24.11 (m=10.26)

69 screened
(Participants continued)
• 15 unable to write legibly
• 10 unable to score on scoring ability procedure
• 12 unable to identify all emotions on emotions screening procedure
• 11 invalid cognition and symptom interviews

58 Respondent interviews
cognitions (CCL-A & CCL-D) and symptoms (modified BAI & BDI-II)

69 screened
(Participants excluded)
• 3 not attempted practice
• 16 not mastered practice
• 2 technical failure Block 1
• 14 invalid performance

43 Respondents with adequate data for analysis for visual-probe Block 1
45 Respondents with adequate data for analysis on visual-probe Block 2

65 Informant interviews (ABS-RC:2)
Part 1 - adaptive behaviour
Domains
• Independent functioning
• Physical development
• Economic activity
• Language development
• Numbers and time
• Domestic activity
• Vocational activity
• Self direction
• Responsibility
• Socialisation

Factors
• Personal self-sufficiency
• Community self-sufficiency
• Personal-social responsibility

65 Informant interviews (ABS-RC:2)
Part 2 - maladaptive behaviour
Domains
• Social behaviour
• Conformity
• Trustworthiness
• Stereotyped and hyperactive behaviour
• Sexual behaviour
• Self-abusive behaviour
• Social engagement
• Disturbing interpersonal behaviour

Factors
• Social adjustment
• Personal adjustment

65 Informant interviews
life stressors (PAS-ADD checklist)
• Loss – Trauma – Change – Other
• Total

65 Informant interviews for mental illness symptoms (PAS-ADD checklist)
• Organic
• Affective/neurotic
• Psychotic

1 withdrew before (PPVT-4)

5 Informants not feasible

69 screened

15 withdrawn before (PPVT-4)
6.1.4 Disability
Sensory and motor impairment as well as epilepsy had the potential to interfere with performance on any tasks involving visual and auditory stimuli, attention and motor control. The computer-based visual-probe task was seen as particularly vulnerable and general population studies using this task have screened for corrected-to-normal vision (Bradley, et al., 1998; Mogg, et al., 2008; Waters, et al., 2014c; Waters, et al., 2012a), epilepsy (Hakamata, et al., 2013; Hakamata, et al., 2014) and physical disability (Waters, et al., 2014c). The majority (91.3%) of participants had the origin of their disability in the developmental period and only 8.7% acquired their disability in adult years (Table 4). The proportion of participants without full control of one or both hands was 15.7% and those without control over one or more limbs was 17.1%. Impairment of sight was reported in 20.3% of participants and of hearing in 17.4% though the exact nature of impairment and method of correction was not ascertained. Epilepsy was reported amongst 10.1% though level of seizure control was not assessed. Data was not gathered on the aetiology of LA apart from whether it originated in the developmental period or not. Careful monitoring for any functional impact on performance and safety occurred and a validity procedure operated for each research task.

6.1.5 Inclusion
Staff at the two support services were asked to nominate clients who could understand and speak in short sentences. All those nominated were asked to attend a briefing by a recruiting support staff member. All who consented after the briefing were accepted for the project but validity procedures governed the extent to which their data was used and the mastery procedure governed progress in the visual-probe task.

6.1.6 Exclusion
No consenting clients were excluded at the outset but staff only nominated those who met the inclusion criteria and no data were kept on clients who staff didn’t nominate. The study involved a range of quite different research tasks (e.g. verbal symptom and cognition tasks as well as visual and motor based visual-probe tasks) for which screening, and validity procedures had been designed. The approach was explicitly inclusionary allowing each respondent to attempt each task with validity procedures governing whether data was analysed. Therefore, validity of data was judged on a task-
by-task basis and data could be excluded from analysis where necessary without the need for case exclusion. However, completion of the Peabody Picture Vocabulary-4 (PPVT-4) (Dunn, et al., 2007) was considered essential for participation and only one person was excluded because it couldn’t be completed. He had a profound hearing loss, speech difficulties and limited reading ability making administration of the PPVT-4 impossible.

The rate of sensory (hearing and sight), physical (fine and gross motor control, epilepsy) was expected to be high given the majority of the sample had an ID (evidenced in reading, writing and comprehension problems). The functional impact of these was monitored and where necessary controlled for in validity procedures. Decisions to excluded interview data were made after administration but decisions about mastery and were made during administration. Participants who did not pass the mastery procedure were excluded following this procedure. A few were allowed to continue on their insistence but responses were not analysed if they hadn’t mastered the task.

Past or present diagnosis of severe mental illness especially, psychosis (particularly schizophrenia) and mood disorder (particularly bipolar) was not an exclusionary criterion. However, participants had to be in receipt of medical or psychological treatment and stabilised for a period of 3 months prior to interview (Table 5). No exclusions were required for this reason but symptoms were monitored during all interviews. Where elevated distress or untreated symptoms of a mental illness were evident at interview, participants were asked for consent to discuss the need for help with their nominated informant in the first instance and if necessary their support or treatment providers. Consent was sought and given in the case of five participants and suitable services or assistance was arranged.

6.1.7 Retention
Participants were made aware that they could withdraw from any or all of the tasks and two people did so. One did so immediately following the initial consent procedure without specifying a reason but asked to re-join at a later date and took part in all the respondent tasks. The other participant withdrew during administration of the
Cognitions Checklist (CCL) because ‘the questions were too hard’ but agreed to retention of the data he had already provided.

6.2 Measures

6.2.1 Demographics
Demographic data were gathered directly from the participants about gender, age, relationship status, living arrangement as well as the level of support they received in the residential environment. Participants gave consent to the support service providing their support-level rating.

6.2.2 Disability
Data on the advent of each participant’s primary disability (developmental origin or adult acquired) were gathered as well as the presence of movement (fine and gross motor co-ordination), sensory (sight and hearing) impairments and chronic physical conditions such as epilepsy. This was done by direct questioning of participants and crosschecking on relevant items of the informant completed ABS-RCS:2. Monitoring of sensory barriers to communication and task performance also occurred during research tasks and one participant did not complete the PPVT-4.

6.2.3 Mental health
Mental disorders recorded were depression, anxiety, psychosis (schizophrenia, psychotic depression, bipolar mood disorder), personality disorder, autism and acquired brain injury. Mental disorders were noted from either participant or informant report. Diagnoses were recorded if they had been made by an appropriate professional and treatment or management was in place for the condition.

6.2.4 Receptive language ability
Peabody Picture Vocabulary Test-4
The Peabody Picture Vocabulary Test-4 (Dunn, et al., 2007) (Appendix F) is an easily administered, user-friendly instrument for testing receptive language that has no reading or writing requirements. It generates a standardised score and is norm-referenced for age-equivalence up to early adulthood. Versions of the PPVT (Dunn, Theriault-Whalen & Dunn, 1993; Dunn, et al., 2007; Dunn, et al., 1997a; Dunn, et al., 1981) and the
BPVT (Dunn, et al., 1982a; Dunn, et al., 1982b; Dunn, et al., 2009; Dunn, et al., 1997b) have been widely used in studies investigating cognition and emotion amongst adults with ID but for different reasons and unfortunately studies vary in the statistics they report (i.e. raw score, standard score, age equivalent) and use in analyses. Few reported complete data for their sample.

Receptive language has been used to exclude potential participants from studies. Reed and Clements (1989) used a BPVS (Dunn, et al., 1982b) raw score of 40 (age equivalent of 4 years, 5 months) to exclude 28 participants from a sample of 85 not reaching its ‘floor’. The PPVT-III (Dunn, et al., 1997a) was used to screen a sample of 122 individuals with ID and 37 with age equivalents below 5.0 were excluded, leaving a final sample with a raw score range of 71-191 and a mean of 116.7 (SD=29.1) (Esbenson, et al., 2005). Esbenson and Benson (2007) used the PPVT-III in a similar sample with a mean standard score of 58.2 (SD=18) and ranging from 40 to 104 (Esbenson, et al., 2007).

Receptive language has also been used as an independent variable in studies of emotion, cognition and symptoms of mental illness. The PPVT (Dunn, et al., 1981) was used as an independent variable alongside measures of depressive symptoms with a sample of 99 adults but neither age equivalents, raw or standard scores are reported (Helsel & Matson, 1988). Dagnan, Chadwick and Proudlove (2000) used the BPVS to discern the raw score median and range for a group who could not complete an emotional identification task (42.0 and 24.0-71.0) as well as for the group who could (68.5 and 52.0-87.0). There are no known studies of the relationship between ability and anxiety related attention bias let alone amongst adults with LA.

Receptive language was used in the present study as a proxy for global ability that could be used to classify level of ID (Tables 5&6). It was also used as a dimensional variable that could be controlled for in the major research tasks. It was co-varied with symptom and cognitions measures as well as response times on the visual-probe task and dimensional measures of scoring ability and emotional recognition. No studies of attentional effects of emotional stimuli have co-varied dimensional ability. The one other study investigating cognitive content-specificity amongst adults with LA used
categories of ID but not as a variable, thus limiting comparisons with its results (Glenn, et al., 2003).

**6.2.5 Informant adaptive behaviour**

**Adaptive Behavior Scale-Residential and Community Second Edition**

The Adaptive Behavior Scale-Residential and Community Second Edition (ABS-RC:2) (Appendix F) is the second edition of a scale developed by the American Association on Mental Retardation (AAMR) (Nihira, et al., 1993). Data for the scale are gathered from an informant with good knowledge of the participant and this is done either in an interview, or by the informant on their own. Part 1 yields raw total, percentile, standard and age equivalent scores for 10 domains of adaptive behaviour or functional skills. Factor scores are also derived for Personal Self-Sufficiency, Community Self-Sufficiency and Personal-Social Responsibility (Tables 1,9&11). A number of domains were of particular interest in the present study. Physical Development Domain (including fine and gross motor control) as a co-variate for validity on the visual-probe task, Numbers and Time Domain for validity of symptom and cognition measures and the Socialisation Domain was used as a proxy for trait anxiety. Part 2 contains domain raw, percentile and standard scores for 8 domains of problem behaviour. The factors of Personal Adjustment and Social Adjustment are also derived for Part 2 (Tables 1,10&11). The total on shyness items from the Social Engagement Domain was used as one of the proxies for trait anxiety. The scoring polarity is effectively reversed in Part 2 because more problematic behaviour generates higher scores whereas more adaptive behaviour generates higher scores on Part 1.

The ABS-RC:2 is used widely for individual program development based on adaptive strengths and weaknesses (Nihira, et al., 1993) but has also been used in empirical research. Part 1 has been used to estimate intellectual functioning using a multiple regression technique (Moss, et al., 1997b; Prosser, et al., 1998b) and studies of symptoms of mental illness, life events (Owen, et al., 2004), challenging behaviour (Allen, et al., 2012; Felce, et al., 2013) and support needs (Emerson, et al., 2000). Part 2 has been used in a comparison study of problem-behaviour checklists (Walsh, et al., 1999) and personality characteristics (Kishore, et al., 2005). The ABS-RC:2 has not been widely used in studies of cognitive variables amongst adults with LA despite the
relatively stable indication of adaptive behaviour it provides and the availability of statistical procedures for estimating IQ using data from the Adaptive Behaviour Scale (Moss, et al., 1997b). Domains and factors are summarised in Table 1.

Table 1

ABS-RC:2 Summary of Domains and Factors

<table>
<thead>
<tr>
<th>Part One Domains</th>
<th>Raw Score</th>
<th>Percentile</th>
<th>Standard Score</th>
<th>Age Equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent functioning</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Physical Development</td>
<td>√</td>
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<tr>
<td>Economic Activity</td>
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<tr>
<td>Language Development</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Numbers and Time</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Domestic Activity</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Pre-vocational/Vocational Activity</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td>Self-Direction</td>
<td>√</td>
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<td>Responsibility</td>
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<tr>
<td>Socialisation</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td><strong>Part Two Domains</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Social behaviour</td>
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<tr>
<td>Conformity</td>
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<td>Trustworthiness</td>
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<td>Stereotyped and Hyperactive Behaviour</td>
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<td>Sexual Behaviour</td>
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<td>Social Engagement</td>
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<tr>
<td>Disturbing Interpersonal Behaviour</td>
<td>√</td>
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<tr>
<td><strong>Part One Factors</strong></td>
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<tr>
<td>Personal Self-Sufficiency</td>
<td>√</td>
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<td>Community Self-Sufficiency</td>
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<td>Personal-Social Responsibility</td>
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<td><strong>Part Two Factors</strong></td>
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<tr>
<td>Social Adjustment</td>
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<tr>
<td>Personal Adjustment</td>
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</tbody>
</table>
6.2.5 Screening and validity procedures

Screening procedures were administered prior to the research tasks or as part of the recruitment process. The PPVT-4, legible name writing, Emotional Screening Procedure (ESP), Scoring Ability Procedure (SAP) were used this way in the present study. The ESP and SAP were used in their dichotomous (pass/fail) versions as well as in their dimensional versions. The dimensional versions facilitated the co-variance of task specific ability with general measures of ability and cognitive variables in the study. Validity procedures were used to detect response biases in symptom and cognition interviews, mastery and clinical validity procedures were used on the visual-probe task.

All participants who met the inclusion criteria (were able to speak and understand sentences) were screened for verbal ability and task specific competence rather broad arbitrary criteria. This meant that participants’ data were included for analysis based on their specific skill with that task rather than their score on a past or current measure of general ability. By allowing participants to proceed regardless of screening measure scores, performance on these pre-task measures could be compared with attainment on the research task. The role of screening and validity procedures in the components of the present study’s first aim is detailed in Chapter Two.

Writing name legibly

Participants were asked to write their name on the consent form. Those who were judged by the investigator to have done so in a legible manner were scored 1 and those who nominated a staff member to write for them or did so themselves in an illegible manner were scored 0. The capacity of this dichotomous procedure to predict mastery and production of adequate data on the visual-probe task was compared with other screening procedures.

Emotions Screening Procedure

The Emotions Screening Procedure (ESP) was designed to quantify ability to recognise emotions. The capacity of its dichotomous version to predict mastery and production of adequate data on the visual-probe task was assessed. The dimensional version was covaried with a range of other variables. The background to developing the ESP is
described in Appendix B and a copy of the ESP is contained in Appendix F.

Four basic emotions were chosen (happy, angry, sad, fearful) as they included emotions relevant to anxiety (scared) and depression (sad) as well as the target emotions in the visual-probe procedure (scared and angry). They included negative valence (sad, angry, scared) and positive valence (happy) as well as high (happy, angry, scared) and low (sad) arousal. The emotions are depicted in line drawings from the Life Facts: managing emotions series (Stanfield & Stanfield) and are presented on A4 size cards. The process involved two steps of descending difficulty: 1. **Labelling**, where the participant is presented with each face in turn and asked to label the emotion depicted, ‘what is this person feeling?’; 2. **Identification**, where all the cards are set out at once and the participant is asked to point out the emotion named by the presenter ‘which person is feeling ...(named emotion)….?’. If any mistakes occurred in the first step, the second was administered, otherwise credit was given for it. The order of card presentation was the same for each step and for each participant, responses were recorded on the ESP answer sheet. Participants were allowed to change their minds but were not corrected; probing only occurred in step 1 and only when an approximation was given (i.e. funny or laughing instead of happy; unhappy or not happy instead of sad). Probing did not occur for responses conveying the incorrect emotion (i.e., sad instead of angry), an action (i.e. hungry or scratching instead of fearful) or something merely of the same polarity (i.e. upset or emotional for sad). Participants were given a score comprised of all their responses but they had to give four correct responses for at least level two to pass the screening procedure (Table 12). All 69 participants completing the PPVT-4 completed the ESP The alpha co-efficient for the ESP used in the current sample (n=69) was .82.

**Scoring Ability Procedure**
The Scoring Ability Procedure (SAP) (Appendix F) was designed as a screening procedure to assess participants’ capacity for understanding questions and providing calibrated answers on key research tasks such as the symptom and cognitions checklists. It also contains a visual scoring aid used to facilitate responses. The capacity of its dichotomous form to predict a valid interview was tested and the dimensional form was co-varied with a range of other variables. All 69 participants completing the ESP and
PPVT-4 completed the SAP. The use of a visual scoring aide such as a histogram (Benson, et al., 1992; Esbenson, et al., 2007; Helsel, et al., 1988; Lindsay, et al., 2007b) or flash cards (Glenn, et al., 2003) is common in cognition, emotion and symptom research with adults who have an intellectual disability. Screening procedures to establish scoring ability are common although these often precede exclusion of potential participants (Esbenson, et al., 2005, 2007; Glenn, et al., 2003; Nezu, et al., 1995; Payne, et al., 2004) and no studies have reported on the capacity of their procedures to predict valid and invalid performance in interviews.

Administration of the SAP involved placing the 4-bar histogram (Appendix F) in front of each participant who was asked to: 1. Count the number of things they saw (credit given for answers of either three or four); 2. Indicate which was the biggest and which was the smallest and; 3. Indicate which was ‘never’ after the researcher pointing out ‘always’. They were then asked to indicate by pointing or saying, how often they; (4) ate cars; (5) walk; (6) breathe; (7) had their eyes open; (8) ate breakfast and; (9) how often the sky is dark at night. Questions 1 to 3 tested basic numeracy and quantification so only factually correct answers were credited. Question 4 is a nonsense question to check for simple acquiescence and only ‘never’ was an acceptable answer. Questions 5 to 8 covered measurable behaviours and 9, day/night awareness for which euphemistic and literal translations were acceptable (e.g., a participant might be referring to their mode of transport when indicating they ‘always’ walk; some people may go to bed early and only notice darkness at night ‘sometimes’; a person may literally ‘never’ eat breakfast), the only unacceptable answer was ‘never’ on 5 (unless the person was not ambulant), 6, 7 or 9 were marked as fail though. Acceptable answers to all questions were required to pass the SAP. This procedure was administered immediately after the ESP and prior to the BAI. Before the CCL, the participant was shown a 5-bar histogram and each score point was explained and the participant asked to name each score. Participants were allowed to change their answers on reflection but incorrect answers were not probed (Table 13). The alpha co-efficient for the SAP used in the current sample ($n=69$) was .94.

**The mastery procedure**
A mastery procedure was developed based on practice procedures used in other studies
using the same visual-probe paradigm and emotional face stimuli (Mogg, et al., 2004c; Pine, et al., 2005; Waters, et al., 2008c). The procedure involved: 1. A paper practice that involved showing the participant a male and female set of neutral faces from the on-screen practice set placed against the screen. The cross was then shown appearing on either side of the screen and the participant notified of the impending request to press the key that corresponds to the placement of the cross; and 2. Up to four blocks of on-screen practices each containing 10 trials, preceded by the instruction to work as quickly as possible pressing the key responding to the side on which the cross appears. Participants were given verbal and gestural prompts and even hand-on-hand assistance to maximize their opportunity to learn the task. Fine and gross motor impairments were obvious on observation but mastery was indicated where the participant could attend to the faces, identify the cross which followed and independently press one key in response without looking down at the keyboard. Common behaviours amongst those not reaching mastery were: not responding at all to the pictures or the cross, pressing keys randomly, pressing both keys at once, or pressing keys prior to the pictures appearing. If proficient, participants were given a full block of 80 trials (Tables 14&15). Some participants were actually unfamiliar with using a keyboard and one participant withdrew from the visual-probe task for this reason.

6.2.6 Symptom and cognitions measures

Beck Anxiety Inventory

The Beck Anxiety Inventory (BAI); (Beck, et al., 1988b; Beck & Steer, 1993a; Clark, et al., 1989) is a 21-item self-report inventory designed to assess the severity of the somatic, affective and cognitive components of anxiety in psychiatric populations with higher scores representing greater severity in anxiety. It has been used in prevalence studies of anxiety (Crawford, et al., 2011) as well as in theoretical studies of cognitive content-specificity (Greenberg, et al., 1989; Jolly, et al., 1994a; Lamberton, et al., 2008). Two-factor (Beck, et al., 1988b) and three-factor solutions have been generated (Beck, Steer & Beck, 1993b) and in 1999, the BAI was the third most widely used instrument for anxiety research (Piotrowski, 1999). It has been shown to have high internal consistency (alpha=92), strong convergent validity, and a test–retest reliability of .75 over a 1-week period (Beck et al., 1988). It uses a 4-point scale with a possible range from 0 to 63. Severity categories are generally considered as: minimal; 0-9, mild;
10-16, moderate; 17-29, severe; 30-63. The BAI asks respondents to report on symptoms over the time-frame of the last week (Beck, et al., 1993a). Copies of the modified and copyright versions of the BAI are contained in Appendix F.

**Beck Depression Inventory**

The Beck Anxiety Inventory (BDI) (Beck, et al., 1961) was one of the first self-report inventories for depression and the current version, the BDI-II (Beck, Steer, Ball & Ranieri, 1996a; Beck, et al., 1996b) has become widely used in theoretical studies of cognitive content-specificity (Beck, et al., 1987; Clark, et al., 1989; Greenberg, et al., 1989; Lamberton, et al., 2008) as well as prevalence of depression. It is a 21-item self-report inventory scored with a 4-point scale designed to assess the severity of the affective, cognitive, motivational, psychomotor, and vegetative components of depression, with higher scores indicating more severe depression. The BDI has demonstrated strong psychometric properties, with a mean alpha coefficient of .89 for university populations, a mean 2-4 week retest reliability of .80 and high convergent validity with clinician ratings and other self-reports of depressive symptom severity (Beck, et al., 1988a; Cohen, 2008). Score categories are: minimal depression; minimal; 0-13, mild; 14-19, moderate; 20-28, severe; 29-63. The BDI-II asks respondents to report on symptoms over the time-frame of the last two weeks (Beck, et al., 1996b). The modified and copyright versions of the BDI-II are contained in Appendix F.

**BDI and BAI with adults who have ID**

The BAI and BDI-II have been used on their own and together with some modification with adults who have LA. Language has been modified and they have been administered by interview with the questions read aloud and scored with visual aids (Lindsay, et al., 2003; Lindsay, et al., 2007b). Lindsay and Lees (2003) used modified forms with 16 sex offenders with mild ID and borderline functioning who were matched with the same number of non-offenders who had similar levels of functioning. They found high test-retest correlations for both instruments and significantly lower levels of anxiety and depression than in controls. Lindsay and Skene (2007b) made modifications according to previously published suggestions in their validation study of the BAI and BDI-II (Dagnan, et al., 2004a; Finlay, et al., 2001). Their sample of 108 adults was drawn from a specialist clinic taking referrals for treatment of depression (n=17), and
anxiety \((n=28)\), offending males (sex offenders) \((n=64)\), other offending males \((n=31)\) and other male referrals \((n=16)\).

Means for Lindsay and Skene’s (2007) whole sample were 12.84 on the BAI and 14.06 on the BDI-II 14.06. For all women \((n=28)\) scores were 17.96 and 18.38, respectively, and those for all men \((n=80)\) were lower at 12.40 and 14.41, respectively. However, means for their anxiety referrals were 29.41 (BAI) and 16.17 (BDI-II). For depression referrals they were 22.42 and 31.84 respectively. Only one other study has used the BAI (unmodified) with adults who had borderline, mild and moderate ID using support services \((n=46)\) (Glenn, et al., 2003). Glenn et al. (2003) published mean scores, standard deviations and ranges on the BAI for men of 17.92; 14.41; 0-63 and for women of 21.29; 14.92; 0-50. However, all of the mean symptom rates in LA samples are significantly higher than a large non-clinical comparison sample \((n=729)\). Crawford et al. (2011) found means of 6.16 on the BAI and 6.25 on the BDI-II in their community sample of adults in the general population in Australia.

Lindsay and Skene (2007) found a two-factor solution when the BDI-II and BAI items were analysed jointly with the anxiety factor accounting for 16.04% of the total variance and depression 21.9% of the total variance although the two instruments were significantly correlated \((r = 0.63; p < 0.001)\). Internal consistency was good with alpha co-efficients of 0.91 and 0.90, respectively. Factor analyses of the two instruments separately revealed similar structures to those found with the general population. This provided some confidence in the use of these in their modified form with adults who have mild to moderate ID (Table 19). Used with the present study’s sample, these modified versions had alpha co-efficients of .91 for the BAI and .81 for the BDI-II. Alphas were calculated only on those participants with a valid completion of each instrument \((n=58)\).

**Anxiety after the visual probe**

To measure situational anxiety after the visual-probe task, participants were asked ‘how worried are you now’ and asked to give a response on the same four-point scale used for the BAI. The last 12 participants were asked this question.
Cognitions Checklist

The CCL is a 26-item self-report instrument developed by Beck, et al. (1987) (Appendix F) to measure the frequency of automatic thoughts and contains 14 personal loss and failure items (CCL-D) as well as 12 items that are related to physical and psychological threat (CCL-A). Both scales show good internal consistency and factor analyses confirm the expected loadings of CCL items on separate anxiety and depression dimensions in both clinical and non-clinical samples (Beck, et al., 1987; Steer, et al., 1994). Correlations between the CCL-D and CCL-A are large ($r$ range = 0.49 to 0.66) and each subscale is more highly correlated with its congruent than incongruent symptom state (Beck, et al., 1987; Beck, et al., 2001; Steer, et al., 1994). The CCL was specifically designed to test the cognitive content-specificity hypothesis and is the most widely used in studies of this type (Beck, et al., 2001). It has previously (Glenn, et al., 2003) been used with adults who have LA though with the scoring system truncated from a 5 to a 4 point scale. Internal consistency as measured by Cronbach alpha with this version was given as .94 for the total scale but no calculation was reported for its components (Table 19). In the present study, alphas were calculated on the scores of only those participants making a valid completion ($n=58$) in each of the instruments with CCL-A = .81, CCL-D = .98 and CCL = .92.

Although Glenn et al. (2003) altered the scoring system they did not report means for their LA sample of 45. Comparison with the general population is feasible though as the CCL (A&D) was administered in this study without modification. Whole sample means are higher in a non-clinical control group of 25 adults (CCL-A = 5.8, CCL-D = 4.48) but lower than a group ($n=1,263$) of clinic outpatients (15.87 and 20.19) and ($n=53$) depressed inpatients (20.02 and 26.92) (Clark, et al., 1996). The challenges of using self-report measures with samples of adults who have ID and comparisons with the general population are addressed in more detail in Chapter Two.

6.2.7 Informant signs and life events

Psychiatric Assessment Schedule for Adults with Developmental Disability Checklist

The original Psychiatric Assessment Schedule for Adults with Developmental Disability Checklist (PAS-ADD Checklist) (Moss, et al., 1998) underwent minor revisions reducing the number of items from 29 to 25 in the PAS-ADD Checklist-R (Moss, 2002)
(Appendix F) used in this study. Many studies do not specify which version they have used so the versions will not be delineated in the present study apart from where direct comparison is made between this study and another. The PAS-ADD Checklist is completed by an informant (carer or support person) who has known the person for at least 6 months. It is quick to administer and doesn’t require an interview with respondent or informant. It contains a life events section and a behaviours section.

Section 1 Life events: This section covers life events experienced in the preceding 12 months. Some of the 18 items were grouped together as loss-related: death of relative or friend, break up of steady relationship, death of first-degree relative, something valuable lost or stolen, separation or divorce, and laid off or sacked from work. Others were grouped together as trauma-related: illness of relative, carer or friend, serious illness or injury to self, breakdown or relationship with parents, serious problem with friend, carer, neighbour or relative and unemployed or seeking work for more than a month. Some items were grouped together as change-related: move of house or residence or retirement from work. Four areas were left ungrouped: problems with police or other authority, major financial crisis, alcohol problem and sexual problem (Tables 16&17). The PAS-ADD checklist Part 1 has been used in a number of studies investigating the impact of LEs on mental health in samples with LA (Hastings, et al., 2004; Owen, et al., 2004)

Section 2 Behaviours: This section contains 25 items rated on 4-point scales based on the informant’s experience of the person in the preceding four weeks. These form five subscales (A, B, C, D, E) that in turn yield three scale scores (1. Affective/Neurotic Disorder 2. Psychotic Disorder and 3. Organic Disorder) as well as a total score. Each scale has a threshold score (5 for Affective/Neurotic, 6 for Organic, and 2 for Psychotic) (Table 18). These indicate the need for further specialist assessment. The authors’ initial investigation showed good validity against clinical opinion as well as reasonable reliability and internal consistency (Moss, et al., 1998). Identification rose in accordance with the severity of disorder. A later validity study found similar results although much of the variance was accounted for by a single depression factor (Sturmey, et al., 2005). A number of large studies have generated prevalence data for the three scales (Allen, et al., 2012; Holden, et al., 2008; Zeilinger, et al., 2011) with the largest publishing norms
for a British sample (Taylor, et al., 2004a). To increase sensitivity of the checklist as a screener for further assessment, Cooper (2007) lowered the threshold for further assessment to two.

A number of studies have identified an anxiety factor (Hatton, et al., 2008; Sturmey, et al., 2005; Zeilinger, et al., 2011) with an eigenvalue >1.0 that resembled the ‘Phobic anxiety’ factor found by Moss et al. (1998) in the original reliability and validity study. There are differences between studies as to which items comprise the anxiety-factor, but there are none that report prevalence data for the factors. The anxiety factor identified by Hatton et al. (2008) was chosen for exploratory use in the present study and a total calculated for each participant.

6.2.6 Visual-Probe
The visual-probe task used in the present study is also known as the dot-probe. It is the same paradigm used in previous studies with adults (Mogg, et al., 2004c), adolescents (Monk, et al., 2006) and children (Pine, et al., 2005). The same emotional face stimuli had also been used in previous studies with adolescents (Monk, et al., 2006) and children (Pine, et al., 2005) and with children diagnosed with generalised anxiety disorder (Waters, et al., 2008c). They are grey-scale photographs of 64 different actors (half male, half female), each presenting a neutral, angry or happy expression. These are presented in pairs with each containing one neutral and either an angry or a happy face. Each block comprised 32 angry-neutral and 32 happy-neutral face pairs with an additional 16 neutral-neutral face pairs that were used on filler trials. The faces stimuli were those constructed by Bradley, Mogg, Falla and Hamilton (1998) and used with adults by Mogg et al (2004) as well as children by Pine et al. (2005) and Waters et al (2008) (Tables 20 & 21).

Administration of the visual-probe task was undertaken on a portable computer (Dell Latitude D630) with a screen measuring 18.5 cm by 29.5 cm. A standard keyboard with all but two keys removed (left in the position of q and right in the position of p) was connected to the laptop for the experiment. Keyboards have previously been modified to simplify responding for adults in the general population and with ID (Merrill, 2006).
The experimental task was programmed using the proprietary software E-Prime II (Psychology Software Tools, Inc.). Each trial began with a 500ms fixation point that was followed by two simultaneously presented faces on the left and right of the screen for 500ms. The inter-trial interval varied randomly from 750 to 1250 milliseconds. The face pair was replaced with an asterisk (probe) that appeared on either the left or right side of the screen in the spatial location that was previously occupied by one of the faces. Participants were asked to press one of two assigned keypad buttons (left in the position of q and right in the position of p) according to where they saw the probe, as quickly as possible, while avoiding mistakes. This instructional strategy has been called the probe position strategy (‘where is the probe’) (Mogg & Bradley, 1999). Others are the probe-classification (‘what is the type of probe’) and the probe-detection (‘is there a probe’) instructional strategies. Mogg and Bradley (Mogg, et al., 1999) conclude that the probe-position task yields faster overall response times (RTs), fewer errors and a similar effect size when compared with the probe classification strategy. This strategy has been preferred for use with a range of age groups (Waters, et al., 2010b).

Each participant who mastered the task completed two consecutive blocks of 80 trials, during which each face pair is presented once in each block. On critical trials (i.e., those with angry-neutral or happy-neutral face pairs), the emotional face appears on either the left or right side of the screen with equal frequency. The asterisk appeared an equal number of times on either the right or left, so that in half the trials, the probe appeared in the same spatial location as the emotional face (congruent trials) and in the other half of trials, the probe appeared in the opposite location to the emotional face (incongruent trials). The order of trials was randomly determined for each participant.

6.3 Procedure

6.3.1 Recruitment

The manager of each service gave explicit written support for the recruitment of participants at their services and these letters were lodged with the Melbourne University Human Research Ethics Committee (Appendix E). Staff from the two support services were briefed via the Recruiting Staff Letter (Appendix G) and asked to nominate clients who could speak and understand short sentences. The recruiting staff were then asked to read the Participant Plain Language Statement for Step One.
(Appendix G) to nominated clients and where the client agreed, use one of the decisions making methods stipulated on the form to obtain consent for Step One on the Participant Consent Form Step One (Appendix G). The study sample and procedure are summarised in Figure 1.

6.3.2 Research Step One

As part of Step One, the recruiter asked each participant to nominate one or two persons who had known them for at least 12 months who would act as informant. These were usually relatives and/or support staff who were then contacted by the researcher and given the Informant Plain Language Statement Steps One and Four (Appendix G). If they agreed, they signed the Informant Consent Form Steps One and Four (Appendix G) and completion of the PAS-ADD Checklist-R and the ABS-RC:2 arranged. Some informants completed this at interview at the centre or in their home and some were briefed on the phone and then posted the forms, returning them by post or in person. Informants were arranged for 65 of the 69 participants who consented to Step One. All participants were asked about how they usually show distress and what support system they use. A Participant Data Sheet (Appendix G) was kept for each participant recording demographics, completion dates for each task including forms as well as notes on validity. At the conclusion of data gathering, the top section containing name was returned to the agency. Only a case number identified the record held by the researcher.

6.3.3 Research Step Two

Plain language statement

All participants who had agreed to Step One were invited to participate in Steps Two, Three and Four. The Participant Plain Language Statement Steps Two, Three and Four was read by the Researcher and consent taken using the Participant Consent Form Steps Two, Three and Four (Appendix G).

Receptive language

The first instrument administered in this step was the PPVT-4 that was administered in a single sitting.
Screening procedures

The screening procedures, (ESP and SAP) were administered immediately prior to the symptom and cognition interview. Participants’ signatures on the consent form were used for the legible writing screening procedure.

Symptoms and cognition interview

The symptom and cognition measures (BAI, BDI-II, CCL-A and CCL-D) were administered to participants by interview with each item read aloud verbatim to the participant. The face-to-face administration was informed by general guidelines for administration of general population self-report measures with adults who have ID (Finlay, et al., 2001, 2002; Prosser, et al., 1998a). This involved a quiet, comfortable interview room where the interviewer read out the questions and if necessary clarified answers before scoring them. Specific simplification to language and standardisation of scoring polarity had been incorporated into the BAI and BDI-II (Lindsay, et al., 2007b) but all questions were read verbatim. Whilst the modified BAI and BDI-II were used to conduct the interview, scoring was completed on the copyrighted forms for the BAI and BDI-II. Although the only previous study using the CCL with this population had contracted the score options from 5 to 4 (Glenn, et al., 2003), it was used unchanged in this study apart from the insertion of an item (18b) to check for comprehension of the intent to live question. The cognition and symptom measures were administered in a single sitting unless a participant requested rescheduling part way through the sitting. Participants were not excluded on the basis of their SAP and ESP results but problems with spurious responses and response sets were anticipated and validity procedures developed.

Validity procedure for symptom and cognition interviews

Careful attention was paid to how participants responded on each of the three measures and a judgement made about the validity of each participant’s completion. Other studies investigating cognitive variables have used clinical observation to discern validity (Benson, et al., 1992; Payne, et al., 2004) and helpful guidelines have been published (Finlay, et al., 2001, 2002; Prosser, et al., 1998a). However, few cognitive studies report the results of validity procedures in interview-based administration of self-report questionnaires. Spurious responses were noted and where necessary reflected in the
scoring for the item or the instrument as a whole. Where participants indicated their physical symptoms on the BAI (e.g. numbness, tingling, pins and needles; unsteady or wobbly on feet) were related to a physical condition (e.g. cerebral palsy, partial paralysis) these scores were not credited but did not invalidate the measure.

Some participants interspersed what appeared to be valid answers with spurious ones such as ‘don’t know’, others gave serial responses of ‘no’ or ‘yes’ and yet others gave word associations (e.g. in response to BAI item of numbness/tingling/pins and needles ‘I had needles in primary school’ or on the BDI item of has sleep changed ‘my bed is nice and warm’) where this happened five or more times, the whole instrument was declared invalid. Amongst participants of lower ability level, these or other spurious responses were patterned across instruments. They were usually detected by interview technique where the participant was allowed a few seconds to answer the question and if an answer was not given after a second inquiry, each potential answer was read out with the order (left/right) reversed on consecutive questions. Other common response sets included: pre-emptive, answering before the question was completed; primacy, giving the first answer read; recency, giving the last answer read response set. Where a consistent response set was confirmed in one instrument, this was judged invalid and others were either not administered or were also declared invalid.

Where participants indicated any score on the BDI item 9 (suicidal thoughts or wishes) this was discussed and safety management procedure engaged where necessary. Distress was evident at interview with five participants. Each was asked for consent to discuss the need for help with their nominated informant in the first instance and if necessary their support or treatment providers. Suitable support or assistance was arranged consistent with their stated preference gathered at Step 1. A similar discussion was prompted by the CCL question 18 (life isn’t worth living) and an antithetical question, 18b (life is worth living) was used as a validity check but not scored.

6.3.4 Research Step Three

Visual-probe Task
The visual-probe task was administered in a quiet room at the support service with just the interviewer and participant present (Tables 22&23). This was the first known use of
the dot-probe paradigm with a sample of adults that comprised all levels of ability below average as well as known sensory-motor impairments. Anticipated challenges included: 1. lack of familiarity with tasks involving keyboards and monitors and subsequent apprehension about the novel task; 2. sensory impairment, particularly sight that might diminish discrimination between stimuli or speed of response; 3. impairment in fine (fingers) or gross (limbs) motor co-ordination that might influence speed of response, variability between limbs, impact of tiredness; or 4. cognitive complexity with verbal comprehension of instructions; 5. perception of and discrimination between on-screen stimuli and simultaneous key pressing within a time frame. To manage the validity of responses, validity procedures involving a mastery procedure as well as clinical observation were designed.

Sample sizes for studies of attentional bias in general population groups are significantly smaller than those used for cognitive content-specificity. Using the dot probe paradigm and emotional faces stimuli used in the present study, a sample of 43 (Waters, et al., 2010a) and 50 children (Pine, et al., 2005) were adequate as was a sample of 30 adults (Mogg, et al., 2004c). Furthermore, a meta-analysis of 125 studies with adults and children using different paradigms and stimuli found an average sample size of 46 (Bar-Haim, et al., 2007). Whilst studies using general population samples suffer far fewer validity problems, the present study still yielded 43 and 45 respectively for the two 80-trial blocks despite an initial recruited sample of 70.

6.3.5 Research Step Four
Step Four, an interview with the Anxiety Disorders Interview Schedule-IV was discontinued after it became obvious that it would be suitable for only a very few participants. The Participant Debriefing Statement was read to all participants at the end of their interview regardless of when they concluded their participation.

6.4 Data management
6.4.1 Data recording
Of the 67 participants who attempted the on-screen practice, 12 (17.1%) only required one practice but 24 (34.3%) needed two practices and 21 used all four practices. A total of 51 (72.9%) reached mastery and continued to Block One along with nine participants
who requested to continue anyway. Procedures for monitoring validity addressed clinical and technical issues as well as governing the adequacy of data for analysis. Clinical validity was monitored during administration of the task and judged according to the same criteria as for the mastery procedure. This was recorded on the Participant Data Sheet and entered into the SPSS file during data entry but no data from invalid blocks was entered into SPSS. Technical validity related to the operation of the equipment that was checked after each task administration revealed two blocks where the keyboard had malfunctioned.

6.4.2 Data cleaning
From the initial raw data generated by the E-run program, the E-Data Aid 2.0 program was used to filter 10 columns (angneu, hapneu, neuneu, trial, image, target, probe response, probe correct response, probe accuracy, probe response time) from the 39 columns of data generated for each block of 80 trials. At this point, the correct response column was checked, blocks with less than 60% correct response were then excluded without their data being entered into SPSS. These data were then transferred to an Excel spreadsheet and the filter function used to split the data from each block into separate files for the 32 angry/neutral trials, 32 happy/neutral trials and 16 neutral/neutral files. For each block, the two files with emotional/neutral trials contained columns for item number (within the sequence of 80 trials), congruence (whether the probe appeared on the emotional picture denoting congruence or on the neutral picture denoting incongruence) accuracy (whether the participant had pressed the button for the side the probe appeared or not) and response time (the time in milliseconds between presentation of the probe and pressing of the button). The single file with neutral/neutral trials contained columns for item number, accuracy and response time but instead of congruence, laterality (whether the probe was presented on the left neutral or the right neutral picture) was recorded. The data within each of the three files for Blocks 1 and 2 was then transposed into a linear sequence and imported into SPSS files and the data from these copied into the respective case file in the main SPSS data file. On the first block, 14 were judged as invalid administrations and 17 were excluded due to inadequate correct responses.
6.4.3 Data exclusions

Given that no studies have used the visual-probe with adults who have ability at the lowest levels it was thought important to record inaccuracies and outliers. All visual-probe studies publish data on the exclusion of trials because of extreme scores (high and low) incorrect answers. Some exclude cases once a threshold for incorrect trials or outliers is reached (Bradley, et al., 1998; Mogg, et al., 2008; Waters, et al., 2012a). Exclusion thresholds have been higher in child studies, with Waters and Kershaw (2015) using 50%, and Waters, Mogg and Bradley (2012a), 38% but Bradley et al. (1998) set theirs at 25% in an adult sample. In the present sample, blocks were excluded if more than 40% of trials were incorrect. Whilst the groups with the lowest levels of ability were expected to have difficulty, the majority of the whole sample was expected to succeed. There were 43 cases from Block 1 and 45 from Block 2 that were clinically valid and had adequate data for analysis.

It is common for general population studies to exclude trials that are incorrect as well as excluding ‘outliers’ that are less than 200 ms or more than 2 SDs above the participants own mean (Eldar, et al., 2012; Ioannou, et al., 2004; Waters, et al., 2010a). Ioannou et al. (2004) lost 3% as errors and 4% as outliers but found no difference between trait anxious and hi-lo defensive groups (Ioannou, et al., 2004). Some studies have reported the numbers for both outliers and incorrect answers together rather than separately. Dodd and Porter (2010) report they removed (outliers and incorrect) 4.86% of trials from their Williams Syndrome group. This was similar to the proportion of dot-probe emotional-face trials removed for the age-matched group but significantly less than for the group matched on IQ. In a further study, 16 adults with Williams Syndrome were matched with groups on attentional control and on age, with reaction times to dot-probe threatening images trials recorded (Dodd, et al., 2011b). The rate of 5.5% removed from the Williams Syndrome group, which included adults with mild and moderate ID, was not statistically different to either comparison group.

In the present study, 4.94% of trials were removed from the first block and 4.75% from the second and this is similar to the rates found using identical stimuli and paradigm to the present study but with children (Ioannou, et al., 2004; Waters, et al., 2010a). The rate of incorrect trials in the blocks not analysed was not recorded but of the 51
participants that attempted and reached mastery, only six did not generate adequate data. Inspection of the data reveals that all three of those who reached mastery in the profound and severe groups produced adequate data. However, three in the moderate group and one each in the mild, borderline and low normal groups didn’t produce adequate data.

6.4.4 Anxiety and depression groups

A number of groups for contrasting levels of anxiety were created. The grouping of participants who reported currently receiving treatment for anxiety ($n=6$) was used along with groupings based on informant ratings of present state anxiety signs as well as trait-like anxiety. The PAS-ADD Checklist affective/neurotic scale was used as whilst it has mixed symptoms of anxiety and depression it has an empirical threshold. For the present study it generated a small group ($n=3$). The Socialisation Domain of the ABS-RC:2 part-1 (range 0-17) and the shyness items (range 0-8) from the Social Engagement Domain of the ABS-RC:2 part-2 were used as proxies for trait-anxiety.

Various empirical approaches have been taken to establishing high and low anxiety groups in general population studies. Almost all adult studies use the Spielberger State-Trait Anxiety Inventory (Spielberger, et al., 1983). Whilst a below and above median split in STAI scores has been used (Mogg, et al., 2000b), most studies prefer to minimise the proportion of mid-range scorers used for high-low anxiety comparisons (Mogg & Bradley, 2002; Mogg, et al., 2000a). Mogg, Holmes, Garner and Bradley (2008) screened potential participants for low and high trait anxiety on a screening measure for anxiety and then selected high and low groups to complete the visual-probe research task and STAI. Similarly, participants were chosen from the upper and lower tertiles of a screening measure of trait anxiety that had been posted to participants. The STAI was then administered after the visual-probe and a cut-point of 40 used to allocate into high and low trait anxious groups (Bradley, et al., 1998). Mogg and Bradley (2002) used upper and lower quartiles on a trait anxiety questionnaire and whilst Mogg et al. (2000a) used scores from all participants in whole sample calculations but excluded mid-range scorers from high-low subgroup comparisons. In the present study, groups were created on the basis of lower and upper quartiles on the informant trait (shyness and socialisation) and self-report present-state anxiety measure (BAI).
A clinical level anxiety (BAI) group was also created based on the mean score of Lindsay and Skene’s (2007) referrals for anxiety treatment group [1 SD (11.09) above the mean of the present sample (15.83)]. Lindsay and Skene’s (Lindsay, et al., 2007b) study is the only one to report BAI scores for a group referred and treated for anxiety. The mean for Lindsay and Skene’s (Lindsay, et al., 2007b) group was considered the best ‘floor’ for the present study’s clinical group. It also corresponded well with the BAI ‘severe’ category (30-63). Situational anxiety was also measured for a portion of the sample ($n=12$), this portion was not divided into sub-groups but the scores were used in exploratory analyses (Chapter 5.9 pp.195-196). In summary, six groupings were used for comparison on attentional responses: current treatment ($n=6$); at or above the Affective/Neurotic Scale threshold ($n=3$); clinical level BAI ($n=10$); high BAI ($n=14$) low socialisation ($n=8$); and high shyness ($n=11$).

Groups were also considered for self-reported depression based on BDI-II scores. The first and fourth quartiles were used for the low and high ($n=14$) BDI-II groups but a clinical group was more difficult to construct. The mean of Lindsay and Skene’s depression referral group (33.84) fell well outside the highest score for the present study (29). Thus only one score fell within the BDI-II range of severe (29-63) so just the quartile groups were used.
Chapter Seven: Descriptive Results

7.1 Introduction
In this chapter, results from the descriptive analyses of data are presented in 9 sections. First, the demographics of the sample are covered. Second, aspects of disability related to the sample are described. Third, existing mental ill-health status in the sample is outlined. Fourth the distribution of receptive language ability in the sample is covered. Fifth, the adaptive behaviour of participants reported by informants is outlined. Sixth, results on the screening and validity procedures are described. Seventh, the signs of mental ill-health and the life events reported by informants are outlined. Eighth the symptoms and cognitions reported by participants in interviews are described. Ninth, data for responses on the visual-probe with emotional faces are outlined.

7.2 Demographics
Demographic data covering gender, age, relationship status and living arrangement are displayed in Table 2.

Table 2
Demographics of Sample

<table>
<thead>
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<td>Female</td>
<td>32</td>
<td>45.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age in years</td>
<td></td>
<td></td>
<td>35.69</td>
<td>11.81</td>
</tr>
<tr>
<td>Relationship status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>46</td>
<td>65.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ongoing relationship not co-habitating</td>
<td>19</td>
<td>27.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ongoing co-habitating</td>
<td>5</td>
<td>7.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living arrangement</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With relative (s)</td>
<td>45</td>
<td>64.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time rostered support</td>
<td>5</td>
<td>7.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-time rostered support</td>
<td>3</td>
<td>4.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent with family or service support</td>
<td>13</td>
<td>18.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent without support</td>
<td>4</td>
<td>5.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. N=70
Gender was relatively evenly divided in the sample, as is the case in other studies using a naturalistic sampling of employment services and day activity programs (Benson, et al., 1992; Dagnan, et al., 2000; Dagnan, et al., 2004b; McGillivray, et al., 2007). Most participants did not have an intimate partner and lived with a family member. Of those who did have a partner, only a small number co-habitated. Consequently, most relied on support from family or paid support staff and few lived on their own. The sample size of 70 compares well with the 46 in the only other study to test cognitive content-specificity (Glenn, et al., 2003) in the subpopulation with low ability but is in dramatic contrast to the large general population samples (Beck, et al., 2001). The size of the present sample is similar to those in general population studies using visual-probe tasks of attention to threat amongst adults (Bar-Haim, et al., 2007), children (Waters, et al., 2010a) and special groups (Pine, et al., 2005).

Participants were recruited from two support services and data describing the number recruited from each service, the proportions of the sample and support level received, where appropriate, are presented in Table 3.

Table 3

Support Service and Support Level of Sample

<table>
<thead>
<tr>
<th>Support Service</th>
<th>Support level</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service 1</td>
<td>1</td>
<td>3</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>9</td>
<td>12.9</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>32</td>
<td>45.7</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>19</td>
<td>27.1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td>Service 2</td>
<td></td>
<td>5</td>
<td>7.1</td>
</tr>
</tbody>
</table>

Note. N=70

Support level was established by the support service according to criteria dictated by their funding source; Service 2 did not use support level system.

Support level is only reported for Service 1, as Service 2 did not use a similar system. The majority of participants received level 3 (45.7%) and level 4 (27.1%) support with
only three participants independent enough to be allocated level 1. The participant given level six support had specific challenging behaviour that required ongoing supervision.

7.3 Disability
Data were gathered on when primary disability was acquired, presence of fine and gross motor impairment, epilepsy, and the sensory impairments of sight and hearing. These are summarised in Table 4.

Table 4

Disability Type of Sample

<table>
<thead>
<tr>
<th>Disability or impairment</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period of acquisition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developmentally acquired</td>
<td>63</td>
<td>91.3</td>
</tr>
<tr>
<td>Adult acquired (brain injury=3; chronic illness=3)</td>
<td>6</td>
<td>8.7</td>
</tr>
<tr>
<td><strong>Designated ID</strong></td>
<td>47</td>
<td>68.1</td>
</tr>
<tr>
<td><strong>Motor impairment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fine</td>
<td>11</td>
<td>15.9</td>
</tr>
<tr>
<td>Gross</td>
<td>12</td>
<td>17.4</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>12</td>
<td>10.1</td>
</tr>
<tr>
<td><strong>Sensory impairment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sight</td>
<td>14</td>
<td>20.3</td>
</tr>
<tr>
<td>Hearing</td>
<td>12</td>
<td>17.4</td>
</tr>
</tbody>
</table>

Note. N=69 due to 1 participant withdrawing prior to disability data gathering; *Participants with receptive language under 75 (p>95%) on the PPVT-4 whose disability was developmentally acquired were designated as having and intellectual disability (ID); *Definitions for motor and sensory impairment as per ABS-RC:2

Inspection of Table 4 shows that only a small proportion of the sample (8.7%) had a primary disability acquired post-developmental period. Participants with a receptive language standard score of 75 or under (95% level of confidence) with their advent during the developmental period (n=47) were designated to have an intellectual disability. This facilitated direct comparison with studies using a categorical approach to intellectual disability. A significant proportion of the sample had motor or sensory impairments and to a lesser extent, epilepsy. Respondents and/or their informant
indicated the presence of these at interview and their impact on research tasks was managed through the screening and validity procedures.

7.4 Mental ill-health
Data were gathered about current treatment for depression, psychosis (psychotic depression or bipolar disorder) personality disorder, anxiety, autism spectrum disorder (ASD) and acquired brain injury (ABI). Their frequency and percentage of the sample are presented in rank order in Table 5.

Table 5

<table>
<thead>
<tr>
<th>Mental Health Problems of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
</tr>
<tr>
<td>Current treatment for depression</td>
</tr>
<tr>
<td>Current treatment for psychosis</td>
</tr>
<tr>
<td>Current treatment for anxiety</td>
</tr>
<tr>
<td>Diagnosed autism spectrum disorder (ASD)</td>
</tr>
<tr>
<td>Adult acquired brain injury</td>
</tr>
<tr>
<td>Diagnosed personality disorder</td>
</tr>
</tbody>
</table>

Note. N=69

Respondents and their informants were asked if they were currently receiving treatment for a mental health problem but not about the type of treatment. Treating practitioners were not contacted for verification.

Given that both services supported adults with a range of disabilities it was not surprising to find that of the 69, three had brain injury during adult years, one reported a diagnosis of personality disorder and four had an ASD (see Table 4). The rate of psychotic disorders was noteworthy at seven (10%) but for three of these it was their primary disability and developed during the adult years. Rates of currently treated anxiety and depression shown in Table 4 are lower than those found in problem-level studies in large samples (Moss, et al., 2000; Taylor, et al., 2004a), but higher than those
at a diagnostic-level (Cooper, et al., 2007), and similar to those conducted at a case-level (Deb, 2001; Holden, et al., 2004).

7.5 Receptive language ability
Receptive language was assessed on the Peabody Picture Vocabulary-4 (PPVT-4) and dimensional data are presented for the raw scores, standard scores, percentiles and age equivalents in Table 6.

Table 6

Receptive Language Ability of the Sample by Dimension

<table>
<thead>
<tr>
<th>PPVT-4</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw score</td>
<td>139.77</td>
<td>44.45</td>
<td>44-222</td>
</tr>
<tr>
<td>Standard score</td>
<td>63.09</td>
<td>21.18</td>
<td>20-120</td>
</tr>
<tr>
<td>Percentile</td>
<td>6.89</td>
<td>13.70</td>
<td>0.1-91</td>
</tr>
<tr>
<td>Age equivalent (years)</td>
<td>10.26</td>
<td>5.10</td>
<td>2.10-24.11</td>
</tr>
</tbody>
</table>

*Note. N=69*

Table 6 shows that all 69 of those who attempted the test completed it with age equivalents ranging from 2 years 10 months to 24 years 11 months. The standard score was used to determine the proportion of the sample that could reasonably be diagnosed as having intellectual disability as noted in Table 4. Receptive language has been measured in studies investigating cognition and emotion as well as cognition and symptoms amongst adults with ID, primarily to screen out prospective participants (Esbenson, et al., 2005; Reed, et al., 1989) below an age-equivalent of 4.5 and 5.0 years respectively. It has also been used to describe samples with standard score ranges of 40 – 104 (Esbenson, et al., 2007) and 53-88 (Dagnan, et al., 2004b) both of which are more constricted than the standard score range of 20-120 in this study. The relationship between this dimensional variable and respondent symptoms, cognition and attention has not been previously investigated and will be considered in Chapter Eight.

The standard scores for all participants were collapsed into categories aligned to IQ categories that are stepped according to an assumed standard deviation of 15 and presented in Table 7.
Table 7

Receptive Language Ability of Sample by Category of Ability

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profound</td>
<td>3</td>
<td>(4.3)</td>
</tr>
<tr>
<td>Severe</td>
<td>8</td>
<td>(11.6)</td>
</tr>
<tr>
<td>Moderate</td>
<td>15</td>
<td>(21.7)</td>
</tr>
<tr>
<td>Mild</td>
<td>21</td>
<td>(30.4)</td>
</tr>
<tr>
<td>Borderline</td>
<td>13</td>
<td>(18.8)</td>
</tr>
<tr>
<td>Low Average</td>
<td>8</td>
<td>(11.6)</td>
</tr>
<tr>
<td>Average</td>
<td>0</td>
<td>(0)</td>
</tr>
<tr>
<td>High Average</td>
<td>1</td>
<td>(1.4)</td>
</tr>
</tbody>
</table>

Note. N=69 ( )=percentage of whole sample

Table 7 shows the frequency of cases in the sample with categories defined by an SD of 15 to enable comparison with IQ category. Most studies using receptive language standard scores have excluded potential participants below the moderate range either arbitrarily (Dagnan, et al., 2004b; Esbenson, et al., 2005, 2007; Glenn, et al., 2003) or after empirical investigation (Reed, et al., 1989) so little is known about the capacity of potential participants below this level. There were 11 participants below the moderate range included in this study, with eight in the severe category and three in the profound, comprising 11.6% and 4.3% of the sample respectively.

7.6 Informant adaptive behaviour

Each participant nominated an informant who knew him or her well; the ABS-RC:2 was then completed in an interview with this informant. Types and frequencies of informant are displayed in Table 8.

Table 8

Type of Informant

<table>
<thead>
<tr>
<th>Type of Informant</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day program or employment support worker</td>
<td>24</td>
<td>36.9</td>
</tr>
<tr>
<td>Residential support worker</td>
<td>11</td>
<td>16.9</td>
</tr>
<tr>
<td>Co-residing relative</td>
<td>23</td>
<td>35.4</td>
</tr>
<tr>
<td>Other relative</td>
<td>7</td>
<td>10.8</td>
</tr>
</tbody>
</table>

Note. N=65

The raw, standard and age equivalent scores for the adaptive behaviour domains (Part-1) are presented in Table 9.

**Table 9**

*ABS-RC:2 Part 1 Adaptive Behaviour*

<table>
<thead>
<tr>
<th>Domain</th>
<th>Score</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Functioning</td>
<td>Raw score</td>
<td>98.05</td>
<td>15.50</td>
<td>56-121</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>14.12</td>
<td>2.86</td>
<td>9-20</td>
</tr>
<tr>
<td></td>
<td>Age equivalent</td>
<td>12.19</td>
<td>4.57</td>
<td>3-16</td>
</tr>
<tr>
<td>Physical Development</td>
<td>Raw score</td>
<td>20.69</td>
<td>3.418</td>
<td>11-24</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>13.34</td>
<td>2.48</td>
<td>8-16</td>
</tr>
<tr>
<td></td>
<td>Age equivalent</td>
<td>9.68</td>
<td>4.71</td>
<td>3-16</td>
</tr>
<tr>
<td>Economic Activity</td>
<td>Raw score</td>
<td>13.63</td>
<td>6.37</td>
<td>2-25</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>13.91</td>
<td>10.29</td>
<td>7-91</td>
</tr>
<tr>
<td></td>
<td>Age equivalent</td>
<td>8.66</td>
<td>4.85</td>
<td>3-16</td>
</tr>
<tr>
<td>Language Development</td>
<td>Raw score</td>
<td>34.20</td>
<td>6.44</td>
<td>18-42</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>13.49</td>
<td>2.31</td>
<td>8-17</td>
</tr>
<tr>
<td></td>
<td>Age equivalent</td>
<td>8.29</td>
<td>2.31</td>
<td>8-17</td>
</tr>
<tr>
<td>Numbers and Time</td>
<td>Raw score</td>
<td>10.63</td>
<td>2.97</td>
<td>0-14</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>12.91</td>
<td>2.27</td>
<td>5-16</td>
</tr>
<tr>
<td></td>
<td>Age equivalent</td>
<td>8.08</td>
<td>2.11</td>
<td>3-11.3</td>
</tr>
<tr>
<td>Domestic Activity</td>
<td>Raw score</td>
<td>14.66</td>
<td>2.11</td>
<td>3-11.3</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>13.60</td>
<td>2.97</td>
<td>6-18</td>
</tr>
<tr>
<td></td>
<td>Age equivalent</td>
<td>8.42</td>
<td>2.30</td>
<td>2-11</td>
</tr>
<tr>
<td>Pre/vocational Activity</td>
<td>Raw score</td>
<td>8.42</td>
<td>2.30</td>
<td>2-11</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>11.37</td>
<td>2.30</td>
<td>5-14</td>
</tr>
<tr>
<td></td>
<td>Age equivalent</td>
<td>8.31</td>
<td>2.46</td>
<td>3.6-10.9</td>
</tr>
<tr>
<td>Self-Direction</td>
<td>Raw score</td>
<td>17.72</td>
<td>4.27</td>
<td>1-23</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>13.28</td>
<td>2.57</td>
<td>8-18</td>
</tr>
<tr>
<td></td>
<td>Age equivalent</td>
<td>6.44</td>
<td>3.27</td>
<td>3-10.3</td>
</tr>
<tr>
<td>Responsibility</td>
<td>Raw score</td>
<td>8.18</td>
<td>1.48</td>
<td>4-10</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>12.54</td>
<td>1.64</td>
<td>8-15</td>
</tr>
<tr>
<td></td>
<td>Age equivalent</td>
<td>7.76</td>
<td>1.63</td>
<td>3-10</td>
</tr>
<tr>
<td>Socialisation</td>
<td>Raw score</td>
<td>21.74</td>
<td>3.00</td>
<td>10-26</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>13.48</td>
<td>1.89</td>
<td>8-17</td>
</tr>
<tr>
<td></td>
<td>Age equivalent</td>
<td>7.10</td>
<td>2.89</td>
<td>3-10.9</td>
</tr>
</tbody>
</table>

*Note. N=65*
All mean domain age equivalents except independent functioning are under 10 years, despite the range for all domains including the ceiling age-equivalent. This probably reflects the substantial proportion of participants that are in the lower range of ability due to the inclusive approach to recruitment. Standard scores across the 10 domains are not dissimilar though.

Raw and standard scores for the seven maladaptive behaviour domains are contained in Table 10.

Table 10

ABS-RC:2 Part 2 Maladaptive Behaviour

<table>
<thead>
<tr>
<th>Domain</th>
<th>Score</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Behaviour</td>
<td>Raw score</td>
<td>8.86</td>
<td>8.40</td>
<td>0-28</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>10.80</td>
<td>2.56</td>
<td>6-14</td>
</tr>
<tr>
<td>Conformity</td>
<td>Raw score</td>
<td>5.17</td>
<td>5.37</td>
<td>0-23</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>10.68</td>
<td>1.74</td>
<td>7-13</td>
</tr>
<tr>
<td>Trustworthiness</td>
<td>Raw score</td>
<td>3.54</td>
<td>4.64</td>
<td>0-26</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>10.17</td>
<td>1.69</td>
<td>5-13</td>
</tr>
<tr>
<td>Stereotyped and Hyperactive Behaviour</td>
<td>Raw score</td>
<td>4.06</td>
<td>4.70</td>
<td>0-23</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>12.34</td>
<td>2.64</td>
<td>5-16</td>
</tr>
<tr>
<td>Sexual Behaviour</td>
<td>Raw score</td>
<td>0.35</td>
<td>0.89</td>
<td>0-5</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>11.38</td>
<td>1.14</td>
<td>6-14</td>
</tr>
<tr>
<td>Self Abusive Behaviour</td>
<td>Raw score</td>
<td>1.91</td>
<td>2.98</td>
<td>0-17</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>11.43</td>
<td>2.06</td>
<td>4-13</td>
</tr>
<tr>
<td>Social Engagement</td>
<td>Raw score</td>
<td>2.02</td>
<td>2.57</td>
<td>0-9</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td>11.42</td>
<td>1.81</td>
<td>7-13</td>
</tr>
</tbody>
</table>

Note. N=65

Because the ABS-RC:2 Part 2 records the presence of maladaptive behaviour, the polarity of its scoring is in effect the reverse to Part 1, hence raw scores cannot be compared across the two parts. Standard scores make this possible and whilst somewhat lower on Part 2 they are fairly consistent across the domains. The range for standard scores shows a similar pattern of consistency but with a more restricted ceiling than Part
1. The raw, quotient and age equivalent scores for the factors derived from Part 1 (3) and Part 2 (2) of the ABS-RC:2 are presented in Table 11.

**Table 11**

*ABS-RC:2 Factors for Part 1 and Part 2*

<table>
<thead>
<tr>
<th>Part</th>
<th>Factor</th>
<th>Score</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Personal Self-Sufficiency</td>
<td>Raw score</td>
<td>80.23</td>
<td>13.17</td>
<td>19-92</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Factor quotient</td>
<td>126.82</td>
<td>15.41</td>
<td>91-145</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age equivalent</td>
<td>13.64</td>
<td>8.45</td>
<td>91-145</td>
</tr>
<tr>
<td>1</td>
<td>Community Self-Sufficiency</td>
<td>Raw score</td>
<td>110.88</td>
<td>25.77</td>
<td>50-155</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Factor quotient</td>
<td>113.09</td>
<td>13.51</td>
<td>73-144</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age equivalent</td>
<td>8.42</td>
<td>3.42</td>
<td>3-16</td>
</tr>
<tr>
<td>1</td>
<td>Personal-Social Responsibility</td>
<td>Raw score</td>
<td>54.80</td>
<td>8.98</td>
<td>31-68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Factor quotient</td>
<td>112.40</td>
<td>14.27</td>
<td>58-144</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age equivalent</td>
<td>9.24</td>
<td>3.64</td>
<td>3-12.9</td>
</tr>
<tr>
<td>2</td>
<td>Social Adjustment</td>
<td>Raw score</td>
<td>17.77</td>
<td>15.17</td>
<td>0-55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Factor quotient</td>
<td>96.37</td>
<td>11.05</td>
<td>65-114</td>
</tr>
<tr>
<td>2</td>
<td>Personal Adjustment</td>
<td>Raw score</td>
<td>6.14</td>
<td>6.56</td>
<td>0-33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Factor quotient</td>
<td>105.11</td>
<td>12.29</td>
<td>61-122</td>
</tr>
</tbody>
</table>

*Note. N=65*

Amongst the Part 1 factors, personal self-sufficiency had the highest mean factor quotient and an age equivalent of 13.64 with quotients on both community self-sufficiency and personal responsibility noticeably lower and age equivalents below 10 years. No age equivalents are available for the Part 2 factors but both factor quotients are below those for Part 1. Further investigation of the relationship between this informant measure of adaptive as well as maladaptive behaviour and symptom measures is reported in Chapter 8.

**7.7 Screening and validity procedures**

Three screening procedures were used in the study: 1. Writing name legibly; 2. Emotional Screening Procedure (ESP); and 3. Scoring Ability Procedure (SAP). The construction and administration of screening measures as well as validity and mastery
procedures are detailed in the Chapter 6. Participants who were administered the screening procedures \((n=69)\) continued in the study with pass/fail criteria applied after administration. On the first screening procedure, 15 (21.4\%) participants did not write their name or did not write it legibly and 54 (77.1\%) did.

The ESP is a two-step, eight-question procedure designed to establish emotional processing of four basic emotions that produces a dichotomous (pass/fail) as well as a dimensional result. The frequency and percentages of correct and incorrect responses on the ESP are presented in Table 12.

### Table 12

**Emotions Screening Procedure Responses**

<table>
<thead>
<tr>
<th>Step and Emotion</th>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ESP Step 2 Identifying Emotion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy face 1</td>
<td>Fail</td>
<td>5</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>64</td>
<td>92.8</td>
<td></td>
</tr>
<tr>
<td>Sad face 1</td>
<td>Fail</td>
<td>7</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>62</td>
<td>89.9</td>
<td></td>
</tr>
<tr>
<td>Angry face 1</td>
<td>Fail</td>
<td>12</td>
<td>17.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>57</td>
<td>82.6</td>
<td></td>
</tr>
<tr>
<td>Fearful face 1</td>
<td>Fail</td>
<td>12</td>
<td>17.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>57</td>
<td>82.6</td>
<td></td>
</tr>
<tr>
<td><strong>ESP Step 1 Labelling Emotion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy face 2</td>
<td>Fail</td>
<td>12</td>
<td>17.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>57</td>
<td>82.6</td>
<td></td>
</tr>
<tr>
<td>Sad face 2</td>
<td>Fail</td>
<td>18</td>
<td>26.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>51</td>
<td>73.9</td>
<td></td>
</tr>
<tr>
<td>Angry face 2</td>
<td>Fail</td>
<td>14</td>
<td>26.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>55</td>
<td>73.9</td>
<td></td>
</tr>
<tr>
<td>Fearful face 2</td>
<td>Fail</td>
<td>29</td>
<td>42.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>40</td>
<td>58.0</td>
<td></td>
</tr>
<tr>
<td><strong>ESP total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>2.9</td>
<td>2.9</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2.9</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>5.7</td>
<td>11.6</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>4.3</td>
<td>15.9</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>7.1</td>
<td>23.2</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>11.4</td>
<td>34.8</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>13</td>
<td>18.6</td>
<td>53.6</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>32</td>
<td>45.7</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td><strong>ESP pass or fail</strong></td>
<td>Fail</td>
<td>12</td>
<td>17.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>57</td>
<td>82.6</td>
<td></td>
</tr>
</tbody>
</table>

*Note. \(N=69\); The ESP uses four drawn faces with eight questions asked in two steps. All items were summed for the ESP total but success on all four Step 2 items was required for overall pass.*
Table 12 shows that only 32 participants (45.7%) accurately labelled (Step 1) and identified (step 2) the four emotions yet 57 (82.6%) were at least able to identify all of them. Step 1 was presented first and all participants were given all eight questions but four correct responses are required on Step 2 to pass on the instrument. On both steps happy was the emotion most frequently correct. Not only did a greater percentage succeed on Step 2 than on Step 1 but the distribution of responses across the four emotions was also more even on the first. Whilst seven points separates the least (angry=57; fearful=57) and the most (happy=64) frequently correct emotions on Step 2, the difference between least (fearful=40) and most (happy=57) frequent on Step 2 is 17. Further investigation of the ESP’s empirical qualities, its capacity to predict valid completion of the dot probe task for emotional faces, and its potential as a dimensional measure of emotional processing, is described in Chapter 8. The SAP is a nine-question instrument that provides a dichotomous (pass/fail) as well as dimensional outcome. Frequency and percentage data of correct and incorrect responses from the SAP are presented in Table 13.
Table 13

Scoring Ability Procedure Responses

<table>
<thead>
<tr>
<th>SAP Items</th>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Counting</td>
<td>Fail</td>
<td>4</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>65</td>
<td>94.2</td>
<td></td>
</tr>
<tr>
<td>2. Biggest and smallest</td>
<td>Fail</td>
<td>6</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>63</td>
<td>91.3</td>
<td></td>
</tr>
<tr>
<td>3. Which is never</td>
<td>Fail</td>
<td>7</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>62</td>
<td>89.9</td>
<td></td>
</tr>
<tr>
<td>4. Cars</td>
<td>Fail</td>
<td>7</td>
<td>10.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>62</td>
<td>89.9</td>
<td></td>
</tr>
<tr>
<td>5. Walking</td>
<td>Fail</td>
<td>4</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>65</td>
<td>94.2</td>
<td></td>
</tr>
<tr>
<td>6. Breathing</td>
<td>Fail</td>
<td>6</td>
<td>8.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>63</td>
<td>91.3</td>
<td></td>
</tr>
<tr>
<td>7. Eyes open</td>
<td>Fail</td>
<td>5</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>64</td>
<td>92.8</td>
<td></td>
</tr>
<tr>
<td>8. Eating breakfast</td>
<td>Fail</td>
<td>3</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>66</td>
<td>95.7</td>
<td></td>
</tr>
<tr>
<td>9. Dark at night</td>
<td>Fail</td>
<td>5</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>64</td>
<td>92.8</td>
<td></td>
</tr>
<tr>
<td>SAP total</td>
<td>1</td>
<td>2</td>
<td>2.9</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>1.4</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>1</td>
<td>1.4</td>
<td>5.8</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>2</td>
<td>2.9</td>
<td>8.7</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>2</td>
<td>2.9</td>
<td>11.6</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>2</td>
<td>2.9</td>
<td>14.5</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>59</td>
<td>85.5</td>
<td>100</td>
</tr>
<tr>
<td>SAP Pass or Fail</td>
<td>Fail</td>
<td>10</td>
<td>14.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pass</td>
<td>59</td>
<td>85.5</td>
<td></td>
</tr>
</tbody>
</table>

Note. N=69; SAP consists of nine questions and a scoring histogram displaying graded responses. All responses were summed for the SAP total but an incorrect response on any item resulted in fail.

Only 10 (14.3%) of the 69 participants who completed the SAP did not pass it with the distribution of responses being relatively even across the nine items. Table 13 item 8 ‘how often do you eat breakfast’ was incorrect the least number of times at three (4.3%) and item 3 (‘point to which one is never’) as well as item 4 (‘how often do you eat
cars’) were most often incorrect. Further examination of the SAP’s capacity to predict valid completion as well as its utility as a dimensional measure of scoring ability is shown in Chapter 8.

All participants who completed symptom and cognition interview measures were offered the mastery procedure. This involved paper and screen based practice and is detailed in Chapter 6. Mastery was judged and recorded by the researcher along with the number of practices to reach it (or not). Those who did not reach mastery but insisted on continuing to block 1, were allowed to do so. Data on the number achieving mastery and the number of trials required to reach it are presented in Table 14.

Table 14

Visual-Probe Mastery

<table>
<thead>
<tr>
<th>Practise type</th>
<th>Task</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper practise</td>
<td>Completed</td>
<td>67</td>
<td>95.7</td>
</tr>
<tr>
<td></td>
<td>Not attempted</td>
<td>3</td>
<td>4.3</td>
</tr>
<tr>
<td>On-screen practise totals</td>
<td>1 practice</td>
<td>12</td>
<td>17.1</td>
</tr>
<tr>
<td></td>
<td>2 practices</td>
<td>24</td>
<td>34.3</td>
</tr>
<tr>
<td></td>
<td>3 practices</td>
<td>10</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>4 practices</td>
<td>21</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>Not attempted</td>
<td>3</td>
<td>4.3</td>
</tr>
<tr>
<td>On-screen practise mastery</td>
<td>Not reached</td>
<td>16</td>
<td>22.9</td>
</tr>
<tr>
<td></td>
<td>Reached</td>
<td>51(^a)(76%)</td>
<td>72.9</td>
</tr>
<tr>
<td></td>
<td>Not attempted</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* N=70; \(^a\)Proportion of sample attempting paper and on-screen practise

Only three participants did not attempt the paper practice and the most common number of on-screen practices required for mastery were two (34%). Of those who mastered the visual-probe, 30 percent required four practices. Only 51 (72.9%) of those attempting reached mastery and all of these continued to block 1 along with nine who requested to continue anyway.
The frequencies of valid interview completion, visual-probe mastery and adequate data completion are presented by PPVT-4 standard score groups (SD=15) in Table 15.

**Table 15**

*Frequency of Validity, Mastery and Adequate Data According To Category of Ability*

<table>
<thead>
<tr>
<th></th>
<th>Profound ID</th>
<th>Severe ID</th>
<th>Moderate ID</th>
<th>Mild ID</th>
<th>Borderline</th>
<th>Low average</th>
<th>Average</th>
<th>High average</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID&lt;25</td>
<td>3 (4.3)</td>
<td>8 (11.6)</td>
<td>15 (21.7)</td>
<td>21 (30.4)</td>
<td>13 (18.8)</td>
<td>8 (11.6)</td>
<td>0 (0)</td>
<td>1 (1.4)</td>
<td>1</td>
</tr>
<tr>
<td>Valid and complete</td>
<td>1 (1.7)</td>
<td>3 (5.2)</td>
<td>11 (19.0)</td>
<td>21 (36.2)</td>
<td>13 (22.4)</td>
<td>8 (13.8)</td>
<td>0 (0)</td>
<td>1 (1.7)</td>
<td>12</td>
</tr>
<tr>
<td>BAI+BDI-II+CCL</td>
<td>1 (2.0)</td>
<td>2 (3.9)</td>
<td>10 (19.6)</td>
<td>17 (33.3)</td>
<td>12 (23.5)</td>
<td>8 (15.7)</td>
<td>0 (0)</td>
<td>1 (2.2)</td>
<td>19</td>
</tr>
<tr>
<td>Mastery of visual-probe data</td>
<td>1 (2.2)</td>
<td>2 (4.4)</td>
<td>7 (15.6)</td>
<td>16 (35.6)</td>
<td>11 (24.4)</td>
<td>7 (15.6)</td>
<td>0 (0)</td>
<td>1 (2.2)</td>
<td>25</td>
</tr>
</tbody>
</table>

Note. N=70 ( )=percent of valid cases not total cases; [ ]= case number.

Table 15 shows validity of all tasks decreased with ability and a greater proportion of the sample completed valid interviews than mastered the visual-probe or generated adequate data. Amongst the severe and profound groups, 3 mastered the probe and generated adequate data but only one of these completed a valid interview. A different 3 cases amongst the severe and profound groups completed valid interviews.
7.8 Informant signs and life events checklist

The same informant was used for the PAS-ADD Checklist as for ABS-RC:2 so the type of informant is not repeated here. Informants gave their answers based on their observations over the past 4 weeks. Data was collected from informants on 1. The PAS-ADD Checklist life events section (loss, trauma, change and other events); and 2. The PAS-ADD Checklist signs of mental ill-health section (subscales for Organic, Psychotic, Affective/Neurotic and the Anxiety factor).

It was not feasible to recruit an informant for five participants so only data on 65 participants is presented. Thirteen of the 19 items on the life events section of the PAS-ADD Checklist are grouped together in loss (6), trauma (5), and change (2) categories with the remaining six ungrouped. The frequency and percentage of each life event is presented in rank order of frequency in Table 16. Event grouping is indicated where relevant.
Table 16

Frequency and Percentage of Life Events

<table>
<thead>
<tr>
<th>Life Event</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Others</td>
<td>35</td>
<td>53.8</td>
</tr>
<tr>
<td>Death of relative or friend (loss)</td>
<td>25</td>
<td>38.5</td>
</tr>
<tr>
<td>Move of house or residence (change)</td>
<td>17</td>
<td>26.2</td>
</tr>
<tr>
<td>Illness of relative, carer or friend (trauma)</td>
<td>13</td>
<td>20.0</td>
</tr>
<tr>
<td>Serious illness or injury to self (trauma)</td>
<td>13</td>
<td>20.0</td>
</tr>
<tr>
<td>Serious problem with friend, carer, neighbour or relative (trauma)</td>
<td>10</td>
<td>15.4</td>
</tr>
<tr>
<td>Break up of steady relationship (loss)</td>
<td>10</td>
<td>15.4</td>
</tr>
<tr>
<td>Problems with police or other authority</td>
<td>5</td>
<td>7.7</td>
</tr>
<tr>
<td>Major financial crisis</td>
<td>4</td>
<td>6.2</td>
</tr>
<tr>
<td>Death of first degree relative (loss)</td>
<td>3</td>
<td>4.6</td>
</tr>
<tr>
<td>Unemployed or seeking work for more than a month (trauma)</td>
<td>3</td>
<td>4.6</td>
</tr>
<tr>
<td>Breakdown or relationship with parents (trauma)</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td>Something valuable lost or stolen (loss)</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td>Alcohol problem</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td>Sexual problem</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Separation or divorce (loss)</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Laid off or sacked from work (loss)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Retirement from work (change)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Drug problem</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note. N=65

Table 16 shows that the most frequently endorsed item was the ‘other events’ with a total of 35 (53.8%). These were detailed only on the answer sheet but could not be categorised as one of the other 18 and mostly related to a recent shift of premises by a number of the work groups in the second support service. The most commonly endorsed item was death of a relative or friend by 25 participants (38.5%) followed by move of house or residence at 17 (26.2%). Three items were not endorsed by the informants of any participants, namely drug problem, retirement from work and laid off or sacked from work.
The grouped items (loss, trauma, change) are totalled separately as well as being incorporated with the non-grouped items into an overall total. The four totals are presented in Table 17.

**Table 17**

**Totals of Grouped Life Events**

<table>
<thead>
<tr>
<th>Group Total</th>
<th>Scores</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss-related life events</td>
<td>0</td>
<td>34</td>
<td>52.3</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>22</td>
<td>33.8</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>7</td>
<td>10.8</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td>Trauma-related life</td>
<td>0</td>
<td>35</td>
<td>53.8</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>22</td>
<td>33.8</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>7</td>
<td>10.8</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>3.1</td>
</tr>
<tr>
<td>Change-related life events</td>
<td>0</td>
<td>49</td>
<td>75.4</td>
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<tr>
<td></td>
<td>1</td>
<td>16</td>
<td>24.6</td>
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<tr>
<td>All life events</td>
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<td>5</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>20</td>
<td>30.8</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>17</td>
<td>26.2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>11</td>
<td>16.9</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>6</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

*Note. N=65*

Table 16 shows that whilst just under half of the sample had experienced loss (47.7%) and a similar proportion trauma-related (46.2%) life events in the past 12 months, a much smaller proportion (24.6%) experienced change-related events. Only five participants (7.7%) had not experienced a significant life event at all.

Scores on the signs section of the PAS-ADD Checklist are organised into three scales. The PAS-ADD checklist provides threshold or ‘cut-off’ scores for the Organic,
Affective/Neurotic and Psychotic scales to indicate the need for diagnostic level assessment. The anxiety factor was derived for the purpose of this study based on Hatton and Taylor’s (2008) anxiety factor and does not have a threshold. Full explanation of the PAS-ADD Checklist and its scales is contained in Chapter 6. Frequencies, percentages and the number of cases reaching threshold, where applicable, are provided for each scale in Table 18.

Table 18

Frequency of Signs and Threshold Cases on the PAS-ADD Checklist

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Scores</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Scale</td>
<td>0</td>
<td>47</td>
<td>72.3</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>5</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>6</td>
<td>9.2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>a5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>a6</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>At or above threshold</td>
<td>2</td>
<td>3.0</td>
</tr>
<tr>
<td>Affective/Neurotic Scale</td>
<td>0</td>
<td>41</td>
<td>63.1</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>4</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>10</td>
<td>15.4</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>a6</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>a11</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>At or above threshold</td>
<td>3</td>
<td>4.6</td>
</tr>
<tr>
<td>Anxiety Factor</td>
<td>0</td>
<td>53</td>
<td>81.5</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>4</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Psychotic Scale</td>
<td>0</td>
<td>59</td>
<td>90.8</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td></td>
<td>a2</td>
<td>3</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td>a4</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>At or above threshold</td>
<td>4</td>
<td>5.7</td>
</tr>
</tbody>
</table>

Note. N=65; aThreshold score for probable disorder specified in PAS-ADD Checklist; Anxiety factor was empirically derived by Hatton and Taylor (2008) and not a scale.
Although Table 18 shows that only 9.2% of the sample displayed signs on the psychotic screen according to their informants, four of these, or 5.7% of the sample had signs at or above the threshold. In comparison, 56.9% of the sample was judged to be displaying signs of Affective/Neurotic Disorders yet only three (4.6%) reached threshold. Only 18.5% of the sample was rated as having signs of anxiety. Analysis of the relationship between stressors (loss, trauma and total stressors) and the respondent measures of symptoms and cognition as well as between stressors and response times on the visual-probe for emotional faces is detailed in Chapter 8.

### 7.9 Symptom and cognitions measures

The modified Beck Anxiety Inventory (BAI) and the modified Beck Depression Inventory-II (BDI-II) were used as symptom measures and the Cognitions Checklist-Anxiety (CCL-A) and Cognitions Checklist-D (CCL-D) as cognitions measures. The frequency, means, standard deviations and range for the valid sets are reported in Table 19.
**Table 19**

**Symptom and Cognition Measures**

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Group</th>
<th>Frequency</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>^BAI</td>
<td>Male</td>
<td>29</td>
<td>16.52</td>
<td>12.59</td>
<td>0-56</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>29</td>
<td>15.14</td>
<td>9.53</td>
<td>2-36</td>
</tr>
<tr>
<td></td>
<td>Whole sample</td>
<td>58</td>
<td>15.83</td>
<td>11.09</td>
<td>0-56</td>
</tr>
<tr>
<td></td>
<td>WS clinical</td>
<td>10</td>
<td></td>
<td></td>
<td>27-56</td>
</tr>
<tr>
<td></td>
<td>WS low - high</td>
<td>14 : 14</td>
<td></td>
<td></td>
<td>0-7.75 : 22-56</td>
</tr>
<tr>
<td></td>
<td>WS mild (10-16)</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WS moderate (17-29)</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WS severe (30-63)</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>^BDI-II</td>
<td>Male</td>
<td>29</td>
<td>13.90</td>
<td>7.57</td>
<td>0-27</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>29</td>
<td>15.17</td>
<td>7.48</td>
<td>1-29</td>
</tr>
<tr>
<td></td>
<td>Whole sample</td>
<td>58</td>
<td>14.53</td>
<td>7.48</td>
<td>0-29</td>
</tr>
<tr>
<td></td>
<td>WS clinical</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WS low - high</td>
<td>15 : 14</td>
<td></td>
<td></td>
<td>0-8 : 21-29</td>
</tr>
<tr>
<td></td>
<td>WS mild (14-19)</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WS moderate (20-28)</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WS severe (29-63)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>^CCL-A</td>
<td>Male</td>
<td>29</td>
<td>13.34</td>
<td>8.05</td>
<td>0-28</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>29</td>
<td>11.38</td>
<td>8.17</td>
<td>0-27</td>
</tr>
<tr>
<td></td>
<td>Whole sample</td>
<td>58</td>
<td>12.36</td>
<td>8.10</td>
<td>0-28</td>
</tr>
<tr>
<td>^CCL-D</td>
<td>Male</td>
<td>29</td>
<td>14.00</td>
<td>9.06</td>
<td>2-36</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>29</td>
<td>12.52</td>
<td>12.14</td>
<td>0-43</td>
</tr>
<tr>
<td></td>
<td>Whole sample</td>
<td>58</td>
<td>13.26</td>
<td>10.65</td>
<td>0-43</td>
</tr>
<tr>
<td>^CCL-total</td>
<td>Male</td>
<td>29</td>
<td>27</td>
<td>15.98</td>
<td>2-64</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>29</td>
<td>23.90</td>
<td>19.14</td>
<td>0-69</td>
</tr>
<tr>
<td></td>
<td>Whole sample</td>
<td>58</td>
<td>25.45</td>
<td>17.54</td>
<td>0-69</td>
</tr>
<tr>
<td></td>
<td>Invalid</td>
<td>10 (14.49%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=69; ( )contains percentage of the whole sample; ^Valid completions only; WS=whole sample; low-high groups correspond to first and fourth quartile groups.*

Clinical validity procedures highlighted 6 cases that were complete but invalid and four that were incomplete and invalid. One participant did not attempt the measures and one passed the SAP but did not complete the measures. Hence, 58 sets of symptom and cognition measures were analysed.
The means on the two modified symptom measures shown in Table 19 are relatively similar for the whole sample although slightly higher for anxiety than depression. The mean for women was higher than men on depression and lower than men on anxiety. The significantly higher range for men on the BAI (0-56) may explain some of these differences. Mean scores on the two cognition measures were again similar for the whole sample though marginally higher for men than women on both measures. Analysis of the relationship between cognitions and symptoms as well as between the two areas of psychopathology is reported in Chapter 8.

### 7.10 Visual-probe for emotional faces

Details of the data recording, cleaning and exclusions for the visual-probe are covered in Chapter Six. Clinical validity was monitored using the same criteria as the mastery procedure. Data were considered adequate if 60% of the trials were accurate in any given block. Technical validity was also recorded and the descriptive data from blocks 1 and 2 for the whole sample are displayed in Table 20.
Table 20

Visual-Probe Blocks 1 and 2 RTs

<table>
<thead>
<tr>
<th>Block and Process</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dot probe block 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completion</td>
<td>Not completed</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Completed</td>
<td>60</td>
<td>85.7</td>
</tr>
<tr>
<td></td>
<td>Not attempted</td>
<td>3</td>
<td>4.3</td>
</tr>
<tr>
<td>aTechnical validity</td>
<td>Equipment not functioning</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>Equipment functioning</td>
<td>58</td>
<td>82.9</td>
</tr>
<tr>
<td></td>
<td>Not attempted or completed</td>
<td>10</td>
<td>14.3</td>
</tr>
<tr>
<td>aClinical validity</td>
<td>Invalid performance</td>
<td>14</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Valid performance</td>
<td>46</td>
<td>65.7</td>
</tr>
<tr>
<td></td>
<td>Not attempted or completed</td>
<td>10</td>
<td>14.3</td>
</tr>
<tr>
<td>bData adequacy</td>
<td>Inadequate data for analysis</td>
<td>17</td>
<td>24.3</td>
</tr>
<tr>
<td></td>
<td>Adequate data for analysis</td>
<td>43</td>
<td>61.4</td>
</tr>
<tr>
<td></td>
<td>Not attempted or completed</td>
<td>10</td>
<td>14.3</td>
</tr>
<tr>
<td><strong>Dot probe block 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completion</td>
<td>Completed</td>
<td>47</td>
<td>67.1</td>
</tr>
<tr>
<td></td>
<td>Not attempted</td>
<td>23</td>
<td>32.9</td>
</tr>
<tr>
<td>aTechnical validity</td>
<td>Equipment not functioning</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Equipment functioning</td>
<td>47</td>
<td>67.1</td>
</tr>
<tr>
<td></td>
<td>Not attempted</td>
<td>23</td>
<td>32.9</td>
</tr>
<tr>
<td>aClinical validity</td>
<td>Invalid performance</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>Valid performance</td>
<td>45</td>
<td>64.3</td>
</tr>
<tr>
<td></td>
<td>Not attempted</td>
<td>23</td>
<td>32.9</td>
</tr>
<tr>
<td>bData adequacy</td>
<td>Inadequate data for analysis</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>Adequate data for analysis</td>
<td>45</td>
<td>64.3</td>
</tr>
<tr>
<td></td>
<td>Not attempted</td>
<td>23</td>
<td>32.9</td>
</tr>
</tbody>
</table>

Note. N=70; aValidity criteria specified in Chapter 6; bData judged adequate for the block if 60 percent of responses correct.

According to Table 20, there were 60 participants who completed block 1 with only 51 of these reaching mastery in the on-screen practices. Of these, 43 completed block 1 in a manner that was observed to be clinically valid and generated adequate data for analysis without technical difficulties. Of the 46 cases judged valid and adequate, two were
technically invalid (due to a keyboard fault) and the other did not yield enough data for analysis.

On block 2, 47 participants completed the task but only 45 had adequate and clinically valid data. Two cases (8 and 48) were valid and had adequate data despite not having adequate data in their block 1 response due to technical failure.

For the purpose of comparison, data on the 45 participants completing block 1 and/or 2 is presented along with that of the full sample. Details of gender, disability, mental illness, receptive language, screening procedures, symptom and cognition measure validity as well as the life events and scale scores of the PAS-ADD checklist are contained in Table 21.
### Table 21

**Characteristics of Participants with Adequate Visual-Probe Data**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Values</th>
<th>Frequency</th>
<th>Percent</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td>34.16 (35.69)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>Male</td>
<td>26</td>
<td>57.8 (54.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>19</td>
<td>42.2 (45.7)</td>
<td></td>
</tr>
<tr>
<td><strong>Motor impairment</strong></td>
<td>Fine</td>
<td>5</td>
<td>11.1 (15.9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gross</td>
<td>4</td>
<td>8.8 (17.4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Epilepsy</td>
<td>5</td>
<td>11.1 (10.1)</td>
<td></td>
</tr>
<tr>
<td><strong>Sensory impairment</strong></td>
<td>Sight</td>
<td>8</td>
<td>17.8 (20.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hearing</td>
<td>6</td>
<td>13.3 (17.4)</td>
<td></td>
</tr>
<tr>
<td><strong>Current treatment</strong></td>
<td>Schizophrenia, psychotic</td>
<td>5</td>
<td>11.1 (10.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Depression, bipolar</td>
<td>5</td>
<td>11.1 (10.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Personality disorder</td>
<td>1</td>
<td>2.2 (1.4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anxiety</td>
<td>6</td>
<td>13.3 (8.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Autism</td>
<td>3</td>
<td>6.7 (5.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acquired brain injury</td>
<td>3</td>
<td>6.7 (4.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Receptive language</strong></td>
<td>Raw score</td>
<td></td>
<td></td>
<td>156.31 (139.7)</td>
</tr>
<tr>
<td></td>
<td>Standard score</td>
<td></td>
<td></td>
<td>69.89 (63.09)</td>
</tr>
<tr>
<td><strong>Screening procedures fail</strong></td>
<td>ESP</td>
<td>1 (12)</td>
<td>2.2 (17.4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAP</td>
<td>3 (10)</td>
<td>6.7 (14.5)</td>
<td></td>
</tr>
<tr>
<td><strong>Symptom measures (invalid)</strong></td>
<td>BAI</td>
<td>3 (11)</td>
<td>6.7 (15.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>BDI-II</td>
<td>3 (11)</td>
<td>6.7 (15.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CCL-A</td>
<td>3 (11)</td>
<td>6.7 (15.8)</td>
<td></td>
</tr>
<tr>
<td><strong>Cognition Checklist (invalid)</strong></td>
<td>CCL-D</td>
<td>3 (11)</td>
<td>6.7 (15.8)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CCL-total</td>
<td>3 (11)</td>
<td>6.7 (15.8)</td>
<td></td>
</tr>
<tr>
<td><strong>PAS-ADD Checklist Life events</strong></td>
<td>Organic subscale affective/neurotic</td>
<td>14 (18)</td>
<td>32.5 (27.7)</td>
<td>.79 (.68)</td>
</tr>
<tr>
<td></td>
<td>subscale</td>
<td>20 (25)</td>
<td>44.2 (27.7)</td>
<td>1.44 (1.22)</td>
</tr>
<tr>
<td></td>
<td>Psychotic</td>
<td>5 (6)</td>
<td>11.7 (9.2)</td>
<td>.23 (.18)</td>
</tr>
</tbody>
</table>

*Note. N=45; *a*Despite overall fail, happy and angry emotions were labelled and identified; ( ) contains numbers for whole sample.*

Across most variables, Table 21 shows that on demographic as well as respondent symptom and cognition measures the group that generated adequate visual-probe data were quite similar to the whole sample. Not surprisingly, the proportion of participants with sensory and motor impairments reduced and the mean receptive language scores increased. Of the mental health problems, both depression and anxiety were noticeably greater in proportion and the number of participants with informant-rated symptoms on the Affective/Neurotic scale increased by 16.5%. The mean receptive language score of
particular note is that only one person failed the ESP and was able to generate adequate data, but despite failing overall, this participant did label and identify (Step 2 of the ESP) both emotions (happy and angry) used in the visual-probe.

For those participants who generated adequate and valid data on the mean of all response times and the neutral/neutral (i.e., trials without an emotional face in the pair) response times along with data on outliers and inaccurate responses are presented in Table 22.

Table 22

*Response Times on Neutral Face Trials, Outliers and Inaccurate Trials*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Block 1</th>
<th></th>
<th>Block 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Mean RTs</td>
<td>591</td>
<td>121</td>
<td>586</td>
<td>105</td>
</tr>
<tr>
<td>Standard deviation RTs</td>
<td>119</td>
<td></td>
<td>123</td>
<td></td>
</tr>
<tr>
<td>Outliers</td>
<td></td>
<td>36 <em>(1.10%)</em></td>
<td></td>
<td>41 <em>(1.19%)</em></td>
</tr>
<tr>
<td>Inaccurate trials</td>
<td></td>
<td>170 <em>(4.94%)</em></td>
<td></td>
<td>171 <em>(4.75%)</em></td>
</tr>
<tr>
<td>Neutral/neutral RTs</td>
<td>588.84</td>
<td>133.03</td>
<td>584.21</td>
<td>110.49</td>
</tr>
</tbody>
</table>

*Note.* block 1 *N=43*; block 2 *N=45*; Response times are in milliseconds; *Proportion of accurate trials; Proportion of all trials*

Inspection of Table 22 shows that mean response times (RTs) on neutral/neutral trials were similar to the mean of all RTs on each block. A comparison between block 1 and block 2 also shows similarity between the mean of all RTs and the mean of neutral/neutral trials. Tests for significance carried out on these means are detailed in Chapter 8. The percentage of inaccurate trials is similar on the two blocks and so is the proportion of outlier; a pattern also found in research using an identical task amongst children in which 5% of responses were inaccurate and less than 1% were outliers.
Further analysis carried out to discern possible pattern(s) is provided in Chapter 8.

For each emotion, the face was presented in tandem with a neutral face but the emotional face appeared half the time on the right and half on the left with the visual-probe, which the participant was asked to respond to, congruent to the emotional face on half of the trials and incongruent on the other half. The mean of the congruent trials was then deducted from the mean of incongruent trials for each emotion on each block. Then presented as a bias score indicating whether the participant attended toward (positive value) or away (negative value) from the emotional face. The data for congruent and incongruent trials of happy and angry trials are presented for block 1 and block 2 in Table 23.

**Table 23**

*Response Times for Emotional Face Trials*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Sum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Block 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congruent angry/neutral RTs</td>
<td>592.25</td>
<td>120.19</td>
<td></td>
</tr>
<tr>
<td>Incongruent angry/neutral RTs</td>
<td>588.61</td>
<td>127.58</td>
<td></td>
</tr>
<tr>
<td>Angry bias (incon-con)</td>
<td>-3.64</td>
<td>42</td>
<td>47</td>
</tr>
<tr>
<td>Congruent happy/neutral RTs</td>
<td>585</td>
<td>129</td>
<td></td>
</tr>
<tr>
<td>Incongruent happy/neutral RTs</td>
<td>591</td>
<td>121</td>
<td></td>
</tr>
<tr>
<td>Happy bias</td>
<td>5.14</td>
<td>37</td>
<td>221</td>
</tr>
<tr>
<td><strong>Block 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congruent angry/neutral RTs</td>
<td>588.48</td>
<td>111</td>
<td></td>
</tr>
<tr>
<td>Incongruent angry/neutral RTs</td>
<td>584.45</td>
<td>109</td>
<td></td>
</tr>
<tr>
<td>Angry bias</td>
<td>-4.02</td>
<td>36</td>
<td>-181</td>
</tr>
<tr>
<td>Congruent happy/neutral RTs</td>
<td>582</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>Incongruent happy/neutral RTs</td>
<td>581</td>
<td>107</td>
<td></td>
</tr>
<tr>
<td>Happy bias</td>
<td>-.95</td>
<td>32</td>
<td>-43</td>
</tr>
</tbody>
</table>

*Note.* block 1 $N=43$; block 2 $N=45$; response times are in milliseconds

The mean RTs for congruent and incongruent trials depicted in Table 20 are similar for both emotions and on both blocks, hence the bias scores are small. These means are
examined in Chapter 8 for difference based on congruence/incongruence, emotion and block.

The last 12 participants to complete both blocks on the dot probe task were asked to rate their anxiety immediately after finishing using the rating system from the BAI. The frequency and percentage of responses are presented in Table 24.

**Table 24**  
*Anxiety After Visual-Probe*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>Sometimes</td>
<td>6</td>
<td>50</td>
</tr>
<tr>
<td>Most of the time</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>All of the time</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Note. N=12*

Table 24 shows that the majority of participants were worried sometimes and no participants were worried all of the time. Whilst this group represents a small subsample, exploratory investigation of the relationship between this rating taken immediately after the task and performance on the dot probe task is described in Chapter 8.
Chapter Eight: Analytical Results

8.1 Introduction
In this chapter, results of the hypotheses tested are reported in five sections with the first considering the empirical qualities of the screening and validity procedures. The second section addresses the prevalence of signs and symptoms of anxiety and depression as well as the relationship between these and stressful life events. The third section deals with the connection between thoughts and symptoms as well as ability. The fourth focuses on the impact of anxiety and ability on attentional responses to emotional faces, and exploratory analyses (Chapter 5.9 pp.195-196) conducted alongside the main hypotheses are incorporated in the fifth section.

8.2 Screening and validity procedures
Screening and validity procedures were designed to assist in achieving the three components of the first aim in the present study: First, an inclusionary approach to recruitment and retention of participants would enable the participation of groups with severe and profound ID. Second, using dichotomous, task-specific screening procedures would mean their capacity to predict valid and invalid performance could be tested. Third, the dimensional versions of screening measures could be used in analysis with a range of other variables. To test the second component of the study’s first aim, the predictive capacity of the screening procedures was tested. Initially, prediction of valid symptom and cognition interviews was tested, then mastery on the visual-probe task, and finally capacity to generate adequate block(s) of visual-probe data.

8.2.1 Validity of symptom and cognition interviews
The relationships between validity of interview and other categorical (ESP pass/fail, SAP pass/fail and legible name) as well as the dimensional (PPVT-4, ABS-RC:2 Physical Development Domain and ABS-RC:2 Numbers and Time Domain) variables were investigated using Pearson’s and point biserial correlation. The results are displayed in Table 25.
Table 25

Inter-Correlations Amongst Interview Validity, Screening and Ability Measures

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Valid symptom &amp; cognition measures</td>
<td>-</td>
<td>.56**</td>
<td>.15</td>
<td>.22</td>
<td>.95**</td>
<td>.07</td>
<td>.38**</td>
</tr>
<tr>
<td>2. PPVT-4 (SS)</td>
<td>-</td>
<td>.20</td>
<td>.40**</td>
<td>.54**</td>
<td>.10</td>
<td>.54**</td>
<td></td>
</tr>
<tr>
<td>3. Legible name</td>
<td>-</td>
<td>.31**</td>
<td>.18</td>
<td>.38**</td>
<td>.61**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. ESP (p/f)</td>
<td>-</td>
<td>.25*</td>
<td>.13</td>
<td>.47**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. SAP (p/f)</td>
<td>-</td>
<td>.07</td>
<td>.38**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. ABS-RC:2 Physical Development (RS)</td>
<td>-</td>
<td>.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. ABS-RC:2 Numbers and Time (RS)</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. N=(65-69); *p<.05 (2-tailed); **p<.01 (2-tailed); ESP=Emotional Screening Procedure; SAP=Scoring Ability Procedure; SS Standard Score; RS=Raw Score; p/f=pass/fail.

Table 25 shows positive and significant correlations between validity of interview measures and three variables. The correlation is large-sized with receptive language, medium-sized with numbers and time, but large-sized with the pass/fail SAP. Interestingly, neither legible name nor pass/fail ESP were related to validity. As expected, receptive language ability was significantly positively correlated with pass/fail ESP, pass/fail SAP and numbers and time, but not with Physical Development.

Given the large correlation between validity of symptom/cognition measures and pass/fail SAP, $\chi^2$ was calculated between the three dichotomous screening variables (SAP, ESP, legible writing) and validity of interview completion. Inspection of the tables (Appendix H) shows that dichotomous SAP correctly classifies 68 of 69 cases on validity of symptom and cognition interviews. Direct logistic regression was then undertaken using valid completion of symptom and cognition measures as the dependent variable. Categorical (SAP, ESP, legible name) and dimensional (ABS – RC: 2 physical development (PD), ABS – RC: 2 numbers and time (NT), PPVT-4 standard score) were used as predictors. A perfect fit was found for the model using the SAP pass/fail criteria and the SAP excluded, consequently odds ratios for other predictors in the model were not generated. The full model was significant though, $\chi^2 (5, N=65) = 55.81$ $p = .000$ and as a whole explained between 57.6% (Cox and Snell R square) and
100% (Nagelkerke R square) of the variance and correctly classified all of the cases. This confirms that the SAP played the most significant role in predicting valid completion of symptoms and cognition measures as measured by clinical validity procedures.

8.2.2 Mastery of visual-probe

The relationships between visual-probe mastery and other categorical (legible name; pass/fail ESP; pass/fail SAP) and dimensional variables (PPVT-4; ABS-RC:2 Physical Development Domain and ABS-RC:2 Socialisation Domain) were examined using Pearson’s and point bi-serial correlations. The results are displayed in Table 26.

Table 26

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Visual-probe mastery</td>
<td>-</td>
<td>.46**</td>
<td>.54**</td>
<td>.51**</td>
<td>.45**</td>
<td>.28*</td>
<td>.31*</td>
</tr>
<tr>
<td>2. PPVT-4 (SS)</td>
<td>-</td>
<td>.20</td>
<td>.40**</td>
<td>.54**</td>
<td>.10</td>
<td>-.01</td>
<td></td>
</tr>
<tr>
<td>3. Legible name</td>
<td>-</td>
<td>.31**</td>
<td>.18</td>
<td>.38**</td>
<td>.42**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. ESP (p/f)</td>
<td>-</td>
<td>.25*</td>
<td>.13</td>
<td>.40**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. SAP (p/f)</td>
<td>-</td>
<td>.07</td>
<td>.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. ABS-RC:2 Physical Development (RS)</td>
<td>-</td>
<td>.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. ABS-RC:2 Socialisation (RS)</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. N=65-69 *p<.05 level (2-tailed); **p<.01 level (2-tailed); ESP=Emotional Screening Procedure, SAP=Scoring Ability Procedure; SS=Standard Score; RS=Raw Score; p/f=pass/fail

Inspection of Table 26 shows significant correlations between all variables and dot-probe mastery. Correlations are small-sized with physical development, medium with socialisation, receptive language and SAP pass/fail, but large-sized with legible writing and pass/fail ESP. Furthermore, receptive language is correlated with pass/fail ESP and pass/fail SAP but nothing else. As expected, pass/fail ESP was significantly correlated with Socialisation but not Physical Development. The latter (containing items on fine and gross motor functioning) was related to legible writing though.
Direct logistic regression was performed to assess the impact of six variables on dot-probe mastery. Categorical variables were legible name, pass/fail ESP, pass/fail SAP and valid symptom/cognition measure interviews. Continuous variables were PPVT-4 standard score, ABS-RC:2 Physical Development Domain raw score and ABS-RC:2 Socialisation Domain raw score. The full model containing all variables was statistically significant at $\chi^2 (6, N=64) = 37.03, p<.000$ confirming that it could distinguish between participants who achieved mastery and those who did not. The model as a whole explained between 42.1% (Cox and Snell R square) and 62.3% (Nagelkerke R square) of the variance and correctly classified 85.9% of cases. The model’s sensitivity for those who reached mastery was 91.7% and specificity for those who did not was 68.8%. Positive predictive value for the model was 91.66% and the negative predictive value was 73.33%. The odds ratio data are displayed in Table 27.

Table 27

<table>
<thead>
<tr>
<th>Predictors</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>p</th>
<th>Odds Ratio</th>
<th>95% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legible name</td>
<td>2.43</td>
<td>1.08</td>
<td>5.04</td>
<td>1</td>
<td>.03</td>
<td>11.32</td>
<td>Lower 1.362 - Upper 94.047</td>
</tr>
<tr>
<td>ESP (p/f)</td>
<td>1.96</td>
<td>1.19</td>
<td>2.72</td>
<td>1</td>
<td>.10</td>
<td>7.09</td>
<td>.69 - 72.53</td>
</tr>
<tr>
<td>SAP (p/f)</td>
<td>1.88</td>
<td>1.31</td>
<td>2.06</td>
<td>1</td>
<td>.15</td>
<td>6.54</td>
<td>.50 - 84.87</td>
</tr>
<tr>
<td>PPVT-4 (SS)</td>
<td>.04</td>
<td>.03</td>
<td>1.43</td>
<td>1</td>
<td>.23</td>
<td>1.04</td>
<td>.98 - 1.1</td>
</tr>
<tr>
<td>ABS-RC:2 PD (RS)</td>
<td>.11</td>
<td>.13</td>
<td>.63</td>
<td>1</td>
<td>.43</td>
<td>1.11</td>
<td>.86 - 1.44</td>
</tr>
<tr>
<td>ABS-RC:2 SD (RS)</td>
<td>.11</td>
<td>.18</td>
<td>.38</td>
<td>1</td>
<td>.54</td>
<td>1.12</td>
<td>.79 - 1.58</td>
</tr>
<tr>
<td>Constant</td>
<td>9.99</td>
<td>5.33</td>
<td>3.51</td>
<td>1</td>
<td>.06</td>
<td>.00</td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=65-69; PD=Physical Development Domain; SD=Socialisation Domain; ESP=Emotional Screening Procedure, SAP=Scoring Ability Procedure; SS=Standard Score; RS=Raw Score; p/f=pass/fail*

As shown in Table 27 only legible name made a unique statistically significant contribution with an odds ratio of 11.32. This shows that participants who could write their name legibly were more than 11 times more likely to master the task after all other predictors were controlled.
A further direct logistic regression was carried out with only the dichotomous screening measures (ESP, SAP and legible name) and PPVT-4 standard score to determine which of these made the most significant contribution. The full model on this occasion was statistically significant at $\chi^2 (4, N=67) = 35.72, p < .000$, confirming it could distinguish between participants who achieved mastery and those who didn’t. The model as a whole explained between 41.3% (Cox and Snell R square) and 62% (Nagelkerke R square) of the variance and correctly classified 86.6% of cases. The model’s sensitivity for those who reached mastery was 94.1% and specificity for those who did not was 62.5%. Positive predictive value for the model was 89% and the negative predictive value, 77%. The odds ratio data are displayed in Table 28.

**Table 28**

*Logistic Regression for Mastery of Visual-Probe with Screening Measures*

<table>
<thead>
<tr>
<th>Predictors</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>$p$</th>
<th>Odds Ratio</th>
<th>95% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legible name</td>
<td>2.99</td>
<td>1.98</td>
<td>9.35</td>
<td>1</td>
<td>.00</td>
<td>19.89</td>
<td>2.93 - 135.18</td>
</tr>
<tr>
<td>ESP (p/f)</td>
<td>2.28</td>
<td>1.13</td>
<td>4.04</td>
<td>1</td>
<td>.05</td>
<td>9.75</td>
<td>1.06 - 89.85</td>
</tr>
<tr>
<td>SAP (p/f)</td>
<td>2.12</td>
<td>1.29</td>
<td>2.70</td>
<td>1</td>
<td>.10</td>
<td>8.31</td>
<td>.67 - 103.70</td>
</tr>
<tr>
<td>PPVT-4 SS</td>
<td>.03</td>
<td>.03</td>
<td>1.20</td>
<td>1</td>
<td>.27</td>
<td>1.03</td>
<td>.98 - 1.08</td>
</tr>
<tr>
<td>Constant</td>
<td>-6.06</td>
<td>1.93</td>
<td>9.83</td>
<td>1</td>
<td>.00</td>
<td>1.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

Note. N=69; ESP=Emotional Screening Procedure; SAP=Scoring Ability Procedure; SS=Standard Score; RS=Raw Score; p/f=pass/fail

As Table 28 illustrates, both legible name and ESP made a significant contribution to the model. Legible name was the largest with an odds ratio of 19.89, although the 95% confidence intervals are wide. This confirms that those with legible writing were 19 times more likely to master the dot-probe task. Consequently, legible name is the most potent of the screening procedures with ESP following but PPVT did not make a significant contribution.
8.2.3 Data adequacy

Relationships between the variables of: adequate data, receptive language, legible name, pass/fail ESP, pass/fail SAP, Physical Development and Socialisation were explored using Pearson’s and point bi-serial correlation. Results are displayed in Table 29.

Table 29

Correlations Amongst Adequate Visual-Probe Data, Screening and Ability Measures

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Adequate visual-probe data</td>
<td>-</td>
<td>.42**</td>
<td>.54**</td>
<td>.55**</td>
<td>.33**</td>
<td>.30*</td>
<td>.23</td>
</tr>
<tr>
<td>2. PPVT-4 (SS)</td>
<td></td>
<td>-</td>
<td>.20</td>
<td>.40**</td>
<td>.54**</td>
<td>.10</td>
<td>-.01</td>
</tr>
<tr>
<td>3. Legible name</td>
<td></td>
<td></td>
<td>-</td>
<td>.31**</td>
<td>.18</td>
<td>.38**</td>
<td>.42**</td>
</tr>
<tr>
<td>4. ESP (p/f)</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>.25*</td>
<td>.13</td>
<td>.40**</td>
</tr>
<tr>
<td>5. SAP (p/f)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>.07</td>
<td>.16</td>
</tr>
<tr>
<td>6. ABS-RC:2 Physical Development (RS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
<td>.20</td>
</tr>
<tr>
<td>7. ABS-RC:2 Socialisation (RS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Note. \( N=64-69 \); *\( p<.05 \) level (2-tailed); **\( p<.01 \) level (2-tailed); ESP=Emotional Screening Procedure; SAP=Scoring Ability Procedure; SS=Standard Score; RS=Raw Score; p/f=pass/fail.

Table 29 shows that all variables except Socialisation were correlated with the generation of adequate visual-probe data. Legible writing and pass/fail ESP had large correlations whilst receptive language, pass/fail SAP, and Physical Development were medium-sized.

Direct logistic regression was then used to consider the impact of the same predictors except socialisation. The full model containing the remaining variables as predictors of adequate data generation was statistically significant, \( \chi^2 (5, N=60) = 37.84 \ p < .000 \), showing that the model did distinguish between participants who generated adequate data and those that did not. The model as a whole explained between 46.8% (Cox and Snell R Square) and 58.3 % (Nagelkerke R Square) and correctly classified 66.3% of cases. The model’s sensitivity for those who generated adequate data was 92.9% and the specificity for those who did not was 77.8%. Positive predictive value of the model was
41.9% and the negative predictive value 18%. The odds ratio data are displayed in Table 30.

Table 30

Logistic Regression for Adequate Visual-Probe Data, Screening and Ability Measures

<table>
<thead>
<tr>
<th>Predictors</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>p</th>
<th>Odds Ratio</th>
<th>95.0% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legible name</td>
<td>3.54</td>
<td>1.24</td>
<td>8.15</td>
<td>1</td>
<td>.00</td>
<td>34.6</td>
<td>3.04 - 393.96</td>
</tr>
<tr>
<td>ESP (p/f)</td>
<td>4.10</td>
<td>1.52</td>
<td>7.27</td>
<td>1</td>
<td>.01</td>
<td>60.46</td>
<td>3.07 - 1191.67</td>
</tr>
<tr>
<td>SAP (p/f)</td>
<td>.11</td>
<td>1.57</td>
<td>.01</td>
<td>1</td>
<td>.94</td>
<td>1.17</td>
<td>.05 - 24.12</td>
</tr>
<tr>
<td>PPVT-4 (SS)</td>
<td>.06</td>
<td>.032</td>
<td>4.02</td>
<td>1</td>
<td>.05</td>
<td>1.07</td>
<td>1.00 - 1.13</td>
</tr>
<tr>
<td>ABS-RC:2 PD (RS)</td>
<td>.07</td>
<td>.14</td>
<td>.06</td>
<td>1</td>
<td>.80</td>
<td>1.04</td>
<td>.78 - 1.37</td>
</tr>
<tr>
<td>Constant</td>
<td>-10.00</td>
<td>3.85</td>
<td>6.75</td>
<td>1</td>
<td>.01</td>
<td>.00</td>
<td></td>
</tr>
</tbody>
</table>

Note. N=65-69 ESP=Emotional Screening Procedure; SAP=Scoring Ability Procedure; PD=Physical Development Domain; SS=Standard Score; RS=Raw Score; p/f=pass/fail.

As shown in Table 30 three variables made unique statistically significant contributions to the model (legible name, ESP p/f and PPVT-4 SS) with the strongest predictors being legible name and ESP p/f with odds ratios of 34.6 and 60.46 respectively. Although verbal ability had a significant impact, it was less than the others with a ratio of 1.07. These results show that participants who can write legibly are 34.6 times more likely to generate adequate data when other factors are controlled and those who pass the ESP, 60.46 times more likely, although again the 95% confidence intervals were wide.

Another direct logistic regression was carried out with only the categorical (ESP, SAP and legible name) variables and PPVT-4 standard score. The full model on this occasion was statistically significant at χ² (4,n=67) = 38.32, p<.000, confirming it could distinguish between participants who achieved mastery and those who didn’t. The model as a whole explained between 43.6% (Cox and Snell R square) and 61% (Nagelkerke R square) of the variance and correctly classified 83.6% of cases. The model’s sensitivity for those who reached mastery was 88.9% and specificity for those
who did not was 72.7%. Positive predictive value for the model was 87% and the negative predictive value, 76%. Odds ratio data are contained in Table 31.

Table 31

Logistic Regression for Adequate Visual-Probe Data and Screening Measures

<table>
<thead>
<tr>
<th>Predictors</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>p</th>
<th>Odds Ratio</th>
<th>95.0% C.I. for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legible name</td>
<td>3.03</td>
<td>.92</td>
<td>10.90</td>
<td>1</td>
<td>.00</td>
<td>20.71</td>
<td>3.43 - 125.16</td>
</tr>
<tr>
<td>ESP (p/f)</td>
<td>3.45</td>
<td>1.28</td>
<td>7.22</td>
<td>1</td>
<td>.00</td>
<td>31.42</td>
<td>2.54 - 388.68</td>
</tr>
<tr>
<td>SAP (p/f)</td>
<td>.87</td>
<td>1.25</td>
<td>.49</td>
<td>1</td>
<td>.48</td>
<td>2.40</td>
<td>.21 - 27.56</td>
</tr>
<tr>
<td>PPVT-4 (SS)</td>
<td>.04</td>
<td>.03</td>
<td>1.95</td>
<td>1</td>
<td>.16</td>
<td>1.04</td>
<td>.99 - 1.09</td>
</tr>
<tr>
<td>Constant</td>
<td>-7.41</td>
<td>2.21</td>
<td>11.20</td>
<td>1</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

Note. N=69; ESP=Emotional Screening Procedure; SAP=Scoring Ability Procedure; SS=Standard Score; p/f=pass/fail.

As demonstrated in Table 31 only two variables made a statistically significant contribution to the model. The pass/fail ESP made the largest contribution with an odds ratio of 31.42 meaning those passing it are 31 times more likely to generate adequate data on the dot-probe task. Additionally, participants who can write legibly are 20 times more likely to achieve that. In this model, PPVT-4 does not make a statistically significant contribution.

8.3 Prevalence, signs, symptoms and stressors

The second aim of the present study was to establish the prevalence of anxiety and depression and the relationship between these and ability as well as between life events and anxiety and depression. To achieve this aim, Hypotheses 1, 2, 3 and 4 (Chapter 3.9 pp 97-100), were tested in this section.

Hypothesis 1

Hypothesis 1 (Chapter 3.9 pp 98-99) for the prevalence of informant signs and respondent symptoms was tested by comparing scores from participants in this study with those of international reference studies using one sample t-tests.

Mean informant signs as well as the percentage of threshold level cases on the Affective/Neurotic, Organic and Psychotic Scales of the PAS-ADD Checklist were
calculated and comparisons then made with those from the only large international norming study of adults (Taylor, et al., 2004a). Results are displayed in Table 32.

Table 32

**Comparison of Threshold Level Cases and Mean Informant Signs with Reference Study**

<table>
<thead>
<tr>
<th>PAS-ADD Checklist Scales</th>
<th>This Study (n=65)</th>
<th>Taylor, Hatton et al. (n=1155)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Threshold Means</td>
<td>Threshold Means</td>
</tr>
<tr>
<td>Organic</td>
<td>3.0% .68 (1.32)</td>
<td>3.9% 0.74</td>
</tr>
<tr>
<td>Affective/Neurotic</td>
<td>4.6% 1.12 (2.00)</td>
<td>14% 2.21***</td>
</tr>
<tr>
<td>Psychotic</td>
<td>5.7% 0.18 (.66)</td>
<td>10.2% 0.41**</td>
</tr>
</tbody>
</table>

*Note. N=65 One sample t-test comparison; **p<.01; ***p<.001; aPAS-ADD Checklist-R used; bPAS-ADD Checklist used with ID sample.*

As Table 32 illustrates, threshold cases of possible Organic Disorder in this sample were similar to the normative sample. However, Affective/Neurotic Disorder and possible Psychotic Disorder, were nearly three and two times as common in the norm sample. Differences between mean signs were significant on Affective/Neurotic and Psychotic Scales respectively. The 4-week point prevalence rates of threshold-level signs as measured by the three scales of the PAS-ADD Checklist were predicted to be similar to those in the reference international study. Consequently, this part of **Hypothesis 1 (Chapter 3.9 pp 98-99)**, is only partially supported.

The mean respondent symptoms from this study were measured by the modified BAI and BDI-II. These are compared with those of the total sample and disorder specific referral sub-samples from the only other study to use the modified versions of these instruments (Lindsay, et al., 2007b). Results are shown in Table 33.
Table 33

Comparison of Respondent Symptom Means with Reference Study

<table>
<thead>
<tr>
<th>Measures</th>
<th>This study</th>
<th>Lindsay and Skene (2007)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total valid (n=58)</td>
<td>Total (n=108)</td>
</tr>
<tr>
<td>^bBAI</td>
<td>15.83</td>
<td>12.84*</td>
</tr>
<tr>
<td>^bBDI-II</td>
<td>14.53</td>
<td>14.06</td>
</tr>
</tbody>
</table>

*Note. One sample t-test comparison *p<.05 ***p value below .001; ^aDisorder specific referral sub-samples ^bvalid completions only.

Table 33 shows a significant difference between the mean BAI score from all (valid) completions in this study and that from all participants in Lindsay and Skene’s total sample, but not for BDI-II. Extremely significant differences exist between means in the total sample of the present study and the means of the clinical level anxiety and depression sub-samples in the reference study. The point prevalence rates for respondent symptoms on the BAI and BDI-II had been predicted to be similar to a reference sample using the same modified versions of these instruments. Consequently, Hypothesis 1 (Chapter 3.9 pp. 98-99), that signs and symptoms of mental ill-health in the sample would be similar to established reference samples, was only partially supported.

Hypothesis 2

Hypothesis 2 (Chapter 3.9 pp. 99-100), for ability, signs and symptoms of anxiety as well as depression was tested with correlations between verbal (PPVT-4), dimensional emotional (ESP), dimensional scoring (SAP) ability and informant (PAS-ADD Checklist Affective/Neurotic Scale and Anxiety factor) as well as respondent (BAI and BDI-II) measures. The results are displayed in Table 34.
The results in Table 34 reveal a significant positive correlation between PPVT-4 and PAS-ADD Affective/Neurotic Scale but no significant relationship with the symptom measures of BAI and BDI-II. Similarly, neither ESP nor SAP was significantly related to informant or symptom measures. Therefore, Hypothesis 2 (Chapter 3.9 pp. 99-100), that measures of ability would be related to each other but not to signs or symptoms of mental ill-health, was predominantly supported.

Hypothesis 3

Hypothesis 3 (Chapter 3.9 p 100), for the relationship between life events, signs and symptoms was tested by correlational methods. Pearson product-moment correlations between total life events (all LEs) on the PAS-ADD Checklist (part 1) and the signs scales (part 2) of the checklist as well as the BAI and BDI-II symptom measures are shown in Table 35.
Inspection of table 35 shows medium- to large- sized correlations between PAS-ADD total LEs and each of the informant (PAS-ADD Checklist) signs scales. Negligible relationships exist between LEs and the respondent symptom measures of the BAI and BDI-II. Furthermore, the latter are not related to any of the four scales derived from the PAS-ADD Checklist. Consequently, Hypothesis 3 (Chapter 3.9 p 100), that the number of life events (12 month prevalence) would be significantly correlated with signs and symptoms of mental ill-health, was only partly supported.

Hypothesis 4
Hypothesis 4 (Chapter 3.9 p 101), for a specific relationship between stressors, signs and symptoms of anxiety and depression was tested by correlational and multiple regression analysis. Table 36 shows Pearson’s r between loss and trauma related LEs, signs (PAS-ADD Checklist Affective/Neurotic scale and Anxiety factor) and symptoms (BAI and BDI-II) of anxiety and depression.
Table 36

*Correlations Amongst Specific LEs, Signs and Symptoms*

<table>
<thead>
<tr>
<th>Signs and Symptoms</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PAS-ADD loss LEs</td>
<td>-</td>
<td>.36**</td>
<td>.24</td>
<td>.38**</td>
<td>.08</td>
<td>-.18</td>
</tr>
<tr>
<td>2. PAS-ADD trauma LEs</td>
<td>-</td>
<td>.25*</td>
<td>.24</td>
<td>-.07</td>
<td>-.15</td>
<td></td>
</tr>
<tr>
<td>3. PAS-ADD Affective/Neurotic</td>
<td>-</td>
<td>.62**</td>
<td>-.13</td>
<td>-.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. PAS-ADD Anxiety factor</td>
<td>-</td>
<td>-.16</td>
<td>-.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. <em>BAI</em></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td>.44**</td>
<td></td>
</tr>
<tr>
<td>6. <em>BDI-II</em></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=55-65; *p<.05 (2-tailed); ** p<.01 (2-tailed); *valid completions only.*

Table 36 contains medium-sized correlations between loss LEs and trauma LEs as well as with the PAS-ADD Checklist signs of anxiety. However, the relationship with the measure of depressive signs, the PAS-ADD Affective/Neurotic subscale, was not significant. For trauma LEs, a small but significant correlation exists with the PAS-ADD Affective/Neurotic Scale but not with the Anxiety factor. Neither type of LE is related to the respondent symptoms on the BAI or BDI-II.

Standard multiple regression was used to investigate the relative contribution of loss LEs, trauma LEs along with the third cluster of change-LEs to the PAS-ADD Checklist Affective/Neurotic score and the PAS-ADD anxiety score. Relationships between LEs and the respondent symptom measures were not investigated given the negligible relationship. The results are presented in Table 37.
Table 37

**Standard Multiple Regression for LEs and PAS-ADD Checklist Affective/Neurotic Scale**

<table>
<thead>
<tr>
<th>Life Events</th>
<th>$R^2$</th>
<th>sr²</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>.109</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss LEs</td>
<td>.03</td>
<td>.18</td>
<td></td>
</tr>
<tr>
<td>Trauma LEs</td>
<td>.03</td>
<td>.17</td>
<td></td>
</tr>
<tr>
<td>Change LEs</td>
<td>.02</td>
<td>.14</td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=65; *p<.05 (2-tailed); LEs=life events.*

Table 37 shows that in relation to the PAS-ADD Affective/Neurotic score, the three LE variables together explained only 10.9% of the variance, which is not statistically significant. Furthermore, none of the three predictor-variables explained a significant amount of variance.

Standard multiple regression was then used to calculate the contribution of loss-, trauma- and change-LEs on the PAS-ADD Anxiety factor with results displayed in Table 38.

Table 38

**Standard Multiple Regression for LEs and PAS-ADD Checklist Anxiety Factor**

<table>
<thead>
<tr>
<th>Life Events</th>
<th>$R^2$</th>
<th>sr²</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>.16*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss LEs</td>
<td>.10</td>
<td>.34*</td>
<td></td>
</tr>
<tr>
<td>Trauma LEs</td>
<td>.01</td>
<td>.11</td>
<td></td>
</tr>
<tr>
<td>Change LEs</td>
<td>.00</td>
<td>.01</td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=65; *p<.05 (2-tailed); LEs=life events.*

In relation to signs measured by the PAS-ADD Anxiety factor, Table 38 shows the model containing all three variables explained 16% of the variance which is significant.
at \( p = .05 \). Of the three variables, the only significant contribution was from loss LEs, with beta of .34 \((p = .009)\). Therefore, **Hypothesis 4 (Chapter 3.9 p 101)**, that loss-related life events would be significantly related to depressive signs and symptoms and trauma-related events to anxiety signs and symptoms was not supported.

### 8.4 Cognitive content specificity for anxiety and depression

The third aim of the present study was to test a key concept underpinning cognitive content-specificity that underpins cognitive models of anxiety and depression. In order to achieve this aim, Hypotheses 5, 6, 7 and 8 were tested in this section.

**Hypothesis 5**

For **Hypothesis 5 (Chapter 4.8 p 144)**, relating to cognitions (CCL-A and CCL-D CCL-T) and ability (PPVT-4, ESP, SAP) correlational data were used. Table 39 shows correlations \((r)\) between the cognitions and ability measures.

**Table 39**

*Correlations Amongst Cognitions and Ability*

<table>
<thead>
<tr>
<th>Ability and Cognitions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PPVT-4 (SS)</td>
<td>-</td>
<td>.42**</td>
<td>.44**</td>
<td>.09</td>
<td>.16</td>
<td>.16</td>
</tr>
<tr>
<td>2. ESP (D)</td>
<td>-</td>
<td>-</td>
<td>.44**</td>
<td>.23</td>
<td>.19</td>
<td>.21</td>
</tr>
<tr>
<td>3. SAP (D)</td>
<td>-</td>
<td>b.00</td>
<td>b.00</td>
<td>b.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. *CCL-Anxiety</td>
<td>-</td>
<td>-</td>
<td>.79**</td>
<td>.92**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. *CCL-Depression</td>
<td>-</td>
<td>-</td>
<td>.96**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. *CCL-Total</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=58 with all valid completions; *=valid completions only; ** \( p < .01 \) (2-tailed); bSAP is constant for valid completions of CCL.*

Table 39 shows medium-sized correlations amongst the ability measures and large-sized correlations between the cognitions measures. No correlations were found between ability measures and cognitions measures. Consequently, **Hypothesis 5 (Chapter 4.8 p 144)**, that measures of ability would be correlated with each other but not with the frequency of cognitions is supported.
**Hypothesis 6**

To test **Hypothesis 6** (Chapter 4.8 p145), for the relationship between cognitions and symptoms, correlational techniques were used.

Table 40 shows correlations (Pearson product moment) between the respondent symptom measures (BAI, BDI-II) and respondent cognition measures (CCL-A, CCL-D CCL-total).

**Table 40**

**Correlations Amongst Cognition and Symptom Measures**

<table>
<thead>
<tr>
<th>Symptoms and Cognitions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. BAI</td>
<td>-</td>
<td>.44**</td>
<td>.22</td>
<td>.24</td>
<td>.23</td>
</tr>
<tr>
<td>2. BDI-II</td>
<td>-</td>
<td>-</td>
<td>.40**</td>
<td>.53**</td>
<td>.50**</td>
</tr>
<tr>
<td>3. CCL-Anxiety</td>
<td>-</td>
<td>-</td>
<td>.79**</td>
<td></td>
<td>.92**</td>
</tr>
<tr>
<td>4. CCL-Depression</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>.96**</td>
</tr>
<tr>
<td>5. CCL-Total</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=58; valid completions only for all measures; ** p<.01 (2-tailed).*

Inspection of Table 40 shows a medium-sized correlation between anxiety-related cognitions and symptoms of depression but the small correlation with anxiety symptoms did not reach significance. Depression related cognitions however, showed a large-sized correlation with depressive symptoms and a small correlation with anxiety symptoms that did not reach significance. Whilst a medium-sized correlation exists between the two symptom measures it was a large size between the two corresponding cognitions measures. Therefore, **Hypothesis 6** (Chapter 4.8 p145), that disorder-specific cognitive content would be correlated with disorder specific symptoms when measured by self-report inventories of anxiety and depression, was only partially supported.

**Hypothesis 7**

For **Hypothesis 7** (Chapter 4.8 pp.145-146), regarding cognitive content predicting anxiety symptoms (BAI), hierarchical multiple regression analysis controlling for
effects of verbal (PPVT-4), emotional (ESP) and scoring (SAP) ability was conducted. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multi-collinearity and homoscedasticity. The dimensional ability variables were entered first (model 1) and the cognitions (CCL-A & CCL-D) variables second (model 2). Results are displayed in Table 41.

**Table 41**

*Hierarchical Multiple Regression to Predict Anxiety with Cognition and Ability Measures*

<table>
<thead>
<tr>
<th>Ability and Cognitions</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
<th>$sr^2$</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1</strong></td>
<td>.105*</td>
<td>.105*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPVT-4 (RS)</td>
<td>.10</td>
<td>-.36*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESP (D)</td>
<td>.05</td>
<td>.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAP (D) (excluded)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td>.16</td>
<td>.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>aCCL-Anxiety</td>
<td>.00</td>
<td>-.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>aCCL-Depression</td>
<td>.02</td>
<td>.25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=58-69; *p<.05 (2-tailed); aValid completions only; RS=raw score; (D)=dimensional.*

Inspection of Table 41 shows that the ability measures in model one explained 10.5% of the variance in BAI, which is significant at the .05 level. After entry of the cognition measures, model two explained 16.4%. The cognition variables added an additional 6% once ability was controlled for yet $R$ squared change was not significant, $F$ change (2, 53) = .16. However, ANOVA suggests that both model one $F$ (2,55) = 3.23, $p<.05$ and model two, $F$ (4,53) = 2.60 $p<.05$ are significant. In the final model, only PPVT-4 recorded a statistically significant beta value though. Therefore, **Hypothesis 7 (Chapter 4.8 pp.145-146): that anxiety-related cognitive content and not depression-related content would exclusively predict anxiety symptoms was not supported.**

**Hypothesis 8**

For **Hypothesis 8 (Chapter 4.8 p146),** concerning cognitive content predicting depressive symptoms, multiple regression analysis controlling for effects of verbal
(PPVT-4), emotional (ESP) and scoring (SAP) ability was conducted. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multi-collinearity and homoscedasticity. The ability variables were entered first (model 1) and the cognitions (CCL-A & CCL-D) variables second (model 2) with results displayed in Table 42.

Table 42

Hierarchical Multiple Regression to Predict Depression with Ability and Cognition Measures

<table>
<thead>
<tr>
<th>Ability and Cognitions</th>
<th>R²</th>
<th>AR²</th>
<th>sr²</th>
<th>Beta</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPVT-4 (RS)</td>
<td>.03</td>
<td>.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESP (D)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAP (D) (excluded)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Model 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.29</td>
<td>.27***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCL-Anxiety</td>
<td></td>
<td></td>
<td>.00</td>
<td>-.03</td>
</tr>
<tr>
<td>CCL-Depression</td>
<td></td>
<td></td>
<td>.11</td>
<td>.55**</td>
</tr>
</tbody>
</table>

Note. N=58-69; **p<.01 (2-tailed); ***p<.001 (2-tailed); *Valid completions only; (RS)=raw score; (D)=dimensional.

Results in Table 42 show that ability measures in the model account for 3% of the variance in depressive symptoms, which is not significant. Model two with the addition of the cognition variables explains 29% of the variance. With ability controlled, the cognitions measures add an additional 26.6%, which is a significant R square change = .27, F change (2,53) 9.95, p<.001. ANOVA confirms that the model as a whole was significant (F (4,57)=5.44, p<.001. Consequently, Hypothesis 8 (Chapter 4.8 p146), that depression-related cognitive content and not anxiety related content would exclusively predict the symptoms of depression, was supported.

8.5 Anxiety, attention and ability

The fourth aim of the present study was to test for the effects of anxiety and ability on attentional responses to emotional stimuli with those participants who mastered the
visual-probe task. To achieve this aim, Hypotheses 9, 10, 11, 12 and 13 were tested in this section.

**Hypothesis 9**

**Hypothesis 9 (Chapter 5.9 pp.193-194) regarding** the viability of the visual-probe experiment with a sample of adults with low ability was tested by establishing the proportion of participants that passed the ESP as well as the mastery procedure and completed at least one block of trials with 60% or more correct. These are displayed according to ability level as defined by standard deviation on the PPVT-4 in Table 43.

**Table 43**

*Participants Mastering the Visual-Probe and at Least One Block with Adequate Data*

<table>
<thead>
<tr>
<th>Task</th>
<th>Ability Category</th>
<th>&lt;25</th>
<th>26-40</th>
<th>41-55</th>
<th>56-70</th>
<th>71-85</th>
<th>86-100</th>
<th>101-115</th>
<th>116-130</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>All cases</td>
<td></td>
<td>3</td>
<td>8</td>
<td>15</td>
<td>21</td>
<td>13</td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>67</td>
</tr>
<tr>
<td>Mastery</td>
<td></td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>17</td>
<td>12</td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>50 (72.46)</td>
</tr>
<tr>
<td>Adequate data</td>
<td></td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>16</td>
<td>11</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>45 (65.21)</td>
</tr>
</tbody>
</table>

*Note.* ( )=contains percent of cases that attempted the dot-probe task.

As Table 43 shows, the majority of the participants who were offered and attempted the dot-probe task were able to pass screening and mastery procedures then generate at least one block with 60% or more correct. Only four of the 11 in the severe and profound categories who attempted the task generated adequate data and success progressively improved as ability increased. Therefore, **Hypothesis 9 (Chapter 5.9 pp. 193-194), that the majority of participants would be able to pass the screening and mastery procedures as well as completing at least one block with a minimum of 60% correct trials, was supported.**

**Hypothesis 10**

**Hypothesis 10** (Chapter 5.9 p194) for a bias toward or away from angry faces in problem-level anxiety was tested by five analyses. Four were ‘within subjects’ analyses
with the first for the difference between congruent and incongruent trials on emotional faces for the whole sample. The second tested for main effects of block, emotion and congruency for the whole sample. The third was for the difference between congruent and incongruent trials in the clinical groups and the same analysis for each of the groups in the ID spectrum constituted the fourth. The fifth analysis was ‘between groups’ and compared the bias scores of groups that were high and low on clinical anxiety variables.

For the first analysis, repeated measures $t$-tests were used to compare the mean RTs from congruent and incongruent trials for angry faces in the whole sample to establish whether a significant bias toward or away from the feared stimuli existed. These were carried out on trials from block 1 and block 2 and included an analysis for bias on happy faces as well with results presented in Table 44.

**Table 44**

*Congruent and Incongruent RTs on Emotional Faces for the Whole Sample*

<table>
<thead>
<tr>
<th>Block and Emotional Face</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Bias</th>
<th>$t$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Block 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angry congruent trials</td>
<td>592.25</td>
<td>120.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angry incongruent trials</td>
<td>588.61</td>
<td>126.58</td>
<td>-3.64</td>
<td>.58</td>
<td>.57</td>
</tr>
<tr>
<td>Happy congruent trials</td>
<td>584.67</td>
<td>128.52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy incongruent trials</td>
<td>591.33</td>
<td>121.141</td>
<td>6.66</td>
<td>-1.25</td>
<td>.22</td>
</tr>
<tr>
<td><strong>Block 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angry congruent trials</td>
<td>588.48</td>
<td>111.45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angry incongruent trials</td>
<td>584.45</td>
<td>109.95</td>
<td>-4.02</td>
<td>.75</td>
<td>.46</td>
</tr>
<tr>
<td>Happy congruent trials</td>
<td>582.58</td>
<td>110</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Happy incongruent trials</td>
<td>581.63</td>
<td>107</td>
<td>-.95</td>
<td>.20</td>
<td>.84</td>
</tr>
</tbody>
</table>

*Note.* $N=43$ for block 1 and $N=45$ for block 2; bias is calculated by subtracting the mean of congruent trials from the mean of incongruent trials with a positive value indicating attention toward and a negative, value attention away.

Results in the analysis displayed in Table 44 did not show a bias away from or toward emotional faces on either block. A bias was not found on happy trials either.
To compare the effect of block (1 and 2), emotion (angry, happy and neutral) and congruence (congruent, incongruent) a three way repeated measures ANOVA for RTs under the three within-subjects conditions was conducted. The results of this analysis are presented in Table 45.

Table 45

*Main and Interaction Effects on RTs for Block, Emotion and Congruency for Whole Sample*

<table>
<thead>
<tr>
<th>Groups</th>
<th>Wilks Lambda</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block</td>
<td>.981</td>
<td>.826</td>
<td>.369</td>
</tr>
<tr>
<td>Emotion</td>
<td>.967</td>
<td>.696</td>
<td>.504</td>
</tr>
<tr>
<td>Congruency</td>
<td>.977</td>
<td>.977</td>
<td>.328</td>
</tr>
<tr>
<td><strong>Interaction effects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block x emotion</td>
<td>.995</td>
<td>.093</td>
<td>.912</td>
</tr>
<tr>
<td>Block x congruency</td>
<td>.995</td>
<td>.23</td>
<td>.634</td>
</tr>
<tr>
<td>Emotion x congruency</td>
<td>.642</td>
<td>1.258</td>
<td>.295</td>
</tr>
<tr>
<td>Block x emotion x congruency</td>
<td>.985</td>
<td>.304</td>
<td>.739</td>
</tr>
</tbody>
</table>

*Note. N=43 for block 1 and N=45 for block 2.*

Inspection of the interaction effects in Table 45 shows that none of the F values are significant. Mauchly’s Test of Sphericity did not yield a score for the dependent variables, block and congruence and the assumption was violated for emotion with p=.035. Consequently, care should be taken when interpreting results for the independent variables. None of the pairwise comparisons were significant either.

Repeated measures t-tests were then conducted on the RTs to angry faces of participants in each anxiety grouping identified by informant or respondent measures. The first group was those who identified as receiving treatment for anxiety at the time of interview and the second was those with informant ratings of anxiety reaching threshold on the PAS-ADD affective/neurotic scale. The third group was those who reported clinical level anxiety on the BAI and the fourth; those who were low (first
quartile) on the ABS-RC:2 Part-1 Socialisation Domain. The fifth group were high (fourth quartile) on the shyness items of the ABS:RC:2 Part-2 Social Engagement Domain. None of these five analyses revealed a bias toward or away from angry faces on block 1 or 2. Detailed results are presented in Appendix H.

Repeated measures t-tests were then carried out on the RTs of participants in each ability level in the ID spectrum who had generated adequate visual-probe data. The analysis tested for difference (bias) between congruent and incongruent angry face trials. The first group was any level of ID and the second, mild ID. The third group was moderate ID and the fourth, severe and profound ID. None of these analyses produced a bias on either block. See Appendix H for details of the results.

The difference between mean bias scores for angry faces in groups that were high and low on anxiety variables was tested by t-tests for independent samples. The first group was split between those receiving treatment for anxiety and those who were not. The second comparison was between those in the sample who were rated at or above threshold for PAS-ADD affective/neurotic scale and those who were not. The third group was divided between those reporting clinical level anxiety and those who did not. The fourth comparison was between participants who were low (first quartile) and high (fourth quartile) on socialisation and the Fifth Group was divided between participants in the first and fourth quartiles on shyness. None of these analyses revealed a bias toward or away on either block 1 or 2. For further detail on the results see Appendix H.

None of the five analyses yielded evidence to support a bias toward or away from angry faces on either block 1 or 2. Consequently, Hypothesis 10 (Chapter 5.9 p 194), that a bias toward or away from angry faces would be demonstrated in those with problem-level anxiety as indicated on either informant or respondent measures, was not supported.

Hypothesis 11

Hypothesis 11 (Chapter 5.9 p 194) for the relationship between ability and response speed was tested by correlations amongst combined (congruent and incongruent) emotional (angry and happy) face RTs and the respondent measures of verbal ability
(PPVT-4 Raw Score), emotion recognition (ESP-D), scoring ability (SAP-D) as well as an informant measure of physical ability (ABS-RC:2 Physical Development Domain). The resulting intercorrelations are presented in Table 46.
Table 46

**Correlations Between Combined Emotional Face RTs and Ability Measures**

<table>
<thead>
<tr>
<th>Ability and Emotional Face RTs</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PPVT-IV (RS)</td>
<td>-</td>
<td>.49**</td>
<td>.59**</td>
<td>.13</td>
<td>-.45**</td>
<td>-.45**</td>
<td>-.49**</td>
</tr>
<tr>
<td>2. ESP (D)</td>
<td>-</td>
<td>.44**</td>
<td>.27*</td>
<td>.08</td>
<td>.06</td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>3. SAP (D)</td>
<td>-</td>
<td>.09</td>
<td>.05</td>
<td>.07</td>
<td>.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. ABS-RC:2 PD</td>
<td>-</td>
<td>-.09</td>
<td>-.08</td>
<td>-.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Angry RTs a combined</td>
<td>-</td>
<td>.97</td>
<td>.94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Happy RTs a combined</td>
<td>-</td>
<td>.95</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Neutral RTs b combined</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=43-69; *p<.05 (2-tailed); **p<.01 (2-tailed); RS=Raw Score; (D)=dimensional; PD=Physical Development Domain; a combined RTs to congruent and incongruent face stimuli in block 1; b combined RTs to left and right neutral face stimuli in block 1.*

Table 46 illustrates that as expected, correlations were found between PPVT-4 and both emotion recognition (medium) and scoring ability (large). However, it is the only measure of the three related to the combined emotional (angry, happy and neutral) RTs. Each of these three is a medium-sized negative correlation. Physical disability was not correlated with PPVT-4 or emotional face RTs. Therefore, **Hypothesis 11 (Chapter 5.9 p 194)** that verbal ability, but not emotional, scoring or motor-related ability would be negatively correlated with RTs to emotional faces was supported.

**Hypothesis 12**

**Hypothesis 12** (Chapter 5.9 p 195), for the relationship between anxiety and response time was tested firstly by correlations between self-report symptom measures (BAI, BDI-II, ‘anxiety after probe’ and combined (congruent and incongruent) RTs for emotional (angry, happy and neutral faces). The results of this analysis are presented in Table 47.
Table 47

**Correlations Between Combined Emotional Face RTs and Symptom Measures**

<table>
<thead>
<tr>
<th>RTs and Symptoms Measures</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. *BAI</td>
<td>-</td>
<td>.44**</td>
<td>.65*</td>
<td>.30 b</td>
<td>.32*</td>
<td>.27</td>
</tr>
<tr>
<td>2. *BDI-II</td>
<td>-</td>
<td>.34</td>
<td>.15</td>
<td>.14</td>
<td>.11</td>
<td></td>
</tr>
<tr>
<td>3. ‘Anxiety after probe’</td>
<td>-</td>
<td>.09</td>
<td>.16</td>
<td>.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Angry RTs b combined</td>
<td>-</td>
<td>.97**</td>
<td>.94**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Happy RTs b combined</td>
<td>-</td>
<td>.95**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Neutral RTs d combined</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=11-58; *valid completions only; b p<.06; c combined RTs to congruent and incongruent face stimuli in block 1; d combined RTs to left and right neutral face stimuli in block 1; *p<.05 (2-tailed); **p<.01 (2-tailed).*

Table 47 shows a medium-sized correlation between combined happy RTs and the BAI whereas the combined angry faces approached significant correlation with the BAI. Neutral face RTs were not correlated with BAI and notably, the BDI-II is not related to any of the face RTs suggesting the relationship is specific to anxiety. This provides some support for hypothesis 12.

The combined RTs to emotional (angry, happy) for symptom groups were tested using t-tests for independent samples. The first group was divided between those with clinical anxiety and those without, the second compared those in the BAI fourth quartile with those in the first quartile. The third group was divided between the fourth quartile of participants on the BDI-II and the first quartile. The results are displayed in Table 48.
Table 48

T-Tests on Combined Emotional Face RTs for High and Low Symptom Groups

<table>
<thead>
<tr>
<th>RTs and Symptoms Groups</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Angry RTs combined</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical BAI (n=10)</td>
<td>686.32</td>
<td>120.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-clinical BAI (n=33)</td>
<td>571.23</td>
<td>116.71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hi BAI (n=14)</td>
<td>656.23</td>
<td>110.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low BAI (n=14)</td>
<td>571.02</td>
<td>89.60</td>
<td>-1.95</td>
<td>.07</td>
</tr>
<tr>
<td>High BDI-II (n=14)</td>
<td>636.76</td>
<td>137.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low BDI-II (n=15)</td>
<td>590.60</td>
<td>82.50</td>
<td>-.92</td>
<td>.37</td>
</tr>
<tr>
<td>*Happy RTs combined</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical BAI</td>
<td>689.95</td>
<td>115.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-clinical BAI</td>
<td>569.21</td>
<td>116.28</td>
<td>2.50</td>
<td>.02*</td>
</tr>
<tr>
<td>Hi BAI</td>
<td>657.81</td>
<td>115.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low BAI</td>
<td>562.32</td>
<td>78.67</td>
<td>2.23</td>
<td>.04*</td>
</tr>
<tr>
<td>High BDI-II</td>
<td>631.48</td>
<td>136.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low BDI-II</td>
<td>582.35</td>
<td>71.24</td>
<td>-.93</td>
<td>.38</td>
</tr>
</tbody>
</table>

*Note. *p<.05 (2-tailed); Only valid symptom interviews used; *combined RTs to congruent and incongruent face stimuli in block 1; Clinical BAI=≥27; High BAI=top quartile; High BDI-II=top quartile; quartile ranges detailed in Table 19.

Inspection of Table 48 shows a significantly longer RT for the clinical and high BAI groups in response to happy faces. In response to angry faces, RTs are significantly slowed for the clinical, but not the high BAI group. The lack of difference in means between the high and low depression groups suggests that the effect may be anxiety specific. Evidence from both analyses support Hypothesis 12 (Chapter 5.9 p 195), that groups with high self-rated anxiety would show slower responses to angry faces than low anxiety groups, was supported.
Hypothesis 13

Hypothesis 13 (Chapter 5.9 p 195), relating to inaccuracies and ability was tested in its first part by comparing inaccuracies from blocks one and two with those in selected reference studies. The data for incorrect and outlier trials are compared with general population and ID samples in Table 49.

Table 49

Inaccuracies and Outliers Compared with General Population and ID Samples

<table>
<thead>
<tr>
<th>Blocks and Items</th>
<th>This study</th>
<th>(Waters, 2010)</th>
<th>(Dodd &amp; Porter 2010)</th>
<th>(Dodd &amp; Porter 2011)</th>
<th>(Mogg, 2004)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Block 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outliers</td>
<td>36</td>
<td></td>
<td>1%</td>
<td>4.86%-4.25%-7.55%</td>
<td>5.5%</td>
</tr>
<tr>
<td></td>
<td>a(1.10%)</td>
<td></td>
<td></td>
<td>(composite)</td>
<td>(composite)</td>
</tr>
<tr>
<td>Incorrect</td>
<td>170</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b(4.94%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Block 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outliers</td>
<td>41</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a(1.19%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incorrect</td>
<td>171</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b(4.75%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. a=Proportion of accurate trials b=proportion of all trials; () contains percent of trials; ^composite=inaccuracies and outliers; Dodd and Porter (2010) groups: (1)=Williams syndrome-(2)=age-matched control group-(3)=ability-matched control group.*

As Table 49 depicts, the proportion of outliers and inaccuracies was consistent across the two blocks administered in this sample. The proportions were also similar to those recorded in a study with general population children (Waters, et al., 2010a) and two studies of adults with Williams Syndrome, some of whom had mild and moderate ID (Dodd, et al., 2010, 2011b). Rather than reporting outliers and inaccuracies separately, Dodd and Porter (Dodd, et al., 2010) (Dodd, et al., 2011b) reported a composite number containing both. In their first study, Dodd and Porter (2010) found that a group of adults with Williams Syndrome and an age matched control group recorded similar rates, but a control group matched on IQ but chronologically younger had a significantly higher number excluded. A study using university students (Mogg, et al., 2004b) recorded fewer inaccuracies and more outliers than the present study and the other comparison studies. This is consistent with other studies using this paradigm and stimuli with adults,
though (Ioannou, et al., 2004). This part of Hypothesis 13 (Chapter 5.9 p 195), was supported.

The second part regarding the relationship between ability and inaccuracies was tested by correlations (r). These are presented in Table 50.

Table 50

*Correlations Between Outliers, Inaccuracies and Ability Measures*

<table>
<thead>
<tr>
<th>Items and Ability</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. B 1 outliers</td>
<td></td>
<td>-.31*</td>
<td></td>
<td>-.32*</td>
<td></td>
<td>.35*</td>
<td></td>
<td>.02</td>
</tr>
<tr>
<td>2. B 1 inaccuracies</td>
<td></td>
<td></td>
<td>-.19</td>
<td>.77**</td>
<td>-.29</td>
<td>.20</td>
<td>.17</td>
<td>-.14</td>
</tr>
<tr>
<td>3. B 2 outliers</td>
<td></td>
<td>-.08</td>
<td></td>
<td>.02</td>
<td>.05</td>
<td>.02</td>
<td></td>
<td>-.001</td>
</tr>
<tr>
<td>4. B 2 inaccuracies</td>
<td></td>
<td></td>
<td>-.33*</td>
<td></td>
<td>.04</td>
<td>-.07</td>
<td></td>
<td>-.01</td>
</tr>
<tr>
<td>5. PPVT-4 (RS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.49**</td>
<td>.59**</td>
<td>.13</td>
<td></td>
</tr>
<tr>
<td>6. ESP (D)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.44**</td>
<td></td>
<td>.27*</td>
</tr>
<tr>
<td>7. SAP (D)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. ABS-RC:2 PD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. N=43-69; *p<.05 (2-tailed) ** p<.01 (2-tailed); B1=block 1; B2=block 2; RS=raw score; (D)=dimensional; PD=Physical Development Domain.*

Inspection of Table 50 shows that of all the ability measures, only PPVT-4 is significantly related to outliers on block 1 with a medium sized positive correlation. It is also negatively correlated with inaccuracies though this only reaches significance with a medium-sized correlation on block 2. None of the other ability measures were significantly related to outliers or inaccuracies on either block. Consequently, Hypothesis 13 (Chapter 5.9 p 195), predicted that inaccuracy rates would be similar to studies of the general population and studies of adults with ID. Also predicted was a negative correlation between inaccuracies and ability. Both parts of this hypothesis were supported.
8.6 Exploratory

Two exploratory analyses (Chapter 5.9 pp. 195-196) were conducted. The first was to examine whether a relationship exists between attentional bias scores and signs as well symptoms of anxiety. Correlations were calculated between bias scores for block 1 of both emotions and: symptoms of anxiety before probe (BAI); signs of anxiety (PAS-ADD Anxiety factor & PAS-ADD A/N) and anxiety after the probe (‘anxiety after probe’). Whilst none were significant, medium-sized, negative correlations were found between RT bias and anxiety after probe \( (r = -.47; r = -.49) \) on both blocks. The results of these analyses are presented in Appendix H.

The second exploratory analysis (Chapter 5.9 pp.195-196), was to examine the relationship between combined angry RTs (congruent and incongruent) and LEs (loss, trauma, change and all LEs). Of the four LE categories, only loss related LEs were correlated with combined angry RTs on block 1 \( (r = .40; p < .01) \) and block 2 \( (r = .33; p < .05) \) as well as combined happy face RTs on block 1 \( (r = .41; p < .01) \), and block 2 \( (r = .36; p < .05) \). These data are presented in Appendix H.
Chapter Nine: Discussion

9.1 Introduction
In this chapter, the main findings are addressed and the implications of the study for future research are considered. The first section summarises the aims of the study and the hypotheses that address them as well the extent of support found for each hypothesis. The second addresses the implications of the findings against existing empirical and theoretical literature and the third covers the strengths of the study. The fourth section highlights the limitations of the study. The fifth section outlines recommendations for future research and the sixth contains conclusions.

The first aim of this study was to recruit a unique sample across the spectrum of low ability (LA) facilitated by task-specific screening procedures that could be helpful in future studies. This aim was operationalised through three components. The second aim was to establish the prevalence of anxiety and depression and the relationship between these and ability, as well as between LEs and anxiety and depression. This aim was operationalised through Hypotheses 1 to 4 relating to the areas of prevalence, signs, symptoms and LEs. Hypothesis 1 (Chapter 3.9 pp. 98-99), was partially supported and Hypothesis 2 (Chapter 3.9 pp. 99-100), was predominantly supported. Hypothesis 3 (Chapter 3.9 p 100), was partially supported and Hypothesis 4 (Chapter 3.9 p.101), was not supported. The third aim was to test the key concept of cognitive content-specificity for anxiety and depression with Hypotheses 5 to 8. Hypothesis 5 (Chapter 4.8 p 144), was supported and Hypothesis 6 (Chapter 4.8 p.145) was partially supported. Hypothesis 7 (Chapter 4.8 pp.145-146), was not supported but Hypothesis 8 (Chapter 4.8 p.146), was. The fourth aim of the study was to test for the effects of anxiety and ability on attentional responses to emotional stimuli with those participants who mastered the visual probe, using Hypotheses 9 to 13. Hypothesis 9 (Chapter 5.9 pp.193-194), was supported but Hypothesis 10 (Chapter 5.9 p.194) was not. Hypothesis 11 (Chapter 5.9 p.194) was supported and so was Hypothesis 12 (Chapter 5.9 p.195). Both parts of Hypothesis 13 (Chapter 5.9 p.195), were supported.
9.2 Integration with extant literature

9.2.1 Screening and validity procedures

Three important aspects of the screening and validity procedures constructed for this study facilitated the collection of a unique sample in accordance with the first aim. First, the study’s inclusionary approach enabled the participation of small groups with profound and severe ID. Second, using dichotomous, task-specific screening procedures allowed their capacity to identify valid and invalid performance of research tasks to be tested. Third, the dimensional versions of these original screening measures facilitated analysis of their relationships with a range of other variables in the study.

In regard to the first point, the current study is one of the few to recruit adults with profound and severe ID to cognitive research. The self-reported data on their cognitive and affective states allowed a rare testing of cognitive concepts with these groups. Their inclusion also left the LA sample replete with participants from each ability group below the normal range. Most other studies excluded potential participants with ability at these levels after screening (Dagnan, et al., 2004a; Dagnan, et al., 2004b; Esbenson, et al., 2005, 2007; Payne, et al., 2004; Reed, et al., 1989; Sams, et al., 2006) or file reviews (Danielsson, et al., 2010). Even studies of cognitive content-specificity (Glenn, et al., 2003) and selective attention to emotional faces (Dodd, et al., 2010, 2011b) using samples with LA, excluded these sub-groups. Small group sizes (Benson, et al., 1992; Helsel, et al., 1988), recruitment difficulties (Crook, et al., 2015); and communication problems (Adams, et al., 2011; Lancioni, et al., 2005; Neerinckx, et al., 2014; Petry, et al., 2006; Vos, et al., 2010) make inclusion difficult. However, to test the viability of cognitive concepts across the spectrum of LA, then potential participants at the lowest levels of ability must be included and screened to discover exactly what they can and cannot do. Adults with profound and severe ID were included in all research tasks they elected (see Table 15) and then data analysed based on competence, task by task.

In relation to the second issue, this cognitive study is unique in its use of task-specific screening procedures to predict validity of symptom and cognition interviews, visual-probe mastery and visual-probe data adequacy. Each of the dichotomous procedures proved useful in discriminating between valid and invalid performance on their target research task. Furthermore, the task-specific procedures were more potent than the
PPVT-4 (Dunn, et al., 2007). Surprisingly few studies have reported on the empirical relationship between a measure of receptive language and valid performance on research tasks in adult samples with ID (Benson, et al., 1992; Esbenson, et al., 2007; Joyce, et al., 2006; Reed, et al., 1989; Sams, et al., 2006). For the present study, the Scoring Ability Procedure (SAP) was constructed to screen for the symptom and cognition interviews with legible writing and the Emotions Screening Procedure (ESP) used for mastery and data adequacy on the visual-probe task with emotional faces.

Previous studies had used similar questions to the SAP (Benson, et al., 1992; Glenn, et al., 2003; Nezu, et al., 1995; Sams, et al., 2006) but none reported data on their capacity to discern valid and invalid cases (Glenn, et al., 2003; Helsel, et al., 1988; Nezu, et al., 1995; Payne, et al., 2004). The dichotomous SAP was the only measure to correctly classify valid interviews in 68 of 69 cases despite receptive language and numerical ability also correlating significantly with validity. Validity was not related to ESP, legible writing or physical disability though. The greater proportion of invalid interviews in the groups with lower ability suggests a greater relative value of the SAP as a screening procedure in this range of ability.

The dichotomous ESP and legible name procedures were constructed to screen for mastery of the visual-probe task with emotional faces. Whilst all of the screening procedures as well as physical ability, socialisation and receptive language were correlated with mastery, only the two task-specific procedures made a significant contribution to the variance. Of these, legible name had the greatest with an odds ratio of almost 20. The few other relevant studies using the visual-probe paradigm excluded potential participants with severe or profound level of disability and did not report on mastery or its predictor(s) (Chakrabarti, et al., 2013; Dodd, et al., 2010, 2011b). Ironically, the task-specific screening is probably most useful with the potential participants who have been excluded from past studies. Inspection of data from the present study confirms that from the sub-sample with ID, 80% of the mildly and 66% of the moderately disabled sample reached mastery yet only 25% of the severe and 33% of the profound groups did so.
In relation to the prediction of cases with an adequate number of trials completed, the screening procedures and other variables inter-correlated in a similar pattern to that for mastery of the visual-probe task. All the screening procedures, except SAP, contributed significant variance but in a second model, only the dichotomous ESP and legible writing were significant. Contrary to the results for mastery, the ESP had the higher odds ratio at 31, though confidence intervals are wide for both. Inspection of the data reveals that all three of those who reached mastery in the profound and severe groups produced adequate data. A further three in the moderate group and one each in the mild, borderline and low average groups did not. Other studies using the same paradigm and stimuli as the present study with typically developing children (Ioannou, et al., 2004; Waters, et al., 2010a) as well as adults with (Dodd, et al., 2010, 2011b) and without ID (Ioannou, et al., 2004; Mogg, et al., 2004b) have addressed the issue of incorrect and outlier trials. Few of them exclude cases from analysis, instead excluding incorrect and outlier trials and reporting these as two separate rates or one single rate.

The relative attainment on validity, mastery and adequacy amongst cases with severe and profound ID is worth noting. One of the three participants in the profound and three of the eight severe group completed valid interviews. A different participant was the only one of the profound group to master the visual-probe task, and of the successful three in the severe group, only one had a valid interview as well. This suggests the two tasks may require different skills, adding further evidence for the use of task-specific screening for research tasks in cognitive studies, especially for adults with the lowest ability. Furthermore, the task-specific screening measures appear superior to receptive language in identifying valid and invalid research task completion.

The third important aspect of the screening and validity procedures was the construction and use of dimensional versions of the ESP and SAP. These allowed the exploration of relationships between emotional recognition, scoring ability and receptive language as well as signs and symptoms of and cognitions related to anxiety and depression. The empirical examination of these relationships in a LA sample has not previously been attempted in a single study. The dearth of dimensional measures of emotional recognition and scoring ability has contributed to the lack of attention afforded these variables in cognitive research. The ESP demonstrated good internal reliability and
appears convergent with ABS-RC:2 socialisation but divergent from ABS-RC:2 physical disability. As expected, it was positively correlated with receptive language and with scoring ability. The SAP also showed good internal reliability and was significantly and moderately correlated with ESP and PPVT-4 as well as showing convergent validity with ABS-RC:2 Numbers and Time Domain. Whilst further examination of validity and reliability is warranted, the data support the use of the SAP and ESP as dimensional measures in this study.

9.2.2 Prevalence, signs, symptoms and stressors
This sub-section covers four issues relating to the prevalence of signs and symptoms as well as their relationship to ability and stressful life events in an unselected sample of adults with low intellectual ability. The first highlights the mixed results on prevalence of signs and symptoms compared with available norm samples. The second addresses the relationship amongst ability measures and whether these co-varied with signs or symptoms of anxiety and depression. The third is concerned with mental ill-health and the number of LEs. The final issue is the relationship between loss-related LEs and depressive signs or symptoms as well as trauma related LEs and anxiety signs or symptoms.

The first issue highlighted in this sub-section is the mixed results when the prevalence of signs and symptoms in the present study are compared with available reference studies. The mean rates of signs and threshold cases are lower in the present study than the four largest studies using the PAS-ADD Checklist (Allen, et al., 2012; Holden, et al., 2008; Taylor, et al., 2004a; Zeilinger, et al., 2011) for both the Psychotic and the Affective/Neurotic scales. Compared to the norming study of Taylor et al. (2004a), differences for both scales are significant but probability is less than .001 for the Affective/Neurotic scale. The large samples had a much greater proportion of participants with higher care-needs and non-family based residential placements than the present study (Allen, et al., 2012; Holden, et al., 2008; Taylor, et al., 2004a). This and the selection for participants with challenging behaviours in two of the studies (Allen, et al., 2012; Holden, et al., 2008) may explain some of the differences in signs and threshold cases. Support for these explanations come from recent evidence that adults living with their families experience greater support (Payne, et al., 2004) and that
quality of relationships rather than level of contact is important for mental well-being (McGillivray, et al., 2007). Studies comparing samples across living settings on social skills (Rojahn, Esbensen, Hoch & MacLean, 2006) and symptoms of depression (Lunsky, et al., 2001; Nezu, et al., 1995; Reiss & Benson, 1985) are equivocal but comparisons based on factors acknowledged to predict mental ill-health in the general population are required (Emerson, et al., 2013b). Regardless of the reason(s), the low rates of signs and proportion of threshold cases have implications for later hypotheses. The low rates will limit the available variance for analyses involving signs of anxiety and depression.

There is only one reference study that used both the BAI and BDI-II amongst a sample with LA, although Lindsay and Skene’s (2007a) study was a validity study for the modified versions rather than a norming study. The rates of symptoms for the total sample in the present study are not vastly different from rates in Lindsay and Skene’s (2007b) study. The threshold for the present study’s clinical anxiety group was based on the mean BAI of Lindsay and Skene’s (2007b) anxiety referral group but it is a much smaller proportion of this study’s total sample than Lindsay and Skene’s (2007b). The only other study using the BAI (Glenn, et al., 2003) found a higher mean rate than the present study but did not use the BDI-II as well. No cases in the present study reached the BDI-II level of Lindsay and Skene’s clinical referrals.

Early studies with the shortened BDI (Helsel, et al., 1988; Kazdin, et al., 1983; Matson, et al., 1983b; Nezu, et al., 1995) are unsuitable for comparison but more recent studies with the unmodified BDI-II (but not the BAI) have collected samples of adults with mild and moderate ID using naturalistic methods similar to the present study. McGillivray and McCabe (2008) and McGillivray and Kershaw (2013) found higher rates than the present study in samples selected for depression but Ailey (2009) found a rate that was lower in an unselected sample with mild and moderate ID. However, symptom rates in the present study and all the others using low ability samples are significantly higher than those for the unmodified versions of the BAI and BDI-II used in unselected samples from the Australian adult general population (Crawford, et al., 2011). The low proportion of clinical level anxiety cases and lack of clinical level depression cases may have implications for the testing of theoretical hypotheses. If
anxiety and depression show limited differentiation at low symptoms levels (Clark, et al., 1996; Greenberg, et al., 1989; Steer, et al., 1994) then low rates of clinical anxiety and depression cases might diminish the likelihood of finding cognitive content-specificity. The possibility of finding anxiety effects on attention might also be curtailed.

The second issue in this sub-section is the positive correlation amongst ability measures but the absence of relationships between ability and symptoms or signs. Amongst the signs of mental ill-health, only the Affective/Neurotic Scale and not the Anxiety factor, was correlated (positively) with one of the ability measures, that of receptive language. Whilst there is already evidence for a linear relationship between receptive language and emotion recognition (Dagnan, et al., 1997b; Reed, et al., 1989; Sams, et al., 2006), measurement of the latter has been inconsistent (Carvajal, et al., 2012) and no dimensional measures of scoring ability could be found. Although the direction and strength of correlations between the three are not surprising, the capacity of future studies to measure these dimensional variables could be enhanced by the availability of the ESP and SAP.

Despite large studies establishing norms for the PAS-ADD Checklist signs of Affective/Neurotic Disorder, (Allen, et al., 2012; Hatton, et al., 2008; Taylor, et al., 2004a; Zeilinger, et al., 2011) the relationship between these signs and receptive language has received little attention. No studies have used the PAS-ADD Checklist along with a dimensional measure of ability. Early studies using a similar informant measure - the PIMRA-I (Helsel, et al., 1988) and the PPVT-R (Helsel, et al., 1988) and IQ (Kazdin, et al., 1983) found no relationship between ability and signs. Both studies used the total PIMRA-I score not the anxiety or depression scales though. In the present study, only the Affective-Neurotic Scale was related to receptive language and not to the other ability measures, confirming the need for further research with larger samples.

The key finding for this second issue is the lack of any relationship between objectively-measured ability and self-reported subjective symptom state. This is consistent with the majority of early studies that found symptoms of depression did not correlate with receptive language in samples of mild (Nezu, et al., 1995) to severe
(Helsel, et al., 1988) ID. Benson and Ivins (1992), also found they did not correlate with category of ID in an LA sample including groups with severe to borderline ID. An exception amongst early studies was that of Kazdin et al. (1983) who found medium-sized, negative correlations between IQ and both the BDI and the ZDS. Despite recruiting from the same levels of ability as Helsel and Matson (1988), Kazdin et al.’s (1983) sample contained a much higher proportion of participants with diagnosed mental illness and living in an institution.

More recent studies using samples of adults with ID have found small to medium-sized negative correlations between self-reported symptoms of depression and receptive language (Esbenson, et al., 2005) as well as IQ (Mileviciute, et al., 2015). Neither Esbenson and Benson (2005) nor Mileviciute and Hartley (2015) used the BDI-II though and both actively selected participants with diagnoses of depression. Furthermore, Mileviciute and Hartley (2015) found the correlations with the affective, not the cognitive or somatic items and IQ on the two self-report measures they used. Recent studies using the BDI-II have used samples with mild to moderate ID (Ailey, 2009; Esbenson, et al., 2005; Helsel, et al.; Matson, et al., 1983b; McGillivray, et al., 2015; McGillivray, et al., 2007; Nezu, et al., 1995) or had potential participants screened positive for depressive symptoms by support staff (McGillivray, et al., 2013; McGillivray, et al., 2008). However, none of those using the BDI-II measured dimensional ability as well. Apart from Lindsay and Lees (2003) and Lindsay and Skeene (2007b), only one recent study could be found that measured symptoms of anxiety with the BAI (Glenn, et al., 2003). Whilst Glen et al. (2003) did use the BAI, they did not use the BDI-II and none of these three studies used a dimensional measure of ability. The low level of clinical anxiety and depression in the present sample may partly explain the lack of significant correlations between self-report symptoms and dimensional ability. Nevertheless, the relationship between ability and symptoms requires further testing in larger studies.

The third issue in this subsection is the divergent relationships between total LEs and symptoms as compared to that between LEs and signs of anxiety and depression. In the present study, the pattern of most and least common specific LEs on the PAS-ADD Checklist was similar to the reference studies (Hastings, et al., 2004; Owen, et al., 2004;
Tsakanikos, et al., 2007) though the rate of total LEs was substantially higher in the present study.

The medium-sized, positive correlations between total number of LEs and all three of the PAS-ADD Checklist scales as well as the anxiety factor are highly consistent with previous studies using the PAS-ADD Checklist. Roy, Martin and Wells (1997) found positive correlations between LEs and threshold positive scores on the three scales. Hastings et al. (2004) found a small correlation, after adjustment for demographic variables, between LEs and Affective/Neurotic but not Psychotic or Organic Disorders and Owen et al. (2004) found a small correlation with Affective/Neurotic Disorder. Relationships have also been found between other measures of signs and LEs. Regression analysis showed that recent, not previous, LEs predicted signs of depression, anxiety and psychosis (Hulbert-Williams, et al., 2014). Esbenson and Benson (2006) found that the capacity of LEs to predict signs of depression varied according to the value of the LE given by the informant.

The lack of significant relationships between total LEs and symptoms of either anxiety or depression is striking given the potency of cumulative LEs in predicting symptoms of both disorders in large general population studies (Hatch, et al., 2007; Lever, 2008; Spinhoven, et al., 2014). Comparisons are difficult as no other studies used the PAS-ADD Checklist part 1 (LEs) with self-reported symptoms, let alone the BDI-II and BAI. The low proportion of clinical-level anxiety and absence of clinical level depression in the sample might explain the lack of a relationship between symptoms and total LEs. McGillivray and McCabe’s (2007) finding that LEs explained the least variance of 5 variables on a regression model predicting for BDI-II symptoms in an unselected community sample lends support to this explanation. However, the strength of the relationship between LEs and signs in the present study does not.

The more likely explanation lies in the gap between informant and respondent perspectives. This is illustrated by the difficulty of establishing concordance between informant and respondent ratings of mental ill-health. Medium to large sized correlations have been found in general population studies where sampling and measurement is optimised (Prusof, et al., 1972), but agreement is inevitably higher for
observable behaviours and lower for subjective ratings of mood and cognitions (Corruble, et al., 1999). Concordance between respondent and informant measures of depression was not found in early studies using samples with LA (Helsel, et al., 1988; Kazdin, et al., 1983). More recent studies have used item-matched measures (Gordon, et al., 2007; Mileviciute, et al., 2015), samples containing clinical cases and clinicians have administered the self-report measures (Beail, et al., 2015; Bramston, et al., 2000). These studies have found small to medium sized correlations between informant and respondent raters although only for depression. Even when an item-matched diagnostic interview was administered to respondents and informants, concordance was found on depression but not anxiety (Moss, et al., 1996b).

Confirming the impact of this gap on the relationship between informant-reported LEs and self-reported symptoms are recent studies that accounted for the respondent’s interpretation (Hulbert-Williams, et al., 2011) or reporting (Wigham, et al., 2014) of the LE. Hulbert-Williams et al. (2011) found large correlations between negative LEs and symptoms of anxiety as well as depression when they asked respondents, not informants, to list LEs as well as give each a valence rating. Wigham et al. (2014) found that adverse LEs identified and judged for valence by respondents were better predictors of self-reported trauma symptoms than LEs reported by informants on the same measure. A person’s interpretation of and subsequent cognitions about internal and external events is at the core of Beck’s generic cognitive model of anxiety and depression (Beck, et al., 2014). Discovering this subjective meaning is more difficult with adults who have LA, particularly those with the lowest levels of ability. There does appear to be a gap between informants and respondents on how they view LEs. In the present study, participants were asked about their symptoms but not the significance and valence of LEs. Seeking this data would help discern whether symptoms were related to LEs.

The fourth issue in this subsection is the lack of significant correlations between trauma LEs and anxiety symptoms as well as between loss LEs and symptoms of depression. The lack any relationship between specific LEs and symptoms of anxiety or depression is surprising, especially given the resounding findings in large child (Eley, et al., 2000), adolescent (Asselmann, et al., 2015) and adult (Finlay-Jones, et al., 1981) studies of
general population samples. However, no studies have tested the predictive capacity of PAS-ADD Checklist loss and trauma LEs for the BDI-II and BAI with a LA sample. PAS-ADD Checklist LEs did not predict unique variance in symptoms gathered with the respondent PAS-ADD 10, yet trauma events did, amongst adults with mild and moderate ID (Martorell, et al., 2009). However, the analysis was not specific for symptoms of anxiety and depression. Tsakanikos et al. (2007) found two loss-related LEs from the PAS-ADD checklist LEs correlated with a diagnosis of depression but none of the LEs were related significantly related to anxiety. Wigham, Taylor and Hatton (2014) found that events from an informant-completed trauma scale predicted trauma symptoms.

The relationships between loss-related LEs and symptoms of depression as well as trauma- or danger-related LEs and symptoms of anxiety clearly require further investigation in samples with LA. It may be that the LE groupings (for loss and danger/trauma) need reconsidering on the basis of the most recent general population studies. The fact that the loss-related group predicted a small but significant amount of variance in the signs of anxiety but not the signs of depression would bolster this explanation. However, as with the impact of cumulative LEs, it may be that the gap between respondent and informant perspectives also needs bridging. Future studies need to capture participants’ ratings of strength and valence of LEs more accurately as well as using self-report measures of both anxiety and depression.

9.2.3 Cognitive content specificity for anxiety and depression

The relationships between cognitions and ability as well as cognitions and symptoms are considered in this sub-section with three central issues addressed. First, the relationship between ability measures and cognitions is considered. Second, the pattern of correlations between disorder specific cognitions and disorder specific symptoms is examined. Third, the extent to which anxious cognitions and depressive cognitions predict symptoms of anxiety and depression is considered.

The first issue is that receptive language did not correlate with anxiety cognitions (CCL-A) or with depression cognitions (CCL-D). The medium sized inter-correlations among the three dimensional ability measures were not surprising but a negative relationship
between general ability and capacity to experience and report cognitions has long been assumed (Ellis, 1983; Hollon, 1984; Rush, et al., 1983). The few general population studies to test this assumption have yielded mixed results despite using samples with primary diagnoses of anxiety and/or depression. Jolly and Dyckman (1994a) did not find a relationship between reading age and anxious or depressed cognitions amongst adolescents yet small, negative correlations were found between ability (vocabulary and abstract reasoning) and anxious (Haaga, et al., 1990) as well as depressive (Crandell, et al., 1986) cognitions for adults. However, these correlations did not affect the strong predictive relationships between cognitions and symptoms (Crandell, et al., 1986; Haaga, et al., 1990). Amongst studies using samples with LA, the CCL-A and CCL-D have only been used once (Glenn, et al., 2003) apart from the present study. Glenn et al. (2003) contracted the scoring system, did not report mean scores for their sample or use a dimensional measure of ability. The Automatic Thoughts Questionnaire (ATQ) has been used in samples that included adults with mild and moderate ID (Esbenson, et al., 2005; McGillivray, et al., 2007; McGillivray, et al., 2008; Nezu, et al., 1995) but none have used a measure of anxiety cognitions as well. Only one study (Esbenson, et al., 2005) co-varied the ATQ with ability, finding a small ($p<.05$) correlation with the PPVT-III in a sample selected for depression. The lower proportion of clinical level cases and lower mean CCL (A and D) rates than the general population (clinical) reference studies (Clark, et al., 1996; Haaga, et al., 1990) may be enough to explain the lack of relationship between cognitions and ability in the present study. It is a unique finding that needs replication but it is supported by good control over interview validity, concurrent measurement of ability and the full breadth of LA in the sample.

The second issue for this subsection is the mixed results for correlations between disorder-specific cognitions and their respective symptoms. The near-significant correlations between anxiety and both the CCL-A and the CCL-D are contrasted by medium-sized correlation between depression and the CCL-A and a large-sized correlation between depression and the CCL-D. Reviews and meta-analyses of general population research consistently show shared variance between cognitions and non-congruent symptoms. Correlations are also consistently higher between cognitions and symptoms of depression than between those of anxiety (Beck, et al., 2001; Clark, et al., 1996; Smith & Mumma, 2007). Early general population studies of the relationship
between cognitions and symptoms used Beck’s (Beck, et al., 1987) measurement paradigm of the CCL (A & D) for cognitions and the BAI and BDI (or BDI-II) for symptoms to compare the means of clinical groups (with primary anxiety or depression) and non-clinical groups. Later studies were more diverse in their measurement paradigms, and analysis approaches were adapted to samples with mixed symptoms yet results are consistent with earlier studies comparing clinical groups (Beck, et al., 2001; Brown, et al., 2014; Cho, et al., 2005; Lamberton, et al., 2008).

The only study to use the CCL (A&D) in a sample with LA used the BAI but not the BDI-II for symptoms (Glenn, et al., 2003). The CCL scoring was contracted from four points to three and the CCL-D was supplemented with the ATQ. Uniformly large correlations were found amongst all cognitions and symptom measures. The sample \( n=46 \) was smaller than the present study’s, was drawn from residential services and had a relatively high proportion of current (15%) and past (15%) diagnoses of depression. Furthermore, Glenn et al. (2003) did not exclude any participants for response biases in symptom and cognition interviews and their choice of symptom and cognition measures was not explained. Other studies have found correlations between the ATQ and depressive symptoms in low ability samples (Esbenson, et al., 2005; McGillivray, et al., 2007; McGillivray, et al., 2008; Nezu, et al., 1995). They did not measure cognitions or symptoms of anxiety, the proportion of clinical level cases varied and none recruited from all levels of LA. Naturalistic sampling of community support services has advantages, yet rates of clinical level symptoms are low (Lindsay, et al., 2007b; McGillivray, et al., 2013; McGillivray, et al., 2007) even when they selected for existing symptoms (McGillivray, et al., 2015; McGillivray, et al., 2008). Similar low rates in the present sample might explain the lack of relationship between anxiety and either CCL-A or CCL-D. They also enhance the contrast of a medium sized correlation between depressive symptoms and the CCL-A and a large sized correlation with the CCL-D. Whilst these findings require replication, they are supported by the fidelity of symptom and cognition data. The next step in analysis is to test the predictive strength of the CCL-D and CCL-A.

The third issue for consideration in this subsection is the significant unique variance in depressive symptoms predicted by the CCL-D, in contrast to the prediction of (negative)
unique variance in anxiety symptoms by ability and not by either the CCL-D or the CCL-A. Two reviews (Brown, et al., 2014; Clark, et al., 1996) and a comprehensive meta-analysis (Beck, et al., 2001) of the adult general population cognitive content-specificity research show that symptoms of anxiety and depression share a significant portion of their variance with both anxious and depressed cognitive content. Despite the overlap, depressive cognitions were significantly more strongly related to depressive symptoms than to anxious symptoms across clinical and non-clinical samples. In addition, greater specificity exists where symptom severity is greater (Beck, et al., 2001; "Guardianship and Administration Act 1986 Version 063," 1986). The evidence is less definitive amongst child and adolescent samples (Laurent, et al., 1993; Sood, et al., 2007). Only two studies have tested cognitive content-specificity for either anxiety or depression in samples with LA (Glenn, et al., 2003; McGillivray, et al., 2007) and the results of these studies are detailed in Chapter Four. McGillivray and McCabe (2007) found a modified ATQ with truncated scoring contributed the largest portion of variance in BDI-II scores with an unselected sample but they did not measure the cognitions or symptoms of anxiety. Glen et al. (2003) also truncated their cognitions measure and found the CCL-A uniquely predicted significant variance in BAI scores. However, both the CCL-A and CCL-D predicted significant variance in depression scores on the Reynolds Child Depression Scale (Reynolds, et al., 1988). Glenn et al. (2003) report 30% of the sample had either a current or past diagnoses of depression though none had an anxiety diagnosis. Neither McGillivray and McCabe (2007) nor Glenn et al. (2003) controlled for ability or recruited from each ability level in the spectrum of LA.

Cognitive content-specificity is a key concept in cognitive models of anxiety and depression but the impact of ability in this area of cognitive theory has had little attention in either general population or LA studies. This is surprising given the concerns of early cognitive theorists about the capacity of adults with ID to participate in cognitive behavioural therapies (Ellis, 1983; Hollon, 1984; Rush, et al., 1983) and the rising interest in this mode of psychotherapy for people with ID (Jahoda, et al., 2009a; Lindsay, et al., 2013a; Lindsay, et al., 2013b; Willner, et al., 2006b). In the present study, significant and unique variance in the BDI-II was predicted by the CCL-D for the first time in a sample with LA. The sample was unselected for depression or anxiety and
did not contain clinical level cases of depression. Furthermore, the fidelity of measurement and control of ability in the design as well as the breadth of ability ensures it ranks well compared with studies in the general population and the subpopulation with LA.

The small but unique predictive role of ability with symptoms of anxiety is harder to explain as very little empirical research has addressed this issue. Haaga et al. (1990) found a small negative correlation between cognitions and anxiety in a clinical sample of adults but it is not clear what the ability ‘floor’ of their sample was. Large general population studies have found a small negative relationship between trait anxiety and ability (Austin, et al., 2002; Mottus, et al., 2007; Samuel, 1980) and when measured prospectively in childhood, IQ predicts (negatively) generalised anxiety disorder (Martin, et al., 2007) and any anxiety disorder (Koenen, et al., 2009) in adulthood. The dearth of anxiety studies using LA samples is surprising given its prevalence (White, et al., 2005) and its role in increasing the risk for depression (Beesdo, et al., 2007). Controlling for ability has not only removed a confounding variable for cognitive content-specificity for the first time, it suggests a relationship between ability and anxiety that needs further investigation.

9.2.4 Anxiety, attention and ability

In this subsection, five issues relating to anxiety, ability and attention are addressed. First, the proportion of participants who passed screening procedures, mastered the visual-probe task and bettered the accuracy threshold for correct trials is considered. Second, the direction of attention in response to emotional faces is discussed. The relationship between ability and speed of response to angry faces is the third issue and the fourth; anxiety and speed of response. The fifth, issue is the accuracy of responses to emotional faces.

First, a significant majority of the sample passed screening and mastery procedures for the visual-probe task. Furthermore, only a small number of these could not complete 60% accurate trials on at least one block. The few other studies using a visual-probe task with emotional faces in samples of adults with ID excluded potential participants based on IQ, leaving ability ‘floors’ of 48 (Dodd, et al., 2011b) and 53 (Dodd, et al.,
All participants in the studies of Dodd and Porter (2010, 2011a, 2011b) had IQ in the borderline, mild and moderately disabled ranges. One used a task-specific screening procedure (emotional recognition) (Dodd, et al., 2010) but did not report any exclusion and none used a mastery procedure. The lowest standard score in the present study was a standard score of 20 (PPVT-4) and of the participants with ability in the severe and profound ranges who mastered the task (3), all generated adequate data for analysis. This is preliminary evidence for the value of a mastery procedure and screening procedures such as the ESP and legible writing at least with participants who have the lowest levels of ability.

Second, is the absence of a significant directional bias in response to angry or happy faces. The difference between congruent and incongruent trials was not significant on any of four ‘within-subject’ comparisons for the whole sample, the anxiety groups or the ability groups. Neither were differences found in the ‘between-subjects’ analyses of high and low scores on anxiety groups. The present study replicated a paradigm and set of facial stimuli (Bradley, et al., 1998) used extensively in general population samples. Bias toward angry faces has been reliably found in clinical and high trait-anxiety adults (Bar-Haim, et al., 2007) and away from (Pine, et al., 2005) as well as toward (Richards, et al., 2007) angry faces in child and adolescent samples. In children, the direction of the bias induced by angry faces is related to the type of anxiety disorder (Waters, et al., 2014a; Waters, et al., 2015). Furthermore, bias toward happy as well as angry faces has been found in some child but not adult studies (Waters, et al., 2014a; Waters, et al., 2010a; Waters, et al., 2008c). Whilst paradigms and stimuli have varied in the limited studies using LA samples, findings indicate: executive attentional deficits may sustain a bias (Cohen Kadosh, et al., 2014); adults with severe and profound disability have diminished regulation of attention (Vos, et al., 2010); and a bias toward threatening stimuli amongst mildly and moderately disabled adults with Williams syndrome exists (Dodd, et al., 2011b). Consequently, the lack of a directional bias, either toward or away from emotions, in any of the sub-groups is an unexpected result for the present study.

Some possible explanations relate to the study design and instruments used whilst others relate to characteristics of the sample. A single researcher administered...
screening, validity and research tasks, some of which were novel, so researcher bias is possible. The mastery procedure containing paper and on-screen practice may have produced a familiarity effect reducing the likelihood of a bias in the experimental blocks. However, practice procedures of similar length are not uncommon in studies with children (Waters, et al., 2010b; Waters, et al., 2012a) and adults (Mogg, et al., 1997; Mogg, et al., 2004c). Furthermore, without the mastery procedure, competence on the task could not have been controlled at the lowest levels of ability. The visual-probe was administered after the anxiety symptom measures in the present study, while many researchers administer it prior (Dodd, et al., 2011b; Mogg, et al., 1997; Mogg, et al., 2000a; Waters, et al., 2010b; Yiend, et al., 2001). It may be that participants are sensitised by exposure to the stimuli making symptom expression and/or endorsement more likely. The presence of medium sized, negative (though not significant) correlations between bias and the self-rated ‘anxiety after probe’ found in the exploratory analysis (Chapter 5.9 pp.195-196) supports this explanation.

It might also be that the stimuli were not sufficiently threatening to disrupt attentional processing in subjects without high trait or state anxiety. Studies eliciting a positive bias in non-anxious samples have used more threatening pictures from the International Affective Picture System (IAPS) (Lang, et al., 2008) series (Mogg, et al., 2000b; Wilson, et al., 2003) to produce directional bias. Given the predicted slowing of processing in the LA sample, it may be that a longer exposure time would have resulted in a reliable bias effect. Another possibility is that the determinants for anxiety groups were inadequate. In particular, a self-report of trait anxiety may have been a more accurate reflection of symptoms than the two proxy measures. The State-Trait Anxiety Inventory (STAI) is commonly used in general population studies (Spielberger, et al., 1983) but neither this nor any other self-report trait anxiety measure has been used in samples of adults with low ability. Amongst the self-ratings used, the BAI requires an estimation of anxiety during the past week and was administered prior to the task. Only ‘anxiety after probe’ was administered after the task and then only to a small portion (n=12) of the sample, reducing the possibility for temporal comparison with the BAI.

In relation to sample characteristics, sensory and motor skills were controlled but it is possible that unmeasured perceptual effects may be present. The task itself may have
caused apprehension in a sample with little experience of the hardware and computer based tasks, thus effecting responses to all stimuli rather than just the angry faces. As the faces used in the visual-probe task differed from those in the ESP, it is possible that they were misinterpreted in the visual-probe, a phenomena most likely with the neutral faces (Maurer & Newborough, 1987; Park, Han & Hyun, 2015). Similarly, Bermejo et al. (2014) found there was greater variability in the judgement of valence in pictures amongst adults with mild and moderate ID compared with an ability matched control group. Another explanation in terms of sample characteristics is the limited number of participants in the five clinical anxiety groups. Those receiving treatment for anxiety (n=6) and those reaching threshold for PAS-ADD Checklist A/N Scale (n=3) were lower than clinical level self-reported present-state anxiety (BAI) (n=10) and those used as proxies for trait anxiety; high shyness (n=8) and low socialisation (n=11). If these were inadequate to generate a bias effect then findings would be consistent with those from non-clinical and non-trait anxious samples where a bias was not found unless more threatening stimuli were used (Bar-Haim, et al., 2007).

It may be that there are other variable(s), not analysed that can explain the apparent lack of bias. For instance, depression has often been mentioned but rarely controlled for in studies of directional bias (Bar-Haim, et al., 2007; Hakamata, et al., 2014). Similarly, new constructs, yet to be tested in samples with LA, might explain the diversity of responses in the present sample. For instance, a recent finding shows that children with principal ‘distress’ clinical disorders showed significant bias toward angry faces and those with principal ‘fear’ disorders showed attention bias away from angry faces. This is consistent with Clark and Watson’s (2006) alternative construct of anxiety and depression. Both diagnostic groups showed a bias toward happy faces (Waters, et al., 2014a). Similarly, anxious children with a bias away from threat (threat avoidant) showed higher autonomic arousal (galvanic skin response) to threat-related cues than did anxious children with attentional bias toward threat (threat-vigilant) (Waters, et al., 2015). Waters and Kershaw (2015) further suggest that differences in the development and direction of bias amongst clinically anxious children infers that different treatment approaches are required (Waters, et al., 2015; Waters, et al., 2012a). Regardless of whether aspects of design or sample characteristics are responsible, an effect for emotional stimuli has not been found at the attention stage of information processing.
addressed by cognitive motivational theory (Mogg, et al., 1998). Further research is clearly required with LA samples in this important area of cognitive theory. Mogg, Holmes, Garner and Bradley (2008) have found that emotional stimuli can affect speed of processing in high trait-anxious groups even when a directional bias is not found.

The third issue is the medium-sized, negative correlations between combined face RTs (valenced and non-valenced) and PPVT-IV but not with ESP, SAP or physical disability. The relationship between speed and ability is consistent with extensive evidence in the general population (Jensen, 2006) and the ID subpopulation (Brewer, et al., 1982; Nettelbeck, et al., 1997). Studies have consistently shown that cognitive processing speed and intelligence is moderately correlated on a broad range of cognitive tasks using non-emotional stimuli (Cornoldi, et al., 2014). The finding in the present study, with emotional stimuli, is unrelated to emotional recognition or physical disability. There was little difference between the two valenced (positive and negative) and the non-valenced (neutral) faces and there were no non-emotional stimuli in the task for comparison. Consequently, questions arise as to whether stimulus (e.g. strength) or participant characteristics (e.g. type and level of symptoms) might have an impact on RT, over and above general ability. Angry faces used in the present study are less threatening than some images known to cause slowing in anxious (Mogg, et al., 2008) and non-anxious (Koster, et al., 2004; Yiend, et al., 2001) adults in the general population. It is possible then that more threatening stimuli may have enhanced the slowing. The impact of participant symptom level and type is considered as part of issues four and five.

The fourth issue is the positive relationship between symptoms of anxiety, but not depression, and RTs in response to emotional faces. Happy face RTs were correlated with the BAI, angry face RTs approached significance and neutral face RTs did not. There was no relationship between emotional face RTs and the BDI-II. Similarly, the clinical anxiety group was slower than the non-clinical anxiety group on happy and angry face RTs, but there was no such difference between high and low BDI-II groups on RTs. These findings clearly show that slowing is related to participant variables of symptom type (anxiety) and severity. This relationship may also be specific for valenced (positive or negative) rather than neutral emotional stimuli. The impact of
anxiety is consistent with general population studies, showing significantly greater slowing in high anxiety groups compared to low anxiety groups (Koster, et al., 2004; Mogg, et al., 2008; Yiend, et al., 2001). Where stimuli have been more threatening (IAPS) than the angry faces used in the present study, slowing was also found in low anxious groups (Fox, et al., 2001; Koster, et al., 2004; Yiend, et al., 2001). Depression was not measured in those samples (Fox, et al., 2001; Koster, et al., 2004; Mogg, et al., 2008; Yiend, et al., 2001) and addressing the relationship between response speed and depression is beyond the scope of the current analysis. Mogg, et al. (2008) found that RTs were slowed by happy face stimuli in both high and low anxious adult groups but there has been little interest in the effect of positively valenced stimuli on RTs amongst adults. However, a number of child and adolescent studies have found biased attention toward happy as well as angry faces has in groups with high trait and clinical anxiety (Waters, et al., 2008a; Waters, 2004; Waters, et al., 2010a).

An important implication of this finding is for attention control theory, which explains threat-related slowing as a response to the decreased cognitive processing efficiency of the executive attentional system. With the executive sub-functions under greater load, reliance is placed on the orienting or stimulus driven system (Eysenck, et al., 2007) and speed rather than accuracy is affected (Eysenck, et al., 2011). Data in the present study were also examined to determine whether inaccuracy was equivalent to that in other studies. It was reasoned that if this was the case, then the finding of slowed processing amongst anxious participants in response to angry faces would support attentional control theory.

The final issue in this subsection is the relationship between inaccuracies and ability. The rate of inaccuracies for the whole sample was not greater than studies in the general population, or the few that have included adults with LA. However, the negative correlation between inaccuracies and ability reached significance on the second block of trials but not on the first. Studies using the same paradigm and similar emotional stimuli but with typically developing children removed similar (Waters, et al., 2010a) as well as much higher (Eldar, et al., 2012) (12.5%) proportions of inaccurate trials. Studies incorporating adults with borderline, mild and moderate disability (Dodd, et al., 2010, 2011a, 2011b) removed a similar proportion of trials to the present study, though like
Eldar (2012) they did not publish the proportion of outliers and inaccuracies removed separately. In their first study, Dodd and Porter (2010) found that a group of adults with Williams syndrome and an age matched control group recorded similar rates, but a control group matched on IQ, though chronologically younger, had a significantly higher number excluded. Studies of adults in the general population found proportionally more outliers and less inaccuracies than the present study (Ioannou, et al., 2004; Mogg, et al., 2004b) yet they still removed more trials overall. No studies have included adults with the lowest levels of ability and none have incorporated a mastery procedure or an accuracy threshold. Whilst there would have been more inaccuracies analysed without these procedures, the bulk of the inaccuracies were in the groups excluded from comparison studies anyway.

Matching accuracy across studies has important implications. The first of these is that participants retained in the study had adequate perceptual ability and motor skills for the task. Second, it suggests that participants had adequate attentional capacity in the orienting and executive systems to justify testing cognitive motivational theory (Mogg, et al., 1998) and attentional control theory (Eysenck, et al., 2007). Accuracy on tasks requiring attentional control with emotional and non-emotional stimuli typically approximates that of adults by age 7-9 although speed does not until later in adolescence (Rosenberg-Kima, et al., 2010; Rueda, et al., 2005). Attentional control theory cites negative emotional stimuli as responsible for escalating demands on the capacity of the executive attention system with the consequent disruption of attentional control. Amongst participants with high anxiety, this results in slowed speed rather than reduced accuracy (Berggren, et al., 2013; Eysenck, et al., 2011). If the developmentally earlier task of accuracy is intact, then more credence can be given to findings about the impact of ability as well as anxiety on speed of response.

The rate of inaccuracies was still expected to vary with ability though. Indeed, the correlation between ability and inaccuracies just reaches significance ($p<.05$) in the present study and is consistent with that found amongst adolescents with non-emotional stimuli (Anderson, et al., 2001). However, the correlation between ability and speed of response to angry faces is greater ($p<.001$). Hence it is reasonable to say that ability has a proportionally greater effect on speed than accuracy and as has been highlighted
already, speed is significantly slower in the high anxiety group when compared with the rest of the sample. The slowing effect in response to happy faces as well as angry ones has not been found in general population attentional control research and requires further research.

9.2.5 Exploratory
Findings from the two exploratory analyses (Chapter 5.9 pp.195-196) offer some tentative support in two separate areas. The correlation between bias and anxiety measured after the visual-probe was larger than between any of the measures taken before the visual-probe. It did not reach significance but it may have with a larger sample. If this was the case, then the temporal ordering of anxiety measurement and the visual-probe task might explain why a directional bias was not evident.

The finding of a relationship between RTs to emotional faces and loss LEs but not other LEs is consistent with a recent finding by Heyman and Hauser-Cram (2015). They found that cumulative LEs predicted RT slowing on tests of executive functioning (EF) in young adults with developmental disabilities. Given the recent evidence that EF deficits play an active role in the onset and maintenance of depression (Letkiewicz, et al., 2014) this would suggest increased risks for depression in adults with LA. Not only do cumulative LEs (Hulbert-Williams, et al., 2014) increase this risk but so too do the consequent EF deficits.

9.2.6 Summary
Four aims were pursued in the present study with some findings confirming existing evidence and others adding new data. First, a sample from all levels of LA was recruited with task-specific screening procedures successful in predicting valid responses at all levels of ability. Second, the signs of depression were related to ability and to LEs but the symptoms of depression and anxiety were not related to either ability or LEs. This confirmed a gap between what informants observed, and what the participants thought and felt. The gap is common in much of the mental health research in samples with LA, but less so in the general population. Third, cognitions were not related to ability but cognitive content-specificity was found for depressive cognitions and symptoms despite no clinical level cases of symptoms in the sample. This is consistent with extensive
general population data and along with the prediction of anxiety (negative) by ability, adds to the negligible evidence for adults with LA. Fourth, participants from all levels were able to produce enough data on the visual-probe task for analysis. A directional bias for emotional stimuli amongst the small group of clinical level anxiety cases was not found and hence, cognitive-motivational theory was not supported. Whilst this was inconsistent with general population findings, the impact of ability and anxiety on speed of response to emotional stimuli was consistent. The slowing of RTs to emotional faces by anxiety, and not depression, despite the maintenance of accuracy provides tentative support for attentional control theory in a low ability sample for the first time. The exploratory analyses (Chapter 5.9 pp.195-196) provide support for the measurement of anxiety after the visual-probe and the impact of loss LEs on RTs.

9.3 Strengths
The strengths of this study can be found in three main areas; study design, study sampling and the areas of inquiry. They are discussed in this section.

9.3.1 Study design
Replicable validity procedures for interviews (biased responses) and the visual-probe (mastery procedure) ensured the fidelity of data collected. For the first time, adults with the lowest ability were able to participate and where they had task-specific capacity, their data were analysed.

Task-specific screening procedures were used alongside validity criteria for each research task. The dichotomous screening procedures were better at detecting valid and invalid performance on research tasks than receptive language.

The creation of dimensional measures of emotional recognition (ESP) and scoring ability (SAP) facilitated the first exploration of relationships amongst these and with the third area of ability, receptive language. Both the ESP and SAP showed good internal consistency.

The concurrent measurement of ability (language, emotion, scoring), mental ill-health (signs, symptoms and cognitions), adaptive functioning (all domains), LEs and responses to emotional faces is unique for a cognitive study with a low ability sample. It
allowed the inter-relationships between these variables to be explored, many for the first time.

9.3.2 Sample
This sample is unique for its breadth of ability levels and the inclusionary approach ensured participation of adults with severe and profound intellectual disability. All levels of ability in the LA spectrum were included and this wide range of ability ensured that substantial variance was contributed to analyses that included receptive language.

A naturalistic approach was taken to sampling where consecutive nominations of potential participants from two community-based support services were accepted. Most participants lived with family or independently. They were thus representative of adults living in the general community, rather than staffed residential care where samples with LA have been traditionally gathered.

Relative to other studies of cognitive content-specificity in adults with ID the sample size was moderate. It was, however, large in comparison to general population studies of attention to emotional stimuli in a visual-probe assessment paradigm.

9.3.3 Areas of enquiry
This is the first study to inter-correlate dimensional measures of emotional recognition, scoring ability and receptive language then co-vary them with signs, symptoms and a range of cognitive variables. This is also the first study to measure symptoms with the modified BAI and BDI-II in a non-clinical sample and then explore concordance between these and the PAS-ADD Checklist. The comparison highlights the gap between what an informant observes and a respondent thinks and feels.

Co-varying ability with signs and symptoms of anxiety and depression showed that people who have lower ability do not necessarily have higher rates of mental ill-health and adds to the debate about what external factors might influence this widely assumed relationship.

Negative LEs were related to signs of anxiety and depression but not to symptoms. This again highlighted the gap between informant and respondent perspectives. Learning a
person’s own interpretation of LEs is the starting point for understanding and changing their responses.

This study is the first to investigate cognitive content-specificity for anxiety and depression in a sample with all levels of intellectual disability using Beck’s assessment paradigm. Validity procedures were used and ability controlled for the first time with an unselected sample. Thus enhancing the significance of the unique predictive role of depressive content with depressive symptoms, and the unique role of receptive language in predicting anxiety symptoms.

No studies have previously examined the impact of emotional faces on selective attention and speed of processing in a sample containing the full spectrum of LA let alone one that included adults with the lowest ability. Robust validity procedures and individual variation in response times helps confirm the paradigm and stimuli are viable in the sample.

The relationship between ability and RTs to emotional faces was tested for the first time, yielding results consistent with general population data. The relationship between anxiety and RTs to valenced (positive and negative) and neutral faces could also be tested with implications for attentional control theory. Ruling out a similar relationship with depressive symptoms strengthens the finding regarding speed, valenced faces and anxiety.

Attentional control theory was tested for the first time in a sample with LA. RTs to emotional faces slowed as anxiety increased but accuracy was similar to that found in general population studies. This suggests that not only was accuracy not compromised by anxiety, but, in adults with LA it is less affected by ability than commonly thought.

9.4 Limitations

The limitations of this study are noted in the areas of study design, sample characteristics and limitations of measurement. These limitations are considered in this section.
9.4.1 Study design
The cross-sectional design of the study increased the risk of some positive results being found purely by chance. It also precluded the exploration of: test-retest reliability of new ability measures; time course of symptoms, particularly anxiety and its relationship with depression; associations between ability-related variables and symptoms over time; and the further assessment of sub-sample groups.

The validity criteria for research tasks were consistent with those from similar studies but their implementation by a single researcher raises the risk of systematic judgement error. The use of a threshold for analysis of visual-probe data based on an arbitrary number of correct trials may have unnecessarily obscured the impact of ability on accuracy. Validity procedures were used for the interviews and visual-probe task based on the assumption that biased responses and inaccuracies would be related to ability. Apart from consent procedures to ensure participation was voluntary, there were no procedures to control for motivational or fatigue related variables.

Further investigation of the reliability and validity of the dichotomous screening procedures of legible writing, SAP and ESP is required in larger samples. The lack of a neutral face in the ESP meant the possibility of misinterpreting the neutral face visual-probe stimuli could not be controlled.

The selection of loss related and trauma related LE groups was made on the basis of a limited review of literature available prior to research implementation. The groupings may not adequately reflect the respective impact of these LEs on depression and anxiety.

A directional bias in selective attention to emotional faces was not found in clinical anxiety groups despite replicating a widely used paradigm and stimuli set. Consequently, no finding could be made about cognitive motivational theory. The absence of bias may be due to the selection of anxiety measures and/or the temporal ordering of the visual-probe and anxiety measurement tasks.
9.4.2 Sample characteristics
The sample encompassed all levels in the spectrum of LA whereas most cognitive studies within this spectrum focus on those with mild and moderate ID. This may limit the direct comparison with other studies.

The naturalistic approach to sampling where consecutive nominations of potential participants from two community-based support services were accepted meant the sample was unselected for anxiety and depression. Rates of anxiety and depression in the sample were lower than reference studies for most measures and a corollary was a small proportion of participants with clinical level symptoms of anxiety and none of depression. This limited the variance in signs and symptoms available in correlational analyses using symptom, cognition and visual-probe data.

The limited size of the clinical anxiety group and absence of one for depression restricted the opportunity for clinical group comparisons used widely in general population research. The sample size is small in comparison to general population studies of cognitive content-specificity. Size limits its value as a prevalence study of symptoms or signs of mental health problems and precludes the use of confirmatory factor analysis with the BAI and BDI-II.

9.4.3 Limitations of measurement
A large number of concurrent measurements were taken in the present study. These were of ability, adaptive behaviour, cognitions, signs and symptoms as well as attentional response to emotional faces. This gives rise to the risk of false positive or type 1 error when interpreting the results of the many analyses using these measurements (Tabachnick & Fidell, 2013).

The visual-probe paradigm and set of stimuli faces replicated those widely used in general population adult, child and adolescent studies. It was the first time the stimuli have been used in a study of adults with LA and the first time the paradigm and stimuli have been used with adults with severe and profound ID. Consequently, results will require further replication.
Trait anxiety was measured by informant ratings of shyness and sociability rather than a self-report measure such as the STAI (Spielberger, et al., 1983). Present-state anxiety was measured by self-report BAI (time-frame one week), as well as an informant PAS-ADD Checklist anxiety factor (time-frame four weeks). Situational anxiety was measured by a self-report estimation immediately following the visual-probe (‘anxiety after probe’). It may be that the rater (informant or respondent), type of anxiety (trait, present-state, situational) or the ordering of tasks (before or after the visual-probe) influenced the presence of a directional bias in the clinical and high anxiety groups.

The self-report estimation of situational anxiety (‘anxiety after probe’) immediately following the visual-probe task was only taken from a small proportion (n=12) of the sample. This limited the chances of testing the relationship between the latter and other anxiety measures as well as speed and bias in attentional response to faces.

9.5 Recommendations and future directions

Recommendation 1
Future cognitive research should incorporate adults from across the spectrum of LA, including those with profound and severe ID. Task-specific screening and validity procedures could facilitate the inclusion of adults from all ability levels in experimental anxiety and depression research. Given the difficulty of assembling samples with adequate size and levels of symptoms, theoretical questions as well as clinical outcomes should be pursued concurrently.

Recommendation 2
The validity criteria for symptom and cognition interviews (response biases) as well as the visual-probe task (mastery procedure) are promising but require inter-rater and test-retest data, particularly from samples recruiting participants with severe or profound ID.

Recommendation 3
The dichotomous screening procedures of legible name, SAP and ESP require further empirical investigation as cut-off measures. Further validation is required against clinical decision, alternative screening procedures and task-specific competence. Inte-
rater and test-retest reliability should also be considered with larger samples using multiple administrators.

**Recommendation 4**
The dimensional versions of the ESP and SAP should be further investigated for criterion-related validity and inter-rater reliability with larger samples of participants with LA. Further development and use of these instruments will allow the concurrent measurement of these dimensional variables in cognitive research.

**Recommendation 5**
Mean symptoms on the BAI and BDI are significantly higher in studies of samples with low ability, including the present one, than available general population norms. Larger, carefully constructed studies are required to explore whether the higher rates are an artefact of measurement and sampling that obscure a lower rate of symptoms, or indeed a higher relative rate of symptoms amongst adults with LA.

**Recommendation 6**
Norms for the modified BAI and BDI-II need to be established in larger clinical and non-clinical samples. This will assist in better discrimination of clinical and non-clinical cases in samples with low ability but also in comparisons with general population samples. The dearth of prevalence data on anxiety symptoms is particularly glaring given it commonly precedes and co-exists with depression in the general adult population.

**Recommendation 7**
Strategies for enhancing concurrence between informant and respondent measurement of anxiety as well as depression along with the mediating factors in this relationship should be further investigated. This could help improve detection of mental health problems amongst adults with low ability, especially where assessment relies on informant measures.

**Recommendation 8**
Further investigation of the impact of negative LEs on symptoms of anxiety and depression should include improved measurement of the subjective strength and valence
of life events. This will enhance the possibility of individually-tailored early intervention and support following these events.

**Recommendation 9**
Finding unique predictors of depression and anxiety in this non-clinical sample is promising but further investigation of cognitive content-specificity should be conducted in samples with higher rates of symptoms or larger groups with primary diagnoses of depression and anxiety. The relationship between anxiety and depression should also be given further consideration.

**Recommendation 10**
The results provide support for the key concept of cognitive content-specificity for depression but not for anxiety. This evidence justifies clinical trials of cognitive behavioural therapy for depression in samples with LA. Treatment involves eliciting change in cognitions, emotions and behaviour that results in reduction of symptoms. As well as evaluating interventions to generate this change, theoretical questions should also be investigated. These should include, the extent to which change in cognitions is required for change in symptoms and how interventions can be adapted for clients with the lowest levels of ability.

**Recommendation 11**
Ability uniquely predicted a small but significant amount of the variance in anxiety symptoms. Prospective and cross-sectional studies show similar small correlations but the only other study using a sample with LA found unique prediction of anxiety by anxious cognitions. Further empirical research is required to confirm and explain the relationships between ability, cognitions and symptoms of anxiety. This should be carried out with a clinical sample.

**Recommendation 12**
In further examination of attentional responses to emotional stimuli a self-report measure of trait anxiety such as the STAI should be used. Further consideration could be given to whether this is administered prior to or post the visual-probe. This will ensure that the three measures are self-report rather than informant.
Recommendation 13
Future research into attentional responses to emotional stimuli amongst adults with LA should recruit samples with higher levels of trait anxiety or larger groups with a clinical diagnosis. This may help in resolving the uncertainty about whether the absence of a directional bias was related to measurement issues or the level of participant symptoms.

Recommendation 14
Further exploration of attentional responses to emotional stimuli in low ability samples should use longer exposures in addition to the widely used 500ms. This may capture any impact of executive control over RT or direction of attention. Concurrent measurement of physiological responses, particularly in the groups with lower ability, might also help illuminate effects of emotional stimuli. Consideration of the impact of depression on attention would also be warranted.

Recommendation 15
The support for attentional control theory might justify trials of ABM to improve attentional control and consequently reduce anxiety (Chen, et al., 2015; Clarke, Notebaert & MacLeod, 2014; MacLeod, et al., 2012). Bias modification protocols show promise as interventions that do not require the intensity of language and higher cognitive functions of cognitive therapies.

9.6 Conclusions
Adults with LA are routinely excluded from cognitive theoretical and clinical research. In this study, participants from all levels were able to validly report on cognitions and symptoms as well as respond to an attentional task. Results confirm the importance of the unique cognitive content behind a person’s feelings and behaviour, regardless of their ability level. Furthermore, ability slows processing and anxiety, but not depression, slows the processing of emotional stimuli. Support for the cognitive model of depression adds urgency to the need for cognitive behavioural therapy trials with adults who have LA. Support for the impact of anxiety on attention should initiate confirmatory theoretical studies as well as trials of attentional training.
REFERENCES


Ackerman, P. L., & Heggestad, E. D. (1997). Intelligence, personality, and interests: Evidence for overlapping traits. *Psychological Bulletin, 121*(2), 219-245.10.1037/0033-2909.121.2.219


APS, Australian Psychological Society (2011). Evidence-based guidelines to reduce the need for restrictive practices in the disability sector. Melbourne: Australian Psychological Society


Arscott, K., Dagnan, D., & Stenfert Kroese, B. (1999). Assessing the ability of people with a learning disability to give informed consent to treatment. Psychological Medicine, 29, 1367-1375


prospective-longitudinal community study of adolescents and young adults. *Psychological Medicine, 45*(01), 153-163. doi:10.1017/S0033291714001160


Ax, A. F. (1953). The Physiological Differentiation between Fear and Anger in Humans. *Psychosomatic Medicine, 15*, 433-422


Berggren, N., & Derakshan, N. (2013). Attentional control deficits in trait anxiety: why you see them and why you don't. *Biological Psychology, 92*(3), 440-446.10.1016/j.biopsycho.2012.03.007


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Disability (PAS-ADD). Social Psychiatry and Psychiatric Epidemiology, 32, 339-343


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severe/profound intellectual and multiple disabilities. *Disability and Rehabilitation, 27*(3), 83-93.10.1080/09638280400007406


Mathews, A., & MacLeod, C. (2002). Induced processing biases have causal effects on anxiety. *Cognition and Emotion*, 16(3), 331-354.10.1080/02699930143000518


Mental Capacity Act (2005) United Kingdom, Department for Constitutional Affairs.


NHMRC, National Health and Medical Research Council. (1999). *National statement on ethical conduct in research involving humans*. Canberra: NHMRC

NHMRC, National Health and Medical Research Council the Australian Vice-Chancellors Committee. (2007 (updated May 2015)). *National Statement on Ethical Conduct in Human Research*. Canberra: Commonwealth of Australia


364


Rudaizky, D., Basanovic, J., & MacLeod, C. (2014). Biased attentional engagement with, and disengagement from, negative information: independent cognitive


367


South Australian Disability Services Act 1993; An act to provide for the funding and provision of disability services in accordance with certain principles and objectives; and for other related purposes(1993a). South Australia


369


Waters, A. M., Bradley, B. P., & Mogg, K. (2014a). Biased attention to threat in paediatric anxiety disorders (generalized anxiety disorder, social phobia, specific phobia, separation anxiety disorder) as a function of 'distress' versus 'fear' diagnostic categorization. Psychological Medicine, 44(3), 607-616.10.1017/S0033291713000779


Waters, A. M., & Kershaw, R. (2015). Direction of attention bias to threat relates to differences in fear acquisition and extinction in anxious children. *Behaviour Research and Therapy, 64*, 56-65.10.1016/j.brat.2014.11.010


Western Australia Disability Services Act (1993b); An Act for the establishment of the Disability Services Commission and the Ministerial Advisory Council on Disability, for the furtherance of principles applicable to people with disabilities, for the funding and provision of services to such people that meet certain objectives, for the resolution of complaints by such people, and for related purposes. Western Australia


Weymar, M., Low, A., Ohman, A., & Hamm, A. O. (2011). The face is more than its parts-brain dynamics of enhanced spatial attention to schematic threat. *Neuroimage, 58*(3), 946-954.10.1016/j.neuroimage.2011.06.061


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Appendix A: Epidemiology of Intellectual Disability
In this appendix, the challenges of describing the sub-population with ID are discussed. Firstly, conceptual and methodological issues are considered and then, key Australian studies and data sets are discussed. International studies and reports on disability are then briefly covered followed by a summary.

Conceptual and methodological
The prevalence of ID in the general population has been studied in Australia and other countries but these studies show a sub-population unlike those examined for physical reasons. Whilst some specific causes dictate additional medical management, the disability itself carries no inherent health risks. Children and those with more severe impairment are vulnerable but this is easily resolved by providing supportive care or advocacy. On reaching adulthood, people with mild disability often require few formal supports. Intellectual disability is defined by arbitrary designation along one or both of two human continua and impairment is generally not assessed until school age. The diagnosis can be made at any time prior to the age of 18 years though and there are many causes within the developmental period. Not all causes are genetic and for those that are, the phenotype is not uniform. The primary reason for identifying and studying this sub-population as a whole is to ascertain and plan potential support needs. Consequently, most existing prevalence studies are conducted or sponsored by government instrumentalities (Wen, 1997).

The heterogeneous characteristics of the sub-population make it difficult to quantify and study. Not surprisingly, studies yield estimates rather than absolute prevalence numbers and vary substantially in their sampling methods, definitions, classification systems and ascertainment methods (Leonard, 2002). Few have managed to survey whole populations and those that have, surveyed only children using a definition based on IQ and a binary classification of mild and severe (Rutter, Tizard, Yule, Graham, & Whitmore, 1976). The sole use of IQ as a definition along with a binary classification is common amongst international and Australian studies though (Kiely, 1987; McLaren &
Sole reliance on IQ, particularly in school years generates higher rates, than when measured adaptive behaviour is included. Using both factors reduces false positives particularly amongst minority groups experiencing educational disadvantage, accounts for maturation during adulthood (MacMillan, Gresham, & Siperstein, 1993) and can reduce estimates from 2% to 1% (Leonard, 2002).

Like many disadvantaged populations case ascertainment is often driven by the need for services, obscuring absolute prevalence and skewing the population of identified cases towards higher levels of need (Edwards, 2002; Gustafsson & Sonnander, 2004; Hassiotis et al., 1999; Thornicroft, Johnson, Leese, & Slade, 2000). A notable example is a recent large-scale study in a geographical area of Scotland that used a comprehensive procedure to ascertain cases from support service providers and all primary health medical practitioners in the region. Their adults with ID represented 0.33% of the adult population but the mildly disabled group was significantly underrepresented (Cooper, Smiley, Morrison, Williamson, & Allan, 2007). The under-identification of adults with ID has been cited as an important phenomena attributed in part to a ‘transition cliff’ between school age and adult services that results in a substantial gap between actual prevalence and administrative prevalence (Emerson & Glover, 2012). The abrupt decline in administrative prevalence in developed countries like England and the United States of America means that many adults with mild and moderate ID miss out on important health and social services with the end result of poorer physical and mental health and greater likelihood of contact with the justice system. Emerson and Glover (2012) refer to this group as the ‘hidden majority’. Adults can also have needs related to their ID minimised due to the diagnostic overshadowing associated with other co-occurring conditions such as psychotic illnesses (Hassiotis et al., 1999) and miss out on the additional long-term support they require (Hassiotis et al., 2001).

**Australian Prevalence Studies**

The main Australian prevalence studies specifically examining ID have been generated at a regional and state level using government ID service recipients to ascertain cases. Amongst those conducted prior to 1993, the highest estimate given was 4.5% and the
lowest .03% once differences in definitions, ascertainment and sampling methods were accounted for, an accurate estimation of range was 0.4% to 0.5% of the general population (Wen, 1997). A more recent state-based study linked records from multiple sources and found a rate of 1.43% (Leonard, Patterson, Bower, & Sanders, 2003).

A national approach to surveying the prevalence of disabilities amongst a stratified sample of the general population was used by the Australian Bureau of Statistics (ABS) in 1981, 1988 and 1993 Survey of Disability, Ageing and Carers (SDAC) (AIHW 2008; Wen 1997). Members of households and establishments were asked to report on their own or another’s area of disability (self care, mobility, verbal communication, schooling and, employment) and associated severity (mild, moderate & severe). The disability definitions were based on a set of survey screening questions which for ID meant a positive response to questions: A. about being ‘slow at learning or understanding things’ and/or; B. reporting ID or another condition assumed to implicate intellectual impairment (e.g., mental retardation, brain damage, slow at learning, developmental delay). No objective assessment or verification of reported condition occurred for what essentially amounts to a definition of intellectual impairment, given that its advent is not specified during the developmental period. Using this cross-sectional survey approach, the rate of persons reported to have ID were 0.76%, 0.95% and 1.86% in the 1981, 1988 and 1993 studies respectively (Wen, 1997).

The survey was repeated in 1998 and 2003 with a changed screening question (‘having difficulty learning or understanding things’) and an expanded set of conditions involving intellectual impairment (e.g. dementia, attention deficit disorder, autism and learning disability) lasting for at least 6 months. The 2003 study indicated that 588,700 (3%) of the general population of Australia were reported to have what they labelled ID; 2.5% of people under 65 had ID; excluding both dementia and ADHD-related conditions the rate was 2%. Only those people living in households were asked when their disabling condition first occurred but of those with ID as their main disabling condition, 95% acknowledged acquiring it before 20 years of age (AIHW, 2008). The definitions and classification systems used in these SDAC studies were significantly different to those used in clinical, research and administrative settings. Combined with the self/informant report identification method of ascertainment, they probably captured
a greater proportion of people with mild ID than do administratively ascertained case registers. Embedded in a larger survey of disability they also provide a broader picture of associated and co-existing functional problems faced by people with ID than studies focussed solely on the sub-population with ID. Secondary analysis from the 1998 SDAC study has also been used to establish the prevalence of mental disorders amongst Australians identified in the survey as have and ID (White, Chant, Edwards, Townsend, & Waghorn, 2005)

**International Prevalence Studies**

The available international studies show enormous variation in estimates with rates reported between .02% and 8.5% with much of this variance due to differences in definitions, classification and sampling (Roeleveld & Zielhuis, 1997). The WHO consensus prevalence is 10.4/1000 worldwide with higher rates amongst children and adolescents in lower income countries (Tomlinson et al., 2014). Within the sub-population of people identified with ID, the highest proportion has a mild disability though these are less likely to appear on service registers. Numbers for moderate, severe and profound levels diminish with severity. Rates differ according to gender, maternal race, socio-economic and educational status and are also influenced by birth weight (Leonard, 2002). In the United States of America, recent and reliable estimates of ID in the general population vary between 1.0% and 1.5% (Leonard, 2002). A recent Canadian study linked administrative data sets covering health, disability and income support details to find an adult cohort of 0.78% of the general population but highlighted the importance yet challenges of linking these data sets, each of which contributed about a third of the cohort membership (Lin et al., 2014)

At a global level, the WHO addresses definitions and concepts of disability, including ID, in its World Report on Disability (WHO, 2011). The report also makes recommendations across a wide range of policy, research and administrative areas. There has been some commentary on the particular implications of the report for the people with ID (Officer & Shakespeare, 2013) but the extent to which the recommendations will be adopted across the world is unclear.
Summary
Identifying the sub-population of people with ID serves important purposes for policy and service planning although it belies the individual variation in strengths and weaknesses as well as support needs. The available prevalence and service usage data does highlight how many adults with ID could miss out on physical and mental health services due to poor identification procedures in health and welfare systems. Describing these needs and identifying those who have them are important preconditions for the research and dissemination of treatment. Often ID is accompanied by physical health or disability, which can further complicate research into mental ill health.

REFERENCES


Appendix B: Review of Emotion Recognition Studies
Appendix B: Review of Emotion Recognition Studies

1. Introduction

In this appendix, studies of emotion recognition in adults with low ability (LA) are reviewed. This was undertaken firstly, to synthesise the experimental and applied research in this area given its relevance to cognitive research. The processing of emotion in general and the recognition of emotional stimuli in particular is important for symptom and cognition interviews as well visual probe tasks with emotional face stimuli. The second aim of the paper was to provide background for the development of a pass/fail emotional recognition screening procedure that could also be used a dimensional measure. It is not a comprehensive or systematic review but covers previous reviews and key papers on emotion recognition in samples with typically developing (TD) and children as well as adults with LA, especially in the borderline, mild, moderate, severe and profound intellectual disability (ID). Some studies have taken an experimental approach with hypotheses focussed on various aspects of the visual or auditory recognition of emotion. Other studies have integrated the study of emotion into applied research examining areas such as assessment of: symptoms and cognitions of anxiety and depression; emotional adjustment to life events; and capacity to participate in cognitive therapy. Both types of studies are discussed and then features of the emotion recognition procedure are outlined.

Sections in the paper will cover: experimental and applied studies; characteristics of research tasks; aspects of emotional recognition; the impact of ability on recognition; the development of emotional recognition; social skills and emotional recognition; neuropsychological aspects of emotional recognition; reviews of experimental studies; and construction of the emotional screening procedure.
2. Experimental and applied studies

Experimental studies

The recognition of emotion has been fairly well investigated in studies of adults with ID and these have been periodically reviewed by: Rojahn, Lederer & Tasse (1995) (21 studies); Moore (2001) (33 studies) and more recently; by Adams & Oliver (2011) with the latter focussing on emotional expression rather than recognition in people with severe and profound ID. The earliest and largest group of studies are experimental investigations of emotion recognition, either amongst sub-groups with ID of various ages or amongst groups with ID that are matched on ability with groups whose development is typical of the general population (Moore, 2001; Johannes Rojahn et al., 1995). Some of these addressed particular theoretical questions. Early questions addressed the relevance of emerging theories of emotion from the general population (Engen, Levy, & Schlosberg, 1958; Gray, Fraser, & Leudar, 1983; Levy, Orr, & Rosenzweig, 1960), later the relationship between emotion recognition ability and the social functioning problems of adults with ID was questioned (Rojahn & Warren, 1997; Simon, Rosen, Grossman, & Pratowski, 1995).

Some have proposed that a specific deficit in emotion recognition underlies the social functioning problems of adults with ID (Rojahn, Esbensen, Hoch, & MacLean, 2006; Rojahn, Rabold, & Schneider, 1995; Zaja & Rojahn, 2008). This is specific because whilst it varies with general ability it is not directly consonant with it. Therefore, it is evident even when participants with ID are matched with control participants who have similar general ability. The contrasting view was that emotion recognition ability was intact at a basic level and adults with ID had instead, problems with the higher-order cognitive functions related to regulation of emotion (Moore, Hobson, & Lee, 1997) that interfered with social functioning. More recent questions have focussed on the role of emotion recognition in the social difficulties of sub-groups with either a specific genetic basis to their ID (Adams & Oliver, 2011; Bouras, Turk, & Cornish, 1998; Dodd & Porter, 2011; Hippolyte, Barisnikov, Van der Linden, & MacLean, 2008), or who have severe or profound and multiple disabilities (Adams & Oliver, 2011; Petry & Maes, 2006; Vos, De Cock, Petry, Van Den Noortgate, & Maes, 2010).
**Applied studies**

The second group of studies group of studies addressing emotional recognition amongst people with ID are more recent and accompany investigations into cognitive variables and/or symptoms of mental ill-health. These have investigated the links between cognitions and emotion (Dagnan & Chadwick, 1997; Dagnan, Chadwick, & Proudlove, 2000; Joyce, Globe, & Moody, 2006; Sams, Collins, & Reynolds, 2006) and cognitions and symptoms (Glenn, Bihm, & Lammers, 2003; McGillivray & McCabe, 2007) and have generally used emotion recognition tasks as screening procedures. Both groups of studies use mainly participant interview methods but few studies incorporate people with severe of profound ID. Investigating emotion recognition as well as expression amongst these groups with more restricted ability typically involves different methods and will be reviewed later in this appendix.

Studies of emotional functioning in adults with mild and moderate ID suggest they experience cognitive, physiological and behavioural signs of emotion (Lindsay, Michie, Baty, Smith, & Miller, 1994) are able to report on their emotions using words and that their reports are congruent with verified experiences, such as loss and trauma (Arthur, 2003; Harper & Wadsworth, 1993). Emotions have been reliably assessed in the clinical setting (Helsel & Matson, 1988; Reed & Clements, 1989) and self-report instruments have been used in either modified (Masi, Brovedani, Mucci, & Favilla, 2002) unmodified (Lindsay, Neilson, & Lawrenson, 1997) or purpose constructed forms (Mindham & Espie, 2003), to measure symptoms of anxiety and depression.

**3. Task characteristics**

**Number of emotions**

Substantial differences exist in the number and type of emotions used in experimental and applied studies. Those using just two have chosen happy and sad (or unhappy) (Levy et al., 1960; Reed & Clements, 1989; J. Rojahn et al., 1995) whilst others have used sets of three usually comprising happy, sad and angry (Bros gol e, Gioia, & Zingmond, 1986; Gioia & Bros gol e, 1988). The most extensive range has been 12 emotions (Joyce et al., 2006) from the Mind Reading series (Baron-Cohen, 2002) but whilst there may be particular reasons for using this many the increased complexity made the task more challenging. The most common approach has been to use sets of
five and six with Gray et al. (1983) initiating the use of the six (joy, sadness, surprise, fear, anger, disgust) from Ekman and Friesen’s (1976) research. This set of emotions has been used in many other studies (Harrigan, 1984; McAlpine, Kendall, & Singh, 1991; McAlpine, Singh, Ellis, Kendall, & Hampton, 1992;Simon et al., 1995; Simon, Rosen, & Ponpipom, 1996; Stewart & Singh, 1995). Different combinations of five have been used [happy, sad, frightened, worried and angry (Dagnan et al., 2000; Dagnan & Proudlove, 1997; Sams et al., 2006)] [surprised, sad, frightened, angry, happy; (Adams & Markham, 1991; Lambert & Defays, 1978; Moore et al., 1997)] [happy, angry, sad, fearful, neutral; (Carvajal, Fernández-Alcaraz, Rueda, & Sarrión, 2012; Dodd & Porter, 2010)] but the more subtle emotions of disgust and surprise have been more difficult for participants with ID to recognise (Adams & Markham, 1991; McAlpine et al., 1991). The four emotions common to all sets of five and six are sadness, anger, fear and happiness (Zaja & Rojahn, 2008). However, only a few studies use these four basic emotions alone (Bouras et al., 1998; Kasari, Freeman, & Hughes, 2001).

**Type of stimuli**

The type of stimuli used has also varied widely with: researcher-modelled faces (Reed & Clements, 1989); Makaton symbols (Dagnan et al., 2000; Dagnan & Proudlove, 1997; Sams et al., 2006); comic strips or cartoons (Lambert & Defays, 1978; Reed & Clements, 1989); diagrams of bodies with and without faces (Brosgole et al., 1986); and diagrams of faces and bodies of birds, dogs and chipmunks (Brosgole et al., 1986; Gioia & Brosgole, 1988); and puppets (Kasari et al., 2001) used. However, the vast majority use photographs of human faces (Gray et al., 1983; Harrigan, 1984; Levy et al., 1960; Simon et al., 1995; Stone, Markham, & Wilhelm, 2013) or diagrams of human faces (Bouras et al., 1998; McKenzie, Matheson, McKaskie, Hamilton, & Murray, 2000; Johannes Rojahn et al., 1995; Stone et al., 2013) Non-photographic stimuli are more widely used with samples of children or adults with ID. Two studies have compared the relative value of photos and diagrams. Lambert and Defays (1978) found photos more effective with ID children and comic strips/schematic drawings more effective with children who have TD but McKenzie et al. (2000) found line drawn diagrams superior with adults who had ID. It is certainly clear that faces are the most salient emotional stimuli though (Brosgole et al., 1986; Johannes Rojahn et al., 1995).
Strength of cues

A number of studies vary the complexity of tasks by varying the strength of cues. Stewart and Singh (1995) note the value of additional cues, e.g. vocal prosody, bodily posture in a program for training adults with ID in emotion recognition. Brosgole et al. (1986) used diagrams of bodies with and without faces and diagrams of faces and bodies of birds, dogs and chipmunks. Gioia and Brosgole (1988) used animals with facial and body cues but also used human facial, postural and auditory stimuli. Groups with TD and ID showed predictable effects on accuracy but those with ID were particularly susceptible to reduced cue strength and this was particularly true as ability decreased (Gioia & Brosgole, 1988).

4. Recognition

Patterns of accuracy

Some factors seem to influence recognition accuracy across all groups. Accuracy is reduced by diminishing the stimuli (i.e. changing from facial to postural or mixing the two) in both ID and TD children and adolescents matched for IQ (Brosgole et al., 1986; Gioia & Brosgole, 1988). Also, basic emotions (happy sad) were easier to identify than complex (disgust surprise) (McAlpine et al., 1991). In addition, Hetzroni and Oren (2002) found no differences in recognition accuracy between samples with ID that were from either a community or institutional residence.

A key question asked in many studies is the relative accuracy of recognition across the different emotions. An almost universal finding is that the highest proportions of correct recognition is with the emotion of happy. This is the case for: children with and without ID, regardless of task complexity (Adams & Markham, 1991); primary school children with TD (Harrigan, 1984); adults with mild and moderate ID (Gray et al., 1983); children with ID and TD as well adults with ID, regardless of the stimulus type (Brosgole et al., 1986; Gioia & Brosgole, 1988); a large sample of 511 children and adults with ID as well as 128 children with TD (McAlpine et al., 1991); adults with and without ID (Maurer & Newborough, 1987a); groups of parents and teachers with and without experience of children with ID, viewing pictures of the children’s emotions (Maurer & Newborough, 1987b); and adults with ID living in a large institution (Simon et al., 1995).
Findings on the least correct emotion are less resounding though. The more subtle emotions of surprise and disgust commonly attracted the least accuracy especially in studies using the Ekman and Friesen (1976) set of six emotions. Surprise had the least accuracy amongst primary age children with TD (Harrigan, 1984) and this is consistent with the review conducted by Rojahn et al (1995) across 21 studies. Disgust drew the least accuracy amongst children and adolescents with and without ID (Adams & Markham, 1991) as well as adults with mild and moderate ID (Gray et al., 1983; Owen, Browning, & Jones, 2001). Disgust as well as surprise were least recognised in a sample of children with and without ID as well as adults with ID (McAlpine et al., 1991; Simon et al., 1996). Other studies report the negatively-valenced emotions to have the most mistakes made on them. Angry was mistaken most amongst: children with and without ID as well as adults with ID regardless of stimuli type (Gioia & Brosgole, 1988); a sample of 119 adults with ID living in the community and in an institution (Hetzroni & Oren, 2002); and adolescents and adults with Williams syndrome (Dodd & Porter, 2010). Scared attracted the least correct responses amongst adults with ID in an institution (Simon et al., 1995) as did sad amongst adults with and without ID (Maurer & Newborough, 1987a).

Some studies reported on the rates of confusions or mis-identification of emotions. Gray et al (1983) reported that the high arousal, negative polarity emotions of fear and anger were the most easily confused, between each other and with other emotions. They explained this as a difficulty with high arousal/strongly rejecting emotions specific to adults with ID. However, Harrigan (1984) reported that surprise was easily confused with happiness and fear amongst TD primary age children. Anger and sadness were most often confused amongst adults with ID and TD children (Maurer & Newborough, 1987a).

A review of recognition accuracy patterns concluded that these are broadly similar across groups with and without ID. The recognition pattern changed with age and followed a similar path for children with and without ID but proceeded at a different rate. The pattern for children with ID is more similar to that of younger children than age peers without ID though (Adams & Markham, 1991). A study of adults with moderate and mild ID, with and without Down syndrome, found that despite lower
scores than the general population, the differences were quantitative rather than qualitative. They conclude that this is evidence for neuronal pathways existing for processing facial configurations as well as pathways for recognising emotions (Carvajal et al., 2012). A more detailed review of studies covering this issue also concludes that patterns between samples from the general population and the subpopulation with ID are similar, but only on basic recognition tasks, not on more complex functions related to emotion processing (Moore, 2001). Moore (2001) summarised studies with and without control tasks as well as with and without group-matching for ability. Picture identification was the easiest task and between groups of adults with ID matched for ability with children, there were no quantitative differences. However, as task distractors and/or ambiguity increased, differences emerged leading to the conclusion that emotion perception is intact but as information-processing demands increase, probably at the level of control or executive functioning, differences are apparent (Moore, 2001).

**Dimensions of valence and arousal**

The most common dimensional explanations of emotion involve polarity or valence (negative-positive) and autonomic nervous system (ANS) activation (Lang, 2014; Levenson, 2014). A full discussion of theory and research related to dimensions in the general population is contained in Chapter Two but a discussion of relevant results from studies that include groups with ID occurs here. Fear, anger, sadness, disgust are generally considered negatively-valenced with happy and surprised considered positively-valenced. Sadness, disgust and surprise are considered low and happy, angry, fearful are associated with high arousal although specific ANS responses between the emotions differ.

In terms of valence, it appears that judgements are similar to those of participants in the general population. Gray et al. (1983) found that judgement of valence was as good amongst groups with mild and moderate ID as it was in a comparative general population sample. Valence judgement was the same for all groups (adults with: borderline/mild ID; adults with schizophrenia; and university students) with greater variation within the ID group in Levy et al.’s (1960) study. Similarly, there was no difference in valence judgments on photos and no significant difference on affect-laden
stories when groups of mild and moderate ID were compared with adults without ID (Owen et al., 2001). Some studies found confusion within the negative valence though, with Gray et al. (1983) finding this between the high arousal emotions of anger and fear. The other negative emotions confused were sadness and anger amongst adults with ID and children with TD (Maurer & Newborough, 1987a). Amongst adults using a social education centre, almost as many participants chose the angry face when asked to indicate the sad face. The confusion with sad was not as significant as when they were asked to indicate angry (Dagnan & Proudlove, 1997).

It does appear that there are two differences between groups with ID and those without that are worthy of note though. The first was greater confusion on neutrally-valenced stimuli. This was found in: adults with mild and moderate ID (Maurer & Newborough, 1987a); adolescents and adults with Williams syndrome (Dodd & Porter, 2010); and adults with ID compared with adults and children without ID (Bermejo, Mateos, & Sanchez-Mateos, 2014; Hippolyte et al., 2008; J. Rojahn et al., 1995). The theoretical implications of this are unclear though, as confusion over neutral or mildly frowning faces is well known amongst adults in the general population (Park, Han, & Hyun, 2015). However, Rojahn et al. (1995) cites it as evidence for specific perceptual deficit that separates adults with ID from other adults and even children who are matched for ability. More recent analysis though suggests that the problem may not lie in perception but the cognitive processing of ambiguous emotion via emotional regulation functions (Berggren & Derakshan, 2013; Moore, 2001). Data illustrating the second distinguishing aspect of valence judgments may support this more recent explanation. Hippolyte et al. (2008) found that adults with Down syndrome, matched with children without ID on ability, tended to maximise the attributed intensity of positive emotions and minimise that of negative emotions whereas the children with TD maximised both polarities and tended to substitute positive categories for negative ones and their sample included a severe sub-group. Adults with ID made higher valence judgements on positive photos, lower judgements of negative ones and had greater variability in their scores than typically developing children matched for general ability (Bermejo et al., 2014). These differences disappeared though when age and ability was co-varied for all groups.
Less data are available on judgements of arousal than valence amongst adults with ID but there is mixed evidence for divergence. Adults with mild and moderate ID made lower attributions of arousal on the Ekman and Friesen (1976) photos than adults without ID (Owen et al., 2001). Amongst groups of primary and secondary school age children with and without ID, those with ID had more difficulty discriminating between the high arousal emotions of happy and angry (Gioia & Brosgo, 1988). In addition, adults with ID made higher judgments of their own arousal than adults without but only on the photos of neutral valence, although the difference was more pronounced in the higher range. The differences were only marginal in comparison to children with typical development though and disappeared when age and ability was co-varied (Bermejo et al., 2014). However, as with valence judgements, these disappeared when age and ability was co-varied.

Only one study has examined the relationship between arousal and valence in groups of adults with (mild and moderate) and without ID and a group of children without ID (Bermejo et al., 2014). They found the relationship between the two dimensions was similar to results from the general population. The association between valence and arousal was stronger for negative stimuli than for positive (in both child and adult sets) with no significant correlation between valence and arousal on positive images. The available data suggest some differences in valence classification when adults with ID are compared to those without ID but less evidence for differences in judgments of arousal. The most recent and comprehensive study of this aspect of emotion recognition amongst adults with ID showed that differences disappeared when age and ability were co-varied for all groups. This suggests that, at least for adults with mild and moderate ID, valence and arousal judgments are related to dimensional ability not diagnostic category. This lends support to the argument that difficulties in emotion recognition scores are related to information-processing demands rather than perception of emotion (Bermejo et al., 2014; Moore, 2001).

**Recognition of ID child and adult emotions**

Familiarity with the target population appears to make a difference to recognition accuracy, especially when it comes to working with children. Maurer and Newborough (1987b) found that emotions (happy, neutral, sad and angry) expressed by children with
TD were better recognised than emotions expressed by children with ID, when viewed by experienced (parents of children with ID) and inexperienced adults as well as teachers working with children who have ID (Maurer & Newborough, 1987b). Adults inexperienced with ID were less accurate than those who were (parents), showing a tendency to mis-identify expressions as neutral except with happy photos of children with ID. There was no difference in the way these two groups performed with photos of children with TD. Experienced teachers were the most accurate group at recognising emotions expressed by children with ID (Maurer & Newborough, 1987b).

5. Ability

Category or level
The most common method of establishing general ability in research samples is by category of disability although the manner in which this was calculated is not always made clear. The data are clear though that category or level of disability is related to the frequency of emotional recognition: children with borderline ID recognised all emotions on the set of six emotions more frequently (73%) than mild (55%) and moderate (46%) (McAlpine et al., 1991); ability was positively correlated with frequency of correct identifications amongst children with and without ID (Lambert & Defays, 1978); adults with mild ID were more successful than those with moderate ID on the set of six emotions (Hetzroni & Oren, 2002); adults with mild ID made fewer mistakes than adults with moderate ID, half of whom had Down syndrome and half who didn’t (Carvajal et al., 2012); a group of adolescents with severe ID made significantly more mistakes than groups with moderate and mild ID and although the latter two were similar on basic tasks, they diverged as difficulty increased (Brosgole et al., 1986). Rojahn and Warren (1997) found a significant medium-sized correlation ($r=.49$) between emotion recognition and category of ID.

IQ or other dimensional
Some studies explicitly report on the relationship between emotion recognition and a particular measure of ability. A medium-sized and significant correlation was found ($r=.40$) between IQ and overall facial recognition amongst adults with mild and moderate ID using the set of six emotions (Simon et al., 1995). IQ predicted overall number of emotions recognised on three tasks amongst adults with mild and moderate
ID (Simon et al., 1996). However, there was no correlation between emotional recognition and score on the Raven’s Matrices (Hippolyte et al., 2008). Whilst ability correlated with performance on emotion recognition (happy sad neutral) simultaneous and successive processes were positively related to facial recognition but attention and planning were not related to facial recognition (Kroeger, Rojahn, & Naglieri, 2001)

**Receptive language**

Receptive language is the most commonly measured aspect of ability in experimental and applied studies that incorporate assessment of emotion recognition alongside symptoms and cognitions. Emotion recognition appears to be associated with level of language comprehension, with a medium-sized correlation ($r=.43$, $p<.01$) found between the BPVS (Dunn, Whetton, & Pintillie, 1982) raw score and the number of faces identified, in a sample of 40 adults with a median score of 64.0 (Dagnan et al., 2000). Some studies have used receptive language measures as screening tools for applied studies. Reed and Clements (1989) found a group that passed a two emotion (happy, sad) recognition test had a mean raw score of 65.4 (age equivalent=7 years) and range of 27-104 on the BPVS. The group that did not pass had a mean 29.2 (age equivalent=3 years 5 months) and a range of 18-52. They used a raw score of 40 (age-equivalent of 4 years, 5 months) on the BPVS as a cut-off for inclusion in their study (Reed & Clements, 1989). Dagnan et al. (2000) found a median BPVS raw score of 68.5 in the group that passed the same two-emotion test and 42.0 in the group that didn’t. Esbenson and Benson (2005, 2007) used an age equivalent of 5 years on the Peabody Picture Vocabulary Test-III (PPVT-III) (Dunn, Dunn, & Williams, 1997) as an arbitrary cut-off in studies using self-report symptom and cognition measures. They didn’t measure emotional recognition though.

Global IQ is not as strong a predictor of capacity for emotion recognition and often more difficult to establish. Sams, Collins and Reynolds (2006) found that BPVS scores were a better predictor of emotion recognition than full scale IQ, Verbal IQ or Performance IQ in their random sample of 59 adults with measured IQs between 50-72. The ability to discriminate among thoughts, feelings and behaviours was significantly associated with BPVS and raw score IQ. Joyce, Gold and Moody (2006) used a set of 12 emotion pictures and found that ability on these was correlated with both the BPVS
and a measure of expression and comprehension of single words and sentences (CASP). The BPVS was a better predictor of ability to identify emotions and pass cognitive mediation tasks though. There may also be specific patterns of recognition associated with certain causes of ID. Amongst a sample of adults with Down syndrome, a positive correlation was found between PPVT-R (Dunn, Theriault-Whalen, & Dunn, 1993) and overall score on an emotion matching test but the correlation wasn’t evident for the control group of typically developing children who had been matched on the PPVT-R. Amongst the group with Down syndrome there was also a negative correlation between recognition of surprised and neutral expressions and a negative correlation with the happy expression (Hippolyte et al., 2008).

The relationship between emotion recognition (six faces) and receptive language (PPVT-R) has been investigated amongst primary school-aged children from disadvantaged families (Schultz, Izard, Ackerman, & Youngstrom, 2001). Other variables including: teacher-rated attentional control; caregiver rated behavioural control; teacher rated social problems and social withdrawal; along with interviews about emotional stories in situations were also accounted for. The mean receptive language score was 77 (SD 15.2) and Schultz et al. (2001) found a small-sized correlation between receptive language and emotion recognition (.27, p<.01). Furthermore, receptive language explained the largest proportion of variance (beta=.22, p<.01) in a regression model predicting emotion recognition and behavioural control was the only other significant contributor (beta=-.17, p<.05). The authors suggest that emotion knowledge relates to but also distinguishes itself from cognitive ability (Schultz et al., 2001).

**Severe and profound**

Only a few experimental studies of emotional recognition include adults from either the severe or profound levels of ID and applied studies have often excluded them on the presumption they would not be able to master the research tasks (Dodd & Porter, 2010; Esbenson & Benson, 2005; Glenn et al., 2003). A couple of the experimental studies used screening procedures prior to the research tasks.
One of the largest studies (179 children and 194 adults) to include severe (20/40) and profound (0/9) administered an oral examination of 6 emotions which none of these participants passed (McAlpine et al., 1991).

A less complex screening procedure involved reading 10 one-digit numbers or geometric shapes with all 10 of the children and adolescents in the severe group passing, five without errors (Brosgole et al., 1986). However, the severe group had more difficulty than moderate and mild groups on the simplest labelling task involving facial emotion; the difference between the other groups only emerged after facial cues were replaced with postural ones, thereby only increasing complexity (Brosgole et al., 1986). All participants in two groups of children and adolescents with severe ID (8 without ASD and 8 with ASD) passed a screening test with single words and phrases as a well as a counting task (Gioia & Brosgole, 1988). On the emotions tasks, the TD and moderate ID groups made similar mistakes with differences emerging only as task complexity increased. However, the two groups with severe ID were significantly worse than the others on all tasks. Given that all participants in the severe groups of the latter two studies (Brosgole et al., 1986; Gioia & Brosgole, 1988) passed basic word and number screening tests, it could be assumed that they possessed at least enough language and numerical concepts to understand the questions. These data, from the few studies that include participants with severe ID, confirmed that emotion recognition is correlated with general ability, including receptive language. The medium-sized correlations between these, and other evidence, suggests it is also associated with specific areas of cognitive and personality functioning

**Profound and multiple disability**

A small but developing literature exists on emotional processing amongst people with profound intellectual and multiple disabilities (PIMD) that do not have language, and cannot participate in traditional interview-based assessments. A review of the limited literature on expression and assessment of emotions and internal states amongst people with this level of ability found there may be deficits in both the sending and receiving of facial expressions of internal states in this group (Adams & Oliver, 2011; Gioia & Brosgole, 1988). Furthermore: the signals may be more subtle and hard for others to interpret without training or experience; there are many methods and measures in the
syndrome-specific literature that could be useful in assessment; and communication of emotion in areas of pain, anxiety, depression in the non-disabled population and assessment methods for this area could be used. As the responsibility for interpreting meaning often falls to carers and clinicians some consideration of how this occurs is important. In fact, Grove, Bunning, Porter and Olsson (1999) argued that meaning should be viewed as the negotiated outcome of interactions, always involving inference.

The few studies of emotional recognition and expression amongst adults with PIMD have yielded some useful data though. Individualised profiles of pleasure and displeasure expressions were developed using an observational analysis of video taped critical incidents for six adults (Petry & Maes, 2006). This demonstrated the sounds and facial expressions used by participants that would not be evident to the unfamiliar person. Another study used service providers to rate four service users with PIMD on video for positive and negative emotional reactions. They found good reliability across observers and where context made a difference it was in the level rather than polarity of emotion (Hogg, Reeves, Roberts, & Mudford, 2001). Grove et al. (1999) received good feedback from a pilot process for validating communication with severe and profound disability (Grove et al., 1999)

Vos et al. (2010) conducted the most detailed study of behavioural and physiological markers of emotion and its dimensions. They investigated the relationship between valence of expressed emotion and physiological correlates in adults with PIMD. Three adults with IQ below 20 or MA less than 2 years of age were observed by staff with at least 1 year of experience working with the group, although they didn’t specify how ability was measured. The observational method developed by Petry and Maes (2006) was used which involved coding emotional expression on a 5-point scale after viewing footage taken on a handheld camera over a period of 3 weeks. Participants wore a vest to record breathing, heart rate and a sensor for skin conductance. Support staff selected behaviours that they thought would represent a positive or negative emotion and these were confirmed by consensus.

The results obtained by Vos et al. (2010) showed that breathing patterns differentiate positive and negative emotions. Furthermore, behavioural codings predicted the
breathing changes as well as the intensity of different emotions. Participants showed more skin conductance (sympathetic ANS activation) on positive emotions than negative emotions and more respiratory sinus arrhythmia (RSA) (parasympathetic ANS activation) was evident when experiencing negative emotions that may be related to the regulation of attention. Heart rate was also higher when emotion intensified. They also concluded that participants gave less attention to negative stimuli than positive stimuli. Whilst Vos et al. (2010) acknowledge some limitations of their small and novel study, they propose that respiration, skin conductance and heart rate differences were linked to arousal not valence. Furthermore, they assert that the reason for lower arousal in negative emotional experiences is due to attentional avoidance and suggest that the higher RSA with negative emotion than positive emotion supports this interpretation.

6. Development of emotional recognition

Maturation in typical development

It is clear that accuracy in recognition increases during the developmental period. Brosgole et al. (1986) found that it increased in children with TD from 5.2 to 5.8 and then again in a 7-year group but no further improvement occurred until age 19 when it became flawless on the same tasks. Other studies have found similar effects with age (Adams & Markham, 1991; McAlpine et al., 1991) but Adams and Markham (1991) observed that simple repetition of emotional recognition is not enough as accuracy does not simply increase with age amongst people with ID. Harrigan (1984) found increased recognition over four age points (3-6-9-12 years) in TD children. This occurs relatively evenly across six emotions (happy, sad, angry, fear, surprise, disgust) and follows a similar path to executive functioning (EF) development, especially accuracy in selective attention tasks to emotional stimuli. The author takes this as evidence that emotional processing development is related to EF development and age (Harrigan, 1984).

Emotion recognition training

There have been few attempts at training people with ID in emotional recognition, a fact reinforced by a literature search conducted by Wood and Kroese (2007) that found only three studies with adults and one with children. All studies showed improvement following training but only two (McAlpine et al., 1992; Stewart & Singh, 1995)
attempted generalisation of skills to different tasks yielding mixed results. One
demonstrated maintenance of gains at an 8-month follow-up (McAlpine et al., 1992).

7. Social skills
Only a few studies have attempted to establish the relationship between social skills and
emotion recognition. All studies measured social skills using subscales of informant
adaptive behaviour scales but assessed emotional recognition with research tasks in
interviews, finding contrasting results. Rojahn and Warren (1997) found a significant
medium-sized correlation \( r = .34 \) between emotion recognition and informant-assessed
social skills. Simon et al. (1995) also measured social skills by informant rating but
found no relationship between this measure and emotional recognition. Matson, Di
Lorenzo, and Andrasik (1983) pointed out that the term social skills covers a broad
range of behaviours that are usually assessed by others using a range of different
measures. Rojahn, et al. (2006) found that informant-rated social skills were correlated
with two emotional recognition tasks that used visual stimuli \( r = .39; r = .42 \) but did not
correlate with two that used verbal stimuli only. Large correlations \( r = .60; r = .57 \) were
found with the two visual recognition tasks and informant-rated communication. The
sample of 63 adults lived in both community and institutional settings and had
borderline, mild, moderate and severe ID.

8. Neuropsychological

Emotion versus non-emotion
One study considered the impact emotional compared with non-emotional instructions
have on responses. Gioia and Brosgole (1988) found that varying the level of
emotionality in the instructions and prompts affected response accuracy. More errors
were made by each group (one group of children with TD and four groups of adults
with moderate and severe ID) after affective (asking for the emotion) instructions than
with descriptive instructions (asking for the behaviour linked with emotion) ones. The
exception was with angry face stimuli where error rates were similar regardless of the
instruction type. Furthermore, when recorded (auditory) stimuli were used, all groups
had greater trouble discriminating between three emotional expressions (happy, sad,
angry) (Gioia & Brosgole, 1988). More errors were made on angry stimuli than happy
and sad regardless of stimuli type (no difference between happy and sad).
Other studies have managed the level of emotionality in the stimuli with differing results. Hippolyte et al. (2008) used a sample of 17 adults with ID and Down syndrome who were matched on ability, using the PPVT-R, with TD children. The groups showed no difference on a facial identity matching task but both groups had trouble as facial features were removed (Hippolyte et al., 2008). Moore et al (1997) found no difference between a group of children with TD and a group with ID in speed of distinguishing a person from an object when the person did not display facial emotion (Moore et al., 1997). Rojahn et al. (1995) found that a group of children with ID showed similar accuracy to a group with TD on a task involving matching faces for age yet were less accurate on a task requiring emotional recognition. As the two groups were matched for ability on the PPVT-R the authors interpret this as evidence for a specific deficit in emotional recognition that is causal for ID

**Face identification versus emotional recognition**

Some studies have investigated the difference between face matching and emotional recognition using facial stimuli. Singh et al. (2003) found that children with mild ID were quicker at matching familiar faces than they were at matching emotional expressions on unfamiliar faces. Whilst overall response times and error rates were higher amongst children with ID compared with age-matched children with TD, the pattern errors was the same. Carvajal et al, (2012) used a sample containing a group with and a group without Down syndrome, finding that participants found it easier to discriminate between facial identity than between facial expression.

**Emotion and executive functioning**

Moore et al. (1997) has argued that emotion perception in ID is intact but the additional cognitive demands (especially those related to language) of many tasks generate the difference from TD. Investigating the impact of emotion on inhibitory control tasks, Kramer, Lagattuta and Sayfan (2015) used a novel happy-sad task in which the participant was asked to say the emotion not depicted. This elicited more errors and longer response times from 4-11- year olds as well as adults than non-emotional stimuli (day-night, up-down) and tasks where emotion was peripheral (boy-girl happy, boy-girl sad). This effect was sustained across age groups even when executive demands were reduced (just saying the emotion depicted). Furthermore, the relative difficulty of
happy-sad compared to other tasks increased with age suggesting that emotion retains its disruptive effect despite maturation of other EF functions (Kramer et al., 2015).

Harrigan (1984) found increased recognition over four age points (3-6-9-12 years) in TD children occurs relatively evenly across six emotions (happy, sad, angry, fear, surprise, disgust) and follows similar path to executive functioning (EF) development especially accuracy in selective attention tasks to emotional stimuli. The author took this as evidence that emotional processing development is related to EF development and age (Harrigan, 1984).

**Specific conditions**

There is a significant literature on emotion recognition in groups with particular neurodevelopmental disorders and specific aetiologies of ID. Not all studies report specific strengths or weaknesses though. Kasari, Freeman and Hughes (2001) found that emotional recognition was not different between a group of children with Down syndrome and one with TD but matched for general ability. However, the group with TD progressed significantly over 2 years resulting in a significant performance advantage over the group with Down syndrome following this period (Kasari et al., 2001). Campbell, McCabe, Melville, Strutt and Schall (2015) found that adolescents with 22q.11.2 deletion syndrome made significantly more emotion recognition errors than adolescents with TD but whilst ID was present in some of the sample, ability was not controlled. Consequently it is difficult to discern the specific effects of 22q.11.2 syndrome. Bouras, Turk and Cornish (1998) found that boys with Fragile X did not differ from two comparison groups on emotion recognition or identity recognition tasks. The first group had TD but were matched according to general ability and the second had ID and Down syndrome but were matched for chronological age and general ability (Bouras et al., 1998). They also performed somewhat better than boys with either Down syndrome or ID when they were matched for age.

Of all the specific conditions, the ASDs appear to have most effect on recognition. Brosigole et al. (1986) found that accuracy decreased when a group with moderate ID also had an additional diagnosis of ASD or epilepsy (Brosigole et al., 1986). Moore, Hobson and Lee (1997) found that three groups had similar rates of recognition of a
person’s actions. Two groups had ID and one of these also had an ASD, the third had TD. However, the groups with ID and ASD were significantly impaired compared to the other two when asked to notice a person’s attitudes as well as actions. However, the reasons are not entirely clear for this difference. It may be due to inefficient strategies (Fink, de Rosnay, Wierda, Koot, & Begeer, 2014) or difficulty with specific emotions (Jones et al., 2011; Uljarevic & Hamilton, 2013). However, recognition of emotion amongst ASD is consistently correlated with IQ and receptive language (Fink et al., 2014; Jones et al., 2011; Loveland, Bachevalier, Pearson, & Lane, 2008; Uljarevic & Hamilton, 2013).

9. Reviews

Two key reviews of the literature on emotion recognition amongst adults with ID have been published. The first of these by Rojahn et al (1995) reviewed experimental studies from 1980 to 1992 that contained at least one subject group with ID. Of 21 studies reviewed, 17 were published articles. 8 studies used ability as a variable and only two of 21 included a severe group. This was the first paper to make the observation about the consistent finding of highest accuracy of emotional recognition with happiness. In fact, happiness was the only emotion included in the recognition tasks for all of the studies reviewed. They argued that, whilst emotion recognition diminished with ability, the comparative impairment is greater amongst adults with ID than people with similar general ability. This they propose as the ‘emotion specificity hypothesis’.

Moore (2001) reviewed emotion-recognition tasks and information-processing demands from a range of studies and categorised into seven types. He found that on some basic emotion-perception tasks, people with ID performed to a similar level of those with TD. Moore (2001) also summarises studies with and without control tasks and with and without ability matching. He then summarises evidence from each type of task and found that picture identification was the easiest with no difference in studies using ID adults and MA matched children. However, as the task distractors and/or ambiguity increased, differences did. Labelling tasks using static stimuli produced deficits but dynamic ones did not. Furthermore, Moore (2001) did not accept Rojahn et al.’s (1995) emotion specificity hypothesis and stated that ability matching may not be adequate to control all cognitive differences between ID and TD groups.
10. Construction of Emotional Screening Procedure

Which emotions should be used?

Emotion recognition has been widely assessed in experimental investigations of emotional functioning amongst adults with LA. It has also been assessed in applied cognitive studies with the subpopulation, usually as part of investigations into the effect of ability on cognitive-mediation of emotion (Dagnan et al., 2000; Joyce et al., 2006; Reed & Clements, 1989; Sams et al., 2006). However, there is little consistency in the type of face stimuli used or in the range of emotions depicted. Whilst the four basic emotions (sad, happy, angry and scared) are the most commonly present in studies (Johannes Rojahn et al., 1995; Zaja & Rojahn, 2008) they have rarely been used together. Furthermore, none of the procedures used in applied studies incorporate a gradient of difficulty that would assist in generating an interval measure as well a pass/fail procedure. Hence a validated emotion recognition procedure for screening decisions and quantifying ability was not readily available for replication.

It was reasoned that recognition of sad and scared would be germane to symptom states of depression and anxiety. Recognition of the two emotions depicted in most visual probe tasks, angry and happy were also hypothesised as pre-requisite skills for that task. General population studies using facial emotion stimuli and a visual-probe paradigm with adults do not screen for emotional recognition. General population studies with children have used practice procedures (Waters, Kokkoris, Mogg, Bradley, & Pine, 2010; Waters, Mogg, & Bradley, 2012) but none used an emotion recognition procedure to screen. Only one study using this paradigm and emotional face stimuli in a sample with LA used a recognition procedure (Dodd & Porter, 2010). However, they did not include adults with profound and severe ID and did not report any exclusions following the procedure.

Which tasks should be used?

Broadly speaking, experimental studies have used two approaches to graduating the difficulty in emotion recognition tasks. One approach has involved managing the type and number of cues, which can be visual or auditory (Bros gol e et al., 1986; Gioia & Bros gol e, 1988; Stewart & Singh, 1995). Other studies have demonstrated that complexity could be manipulated via the demands of the task whilst the stimuli are kept
constant. For instance a number of studies have found that the easiest task involves arranging all the emotional faces in front of the participant and asking which picture represents a given emotion (Adams & Markham, 1991; Harrigan, 1984; McAlpine et al., 1991). All studies found participants were more accurate on this emotion identification (EI) task than the second. Emotion labelling (EL) entails cards presenting emotional face cards one at a time and asking the participant, what the person in the picture is feeling. Despite differences in the number and type of emotions used, studies using two steps similar to these found higher frequency of recognition on EI than EL in groups of: adults with Down Syndrome who had mild and moderate ID (Carvajal et al., 2012); groups of children, 3, 6, 9 and 12 years of age (Harrigan, 1984); and children and adolescents with mild and moderate ID (Adams & Markham, 1991; McAlpine et al., 1991). Similar results were found using these two tasks with adults who had moderate ID and participated in a group-training program for emotion recognition (McKenzie et al., 2000).

REFERENCES


Berggren, N., & Derakshan, N. (2013). Attentional control deficits in trait anxiety: why you see them and why you don’t. Biological Psychology, 92(3), 440-446. doi:10.1016/j.biopsycho.2012.03.007


Appendix C: Measurement of Attentional Responses
Appendix C: Measurement of Attentional Responses

In this appendix, the major experimental paradigms and stimuli used to assess selective (direction) attention, processing speed and accuracy in response to emotional stimuli are examined. The major assessment paradigms are examined initially, followed by a discussion of the types of emotional stimuli used with these paradigms. Instructional strategies used in the visual-probe paradigm are then considered, with a summary concluding the section.

Experimental assessment paradigms
The experimental methods for assessing attention can be divided into filtering, search, cuing and multiple task paradigms. Attention and emotion interactions have been found using a range of paradigms (Weymar, Gerdes, Low, Alpers, & Hamm, 2013). The most widely used are the filtering paradigm of the emotional ‘stroop’ and the visual cuing paradigm of the attentional probe, also called a ‘visual-probe’ or ‘dot probe’. Visual search strategies are also used but not as extensively as the visual-probe and emotional stroop (Yiend, Mathews, & Cowan, 2005). Each of these comprises a carefully-designed behavioural experiment used with increasing precision due to technological advances in measurement. The emotional Stroop task involves participants naming the colour of ink in which words are printed as quickly as possible. Findings show that the meaning of the word itself (which must be ignored to name the ink colour) tends to interfere, in varying degrees with the speed of colour naming. The underlying premise is that if greater attention is selectively paid to the content of particular emotional words then there will be a greater impact on speed of colour naming.

Reviews of early (Williams, Mathews, & MacLeod, 1996) and later (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van Ijzendoorn, 2007) studies using the stroop paradigm show clear selective interference in attention. This resulted in slower response to fear-relevant words amongst groups with clinical anxiety and high trait anxiety. Interestingly, both negative and positive valenced words were found to interfere with participants with high state anxiety but not trait anxiety. High trait anxiety was
associated with greater interference from negative than positive emotional words (Rutherford, MacLeod, & Campbell, 2004). Whilst the interference effect of the Stroop is robust and its use has been widespread, the inferences that can be drawn from it are ambiguous and have been the subject of debate. The extent to which the effect is related to emotion or to some aspect of language use has been questioned (Algom, Chajut, & Lev, 2004; Yiend, 2010) and there is conjecture about the exact cognitive process (es) underlying the stroop effect (MacLeod, 2005). There does appear to be some consensus though that the conclusions that can be drawn from the Stroop test in relation to emotion and attention, are limited. It has subsequently been largely superseded in studies of negative emotion and attention in favour of visual cueing paradigms (Bar-Haim et al., 2007; Yiend, 2010). There is also a significant confounding effect of printed words for special groups with literacy difficulties related to verbal ability that is not addressed in literature reviews.

The visual-probe task involves the presentation of two stimuli of different valence (one with emotional significance and one without) simultaneously in adjacent locations (usually on either side) on a computer screen for a specific time period. The pair of stimuli is shown after a fixation cross that is presented in the centre of the screen. Following the stimuli, an emotionally neutral object such as an asterisk appears in place of either the emotional or neutral stimuli and the participant is asked to respond to this target. If attention is biased toward one type of stimulus or the other then it should draw a faster response when the asterisk is located in the same position as that stimulus. This is because reaction times benefit from the attention being already fixated at the appropriate location (Bradley, Mogg, & Millar, 2000). When the target stimulus is fear-related the faster response denotes attentional vigilance, or bias towards, and when it draws a slower response, attentional avoidance or bias away. This paradigm was first introduced using word-based stimuli, with words relating to either physical threat (e.g., injury, agony, etc.) or social threat (e.g., criticised, ashamed, etc.) paired with a neutral word matched for both length and frequency (MacLeod, Mathews, & Tata, 1986). It is now the most widely used in investigations of attention and anxiety but with pictures, usually of human emotion as stimuli (Yiend, 2010). Studies using this paradigm show consistent patterns of bias toward threatening stimuli in clinically and high trait anxious
adults when compared with non-anxious controls (Bar-Haim et al., 2007; Frewen, Dozois, Joanisse, & Neufeld, 2008; Yiend, 2010).

The bulk of evidence for biased attentional processing has so far been gained through carefully-designed behavioural experiments. More recently, cognitive neuroscience is building on the findings of experimental cognitive psychology. The use of techniques such as evoked response potentials (ERPs) and functional magnetic resonance imaging (fMRI) that give an immediate indication of the extent and location of cognitive processing during tasks can provide evidence that is more direct than what is generated by behavioural tasks (Larson, Clayson, & Clawson, 2014; Righi et al., 2012). In some cases, evidence is found that can not be demonstrated in the behavioural tasks (Eysenck & Derakshan, 2011) but on the whole, the findings from neuroscience have supported earlier findings and hence, cognitive theory (Frank & Badre, 2015).

**Emotional stimuli**

The use of emotional faces as stimuli is now widespread in conjunction with the visual-probe paradigm when investigating the impact of emotional stimuli on attention across the age range (Bradley, Mogg, Falla, & Hamilton, 1998; Mogg & Bradley, 1999; Waters, Henry, Mogg, Bradley, & Pine, 2010). Furthermore, they have been used in studies of health-related anxiety (Lees, Mogg, & Bradley, 2005); social anxiety disorder (Mogg, Philippot, & Bradley, 2004); trait-related anxiety and defensiveness (Ioannou, Mogg, & Bradley, 2004) and; differential social and trait anxiety (Mogg & Bradley, 2002). However, individual differences in anxiety can influence detection (Bradley et al., 2000) and expressionless faces can be mis-interpreted as frowning (Park, Han, & Hyun, 2015) amongst adults. They have real-life relevance, are easily administered and make no literacy demands, making them an obvious choice for use with children and adults with LA as long as participants can recognise and discriminate the relevant emotions. They also appear to generate a greater effect in subliminal exposures than linguistic stimuli (Bar-Haim et al., 2007).
A more detailed discussion of the significance of faces in emotional processing can be found in Chapter Two. Furthermore, a review of experimental and applied research on recognition of facial emotions amongst samples with low ability is contained in Appendix B. However, evidence for the impact of negatively-valenced stimuli, in particularly faces, is quite clear for attentional experiments. Emotion in faces modulates attentional processing of emotion in voices amongst 9 month-old infants who also allocate more attentional resources to fearful rather than happy faces (Otte, Donkers, Braeken, & Van den Bergh, 2015). Negatively-valenced faces place greater demands on the attentional system than neutral or positive ones (Brenner, Rumak, Burns, & Kieffaber, 2014; Recio, Shmuilovich, & Sommer, 2014) and are processed earlier than positive ones. They can be schematic or photographic (Bradley et al., 1998) but need to be complete for valence to be recognised (Weymar, Low, Ohman, & Hamm, 2011). Negative faces may generate a spatial bias of visual attention toward the left visual field more so than positive emotions (Armaghani, Crucian, & Heilman, 2014). Faces appear to receive prioritised memory access and suppress memory access for competing objects (Bach, Schmidt-Daffy, & Dolan, 2014). Faces can come from widely-used sets such as the International Affective Picture System (IAPS) ((CSEA-NIMH), 1999), used for instance by Rudaizky, Basanovic and MacLeod (2014) and Yiend and Mathews (2001), the Nim-Stim, used by Mogg, Holmes, Garner and Bradley (2008) or the Ekman and Freisen test of affective cognition (1976) (Ekman & Friesen, 1976). Each picture set has angry, threatening faces but these can be substituted by other frightening stimuli such as dangerous animals and objects or fear-specific stimuli (Michalowski et al., 2009; Osinsky, Wilisz, Kim, Karl, & Hewig, 2014). The instructional strategies used within the visual-probe assessment paradigm are detailed in Chapter Six.

**Summary**

For experimental research on the impact of emotional stimuli on attention at its different levels, the dot-probe visual cueing paradigm is well supported as a measurement task by behavioural and neuro-scientific data. The use of facial stimuli has facilitated investigations across age groups and a relatively straightforward instructional strategy is available. Consequently there may be adequate evidence for a viability trial of both the paradigm and stimuli with adults who have low LA.
REFERENCES


Appendix D: Chronological- And Ability-Based Comparison Groups
Appendix: D Chronological- and ability-based comparison groups

This appendix considers the issue of ‘mental age’ (MA) and ‘chronological age’ (CA) comparisons groups in cognitive research. The history of MA comparison groups along with the developmental approach to ID is considered first of all. The issue of whether the practice of mental age comparison remains relevant in cognitive research is then discussed and a summary concludes the section.

History
There was a surge of empirical interest in the cognitive similarities and differences between people with ID and those without ID in the 1960s (Burack, Dawkins, Stewart, Flores, Iarocci, & Russo, 2012). This coincided with the rise of cognitive psychology that was interested in measuring unobservable mental or ‘cognitive’ processes (Rachman, 2015). Much of the research including people with ID focussed on identifying differences between them and people with TD in specific areas of cognitive functioning such as sustained attention and distraction (Crosby, 1972; Crosby & Blatt, 1968; Ellis, 1963; Zeaman & House, 1963), as well as processing speed on a range of tasks by measuring reaction time (Brewer & Smith, 1982, 1984; Saccuzzo & Michael, 1984). Differences were seen as due to either ‘structural’ and therefore permanent aspects of processing, or ‘functional’ aspects that are related to ‘control’ of processing and therefore amenable to training interventions (Nettelbeck & Wilson, 1997). Zigler (Hodapp & Zigler, 1997; Zigler, 1969) characterised these studies as ‘difference’ or ‘defect’ focussed and claimed they depicted ID as being caused by a single or set of defects that generated the disability and therefore promoted a pessimistic view that the development of people with ID was limited entirely by innate rather environmental factors. Not surprisingly, Zigler’s characterisation of the cognitive research as entirely ‘defect’ focussed attracted some criticism in return (Leland, 1969; Milgram, 1969).
A tradition of dividing people with ID into two groups for research and policy purposes was already long established (Cornoldi, 2006; Flugel, 1951; Sarason, 1953) although this dichotomy was not universally accepted (Leland, 1969). One grouping was for those individuals who had a clear and specific ‘organic’ cause identified for their disability (i.e. genetic, meningitis, head injury) and the second grouping was for individuals who had no apparent ‘organic’ cause. These were often referred to in the early literature as ‘brain damaged’ and ‘non-brain damaged’ groups (Maher, 1963). The latter were usually from families of low socio-economic or marginalised groups and also referred to as ‘cultural-familial’ or even ‘garden variety’ (Sarason, 1953). It was this second group that Zigler (1969) felt his ‘developmental approach’ was most applicable to. The major tenets were that people with ID move through developmental stages in a ‘similar sequence’ or order to those who aren’t, although at a slower rate. They also possess a ‘similar structure’ of cognitive functioning that means their functioning in particular areas would be similar to people with TD when matched on general ability or ‘mental age’ (Hodapp, Burack, & Zigler, 1998). Hence the practice of using mental age matching became popular in studies with ‘familial’ ID. This meant that people with TD but usually a much lower chronological age would be matched with people with ID on a measure of ability (so-called mental-age matching) on the premise that results on the research topic in focus would be similar across groups.

Relevance
The idea that people of all abilities learn and develop following a similar pathway mitigates against the de-humanising of people with ID but the limitations of a number of aspects of the developmental approach in its early form have become evident over time. The reliance on distinguishing between ‘organic’ and ‘familial’ types of ID is inappropriate when the biological basis for a much greater proportion of the causes of LA is now clear (AIHW, 2008; McLaren & Bryson, 1987). Treating ID as an undifferentiated state to be categorically distinguished from the rest of the population seems inappropriate when two of the major criteria, intellectual ability and adaptive behaviour can be measured as continuous variables across the whole population. There is also increased evidence that particular causes of LA are associated with particular patterns of cognitive strength and weakness (Campbell, McCabe, Melville, Strutt, & Schall, 2015; Cornish, Scerif, & Karmiloff-Smith, 2007; Dodd & Porter, 2011).
Structural brain differences associated with some types of ID have also been established (Sandu, Paillere Martinot, Artiges, & Martinot, 2014). The samples for early studies of adults with ID were almost exclusively from large institutions (Crosby, 1972; McCarver & Cavalier, 1983) that excluded people who lived with minimal support in the general community. Promoting the use of ‘mental age’ matching of samples in research has had broader implications than matching according to one or more specific abilities in research studies. It has perpetuated the use of the term as a pejorative marker of someone who is legally, sexually and physically an adult but whose intellectual functioning in a number of areas is less than similar-aged peers.

More recent accounts of the developmental approach accommodate some of these criticisms and acknowledge that the ‘similar structure’ aspect is less viable given the increased information on genetic syndromes that often endow particular profiles of development and intellectual functioning, though asserting that the ‘similar sequence’ aspect is sustainable (Burack et al., 2012; Hodapp, 2004; Hodapp & Zigler, 1997). The distinction between this and the ‘defect’ approach has been further blurred by acknowledgement from those identifying deficits in particular areas of cognitive functioning that people with ID can learn and enhance their cognitive functioning within the limits of structural differences (Nettelbeck & Wilson, 1997).

Recent research on cognitive functioning has also informed the understanding of psychopathology in the developmental period. The trajectories of cognitive functions through the developmental period (Anderson, Anderson, Northam, Jacobs, & Catroppa, 2001; De Luca & Leventer, 2008) and across the lifespan (De Luca, Wood, Anderson, Buchanan, Proffitt, Mahony, & Pantelis, 2003) are becoming increasingly clearer, particularly for executive functions. Given the role of these in regulation of emotion and behaviour (Rueda, Posner, & Rothbart, 2005), it is not surprising that empirical studies show a more generalised pattern of psychopathology and less differentiation of anxiety disorders during the developmental period (Rao, Beidel, Turner, Ammerman, Crosby, & Sallee, 2007). Some researchers suggest models of anxiety need to account for developmental stage, level of functioning and cognitive capacity (Baron-Cohen, Wheelwright, Robinson, & Woodbury-Smith, 2005; Barrett, 2000; Hadwin, Garner, & Perez-Olivas, 2006). Classification systems are delineated by chronological age and
contain a different set of anxiety disorders for children and adolescents (APA, 2000). Differentiation is greater in adolescents (Alfano, Beidel, & Turner, 2006) and this may relate to developmental stage-specific cognitive capacity (Bogels, Snieder, & Kindt, 2003; Kindt & van den Hout, 2001).

Summary
Understanding the typical development of cognitive and emotional functioning is important in the study of cognitive models of anxiety and depression in adults with LA. Particular areas of interest include attentional sub-functions, emotion recognition ability and patterns of self-reported cognitions and symptoms. It will at times be useful to identify the impact of general ability on the viability of particular concepts for a person or group. However, the value of comparing groups of adults whose cognitive and emotional functioning has plateaued, albeit at a level below that of age peers, with children or adolescents who are still developing is unclear. Contemporary cognitive research with adults who have LA also largely eschews such comparisons. Instead, concepts proven in the general adult population have been tested for viability in samples of adults with LA. The impact of general ability on the relevance of these concepts is increasingly accounted for through concurrent measurement of general ability, task specific abilities, adaptive functioning and self-reported symptoms. There is still much work to do though in order to include the full spectrum of abilities in such studies.

REFERENCES


Appendix E: Correspondence

Introduction Letter

Project Summary Sheet

Radius Approval

Impact Approval
Mr. Peter Young  
Manager of Adult Support Services  
Peter Harcourt Services  
P.O. Box 3014 Bendigo D.C.  
Victoria 3554  
6th September 2010

Dear Peter

I am writing in regard to my research project *Investigating Anxiety Problems in Adults with Intellectual Disability*. I have enclosed some background in this letter along with a *Project Summary Sheet* but would like the chance to meet you and discuss the possible involvement of your clients and staff in the research.

**Background**

Despite extensive research in the general adult population, anxiety and depression amongst adults with intellectual disability has received little international and no Australian attention. Whilst a few studies have identified these common mental disorders at the problem level, only one international study has shown that the sub-types of anxiety disorder can be identified at diagnostic level.

**Recruitment**

I am seeking help from services that provide employment, day activity support or work education (in Victoria) to adults with mild and moderate intellectual disability or borderline intellectual ability aged 16-64. Participating services will be asked to seek consent (‘recruit’) from as many of their employees/clients as possible for the *first step* of the project.

**Project status**

I am undertaking the project as part of my Ph.D. studies and the Behavioural and Social Sciences Human Ethics Sub-Committee of the University of Melbourne has approved the project (Ethics ID: 0830057). I am an endorsed Clinical Psychologist with experience in public mental health and disability services.

**Benefits**

Establishing prevalence at the problem and diagnostic levels will help to demonstrate the scope of the clinical issues. Mainstream cognitive treatments for anxiety have not been used amongst adults with intellectual disability thus validating key aspects of their (cognitive) theoretical underpinnings is essential before treatment research is commenced with this clinically neglected group

Yours sincerely

Stephen Edwards  
Clinical Psychologist  
0406017390  
stephen.edwards@monash.edu

c.c. Catherine Baker
Investigating Anxiety Problems in Adults with Intellectual Disability

Project Summary Sheet

Little is known about the prevalence of anxiety and depression amongst adults with intellectual disability or whether the theories behind treatments used with the general population are applicable. The first section (steps one and two) of the study will: (a) determine the prevalence of symptoms of anxiety and depression amongst adults with mild and moderate intellectual disability who use support services; (b) determine whether a full range of anxiety disorder sub-types can be diagnosed in this population and; (c) examine the relationship of symptoms to life stressors. The second section (steps three and four) will test whether key aspects of cognitive theories that underpin treatments in the general population apply to adults with intellectual disability.

Adults aged 18–64 with an intellectual disability (mild or moderate) or intellectual functioning in the borderline range will be recruited from a support service* that agrees to participate in the project. The first step will involve the participant’s* nominated informant* completing a checklist about the participant, covering symptoms and recent stressors. Participants with scores above threshold on the checklist will have their knowledge of words and emotions assessed before being asked to consent to interviews that comprise the second, third and fourth steps.

The second step involves a clinical interview schedule, which can generate a diagnosis of depression and or anxiety disorder(s) in the general population. The third step is an interview using measures of symptoms and thoughts typical of each disorder. In the fourth step, participants will view pictures of angry and neutral faces to assess how anxiety affects the direction of their attention. If the questionnaire (step one) and schedule (step two) prove valid, assessment of the most common mental disorders will be easier in this disadvantaged group. If thoughts predict symptoms (step three) and anxiety affects attention (step four) in the same way as in the general population, cognitive treatments could be offered to this clinically neglected group.
Section one (steps one and two) will determine: the prevalence of problem-level symptoms of anxiety and depression using a screening questionnaire; the degree to which anxiety disorders can be diagnosed and differentiated by subtype with an interview schedule used in the general population and; the relationship between symptoms and life stressors. Section two (steps three and four) will test key components of cognitive theories that explain how anxiety occurs and is maintained, by identifying thoughts that are specific to anxiety, as well as those that are specific to depression. Then testing whether these predict the symptoms of the respective disorder (cognitive specificity) and testing whether adults with intellectual disability attend (attentional bias) to anxiety-provoking stimuli in the same way as adults and children in the general population.

* TERMS

A participant is a person who is a client of the support service where the project is carried out and has consented to participate in one or more of the project steps.

An informant is a person who is nominated by the participant and who has known the participant well for at least 12 months. The informant may be a family member, carer or support worker. In this research project, Participants with an intellectual disability might use this person in their usual decision making process.

A support service is a government funded or managed service that provides employment, education or residential support to people with disabilities, including people with intellectual disabilities. The support service must be accredited by their respective funding body for working with adults with disabilities (e.g. Commonwealth Government Disability Service Standards).

Recruiting staff are employees of a support service who are not in a supervisory or management relationship with potential participants.
21 February 2011

Mr Stephen Edwards
Clinical Psychologist / Senior Research Fellow
International Public Health Unit
Monash University
3rd Floor Burnett Tower, 89 Commercial Road
Prahran Vic 3181

Dear Stephen

PhD Research Project - Investigating Anxiety Problems in Adults with Intellectual Disability

This is to confirm that I have reviewed the information you have provided regarding your research and agree to Radius Disability Services participating in this project.

The documents I have reviewed include the Project Application and the Forms and Procedure Summary. I am satisfied that they are acceptable for use at our service and with our clients.

I note that your project has approval from the Melbourne University Behavioural and Social Sciences Human Ethics Sub - Committee (ID: 0830057). Please forward a copy of this letter to the Committee for its information.

Please contact Stephen Wilson to discuss and coordinate Radius’ involvement in this project.

Yours sincerely,

Jan Boynton
Chief Executive Officer
Radius Disability Services

Cc: Stephen Wilson
Dear Stephen Edwards and Henry Jackson,

It is with pleasure that Impact Support Services embraces your project and research and willingly wishes to participate in this complex research project. As an organisation which works across the mental health and disability industries the project will no doubt be of interest within the organisation; both with the service users and the staff groups.

I have read the research project content and agree that it all appears to be sound and thorough. Impact Support Services have reviewed the all the corresponding documents and are satisfied that these are acceptable to use within our service setting.

Impact Support Services is happy to confirm their involvement with Stephens research project – Investigating anxiety problems in adults with intellectual disabilities.

Yours sincerely,

Dianne Holbery,
CEO,
Impact Support Services.
Appendix F: Measures

DMIO41108

PPVT-4 Cover Sheet

ABS-RC:2 Cover Sheet

Emotions Screening Procedure

Scoring Ability Procedure

BAI (modified)

BDI-II (modified)

BAI (sample)

BDI-II (sample)

Cognitions Checklist

PAS-ADD Checklist Cover Sheet
Social and Behavioural Assistance

Based on the assistance provided or funded by your service over the past three months, select the rating category that best fits this worker’s assistance requirements for each item, (a) through to (k), in the table below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Rating Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Maintain friendly and cooperative relationships with fellow workers</td>
</tr>
<tr>
<td>1B</td>
<td>Greet and interact with people confidently</td>
</tr>
<tr>
<td>1C</td>
<td>Behave in a manner that is appropriate to the work environment</td>
</tr>
<tr>
<td>1D</td>
<td>Control anger and frustration appropriately</td>
</tr>
<tr>
<td>1E</td>
<td>Cope with work-related or employment preparation-related stress and pressure appropriately</td>
</tr>
<tr>
<td>1F</td>
<td>Maintain a positive outlook and mood most of the time</td>
</tr>
<tr>
<td>1G</td>
<td>Manage fear or anxiety about work issues</td>
</tr>
<tr>
<td>1H</td>
<td>Display emotions appropriate to the situation</td>
</tr>
<tr>
<td>1I</td>
<td>Cope with change in the work environment</td>
</tr>
<tr>
<td>1J</td>
<td>Address attitudinal barriers e.g. difficulty in dealing with authority figures, difficulty in accepting direction</td>
</tr>
<tr>
<td>1K</td>
<td>Maintain personal hygiene, grooming and dress appropriate to the work or training environments</td>
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</tbody>
</table>

Evidence Source(s) for the Social and Behavioural Assistance items:

- Internal assessments and observations [ ] Records of support provided [ ] Evidence of external sources [ ]

Always keep evidence records that an auditor can check, unless no assistance from this service is selected for all items. Evidence sources may include references to case note/progress note entries, observation sheets, incident forms, other assessments, work experience reports, letters from specialists, etc. Simply write the name and brief description of the document, date of document/entry and where it can be found (e.g. progress notes, 16 July 2003, in job seeker’s case file). Please indicate on the check boxes the kind of evidence that you have for each domain. You are required to keep a copy of the above evidence on your files for audit purposes.

Cognitive Assistance

Based on the assistance provided or funded by your service over the past three months, select the rating category that best fits this worker’s assistance requirements for each item, (a) through to (j), in the table below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Rating Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A</td>
<td>Learn complex tasks (e.g. involving three or more steps) relevant to their current job after being shown or instructed in the task once or twice</td>
</tr>
<tr>
<td>2B</td>
<td>Learn simple tasks (e.g. involving one or two steps) relevant to their current job after being shown or instructed in the task once or twice</td>
</tr>
<tr>
<td>2C</td>
<td>Solve problems and make decisions appropriate to current work role</td>
</tr>
<tr>
<td>2D</td>
<td>Understand and follow complex new instructions (e.g. involving three or more steps)</td>
</tr>
<tr>
<td>2E</td>
<td>Understand and follow simple new instructions (e.g. involving one or two simple steps)</td>
</tr>
<tr>
<td>2F</td>
<td>Remember tasks or instructions for the remainder of the work/training day after being shown or told</td>
</tr>
<tr>
<td>2G</td>
<td>Remember tasks or Instructions several days after being shown or told</td>
</tr>
<tr>
<td>2H</td>
<td>Concentrate on tasks without being distracted</td>
</tr>
<tr>
<td>2I</td>
<td>Plan and organize work tasks</td>
</tr>
</tbody>
</table>

Evidence Source(s) for the Cognitive Assistance items:

- Internal assessments and observations [ ] Records of support provided [ ] Evidence of external sources [ ]

Always keep evidence records that an auditor can check, unless no assistance from this service is selected for all items. Evidence sources may include references to case note/progress note entries, observation sheets, incident forms, other assessments, work experience reports, letters from specialists, etc. Simply write the name and brief description of the document, date of document/entry and where it can be found (e.g. progress notes, 16 July 2003, in job seeker’s case file). Please indicate on the check boxes the kind of evidence that you have for each domain. You are required to keep a copy of the above evidence on your files for audit purposes.
Vocational Assistance

Based on the assistance provided or funded by your service over the past three months, select the rating category that best fits this worker’s assistance requirements for each item, a) through to o), in the table below.

Over the past three months, what level of assistance has this service provided to enable the worker to

<table>
<thead>
<tr>
<th>No assist</th>
<th>Some assist</th>
<th>Moderate assist</th>
<th>High assist</th>
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</thead>
<tbody>
<tr>
<td>3A. Undertake the full range of tasks required for current job</td>
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<tr>
<td>3B. Understand the basic requirements of employment (e.g. attending work, reporting to supervisor, complying with instructions)</td>
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<tr>
<td>3C. Demonstrate a level of work productivity and work quality acceptable in the workplace (including under supported wages system)</td>
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<tr>
<td>3D. Work on task under the usual supervisory conditions for at least 30 minutes</td>
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<tr>
<td>3E. Work on task under the usual supervisory conditions for at least 1 hour</td>
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<tr>
<td>3F. Understand time and be punctual in starting and finishing work and scheduled breaks</td>
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<tr>
<td>3G. Respond appropriately to instructions from work/work preparation supervisor</td>
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<tr>
<td>3H. Use initiative appropriately in the workplace (e.g. to initiate work tasks, move on to the next step, etc.)</td>
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<tr>
<td>3I. Ask for assistance appropriately if required</td>
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<tr>
<td>3J. Comply with safety requirements in the workplace or work preparation setting</td>
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<tr>
<td>3K. Attend at least 95% of work or work preparation sessions</td>
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<tr>
<td>3L. Give appropriate notification of any absences (e.g. due to sickness)</td>
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<tr>
<td>3M. Contact employer by telephone</td>
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<tr>
<td>3N. Adapt to environmental conditions in the workplace (e.g. noise, heat, cold, humidity)</td>
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<tr>
<td>3O. Travel to and from work independently (e.g. travel training or assisting with transport bookings)</td>
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<tr>
<td>3P. Develop awareness and acceptance of own abilities and limitations in work activities and employment goals</td>
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<tr>
<td>3Q. Be motivated and enthusiastic about current employment</td>
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</tbody>
</table>

Evidence Source(s) for the Vocational Assistance Items:

- Internal assessments and observations
- Records of support provided
- Evidence of external sources

Always keep evidence records that an auditor can check, unless no assistance from this service is selected for all items. Evidence sources may include references to case note/progress note entries, observation sheets, incident forms, other assessments, work experience reports, letters from specialists, etc. Simply write the name and brief description of the document, date of document entry and where it can be found (e.g. progress notes, 16 July 2003, in job seeker’s case file). Please indicate on the check boxes the kind of evidence that you have for each domain. You are required to keep a copy of the above evidence on your files for audit purposes.

Physical Assistance and Personal Care

Based on the assistance provided or funded by your service over the past three months, select the rating category that best fits this worker’s assistance requirements for each item, a) through to m), in the table below.

Over the past three months, what level of assistance has this service provided to enable the worker to

<table>
<thead>
<tr>
<th>No assist</th>
<th>Some assist</th>
<th>Moderate assist</th>
<th>High assist</th>
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<tbody>
<tr>
<td>4A. Manipulate objects and complete fine motor tasks (e.g. tasks involving dexterity of fingers) relevant to work placement</td>
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<tr>
<td>4B. Move objects around and complete gross motor tasks (e.g. tasks involving movement and coordination of arms and/or legs)</td>
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<tr>
<td>4C. Lift and move objects in accordance with the requirements of work placement and within safety limits</td>
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<tr>
<td>4D. Move around the workplace or training environment freely and safely</td>
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<tr>
<td>4E. Set up and arrange own work environment, equipment and materials</td>
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<tr>
<td>4F. Maintain required work pace without tiring</td>
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<tr>
<td>4G. See clearly to perform work-related activities (when wearing contact lenses or glasses if these are normally worn)</td>
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<tr>
<td>4H. Attend to toileting and personal hygiene needs</td>
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</tr>
<tr>
<td>4I. Prepare and consume drinks and food at work or work preparation setting</td>
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<tr>
<td>4J. Manage own medication while at work</td>
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<tr>
<td>4K. Maintain personal comfort and pressure area care (if unable to walk)</td>
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<tr>
<td>4L. Manage pain associated with physical injury or illness</td>
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</tr>
<tr>
<td>4M. Transfer between wheelchair and other seating and/or load and unload from wheelchair transporter</td>
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<td></td>
</tr>
</tbody>
</table>

Evidence Source(s) for the Physical Assistance and Personal Care Items:

- Internal assessments and observations
- Records of support provided
- Evidence of external sources

Always keep evidence records that an auditor can check, unless no assistance from this service is selected for all items. Evidence sources may include references to case note/progress note entries, observation sheets, incident forms, other assessments, work experience reports, letters from specialists, etc. Simply write the name and brief description of the document, date of document entry and where it can be found (e.g. progress notes, 16 July 2003, in job seeker’s case file). Please indicate on the check boxes the kind of evidence that you have for each domain. You are required to keep a copy of the above evidence on your files for audit purposes.
Communication Abilities

Based on observations and assessment over the past three months, select the rating category that best fits this worker's communication abilities for each item a) through to f) below.

5a) Understanding Language

UNDERSTANDS COMPLEX LANGUAGE
Understands complex spoken English or other spoken language used in the workplace (e.g. spoken request to complete a task involving 3 or 4 steps)
Understands complex signed instructions using Auslan, signed English or other signed language (e.g. signed request to complete a task involving 3 or 4 steps)
Understands complex instructions only when symbol language (e.g. Compic) is used

UNDERSTANDS SIMPLE LANGUAGE:
Understands simple spoken instructions (e.g. spoken request to complete a task involving one or two steps)
Understands simple signed instructions (e.g. signed request to complete a task involving one or two steps)
Understands simple instructions only when symbol language is used

DIFFICULTY UNDERSTANDING LANGUAGE:
Has difficulty understanding spoken instructions and needs additional gestures, prompts, cues or symbols
Has difficulty understanding signed instructions and needs slower signing, repeated signs, additional gestures, prompts or cues
Has very limited understanding of any language, either spoken or signed language or symbols

5b) Expressive Language

USES COMPLEX LANGUAGE
Speaks the language used in the workplace clearly and fluently using complex sentences
Uses sign language fluently to communicate complex sentences
Uses an electronic communicator or symbols or other alternative communication system to communicate complex sentences

USES SIMPLE LANGUAGE:
Speaks the language used in the workplace clearly using simple sentences or phrases
Uses sign language to communicate simple sentences or phrases
Uses an electronic communicator or symbols or other alternative communication system to communicate simple sentences or phrases

DIFFICULTY SPEAKING:
Has speech that is moderately difficult to understand (e.g. some slurring of speech, slow speech, or has difficulty finding the right words)
Has speech that is extremely difficult to understand (e.g. has severe speech production difficulties)
Has very limited vocabulary (i.e. can use less than 30 words, signs or symbols)
Has no expressive language (i.e. cannot communicate at all through speech, sign language or symbols)

5c) Speaks Another Language

This worker speaks a language other than English and:
Cannot speak English at all
Cannot speak English but has some understanding of the English language
Can speak only limited English (i.e. insufficient English to be clearly understood in the workplace without assistance)
Has spoken English which is heavily accented
Not applicable - does not speak a language other than English.

5d) Hearing

Has no difficulties hearing conversations, instructions or other work-related sounds
Has difficulty hearing some sounds (e.g. high pitched sounds or conversations where there is low level background noise)
Has moderate to severe deafness and relies to some extent on lip-reading or other cues
Profoundly deaf and relies totally on lip-reading, sign language and/or other cues
Listening skills are disrupted by physical or psychiatric conditions such as tinnitus or auditory hallucinations

5e) Other Language Use Issues

Has echolalic speech (i.e. repeats what others say), rushed speech (i.e. talks rapidly) or speaks continuously
Has speech that is disorganized, lacks meaning or doesn’t make sense to the listener
Is reluctant to speak in work-related situations
Uses offensive language at least once per week in the work or work preparation setting
Not applicable - has none of these language use issues

5f) Language Used in the Workplace

This person's main language (e.g. spoken English, another spoken language, or sign language) is used routinely by:
Most employees in the workplace
Some employees in the workplace
No other employees in the workplace

Evidence Source(s) for the Communication Abilities items:
Internal assessments and observations. Records of support provided. Evidence of external sources.
Always keep evidence records that an auditor can check, unless no assistance from this service is selected for all items. Evidence sources may include references to case notes/progess note entries, observation sheets, incident forms, other assessments, work experience reports, letters from specialists, etc. Simply write the name and brief description of the document, date of document/entry and where it can be found (e.g. 'progress notes, 16 July 2003, in job seeker's case file'). Please indicate on the check boxes the kind of evidence that you have for each domain. You are required to keep a copy of the above evidence on your files for audit purposes.
### Workplace Environment Assistance

During the past three months, which of the following types of assistance has your service provided or funded for this worker?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6A</td>
<td>Workplace assessment (e.g. assessment of worksites for physical accessibility and/or modification requirements)</td>
</tr>
<tr>
<td>6B</td>
<td>Negotiating and arranging modifications to the workplace environment (e.g. building modifications, ramps)</td>
</tr>
<tr>
<td>6C</td>
<td>Job modification or redesign to match the capabilities of the worker</td>
</tr>
<tr>
<td>6D</td>
<td>Selection and procurement of adaptive equipment or technology</td>
</tr>
<tr>
<td>6E</td>
<td>Training the worker in the use of adaptive equipment or technology</td>
</tr>
<tr>
<td>6F</td>
<td>Training co-workers in the use of adaptive equipment or technology</td>
</tr>
<tr>
<td>6G</td>
<td>Supporting co-workers to adjust to the worker’s abilities and workplace support needs</td>
</tr>
<tr>
<td>6H</td>
<td>Supporting the employer to accommodate the worker’s abilities and workplace support needs</td>
</tr>
<tr>
<td>6I</td>
<td>Not applicable - no workplace environment assistance has been provided or funded by this service in the past three months</td>
</tr>
</tbody>
</table>

**Evidence Source(s) for the Workplace Environment Assistance Items:**

- Internal assessments and observations
- Records of support provided
- Evidence of external sources

Always keep evidence records that an auditor can check, unless no assistance from this service is selected for all items. Evidence sources may include references to case note/progress note entries, observation sheets, incident forms, other assessments, work experience reports, letters from specialists, etc. Simply write the name and brief description of the document, date of document/entity and where it can be found (e.g. progress notes, 16 July 2000, in job seeker’s case file). Please indicate on the check boxes the kind of evidence that you have for each domain. You are required to keep a copy of the above evidence on your files for audit purposes.
### Special Assistance

<table>
<thead>
<tr>
<th>During the past 3 months, has this worker required any of the following types of special assistance in the workplace or preparation setting?</th>
<th>NO</th>
<th>YES</th>
<th>Not required in the past 3 months</th>
<th>Required once in the past 3 months</th>
<th>Required more than once in the past 3 months (but not every week)</th>
<th>Required at least once each week</th>
<th>N/A – has not occurred in the past 3 months</th>
<th>Assistance for less than 10 minutes</th>
<th>Assistance for between 10 and 30 minutes</th>
<th>Assistance for more than 30 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>7A) Physical intervention by service staff to prevent injury to self or others (e.g. due to aggression or self-injurious behaviour)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7B) Non-physical intervention by service staff to prevent injury to self or others (e.g. verbal intervention, behaviour management strategies)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7C) First aid treatment for episodic conditions such as epilepsy or asthma or incidents such as falls or other immediate threats to health</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7D) Counselling or other intervention for severe mental health-related episodes such as severe stress, anxiety, panic attack, delusions or suicidal threat</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7E) Counselling for less acute issues such as grief, behavioural issues</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Evidence Source(s) for the Special Assistance Items:

- Internal assessments and observations
- Records of support provided
- Evidence of external sources

Always keep evidence records that an auditor can check, unless no assistance from this service is selected for all items. Evidence sources may include references to case notes/progress note entries, observation sheets, incident forms, other assessments, work experience reports, letters from specialists, etc. Simply write the name and brief description of the document, date of document/entry and where it can be found (e.g. ‘progress notes, 10 July 2003, in job seeker’s case file’). Please indicate on the check boxes the kind of evidence that you have for each domain. You are required to keep a copy of the above evidence on your files for audit purposes.

### Other Assistance

During the past three months, which of the following types of other assistance has your service provided or funded?

| 8A) Advising or counselling the worker’s family regarding the worker’s employment-related issues | | |
| 8B) Assisting the worker with employment-related matters involving other agencies (e.g. declaring income to Centrelink) | | |
| 8C) Liaising with other agencies and treating professionals regarding the worker’s disability, medical or psychiatric condition | | |
| 8D) Providing recognized vocational training (i.e. training towards a recognized vocational certificate or New Apprenticeship) | | |
| 8E) Transporting the worker to and from work, training or other employment-related appointments | | |
| 8F) Interpreter assistance for interviews and/or work orientation (e.g. sign language interpreter or other language interpreter) | | |
| 8G) English language and/or literacy training for the worker | | |
| 8H) Assisting the worker with career planning, development and progression | | |
| 8I) Not applicable – none of these items of assistance have been provided or funded by this service in the past three months | | |

Evidence Source(s) for the Other Assistance Items:

- Internal assessments and observations
- Records of support provided
- Evidence of external sources

Always keep evidence records that an auditor can check, unless no assistance from this service is selected for all items. Evidence sources may include references to case notes/progress note entries, observation sheets, incident forms, other assessments, work experience reports, letters from specialists, etc. Simply write the name and brief description of the document, date of document/entry and where it can be found (e.g. ‘progress notes, 16 July 2003, in job seeker’s case file’). Please indicate on the check boxes the kind of evidence that you have for each domain. You are required to keep a copy of the above evidence on your files for audit purposes.

### Variable Assistance
9A) Based on your assessment, observations and other evidence collected over the past three months have this worker’s assistance needs been:
- Fairly stable and consistent
- Varying from month to month
- Varying from week to week
- Varying from day to day
- Varying continuously (e.g. from hour to hour)

9B) Have the fluctuations in this worker’s assistance needs been:
- Negligible (no significant fluctuations observed over the past three months)
- Minor (fluctuating from no assistance to some assistance, from some assistance to a lot of assistance or from a lot of assistance to complete assistance)
- Major (fluctuating from no or some assistance to complete assistance)

9C) Is there any evidence within the past two years, that this worker has an episodic condition (e.g. psychiatric illness) or deteriorating condition (e.g. multiple sclerosis)?
- Yes ☑
- No ☐

Evidence Source(s) for the Variable Assistance items:
- Internal assessments and observations ☑
- Records of support provided ☐
- Evidence of external sources ☐

Always keep evidence records that an auditor can check, unless no assistance from this service is selected for all items. Evidence sources may include referrals to case notes/progress note entries, observation sheets, incident forms, other assessments, work experience reports, letters from specialists, etc. Simply write the name and brief description of the document, date of document/entry and where it can be found (e.g. progress notes, 16 July 2003, In job seeker’s case file). Please indicate on the check boxes the kind of evidence that you have for each domain. You are required to keep a copy of the above evidence on your files for audit purposes.
### Section I. Identifying Information

<table>
<thead>
<tr>
<th>Name</th>
<th>Male</th>
<th>Female</th>
<th>Year</th>
<th>Month</th>
<th>Day</th>
</tr>
</thead>
</table>

| Date of Rating | | | |
| Date of Birth | | | |
| Age | | | |

**Setting/Agency**

| Examiner’s Name | | |
| Examiner’s Title | | |

**Respondent’s Name**

| Relationship to Subject | | |

### Section II. Record of ABS-RC:2 Domain Scores

<table>
<thead>
<tr>
<th>Part One Domain Scores</th>
<th>Raw Score</th>
<th>Percentile</th>
<th>Standard Score</th>
<th>Age Equiv.</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Independent Functioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Physical Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. Economic Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>IV. Language Development</td>
<td></td>
<td></td>
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<tr>
<td>V. Numbers and Time</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>VI. Domestic Activity</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>VII. Prevocational/Vocational Activity</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>VIII. Self-Direction</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>IX. Responsibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X. Socialization</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part Two Domain Scores</th>
<th>Raw Score</th>
<th>Percentile</th>
<th>Standard Score</th>
<th>Age Equiv.</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>XI. Social Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XII. Conformity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>XIII. Trustworthiness</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>XIV. Stereotyped and Hyperactive Behavior</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XV. Sexual Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XVI. Self-Abusive Behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>XVII. Social Engagement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>XVIII. Disturbing Interpersonal Behavior</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
EMOTIONS SCREENING PROCEDURE (IN. 4)

Question and Scoring Sheet

Project: INVESTIGATING ANXIETY PROBLEMS IN ADULTS WITH INTELLECTUAL DISABILITY

Researchers: STEPHEN EDWARDS (student) PROF. HENRY JACKSON (supervisor)

<table>
<thead>
<tr>
<th>Step</th>
<th>Procedure</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Happy</td>
</tr>
<tr>
<td>Note: begin with step two (labelling) and revert to step one (identification) if unsuccessful</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| **Item One** (identification) | 1. Set all picture cards out together  
2. Ask participant: ‘Point to the ............ face’, tick for correct indication and cross for incorrect.  
3. If any incorrect answer is given, the participant does not proceed | |
| **Item Two** (labelling) | 1. Present the picture cards (containing line drawn depictions of male and female faces of four basic emotions happy, sad, angry, fearful) consecutively.  
2. Ask: ‘what is this person feeling’  
3. write verbatim response(s) in appropriate column  
4. If participant does not give an adequate synonym on any one of the emotions, revert to step One | |

Materials: ‘Life Facts’ series picture cards or similar

**SCORING ABILITY PROCEDURE (IN. 5)**

**Participant:**

**Date:**

**A. Question and Scoring Sheet**

**Project:** INVESTIGATING ANXIETY PROBLEMS IN ADULTS WITH INTELLECTUAL DISABILITY  
**Researchers:** Stephen Edwards (student) Prof. Henry Jackson (supervisor)

<table>
<thead>
<tr>
<th>Step</th>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
</table>
| **Procedure:**
  1. Before the BAI & BDI-II, put the four bar histogram (B) in front of the participant. Ask each question and encourage the participant to indicate their answer on the bar as well as saying it.  
  2. Before the CCL, put the five bar histogram (C) in front of the participant and tell them it is like the other one but with five instead of four, questions do not need to be repeated | How many things can you see? | (counts self/together) |
| | Which is the biggest and which is the smallest? | Speaks/points |
| | If this one is always, which one is never? | Speaks/points |
| | How often do you eat cars? | Speaks/points |
| | How often do you walk? | Speaks/points |
| | How often do you breathe? | Speaks/points |
| | How often are your eyes open? | Speaks/points |
| | How often do you eat breakfast? | Speaks/points |
| | How often is the sky dark at night? | Speaks/points |

**Materials:**
Histogram picture

**References:**
B. Histogram Picture Sheet

0 NEVER

1 SOMETIMES

2 MOST OF THE TIME

3 ALL OF THE TIME

NEVER 0

SOMETIMES 1

MOST OF THE TIME 2

ALL OF THE TIME 3
C. Histogram Picture Sheet

<table>
<thead>
<tr>
<th>NEVER</th>
<th>SOMETIMES</th>
<th>A LOT</th>
<th>MOST OF THE TIME</th>
<th>ALL OF THE TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

- **1**: Sometimes
- **2**: A Lot
- **3**: Most of the Time
- **4**: All of the Time
# Revised Beck Anxiety Inventory

**Name:**

**Age:**

**Sex:**

**Date:**

**Instructions:** Please carefully read aloud each item in the checklist. Using the attached histogram, encourage the respondent to indicate one statement that best describes the way they have been feeling during the past week, including today. Place a tick in the corresponding box next to each symptom. After completion, total each column, then combine the subtotals to reveal the total overall score.

<table>
<thead>
<tr>
<th>Item</th>
<th>0: No, Never</th>
<th>1: Sometimes</th>
<th>2: Most of the Time</th>
<th>3: All of the Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Numbness/Hairiness/Prickles &amp; Needles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Feeling Hot</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Wobbly/Jelly Legs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Can't Relax, Wound-up</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Scared something bad will happen</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Dizzy / Light-headed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Heart beating very fast</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Unsteady, wobbly on feet</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Terrified, Really scared</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Nervous, Panicky</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Feel you might choke</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Shaky/Trembling Hands</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Shaky Body</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Scared you'll lose control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Hard to breathe properly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Scared you might die</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Scared/Afraid for no reason</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Pains in your stomach</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Feel you might faint/fall over</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Face flushed/chew/red</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Sweating (even when you don't feel hot)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
REVISED BECK DEPRESSION INVENTORY

Name: ________________________ Age: _____ Sex: _____ Date: _____

Instructions: Please read each question aloud, and then using the attached histogram, encourage the respondent to indicate one statement in each group that best describes the way they have been feeling during the past two weeks, including today. Circle or underline the reply below that comes closest to how they have been feeling. After completion, circle the numbers that correspond to the statements, and total on page 2.

<table>
<thead>
<tr>
<th>1. Sadness</th>
<th>6. Punishment Feelings</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Have you ever felt sad?</td>
<td>• Have you ever felt that your life is a punishment?</td>
</tr>
<tr>
<td>No, Never</td>
<td>No, Never</td>
</tr>
<tr>
<td>Sometimes</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Most of the time</td>
<td>Most of the time</td>
</tr>
<tr>
<td>All of the time</td>
<td>All of the time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Pessimism</th>
<th>7. Self-Dislike</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Have you looked forward to the future?</td>
<td>• Have you liked yourself as a person?</td>
</tr>
<tr>
<td>No, Never</td>
<td>No, Never</td>
</tr>
<tr>
<td>Sometimes</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Most of the time</td>
<td>Most of the time</td>
</tr>
<tr>
<td>All of the time</td>
<td>All of the time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Past Failure</th>
<th>8. Self-Criticalness</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Have you ever felt like a failure?</td>
<td>• Have you blamed yourself for mistakes or bad things that</td>
</tr>
<tr>
<td>No, Never</td>
<td>have happened?</td>
</tr>
<tr>
<td>Sometimes</td>
<td>No, Never</td>
</tr>
<tr>
<td>Most of the time</td>
<td>Sometimes</td>
</tr>
<tr>
<td>All of the time</td>
<td>Most of the time</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Loss of Pleasure</th>
<th>9. Suicidal Thoughts or Wishes</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Have you enjoyed doing things as much as</td>
<td>• Have you had any thoughts of killing yourself?</td>
</tr>
<tr>
<td>usual?</td>
<td>No, Never</td>
</tr>
<tr>
<td>No, Never</td>
<td>Sometimes, but wouldn’t do it</td>
</tr>
<tr>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Most of the time</td>
<td>All of the time</td>
</tr>
<tr>
<td>All of the time</td>
<td></td>
</tr>
</tbody>
</table>

5. Guilty Feelings
   • Have you ever felt that things have been
     your fault?
     No, Never
     Sometimes
     Most of the time
     All of the time

Subtotal Page 1
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Have you felt like crying?</td>
<td>- Have you been sleeping as well as usual? If no: More or Less than usual? No change More/Less than usual A lot more/Less than usual All the time/Not at all</td>
</tr>
<tr>
<td>No, Never</td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td></td>
</tr>
<tr>
<td>Most of the time</td>
<td></td>
</tr>
<tr>
<td>All of the time</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11. Agitation</th>
<th>17. Irritability</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Have you felt more wound-up than usual?</td>
<td>- Have you been more bad tempered than usual? No, Never Sometimes Most of the time All of the time</td>
</tr>
<tr>
<td>No, Never</td>
<td></td>
</tr>
<tr>
<td>Sometimes</td>
<td></td>
</tr>
<tr>
<td>Most of the time</td>
<td></td>
</tr>
<tr>
<td>All of the time</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12. Loss of Interest</th>
<th>18. Changes in Appetite</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Have you been as interested in doing things and seeing other people, as usual? No, Never Sometimes Most of the time All of the time</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13. Indecisiveness</th>
<th>19. Concentration Difficulty</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Have you been able to make decisions, as well as usual? No, Never Sometimes Most of the time All of the time</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>14. Worthlessness</th>
<th>20. Tiredness or Fatigue</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Have you ever had thoughts that you are useless as a person? No, Never Sometimes Most of the time All of the time</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>15. Loss of energy</th>
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<tbody>
<tr>
<td>- Have you felt that you’ve been able to work and do as many things as usual? No, Never Sometimes Most of the time All of the time</td>
<td></td>
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<thead>
<tr>
<th>Subtotal Page 2</th>
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<tbody>
<tr>
<td>Subtotal Page 1</td>
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<tr>
<td>TOTAL SCORE</td>
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</table>
Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by each symptom during the PAST WEEK, INCLUDING TODAY, by placing an X in the corresponding space in the column next to each symptom.

<table>
<thead>
<tr>
<th></th>
<th>NOT AT ALL</th>
<th>MILDLY</th>
<th>MODERATELY</th>
<th>SEVERELY</th>
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<td>21</td>
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# BDI-II

**Name:** ____________________________  **Marital Status:** ____________  **Age:** ______  **Sex:** ____________

**Occupation:** ____________________________  **Education:** ____________

**Instructions:** This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

<table>
<thead>
<tr>
<th>1. Sadness</th>
<th>6. Punishment Feelings</th>
</tr>
</thead>
<tbody>
<tr>
<td>0  I do not feel sad.</td>
<td>0  I don’t feel I am being punished.</td>
</tr>
<tr>
<td>1  I feel sad much of the time.</td>
<td>1  I feel I may be punished.</td>
</tr>
<tr>
<td>2  I am sad all the time.</td>
<td>2  I expect to be punished.</td>
</tr>
<tr>
<td>3  I am so sad or unhappy that I can’t stand it.</td>
<td>3  I feel I am being punished.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Pessimism</th>
<th>7. Self-Dislike</th>
</tr>
</thead>
<tbody>
<tr>
<td>0  I am not discouraged about my future.</td>
<td>0  I feel the same about myself as ever.</td>
</tr>
<tr>
<td>1  I feel more discouraged about my future than I used to be.</td>
<td>1  I have lost confidence in myself.</td>
</tr>
<tr>
<td>2  I do not expect things to work out for me.</td>
<td>2  I am disappointed in myself.</td>
</tr>
<tr>
<td>3  I feel my future is hopeless and will only get worse.</td>
<td>3  I dislike myself.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Past Failure</th>
<th>8. Self-Criticalness</th>
</tr>
</thead>
<tbody>
<tr>
<td>0  I do not feel like a failure.</td>
<td>0  I don’t criticize or blame myself more than usual.</td>
</tr>
<tr>
<td>1  I have failed more than I should have.</td>
<td>1  I am more critical of myself than I used to be.</td>
</tr>
<tr>
<td>2  As I look back, I see a lot of failures.</td>
<td>2  I criticize myself for all of my faults.</td>
</tr>
<tr>
<td>3  I feel I am a total failure as a person.</td>
<td>3  I blame myself for everything bad that happens.</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>4. Loss of Pleasure</th>
<th>9. Suicidal Thoughts or Wishes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0  I get as much pleasure as I ever did from the things I enjoy.</td>
<td>0  I don’t have any thoughts of killing myself.</td>
</tr>
<tr>
<td>1  I don’t enjoy things as much as I used to.</td>
<td>1  I have thoughts of killing myself, but I would not carry them out.</td>
</tr>
<tr>
<td>2  I get very little pleasure from the things I used to enjoy.</td>
<td>2  I would like to kill myself.</td>
</tr>
<tr>
<td>3  I can’t get any pleasure from the things I used to enjoy.</td>
<td>3  I would kill myself if I had the chance.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Guilty Feelings</th>
<th>10. Crying</th>
</tr>
</thead>
<tbody>
<tr>
<td>0  I don’t feel particularly guilty.</td>
<td>0  I don’t cry any more than I used to.</td>
</tr>
<tr>
<td>1  I feel guilty over many things I have done or should have done.</td>
<td>1  I cry more than I used to.</td>
</tr>
<tr>
<td>2  I feel quite guilty most of the time.</td>
<td>2  I cry over every little thing.</td>
</tr>
<tr>
<td>3  I feel guilty all of the time.</td>
<td>3  I feel like crying, but I can’t.</td>
</tr>
</tbody>
</table>

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Subtotal Page 1  Continued on Back
COGNITION CHECKLIST (CCL) (IN. 9)

A. Question Sheet

Project: INVESTIGATING ANXIETY PROBLEMS IN ADULTS WITH INTELLECTUAL DISABILITY

Researchers: Stephen Edwards (student) Prof. Henry Jackson (supervisor)

How often do you think?

1. I'm a social failure.
   Never  Sometimes  A lot  Most of the time  Always

2. I'll never be as good as other people are.
   Never  Sometimes  A lot  Most of the time  Always

3. People don't respect me anymore.
   Never  Sometimes  A lot  Most of the time  Always

4. No one cares whether I live or die.
   Never  Sometimes  A lot  Most of the time  Always

5. I'm worse off than they are.
   Never  Sometimes  A lot  Most of the time  Always

6. I don't deserve to be loved.
   Never  Sometimes  A lot  Most of the time  Always

7. I've lost the only friends I've had.
   Never  Sometimes  A lot  Most of the time  Always

8. I'm not worth other people's attention or love.
   Never  Sometimes  A lot  Most of the time  Always

9. There's no one left to help me.
   Never  Sometimes  A lot  Most of the time  Always

10. What if I get ill and become sickly?
    Never  Sometimes  A lot  Most of the time  Always

11. Something might be happening that will make me ugly.
    Never  Sometimes  A lot  Most of the time  Always

12. I am going to be hurt.
    Never  Sometimes  A lot  Most of the time  Always
13. What if no one reaches me in time to help?
Never  Sometimes  A lot  Most of the time  Always

14. I'm going to have an accident.
Never  Sometimes  A lot  Most of the time  Always

15. I might be trapped.
Never  Sometimes  A lot  Most of the time  Always

16. I am not a healthy person.
Never  Sometimes  A lot  Most of the time  Always

17. There's something very wrong with me.
Never  Sometimes  A lot  Most of the time  Always

18. Life isn't worth living.
Never  Sometimes  A lot  Most of the time  Always

18(b) Life is worth living.
Never  Sometimes  A lot  Most of the time  Always

19. I'm worthless.
Never  Sometimes  A lot  Most of the time  Always

20. I have become ugly.
Never  Sometimes  A lot  Most of the time  Always

21. I will never defeat my problems.
Never  Sometimes  A lot  Most of the time  Always

22. Something awful is going to happen.
Never  Sometimes  A lot  Most of the time  Always

23. I'm going to have a heart attack.
Never  Sometimes  A lot  Most of the time  Always

24. I'm losing my mind.
Never  Sometimes  A lot  Most of the time  Always

25. Something will happen to someone I care about.
Never  Sometimes  A lot  Most of the time  Always

26. Nothing ever works out for me anymore.
Never  Sometimes  A lot  Most of the time  Always
## B. Score Sheet

<table>
<thead>
<tr>
<th>Statements in Order of Presentation</th>
<th>A</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I'm a social failure.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I'll never be as good as other people are.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. People don't respect me anymore.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. No one cares whether I live or die.</td>
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<td></td>
</tr>
<tr>
<td>5. I'm worse off than they are.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I don't deserve to be loved.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I've lost the only friends I've had.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I'm not worth other people's attention or love.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I'm not worthy of other people's attention or affection.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. There's no one left to help me.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. What if I get ill and become sickly? What if I get sick and become an invalid?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Something might happen that will make me ugly. Something might happen that will ruin my appearance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. I am going to be hurt. I am going to be injured.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. What if no one reaches me in time to help?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. I'm going to have an accident.</td>
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<tr>
<td>16. I am not a healthy person.</td>
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<tr>
<td>17. There's something very wrong with me.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Life isn't worth living.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. I'm worthless.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. I have become ugly. I have become physically unattractive.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. I will never defeat my problems. I will never overcome my problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Something awful is going to happen.</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>25. Something will happen to someone I care about.</td>
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<tr>
<td>26. Nothing ever works out for me anymore.</td>
<td></td>
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</table>

**Total**

### References:


PAS-ADD Checklist
(Revised)

The PAS-ADD Checklist asks about behaviours which sometimes happen if a person has poor mental health. The Checklist aims to help staff and carers to decide whether assessment of an individual's mental health may be helpful.

The person completing the Checklist should have known the individual for at least six months, if possible.

If you do not have all the information you need, try to get it; for example, if you know the person only during the day, you may not know how well they sleep, and you may wish to ask someone whose information is reliable.

Before rating, it is important to ensure that the person does not have any uncorrected hearing or vision problems. Such problems can result in symptoms which may be confused with mental health problems.

Date.

Your name (person completing the Checklist).

Name of the person the Checklist is about.

Your relationship to the person
(eg keyworker, mother, community nurse, etc).

Length of time you have known the person.
Appendix G: Forms And Procedure Summary

Recruiting Staff Letter

Participant Plain Language Statement Step One

Participant Consent Form Step One

Informant Plain Language Statement Steps One And Four

Informant Consent Form Steps One And Four

Participant Plain Language Statement Steps Two, Three And Four

Participant Consent Form Steps Two, Three And Four

Participant Debriefing Statement
FORMS AND PROCEDURE SUMMARY

INVESTIGATING ANXIETY PROBLEMS IN ADULTS WITH INTELLECTUAL DISABILITY

STEPHEN EDWARDS  (STUDENT RESEARCHER)
PROF. HENRY JACKSON  (RESPONSIBLE RESEARCHER)

A. PROCEDURE

1. The support service manager nominates recruiting staff who will be given the RECRUITING STAFF LETTER (pages 3&4) and briefed by the researcher in obtaining consent from a participant. Consent may be taken with or without a witness and will be taken with an alternative decision maker where one exists.

2. Recruiting staff will:
   a. Read the PARTICIPANT PLAIN LANGUAGE STATEMENT FOR STEP ONE (pages 5&6) to each client and ask consenting clients to sign the PARTICIPANT CONSENT FORM STEP ONE (page 7).
   b. In conjunction with the participant, identify possible informants.

3. The researcher will give the informant the INFORMANT PLAIN LANGUAGE STATEMENT STEPS ONE AND FOUR (page 8), and ask informants to sign INFORMANT CONSENT FORM STEPS ONE AND FOUR (page 9). Consenting informants will complete the PAS-ADD checklist and the Adaptive Behaviour Scale after education from the researcher. They will also participate in the ADIS-IV interview as part of step four if the participant is asked and agrees to involvement.

4. The researcher will read the PARTICIPANT PLAIN LANGUAGE STATEMENT for STEPS TWO, THREE AND FOUR (pages 10&11) to Participants and asked to consent by signing the PARTICIPANT CONSENT FORM for STEPS TWO THREE AND FOUR (page 12).

5. All participants in steps TWO, THREE AND FOUR will be read the DEBRIEFING STATEMENT (page 13) by the researcher on completion of their last step.
B. FORMS

- RECRUITING STAFF LETTER (pages 3&4)
- PARTICIPANT PLAIN LANGUAGE STATEMENT STEP ONE (pages 5&6)
- PARTICIPANT CONSENT FORM STEP ONE (page 7)
- INFORMANT PLAIN LANGUAGE STATEMENT STEPS ONE AND FOUR (page 8)
- INFORMANT CONSENT FORM STEPS ONE AND FOUR (page 9)
- PARTICIPANT PLAIN LANGUAGE STATEMENT STEPS TWO, THREE AND FOUR (pages 10&11)
- PARTICIPANT CONSENT FORM STEPS TWO, THREE AND FOUR (page 12)
- PARTICIPANT DEBRIEFING STATEMENT (page 13)
RECRUITING STAFF LETTER

(RECRUITING PARTICIPANTS AND NOMINATING INFORMANTS)

Project Title: Investigating Anxiety Problems In Adults With Intellectual Disability
Researchers: Stephen Edwards (student researcher)
Professor Henry Jackson (responsible researcher)
University: University of Melbourne, School of Behavioural Science, Faculty of Medicine, Dentistry & Health Sciences

Dear staff member

I am a Psychologist doing a research project at Melbourne University as part of a PhD. thesis. The project has been approved by the University of Melbourne Human Research Ethics Committee (approval number 0830057) and the management of this service.

In this project, I want to find out: (step one) If people who use support services have mental health problems and if stressful things affect their mental health; (step two) If the thoughts and symptoms of anxiety are different from the thoughts and symptoms of depression (step three); If people react differently to faces when they have anxiety problems. (step four) If an interview called the ADIS is suitable for assessing anxiety problems;

I would like your help with two tasks but your involvement is voluntary and none of your personal information will be needed.

Task One, Consent: The clients of your service are the intended participants but each individual must give consent before they can take part in the research. For each client, please follow the procedure below which is most similar to their usual decision making process:

   a. If the client normally makes their own decisions, read the PLAIN LANGUAGE EXPLANATION FOR STEP ONE to them and ask them to sign the PARTICIPANT CONSENT FORM STEP ONE if they agree to participate.
   b. If the client makes decisions with support from another person (e.g. a related or paid carer or family member) then ask that person to witness the decision.
   c. If the client has a person with legal authority (alternative decision maker) to make decisions for them (e.g. a guardian with either plenary or health related powers) then read the PLAIN LANGUAGE EXPLANATION FOR STEP ONE to that person and ask them to sign the PARTICIPANT CONSENT FORM STEP ONE if they agree to the client participating.
**Task Two, Nominating an informant:** For those clients that agree (or whose alternative decision makers agree on their behalf) to participate, an informant(s) who has known the person well for at least 12 months will complete a checklist about mental health problems as well as a checklist about the person’s ability to do things for themselves.

a. If the client normally makes their own decisions, ask them for the name(s) of one or more people who have known them for more than a year and could answer a questionnaire about them. This may be a member of the support staff team at your agency, another agency or a family member.
b. If the client makes decisions with support from another person, ask them to help nominate the informant(s)
c. If the client has a legal alternative decision maker, ask them for the name(s).
d. Record the name(s) and a telephone number if necessary on the **CONSENT FORM** and give them to me.

Thankyou for your help

**Stephen Edwards (Student Researcher)**

**Professor Henry Jackson (Responsible Researcher)**

If you have any questions about the project you can ring Henry Jackson on 0409217614.

If you have any concerns about the conduct of this research project you can contact the Executive Officer, Human Research Ethics, The University of Melbourne, ph: 8344 2073; fax 9347 6739.
PARTICIPANT PLAIN LANGUAGE STATEMENT FOR
STEP ONE

(READ BY RECRUITING STAFF)

Project Title: Investigating Anxiety Problems In Adults With Intellectual Disability
Researchers: Stephen Edwards (student researcher)
Professor Henry Jackson (responsible researcher)
University: University of Melbourne, School of Behavioural Science, Faculty of Medicine, Dentistry & Health Sciences

To either:
1. The person who makes their own decisions
2. The person who makes decision with assistance from someone else (related or paid carer or family member)
3. The person who has legal authority to make an alternative decision (an appointed guardian)

Stephen Edwards is a Psychologist from Melbourne University. He is doing a research project. The project has been approved by the University Human Research Ethics Committee and the Manager of (this service) (approval number…………………). Stephen wants to find out if people who use support services have mental health problems and if stressful things affect their mental health.

Stephen wants your help and I will tell you how. If you don’t understand please tell me, I can explain things again or ask Stephen to explain them for you. These are the things he wants you to agree to:

1. He wants to meet one or two people who have known you for at least a year
.................................................................................................................................................. .

2. He wants to give them two questionnaires. One is about mental health, the other one is about what things you can and can’t do for yourself.

3. He wants (this service………) to tell him your level of ability and the level of support you receive.

You won’t have to answer any questions but Stephen might ask for your help again

Remember, these things will only happen if you agree. You can change your mind whenever you want to. If you change your mind, your answers will be taken out of the project. You will still get the same help from (this service………………………….)
Your answers will only be seen by Stephen Edwards, Henry Jackson and the person who fills them out. Your name will be taken off the forms and a number put there to keep your answers secret. The forms and answers will be stored safely for at least five years and destroyed after that.

When the answers are put together, no one will know you or your answers. When the results are published, no one will know you or your answers.

If you are worried about anything that has been said, you can talk to someone you usually talk to or to someone that (support service...........) suggests.

Stephen Edwards (Student Researcher)

Professor Henry Jackson (Responsible Researcher)

If you have any questions about the project you can ring Henry Jackson on 0409217614

If you have any concerns about the conduct of this research project you can contact the Executive Officer, Human Research Ethics, The University of Melbourne, ph: 8344 2073; fax 9347 6739.
PARTICIPANT CONSENT FORM STEP ONE

(READ BY RECRUITING STAFF AND SIGNED BY PARTICIPANT OR LEGALLY AUTHORISED ALTERNATIVE DECISION MAKER)

Project Title: Investigating Anxiety Problems In Adults With Intellectual Disability

Researchers: Professor Henry Jackson (responsible researcher)
Stephen Edwards (student researcher)

University: University of Melbourne, School of Behavioural Science, Faculty of Medicine, Dentistry & Health Sciences

The purpose of Step One of the research project has been fully explained to me and I have listened to or read the attached PLAIN LANGUAGE STATEMENT FOR STEP ONE. I UNDERSTAND the aims and procedures of Step One and any risks to myself which are involved and that the project is for research not treatment purposes. I REQUEST to participate on condition that I can withdraw my consent to participate at any time and all information I give will be destroyed after five years.

Signed: ............................................................ Date: ............

With / without witness (cross out what does not apply)

As an independent witness, I confirm that the aims and procedures of the research and any risks to the participant have been adequately explained to the participant whose signature I witness. In my opinion he/she appears to understand and wishes to participate.

Name of witness: ........................................... Signed: .......................... Date: ............

Or legally authorised alternative decision maker to sign.

Authority: .................................................. Name: ..............................

Signed: .......................................................... Date: ............

Stephen Edwards (Student Researcher)

Professor Henry Jackson (Responsible Researcher)

If you have any questions about the project you can ring Henry Jackson on 0409217614

If you have any concerns about the conduct of this research project you can contact the Executive Officer, Human Research Ethics, The University of Melbourne, ph: 8344 2073; fax 9347 6739.

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Dear carer or support worker acting as informant for ……………………………..

I am a psychologist doing a research project at Melbourne University for my Ph.D. thesis. The project has been approved by the University Human Research Ethics Committee (approval No. 0830057) and the management of (this service). I want to explain the research project because you have been nominated to act as informant for the person named above, you have known them for at least twelve months and they have agreed to participate in step one.

In this project, I want to find out: (step one) If people who use support services have mental health problems and if stressful things affect their mental health; (step two) If the thoughts and symptoms of anxiety are different from the thoughts and symptoms of depression (step three); If people react differently to faces when they have anxiety problems. (step four) If an interview called the ADIS is suitable for assessing anxiety problems;

I would like your help in the steps one and possibly four but your involvement is voluntary and none of your personal information will be needed. If you agree to participate you can change your mind and withdraw from the project at anytime. If you do change your mind, all your answers will be taken out of the project. In step one; I would like you to complete two questionnaires about the person you support. One has questions about mental health problems that any person might have and the other has questions about a person’s ability to do things for themselves. If the person agrees to and completes step two and step three, I may need your help with step four. In that step I would like you to answer the same questions as the person you support during an interview with me using questions about anxiety and depression.

I will advise you if I need your help for step four

You might find completing the questionnaires tiring or confusing and possibly even worrying but you can contact me and ask any questions you have. The person you are informant for may be worried or concerned about you completing the questionnaires but I will answer any questions they have and if necessary arrange for them to talk to someone who usually supports them or to someone that the support agency suggests.

Stephen Edwards (Student Researcher) Professor Henry Jackson (Responsible Researcher)

If you have any questions about the project you can ring Henry Jackson on 0409217614. If you have any concerns about the conduct of this research project that they can contact the Executive Officer, Human Research Ethics, The University of Melbourne, ph: 8344 2073; fax 9347 6739.
INFORMANT CONSENT FORM STEPS ONE AND FOUR

Project Title: Investigating Anxiety Problems In Adults With Intellectual Disability

Researchers: Professor Henry Jackson (responsible researcher)
Stephen Edwards (student researcher)

University: University of Melbourne, School of Behavioural Science, Faculty of Medicine, Dentistry & Health Sciences

The purpose of step one and step four of the research project has been fully explained to me and I have listened to or read the attached PLAIN LANGUAGE STATEMENT FOR STEPS ONE FOUR. I UNDERSTAND the aims and procedures of step one and step four as well as any risks to myself which are involved, and that the project is for research and not treatment purposes. I REQUEST to participate on condition that I can withdraw my consent to participate at any time and that all information I give will be destroyed after a period of five years.

Signed: ..............................................................................

Date: ..............................................................................

Stephen Edwards (Student Researcher)

Professor Henry Jackson (Responsible Researcher)

If you have any questions about the project you can ring Henry Jackson on 0409217614
If you have any concerns about the conduct of this research project you can contact the Executive Officer, Human Research Ethics, The University of Melbourne, ph: 8344 2073; fax 9347 6739.
PARTICIPANT PLAIN LANGUAGE STATEMENT
STEPS TWO, THREE & FOUR

(READ TO PARTICIPANT AND INFORMANT BY RESEARCHER)

Project Title: Investigating Anxiety Problems In Adults With Intellectual Disability
Researchers: Professor Henry Jackson (responsible researcher)
Stephen Edwards (student researcher)
University: University of Melbourne, School of Behavioural Science, Faculty of Medicine, Dentistry & Health Sciences

To either:
1. The person who makes their own decisions or;
2. The person who has legal authority to make an alternative decision (an appointed guardian) or;
3. The person who makes decision with assistance from someone else (related or paid carer or family member)

I want to ask you for some more help with my research project. If you don’t understand what I say, please tell me or ask me to explain again. I am a psychologist from Melbourne University doing a research project. The project has been approved by the University Human Research Ethics Committee and the Manager of (...................................................this service).

I want to find out if an interview about anxiety and depression will work; if the thoughts and symptoms of anxiety are different from the thoughts and symptoms of depression and; if anxiety changes people’s reactions to faces.

These are the things I want your help with:

1. I want to ask you questions about word meanings, the names of feelings, and about scoring with numbers. This will take about half an hour.
2. I might ask you questions about thoughts and symptoms of anxiety and depression this will take about half an hour.
3. I might ask you to look at some faces on a computer and press some buttons. This will take about half an hour.
4. I might want to ask you questions about anxiety and depression. This will take about an hour. This will take about an hour and I would like (your informant…….) to be here as well.

These things will only happen if you agree. You can change your mind whenever you like. If you decide to stop, your answers will be taken out of the research. You will still get the same help from (this service.........................).
Your answers will only be seen by me and Henry Jackson. Your name will be taken off the forms as soon as they have been filled out. This will keep your answers secret from other people. The answers will be stored safely for at least five years and destroyed after that.

When all the answers are put together, no one will know which ones are yours. When the results are published, no one will know which one is you.

Doing the interviews and activities might be tiring or worrying. If you want to stop for a rest, just tell me. You can ask for extra help from your supervisor or (informant) or from me.

Before I start any questions, I will ask you and ............(your informant) how you show worry and the best ways to help you when you are worried.

Stephen Edwards (Student Researcher)

Professor Henry Jackson (Responsible Researcher)

If you have any questions about the project you can ring Henry Jackson on 0409217614
If you have any concerns about the conduct of this research project you can contact the Executive Officer, Human Research Ethics, The University of Melbourne, ph: 8344 2073; fax 9347 6739.
PARTICIPANT CONSENT FORM STEPS TWO, THREE AND FOUR
(READ BY RESEARCHER AND SIGNED BY PARTICIPANT OR LEGALLY AUTHORISED ALTERNATIVE DECISION MAKER)

Project Title: Investigating Anxiety Problems In Adults With Intellectual Disability
Researchers: Professor Henry Jackson (responsible researcher)
Stephen Edwards (student researcher)
University: University of Melbourne, School of Behavioural Science, Faculty of Medicine, Dentistry & Health Sciences

The purpose of steps two, three and four of the research project has been fully explained to me and I have listened to or read the attached PLAIN LANGUAGE STATEMENT FOR STEPS TWO THREE AND FOUR. I UNDERSTAND the aims and procedures of Steps two, three and four and any risks to myself which are involved and that the program is for research not treatment purposes. I REQUEST to participate on condition that I can withdraw my consent to participate at any time and all information I give will be destroyed after five years.

Signed..................................................................................................................Date:............

With / without witness (cross out what does not apply)

As an independent witness, I confirm that the aims and procedures of the research and any risks to the participant have been adequately explained to the participant whose signature I witness. In my opinion he/she appears to understand and wishes to participate.

Name of witness………………………………Signed………………………………Date .....

Or legally authorised alternative decision maker to sign.

Authority:………………………………Name:…………………………………………………………

Signed:
.................................................................................................................................Date:............

Stephen Edwards (Student Researcher)

Professor Henry Jackson (Responsible Researcher)

If you have any questions about the project you can ring Henry Jackson on 0409217614
If you have any concerns about the conduct of this research project you can contact the Executive Officer, Human Research Ethics, The University of Melbourne, ph: 8344 2073; fax 9347 6739.
PARTICIPANT DEBRIEFING STATEMENT

(READ BY RESEARCHER)

**Project Title:** Investigating Anxiety Problems In Adults With Intellectual Disability

**Researchers:**
Stephen Edwards (student researcher)
Professor Henry Jackson (responsible researcher)

**University:**
University of Melbourne, School of Behavioural Science, Faculty of Medicine, Dentistry & Health Sciences

**To: The person who has participated in step 1, 2, 3 or 4**

Thank you for helping with my research. I hope it will help me understand anxiety and depression. I especially want to know if symptoms can be measured, if thoughts and symptoms are changed and if anxiety affects responses to faces amongst people who use support services. If anxiety has the same effects as it does on other people, treatments used in the rest of the population might be useful with adults who use support services.

Some people feel tired after answering lots of questions and some people get feelings or thoughts afterwards as well. This is quite normal and most people feel better after showing their feelings in the usual way. It can take a few days for the feelings to go though. If you have worries you could tell your supervisor or (informant) or you could talk to me again. If you need extra help, you could tell you supervisor or (informant) so that it can be arranged. You can also contact me or the principal researcher (Henry Jackson on 0409217614) to arrange extra help.

**Stephen Edwards (Student Researcher)**

**Professor Henry Jackson (Responsible Researcher)**

If you have any questions about the project you can ring Henry Jackson on 0409217614
If you have any concerns about the conduct of this research project you can contact the Executive Officer, Human Research Ethics, The University of Melbourne, ph: 8344 2073; fax 9347 6739.
Appendix H: Additional Results

CHI Square for Screening Procedures and Valid Interviews

Analysis for Angry Face Bias in Anxiety Groups

Analysis for Angry Face Bias in Ability Groups

Analysis of Difference in Bias to Angry Faces for High and Low Anxiety Groups

Exploratory Analyses
Chi Square for Screening Procedures and Valid Interviews

Figure 1

Valid Symptom and Cognition Measures x SAP (p/f)

<table>
<thead>
<tr>
<th>Crosstab</th>
<th>SAP (p/f)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>fail</td>
<td>pass</td>
</tr>
<tr>
<td>Valid symptom and cognition measures</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>% within Valid measures</td>
<td>90.9%</td>
<td>9.1%</td>
</tr>
<tr>
<td>% within SAP (p/f)</td>
<td>100.0%</td>
<td>1.7%</td>
</tr>
<tr>
<td>% of Total</td>
<td>14.5%</td>
<td>1.4%</td>
</tr>
<tr>
<td>1</td>
<td>Count</td>
<td>0</td>
</tr>
<tr>
<td>% within Valid measures</td>
<td>0.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>% within SAP (p/f)</td>
<td>0.0%</td>
<td>98.3%</td>
</tr>
<tr>
<td>% of Total</td>
<td>0.0%</td>
<td>84.1%</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>10</td>
</tr>
<tr>
<td>% within Valid measures</td>
<td>14.5%</td>
<td>85.5%</td>
</tr>
<tr>
<td>% within SAP (p/f)</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>% of Total</td>
<td>14.5%</td>
<td>85.5%</td>
</tr>
</tbody>
</table>

Chi-Square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>61.664*</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction\b</td>
<td>54.546</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>50.404</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.000</td>
<td></td>
<td>.000</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>60.770</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N of Valid Cases

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 1.59.
b. Computed only for a 2x2 table

Symmetric Measures

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal</td>
<td>Phi</td>
<td>.945</td>
</tr>
<tr>
<td></td>
<td>Cramer's V</td>
<td>.945</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>69</td>
<td></td>
</tr>
</tbody>
</table>
### Figure 2

**Valid Symptom and Cognition Measures x ESP (p/f)**

<table>
<thead>
<tr>
<th>Crosstab</th>
<th>ESP (p/f)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>fail</td>
<td>pass</td>
<td>Total</td>
</tr>
<tr>
<td>Valid symptom and cognition measures</td>
<td>Count</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>% within valid measures</td>
<td>36.4%</td>
<td>63.6%</td>
</tr>
<tr>
<td></td>
<td>% within ESP (p/f)</td>
<td>33.3%</td>
<td>12.3%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>5.8%</td>
<td>10.1%</td>
</tr>
<tr>
<td>1 Count</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% within valid measures</td>
<td>13.8%</td>
<td>86.2%</td>
</tr>
<tr>
<td></td>
<td>% within ESP (p/f)</td>
<td>66.7%</td>
<td>87.7%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>11.6%</td>
<td>72.5%</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>12</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>% within valid measures</td>
<td>17.4%</td>
<td>82.6%</td>
</tr>
<tr>
<td></td>
<td>% within ESP (p/f)</td>
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<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>17.4%</td>
<td>82.6%</td>
</tr>
</tbody>
</table>

### Chi-Square Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>3.279a</td>
<td>1</td>
<td>.070</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correctionb</td>
<td>1.896</td>
<td>1</td>
<td>.169</td>
<td></td>
<td></td>
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<tr>
<td>Likelihood Ratio</td>
<td>2.802</td>
<td>1</td>
<td>.094</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.090</td>
<td>.090</td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>3.231</td>
<td>1</td>
<td>.072</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 1.91.
b. Computed only for a 2x2 table

### Symmetric Measures

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal by Nominal</td>
<td>Phi</td>
<td>.218</td>
</tr>
<tr>
<td></td>
<td>Cramer's V</td>
<td>.218</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td></td>
<td>69</td>
</tr>
</tbody>
</table>

|
Figure 3.

**Valid Symptom and Cognition Measures x Legible name**

<table>
<thead>
<tr>
<th>Crosstab</th>
<th>Legible name</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no</td>
<td>yes</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>4</td>
<td>7</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>% within measures</td>
<td>36.4%</td>
<td>63.6%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>% within legible name</td>
<td>26.7%</td>
<td>13.0%</td>
<td>15.9%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>5.8%</td>
<td>10.1%</td>
<td>15.9%</td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>11</td>
<td>47</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>% within measures</td>
<td>19.0%</td>
<td>81.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>% within legible name</td>
<td>73.3%</td>
<td>87.0%</td>
<td>84.1%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>15.9%</td>
<td>68.1%</td>
<td>84.1%</td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>15</td>
<td>54</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>% within measures</td>
<td>21.7%</td>
<td>78.3%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>% within legible name</td>
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<td>100.0%</td>
<td>100.0%</td>
<td></td>
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<tr>
<td>% of Total</td>
<td>21.7%</td>
<td>78.3%</td>
<td>100.0%</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Chi-Square Tests</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>1.645a</td>
<td>1</td>
<td>.200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correctionb</td>
<td>.781</td>
<td>1</td>
<td>.377</td>
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<tr>
<td>Likelihood Ratio</td>
<td>1.490</td>
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<tr>
<td>Fisher's Exact Test</td>
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<td></td>
<td></td>
<td>.237</td>
<td>.185</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
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<td>1</td>
<td>.203</td>
<td></td>
<td></td>
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<tr>
<td>N of Valid Cases</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.39.
b. Computed only for a 2x2 table

<table>
<thead>
<tr>
<th>Symmetric Measures</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Nominal by Nominal</td>
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<td>.154</td>
</tr>
<tr>
<td></td>
<td>Cramer's V</td>
<td>.154</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td></td>
<td>69</td>
</tr>
</tbody>
</table>
**Analysis for Angry Face Bias in Anxiety Groups**

**Bias Calculation for Anxiety Groups and Angry Faces**

<table>
<thead>
<tr>
<th>Symptom Group</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Bias</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Current treatment for anxiety (n=6)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 Congruent trials</td>
<td>534.58</td>
<td>131.85</td>
<td>-3.32</td>
<td>.337</td>
<td>.75</td>
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<tr>
<td>B1 Incongruent trials</td>
<td>531.26</td>
<td>145.05</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2 Congruent trials</td>
<td>513.05</td>
<td>137.07</td>
<td>-3.02</td>
<td>.292</td>
<td>.78</td>
</tr>
<tr>
<td>B2 Incongruent trials</td>
<td>510.03</td>
<td>140.96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. At or above Affective/Neurotic threshold (n=3)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 Congruent trials</td>
<td>549.36</td>
<td>167.24</td>
<td>-9.04</td>
<td>1.181</td>
<td>.36</td>
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<td>B1 Incongruent trials</td>
<td>540.32</td>
<td>174.86</td>
<td></td>
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</tr>
<tr>
<td>B2 Congruent trials</td>
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<td>160.41</td>
<td>-17.06</td>
<td>1.55</td>
<td>.26</td>
</tr>
<tr>
<td>B2 Incongruent trials</td>
<td>544.14</td>
<td>141.29</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Clinical level BAI (n=10)</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 Congruent trials</td>
<td>688.96</td>
<td>105.59</td>
<td>-5.26</td>
<td>.35</td>
<td>.74</td>
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<td>127.25</td>
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<td>B2 Congruent trials</td>
<td>645.41</td>
<td>134.08</td>
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<td></td>
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<td>630.82</td>
<td>118.88</td>
<td>-14.59</td>
<td>.87</td>
<td>.42</td>
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<td><strong>4. Low Socialisation (n=8)</strong></td>
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<tr>
<td>B1 Congruent trials</td>
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<td>1.50</td>
<td>.18</td>
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<td>B1 Incongruent trials</td>
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<td>94.01</td>
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<tr>
<td>B2 Congruent trials</td>
<td>548.55</td>
<td>79.71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2 Incongruent trials</td>
<td>544.09</td>
<td>86.85</td>
<td>-4.46</td>
<td>-.25</td>
<td>.81</td>
</tr>
<tr>
<td><strong>5. High Shyness (n=11)</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>B1 Congruent trials</td>
<td>545.49</td>
<td>119.76</td>
<td>-9.77</td>
<td>-1.45</td>
<td>.178</td>
</tr>
<tr>
<td>B1 Incongruent trials</td>
<td>555.27</td>
<td>135.40</td>
<td></td>
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<tr>
<td>B2 Congruent trials</td>
<td>558.50</td>
<td>119.05</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>B2 Incongruent trials</td>
<td>557.29</td>
<td>121.13</td>
<td>1.22</td>
<td>.15</td>
<td>.89</td>
</tr>
</tbody>
</table>

*Note: Bias is calculated by subtracting the mean of congruent trials from the mean of incongruent trials with a positive value indicating attention toward and a negative, value attention away.*

Analyses shown do not reveal biases away from or toward emotional faces.
Analysis for Angry Face Bias in Ability Groups

Bias Calculation for Ability Groups and Angry Faces

<table>
<thead>
<tr>
<th>Ability Group</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Bias</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All intellectually disabled (n=26)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>B1 Congruent trials</td>
<td>639.02</td>
<td>109.14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 Incongruent trials</td>
<td>637.04</td>
<td>121.49</td>
<td>1.98</td>
<td>.20</td>
<td>.84</td>
</tr>
<tr>
<td>B2 Congruent trials</td>
<td>637.63</td>
<td>93.217</td>
<td></td>
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</tr>
<tr>
<td>B2 Incongruent trials</td>
<td>639.34</td>
<td>88.86</td>
<td>-1.71</td>
<td>-.25</td>
<td>.80</td>
</tr>
<tr>
<td>2. Mild intellectual disability (n=16)</td>
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</tr>
<tr>
<td>B1 Congruent trials</td>
<td>633.35</td>
<td>102.22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 Incongruent trials</td>
<td>634.19</td>
<td>106.27</td>
<td>-0.83</td>
<td>-.09</td>
<td>.933</td>
</tr>
<tr>
<td>B2 Congruent trials</td>
<td>640.02</td>
<td>74.85</td>
<td></td>
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<tr>
<td>B2 Incongruent trials</td>
<td>647.80</td>
<td>78.16</td>
<td>-7.78</td>
<td>-1.13</td>
<td>.277</td>
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<tr>
<td>3. Moderate intellectual disability (n=7)</td>
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<tr>
<td>B1 Congruent trials</td>
<td>642.90</td>
<td>124.05</td>
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<tr>
<td>B1 Incongruent trials</td>
<td>637.05</td>
<td>156.01</td>
<td>5.84</td>
<td>.19</td>
<td>.85</td>
</tr>
<tr>
<td>B2 Congruent trials</td>
<td>634.27</td>
<td>121.23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2 Incongruent trials</td>
<td>625.44</td>
<td>105.13</td>
<td>8.83</td>
<td>.48</td>
<td>.65</td>
</tr>
<tr>
<td>4. Severe and profound intellectual disability (n=3)</td>
<td></td>
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</tr>
<tr>
<td>B1 Congruent trials</td>
<td>660.23</td>
<td>152.85</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 Incongruent trials</td>
<td>652.24</td>
<td>162.39</td>
<td>7.99</td>
<td>.35</td>
<td>.76</td>
</tr>
<tr>
<td>B2 Congruent trials</td>
<td>632.67</td>
<td>149.61</td>
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<tr>
<td>B2 Incongruent trials</td>
<td>626.63</td>
<td>135.03</td>
<td>6.04</td>
<td>.35</td>
<td>.76</td>
</tr>
</tbody>
</table>

Note: Bias is calculated by subtracting the mean of congruent trials from the mean of incongruent trials with a positive value indicating attention toward and a negative value attention away.

The biases within ability groups that are evident in this analysis were of mixed direction but even though they were toward the emotional faces in the two lowest ability groups, none reached significance.
Analysis of Difference in Bias to Angry Faces for High and Low Anxiety Groups

*T-tests for difference in Bias between High and Low Anxiety Groups*

<table>
<thead>
<tr>
<th>Sample</th>
<th>Mean Bias</th>
<th>Std. Deviation</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 current anxiety treatment (6)</td>
<td>-1.40</td>
<td>23.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 no anxiety treatment (37)</td>
<td>.45</td>
<td>42.72</td>
<td>-.10</td>
<td>.92</td>
</tr>
<tr>
<td>B2 current anxiety treatment</td>
<td>-3.02</td>
<td>25.29</td>
<td>-.07</td>
<td>.94</td>
</tr>
<tr>
<td>B2 no anxiety treatment</td>
<td>-4.18</td>
<td>37.39</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Group 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 at or above A/N threshold (3)</td>
<td>24.86</td>
<td>37.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 below A/N threshold (26)</td>
<td>-1.70</td>
<td>47.27</td>
<td>.93</td>
<td>.36</td>
</tr>
<tr>
<td>B2 at or above A/N threshold</td>
<td>10.18</td>
<td>21.86</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>B2 below A/N threshold</td>
<td>-2.11</td>
<td>34.93</td>
<td>.59</td>
<td>.56</td>
</tr>
<tr>
<td>Group 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 Clinical anxiety BAI (7)</td>
<td>.14</td>
<td>39.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 Non-clinical anxiety BAI (33)</td>
<td>2.81</td>
<td>41.71</td>
<td>-.16</td>
<td>.88</td>
</tr>
<tr>
<td>B2 Clinical anxiety BAI</td>
<td>-14.59</td>
<td>44.59</td>
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</tr>
<tr>
<td>B2 Non-clinical anxiety BAI</td>
<td>-.31</td>
<td>34.17</td>
<td>-.96</td>
<td>.88</td>
</tr>
<tr>
<td>Group 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B1 Low socialisation (14)</td>
<td>-10.68</td>
<td>51.91</td>
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</tr>
<tr>
<td>B1 High socialisation (28)</td>
<td>7.46</td>
<td>32.02</td>
<td>1.4</td>
<td>.17</td>
</tr>
<tr>
<td>B2 Low socialisation</td>
<td>1.33</td>
<td>44.25</td>
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<tr>
<td>B2 High socialisation</td>
<td>-6.12</td>
<td>29.86</td>
<td>-.59*</td>
<td>.57</td>
</tr>
<tr>
<td>Group 5</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>B1 High shyness (n=12)</td>
<td>12.67</td>
<td>21.52</td>
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</tr>
<tr>
<td>B1 Low shyness (n=31)</td>
<td>-2.58</td>
<td>44.45</td>
<td>1.09</td>
<td>.28</td>
</tr>
<tr>
<td>B2 High shyness</td>
<td>-1.22</td>
<td>29.115</td>
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<tr>
<td>B2 Low shyness</td>
<td>-4.42</td>
<td>37.69</td>
<td>.27</td>
<td>.79</td>
</tr>
</tbody>
</table>

Note: Group 3 high anxiety=BAI in clinical range; Groups 4 & 5 high and low=quartiles; *t-value for dissimilar variance; criteria for groups detailed in Chapter Six; A/N=PAS-ADD Checklist Affective/Neurotic Scale

The analysis of difference between high and low portions of anxiety groups shown in this analysis revealed no significant results.
## Exploratory Analyses

### Correlations Between Bias Scores And Measures of Signs and Symptoms

<table>
<thead>
<tr>
<th>Bias signs and symptoms</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Angry bias block 1</td>
<td>-</td>
<td>.24</td>
<td>-.02</td>
<td>-.10</td>
<td>.07</td>
<td>-.05</td>
<td>-.47</td>
</tr>
<tr>
<td>2. Happy bias block 1</td>
<td>-</td>
<td>-.06</td>
<td>-.20</td>
<td>.02</td>
<td>-.15</td>
<td>-.47</td>
<td></td>
</tr>
<tr>
<td>3. (^a)BAI</td>
<td>-</td>
<td>-</td>
<td>.44**</td>
<td>-.13</td>
<td>-.13</td>
<td>.65*</td>
<td></td>
</tr>
<tr>
<td>4. (^a)BDI-II</td>
<td>-</td>
<td>-</td>
<td>-.09</td>
<td>-.06</td>
<td>.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. PAS-ADD Anxiety factor</td>
<td>-</td>
<td></td>
<td>.62**</td>
<td></td>
<td></td>
<td>.10</td>
<td></td>
</tr>
<tr>
<td>6. PAS-ADD A/N Scale</td>
<td>-</td>
<td></td>
<td>.37</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Anxiety after probe</td>
<td>-</td>
<td></td>
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</tr>
</tbody>
</table>

*Note. N=11-58; \(^a\)=valid completions only; \(p<.05\) (2-tailed); \(p<.01\) (2-tailed)*

The analysis above shows the two respondent measures of anxiety are significantly correlated. Similarly, informant measures are related to each other but not to bias or to the respondent measures. Of note is the medium-sized, (non-significant) negative correlation between anxiety after probe and bias scores for angry as well as happy faces.

### Correlations Between Combined Emotional RTs And Life Events

<table>
<thead>
<tr>
<th>RTs and life events</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (^a)Angry RTs block 1</td>
<td>-</td>
<td>.90**</td>
<td>.97**</td>
<td>.87**</td>
<td>.18</td>
<td>.40**</td>
<td>-.09</td>
<td>-.02</td>
</tr>
<tr>
<td>2. (^a)Angry RTs block 2</td>
<td>-</td>
<td>.89**</td>
<td>.98**</td>
<td>.05</td>
<td>.33*</td>
<td>-.23</td>
<td>-.16</td>
<td></td>
</tr>
<tr>
<td>3. (^a)Happy RTs block 1</td>
<td>-</td>
<td>.87**</td>
<td>.11</td>
<td>.41**</td>
<td>-.07</td>
<td>-.00</td>
<td></td>
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</tr>
<tr>
<td>4. (^a)Happy RTs block 2</td>
<td>-</td>
<td>.02</td>
<td>.36*</td>
<td>-.20</td>
<td>-.13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Change-related LEs</td>
<td>-</td>
<td>.03</td>
<td>.17</td>
<td>.20</td>
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</tr>
<tr>
<td>6. Loss-related LEs</td>
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<td>.36**</td>
<td>.70**</td>
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<tr>
<td>7. Trauma-related LEs</td>
<td>-</td>
<td></td>
<td></td>
<td>.72**</td>
<td></td>
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<tr>
<td>8. All LEs</td>
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</tr>
</tbody>
</table>

*Note. N=43-65; \(p<.01\) (2-tailed); \(p<.05\) (2-tailed); \(^a\)=combined congruent and incongruent RTs; LEs=life events*

This analysis illustrates that loss LEs are the only life events related to emotional face RTs and correlations are of medium-size for both emotions and both blocks.
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