

**EMOTIONAL SELF-AWARENESS AND DEPRESSIVE
SYMPTOMS:
AN INVESTIGATION OF AN EARLY INTERVENTION
MOBILE PHONE SELF-MONITORING PROGRAM FOR
ADOLESCENTS**

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Abstract

Up to 30% of adolescents experience depressive symptoms before 18 years of age and are at risk of developing severe recurrent depression. There is, however, a lack of appropriate treatments available for these young people. Self-monitoring is often used in therapy to increase awareness about mood and distress, and is likely to decrease depressive symptoms. Furthermore, self-monitoring has potential as an early intervention tool for young people at risk of depression, particularly when mobile phones are used as a medium. Using both qualitative and quantitative methods, this thesis investigates the concept of emotional self-awareness (ESA) and its mediating role in the relationship between self-monitoring and depressive symptoms. To this end, several studies were conducted.

First, a systematic literature review examining the benefits of ESA was conducted. A review of 50 publications found five common themes throughout the literature regarding ESA: (a) becoming aware of an emotional experience; (b) the ability to define and distinguish specific feelings; (c) identifying the contextual factors surrounding emotions; (d) communication of emotional knowledge; and (e) analysing emotional events to make decisions.

Second, a post-hoc qualitative study examined secondary school students' general feedback about ESA after self-monitoring. Spontaneous feedback from 20% of participants reported at least one ESA theme after completion of the self-monitoring program.

Third, following from the post-hoc study, in-depth qualitative interviews were conducted with 37 young people after self-monitoring, specifically targeting ESA. This study provided rich descriptive detail about the themes of ESA from young people's perspectives.

Fourth, a preliminary measure of ESA was developed and tested with 22 young people with subclinical depressive symptoms, recruited from two general practitioners in a rural setting. This small-scale mixed-methods study combined an in-depth qualitative interview and a quantitative measure of ESA. Young people with high scores on the ESA measure had a different qualitative experience than those with low scores.

Last, a randomised controlled trial examined the effects of self-monitoring on depressive symptoms when mediated by ESA. Young people with mild or more depressive symptoms were recruited from primary care settings and randomised into an intervention group ($n = 68$) or an attention-comparison group ($n = 46$). Mediation analysis demonstrated that self-monitoring significantly increased ESA in the intervention group when compared with the comparison group and that an increase in ESA significantly decreased depressive symptoms.

Furthermore, there was a medium size of indirect effect ($\kappa^2 = 0.44$) for depressive symptoms per week indirectly through ESA when compared with the comparison group.

In summary, a useful model of ESA was developed in this thesis and tested across the studies suggesting that self-monitoring can increase ESA, which in turn, decreases depressive symptoms. Mobile phones are well suited to early intervention programs, providing an alternative to watchful waiting. Mobile phone self-monitoring programs should be considered as a first-step low-cost early intervention for young people who are at-risk of mental health problems. Self-monitoring has the advantages of helping young people increase their ESA while gaining more information about their mental health symptoms, which can also direct them to suitable interventions.

Declaration

This is to certify that:

- 1) the thesis comprises only my original work towards the PhD except where indicated in the Preface,
- 2) due acknowledgement has been made in the text to all other material used,
- 3) the thesis is less than 100,000 words in length, exclusive of tables, maps, bibliographies and appendices.

I, Sylvia Kauer, declare that the research reported in this thesis was conducted in accordance with the principles of ethical treatment of human participants as approved for this research by the Royal Children's Hospital Human Research Ethics Committee and further registered with the University of Melbourne Human Research Ethics Committee.

Sylvia Deidre Kauer

June 2012

Preface

The studies in this thesis were conducted by a team of researchers. The lead investigator for all studies was Dr Sophie Reid. The candidate was responsible for writing ethics applications for all studies in this thesis and responsible for recruitment, data entry and follow-up for the studies described in Chapters 4, 5 and 6. Mr Alex Crooke was employed as a research assistant for the studies described in Chapters 5 and 6, which involved recruiting participants and data entry. Mr Crooke was also the primary research assistant responsible for recruitment, data entry, and conducting follow-ups for the study described in Chapter 7. Ms Angela Khor also assisted with recruitment for the studies described in Chapters 5 and 6 and follow-ups in the study described in Chapter 7. The candidate did all the data analyses for the Chapters in this thesis with the exception of the secondary analysis of rumination described in Chapter 7 (p. 251), which was conducted by Mr Stephen Hearps. The candidate was also responsible for the writing of the thesis in its entirety except for the methods sections and some of the demographics in the results sections which were jointly written by Dr Sophie Reid, Mr Stephen Hearps and the candidate.

The data collection for Chapter 4 was conducted by the candidate before commencement of this PhD in her role as a research assistant on the *mobiletype* project and formed the conceptualisation of this research topic.

Parts of this thesis were presented by the candidate at several conferences. Abstracts and posters are presented in Appendix A for the following conference presentations:

Kauer, S. D., (2011). Using mobile phones in the prevention of adolescent depression: A randomised controlled trial examining emotional self-awareness as a mediating variable. Presented at the *International Society for Research on Internet Interventions Conference*: Sydney, Australia and the *European Psychiatric Society Congress*: Vienna, Austria.

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Elke Power copy-edited this thesis in accordance with the Editing of Research Thesis by Professional Editors guidelines.

A publication based on the analyses conducted in Chapter 7 is currently in press:

Kauer, S. D., Reid, S. C., Crooke, A. H. D., Khor, A., Hearps, S. J. C., Jorm, A. F., Sanci, L. & Patton, G., accepted, August 2011). Self-monitoring using mobile phones in the early stages of adolescent depression: randomised controlled trial with an attention comparison group to examine the mediating effect of emotional self-awareness. *Journal of Medical Internet Research*.

The candidate was primary author and responsible for planning, preparation and execution of this publication. Co-authors provided assistance with data collection, comments and suggestions. The signed Contribution to Authorship Form is on the following pages.

Contribution to Published Work

The following conditions apply to the publication included in Chapter 7 of the published work:

- The candidate contributed to more than 50% of the content of the publication and is the primary author, meaning the one who is primarily responsible for the planning, execution and preparation of the work for publication.
- The initial draft of the paper was written by the candidate and subsequent editing in response to co-authors and editors has been performed by the candidate.
- Author contributions are acknowledged in the 'Preface' and detailed on this 'Contribution to Published Work' form.
- The publication was accepted for publication in a peer-reviewed journal prior to submission of the thesis.
- The publication directly pertains to the thesis topic.

Publication:

Kauer, S.D., Reid, S.C., Crooke, A.H.D., Khor, A., Hearps, S.J.C., Jorm, A.F., Sanci, L. & Patton, G. (accepted, August 2011). Self-monitoring using mobile phones in the early stages of adolescent depression: Randomized controlled trial with an attention comparison group to examine the mediating effect of emotional self-awareness. *Journal of Medical Internet Research*.

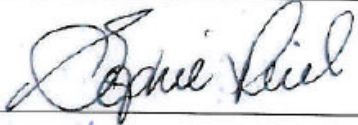





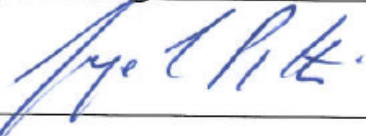
Declaration by candidate

My contribution to the published work included planning, preparation, data collection, data analysis, writing and editing. My contribution to the published work constituted at least **80%**.

Declaration by co-authors

The undersigned hereby authorise the inclusion of this published work in the candidate's PhD thesis and certify that:

- 1) the above declaration correctly reflects the nature and extent of the candidate's contribution to this work; and
- 2) the candidate contributed the proportion of the content in the publication declared above and is *primary author*.

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CHAPTER 1
Overview of the Thesis

Every action and thought experienced by an individual is coloured by emotions. Feeling happy, sad, angry, or frightened can change the way a person feels about other people, certain places and events, even the simplest of situations. Particular events and objects are associated with laughter and affection, whereas others are clouded with feelings of sadness and anger. Learning to cope with emotions is an important developmental task that takes place during childhood and further develops during adolescence. During childhood and adolescence, an individual learns to behave in particular ways in order to achieve desired emotional outcomes; avoiding people who cause upset and acting out to gain attention. Sometimes emotions are suppressed to avoid hurting other's feelings and limit confrontation with parents and siblings. Struggling to cope effectively with the array of emotions experienced and their intensity can have a negative impact on everyday life. The stressors of navigating adolescence and a maturing ability to regulate negative emotions can interfere with everyday life leading to symptoms of depression. Whilst cognitive behavioural therapy and other treatments are available to help young people diagnosed with depression, many people experiencing severe depression remain undiagnosed. There is a substantial number of young people who experience mild depressive symptoms, which often goes untreated and may progress to become a life-long struggle with depression. Prevention is often the best medicine, yet the best way to assist teenagers to regulate their emotions productively before the onset of clinical depression, and hence prevent depression, is still undetermined.

The aims of this thesis are to explore the concept of awareness of emotions and investigate the utility of increasing emotional self-awareness (ESA) in an early intervention self-monitoring program to prevent diagnosable depression in young people aged 14 to 24 years with mild or more depressive symptoms. The main hypothesis of this thesis is that self-monitoring increases ESA, which, in turn, decreases depressive symptoms. To this end, several studies were conducted including:

- 1) A systematic literature review examining the existing literature on the therapeutic benefits of awareness of emotions.
- 2) A qualitative study examining young people's spontaneous feedback about their awareness of emotions upon completion of a self-monitoring program.
- 3) An in-depth qualitative study focusing on young people's experience of a self-monitoring program and their awareness of emotional experiences.
- 4) A small-scale mixed-methods study combining an in-depth qualitative interview and quantitative measures of emotion-focused attention.
- 5) A randomised controlled trial to examine the effects of self-monitoring on depressive symptoms when mediated by ESA.

Psychotherapy has long involved the process of increasing awareness of emotions in the early stages of therapy. There is little research, however, about the specific attributes of the therapeutic process of increasing awareness and why some types of self-awareness lead to benefits and some, such as rumination and worry, lead to detrimental outcomes. This thesis is primarily concerned with identifying the specific attributes of ESA that lead to beneficial outcomes and using the concept of ESA as a basis for an early intervention program.

Chapter 2 explores the severity and prevalence of depression among youth and the impact of emotion regulation on adolescent depressive symptoms. The various treatment, prevention and early intervention programs that are currently available are examined, and the need for new strategies in a stepped-care approach is addressed. Next, the focus shifts to examine emotion-focused coping, reflexive and reflective processing, and the reinforcement sensitivity theory. Awareness of emotions is then discussed focusing on adaptive outcomes of awareness and increasing young people's awareness in an early intervention program.

Chapter 3 discusses the similarities of several theories of awareness arising from different backgrounds. Next, a systematic literature review is conducted examining research focused on awareness with adaptive outcomes. The thematically derived model of ESA based upon this previous research is then described.

Chapter 4 explores previous research about self-monitoring and discusses the potential of self-monitoring for increasing ESA. A preliminary observational study is then described where feedback from secondary school students who completed a mobile

phone self-monitoring program is examined. A thematic approach is then used to examine the responses of participants to determine if the patterns match the themes of ESA identified from the systematic literature review.

An in-depth qualitative study is described in Chapter 5 with young people attending an adolescent outpatient clinic. Thematic analysis was used to examine young people's descriptions of their emotional experiences during a mobile phone self-monitoring program. The aim of this chapter is to qualitatively examine whether young people experienced an increase in ESA upon completion of a self-monitoring program. A thematic map of ESA is presented in Chapter 5, based on the qualitative information gathered in Chapters 3, 4 and 5.

Chapter 6 focuses on a mixed methods approach, beginning with a rationale for using mixed methods analyses. In this chapter, participants from a rural general practice clinic completed existing measures related to the topic of ESA and an in-depth qualitative interview. The qualitative and quantitative methodologies were then compared. From this, a measure of ESA was then created. A preliminary measure is presented using items from existing measures of topics related to ESA and based on responses from the qualitative interviews.

Chapter 7 focuses on the gold standard of research in psychology, namely a randomised controlled trial, examining the effects of a self-monitoring program on depressive symptoms via the indirect pathway of ESA. A latent growth curve model was estimated to determine whether self-monitoring increases ESA and whether an increase in ESA, in turn, leads to a decrease in depressive symptoms.

Finally, Chapter 8 draws together the theoretical, research and treatment implications of ESA investigated throughout the thesis. The qualitative construct of ESA and the relationship between ESA and depression is discussed. The findings from the current thesis are then compared with previous research with a view to examining how the model of ESA may add to the knowledge in this area whilst considering the limitations of the methods used. Next, further research is suggested that could improve the measurement of ESA. To end the final chapter, the importance of preventing depression and the practical implications of a self-monitoring program based on the concept of ESA is summarised.

CHAPTER 2

Emotions, Coping and Becoming Aware: Background and Theory

Depression and Depressive Symptoms

Symptomology of depression

Depressive disorder affects one in five people at some stage of their life (Blazer, Kessler, McGonagle, & Swartz, 1994; Kessler, Avenevoli, & Merikangas, 2001; Kessler et al., 2005; Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993). The World Health Organization (WHO) defines depression as “a common mental disorder that presents with depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, and poor concentration” (WHO, 2011, p. 1). The two major classifications of depression that are currently used are: the Diagnostic and Statistical Manual of Mental Disorders, Version IV (DSM IV; American Psychiatric Association, 2000); and the International Classification of Diseases, Version 10 (ICD-10) published by the WHO (Janca, Ustun, van Drimmelen, Dittmann, & Isaac, 1994). The DSM IV classifies a major depressive episode (MDE) as an episode of depressed mood and loss of interest in most activities (Antony, Bieling, Cox, Enns, & Swinson, 1998) with at least four of the following symptoms present: (a) weight and appetite gain or loss; (b) changes in sleep; (c) fatigue; (d) restlessness; (e) feelings of guilt or worthlessness; (f) diminished ability to think or concentrate; and (g) thoughts of death or suicide. Although the symptomatology of MDE is similar for adults and adolescents, irritability is often a prominent symptom of adolescent MDE whereas adults generally experience depressed mood or loss of interest (Kessler et al., 2001). A diagnosis of Major Depressive Disorder (MDD) requires meeting the MDE criteria for 2 or more weeks. Subclinical depression is a milder form of depression, consisting of one or more of the MDE criteria, but falling short of meeting the criteria for MDD (American Psychiatric Association, 2000). Subclinical depression is more prominent among young people than MDD (American Psychiatric Association, 2000). The ICD-10 definition consists of mild, moderate and severe classifications of depressive episodes. The typical symptoms in a depressive episode consist of: “depressed mood, loss of interest and enjoyment, and reduced energy leading to increased fatigability and diminished activity. Marked tiredness after only slight effort is common” (Janca et al., 1994, p. 100). The ICD-10 lists other common symptoms of depression including: reduced

concentration and attention; reduced self-esteem and self-confidence; ideas of guilt and unworthiness; bleak and pessimistic views of the future; ideas or acts of self-harm or suicide; disturbed sleep; and diminished appetite (Janca et al., 1994). The ICD-10 defines a mild episode of depression as lasting for more than 2 weeks and including two of the typical symptoms of a depressive episode in combination with two of the other common symptoms of depression listed above. The symptoms must be distressing to the individual but not intense. A moderate depressive episode is two of the typical symptoms of a depressive episode in combination with three or four of the other common symptoms of depression, lasting for two weeks with considerable difficulty in everyday activities. A severe depressive episode includes depressed mood, loss of interest and enjoyment, and increased fatigue as well as four of the other common symptoms of depression listed above generally lasting two weeks with an inability to continue with everyday activities. Loss of self-esteem, loss of self-confidence, guilt and unworthiness are prominent in a severe depressive episode (Janca et al., 1994). If more than one episode of mild, moderate or severe depression occurs then the individual is diagnosed with a recurrent depressive disorder (Janca et al., 1994).

Prevalence of adolescent depression

In western countries, up to 30% of young people experience mild, moderate or more severe depressive symptoms by 18 years of age (Lewinsohn et al., 1993; Rushton, Forcier, & Schectman, 2002). Mild depressive symptoms can progress to moderate and then severe symptoms (Rushton et al., 2002), resulting in diagnosable MDD. The point prevalence for MDD in the 15 to 25 years of age group is 6.1% compared with a point prevalence of 4.9% for all age groups (Blazer et al., 1994), with more young women affected by depression than young men (Blazer et al., 1994; Kessler et al., 2001; Lewinsohn et al., 1993; Rushton et al., 2002). Results from the Oregon Adolescent Depression Project (Seeley & Lewinsohn, 2008) showed that the mean age of onset of adolescent MDD was 14.9 years ($SD = 2.8$) with 33% of adolescents experiencing a second episode within four years. Recurrent episodes of MDE before 15 years of age (early onset MDD; Hammen, Brennan, Keenan-Miller, & Herr, 2008) are associated with more severe and chronic symptoms of depression, suicidal ideation, comorbidity with anxiety and worse social functioning by 20 years of age than those with an onset

after 15 years of age (Hammen et al., 2008). In addition, there is a high overall lifetime prevalence of MDD for young people with estimates of 16.6% (Kessler et al., 2005), 17.1% (Blazer et al., 1994) and 25% (Lewinsohn et al., 1993) reported. Therefore, not only is the prevalence of diagnosable depression higher among adolescents than adults, approximately one in three adolescents experience subclinical symptoms of depression.

Research suggests that mental health problems, particularly emotional disturbance, increase from childhood to adolescence (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Fleming, Offord, & Boyle, 1989; Patton et al., 1996). In an Australian study (Patton et al., 1996), high scores (above 18) on the Clinical Interview Schedule – Revised (CIS-R) were found for 10.5% of Year 7 students, 13.5% of Year 9 students and 21% of Year 11 students. This is further demonstrated in an American study investigating the 3-month prevalence of any disorder in 9 to 16 year olds (Costello et al., 2003). The prevalence of any depressive disorder increased from 0.4% in 12 year-olds to 2.6% in 13 year-olds with another increase from 2.7% in 14 year-olds to 3.7% in 15 year-olds.

The increasing rates of depressive symptoms occurring with the onset of adolescence are attributed to many factors. First, adolescents generally have increased responsibility and stressors compared with prepubescent children (Geisner, 2006). Second, adolescents internalise coping strategies more than younger age groups and rely less on the aid of their parents and others around them than when they were younger (Saari, 1997). Third, adolescents have a heightened sensitivity to peer interactions and require more complex social interactions and long-term rewards than before the onset of adolescence (Allen & Sheeber, 2008). Fourth, many hormonal and neural changes occur during adolescence that have an effect on the brain regions associated with emotions and affect such as the amygdala, hippocampus, ventral striatum and hypothalamus (Allen & Sheeber, 2008). The onset of depressive symptoms places young people at-risk of depressive episodes, and a lifetime of depression.

Life course of depression

Depression is a recurrent disorder. Fifty to sixty percent of people who have a single depressive episode will have another (Rude, Gortner, & Pennebaker, 2004). A predictive study determined that the probability of staying well after an episode of major

depression was 76% at 6-month follow-up, 63% after 1 year and 25% after 5 years (Maj, Velto, Pirozzi, Lobracc, & Magliano, 1992), demonstrating that depression is not contained to a single episode.

Depression commonly co-occurs with other mental illnesses, with 31% of people who suffer from depression reporting a history of another mental illness (Lewinsohn et al., 1993). Comorbidity often occurs between depression and anxiety disorders, substance abuse, eating disorders or conduct disorders. In the adolescent population, 75% of depressed young people reported a history of another mental illness, in particular, anxiety disorders, conduct disorders or substance-use disorders (Kessler et al., 2001). Furthermore, 3.4% of people diagnosed with MDD will eventually suicide (Blair-West, 1999), with more men than women successfully committing suicide. Suicide is most frequent in young people, particularly those in their early 20s (Fairweather, 2007). Of those diagnosed with MDD in the general adult population, 16.6% will attempt suicide within 2 years of their diagnosis (Oquendo et al., 2007). The prognosis for young people experiencing mild to severe depressive symptoms is unfavourable with increased risk of future comorbidity, suicide and a life course of depression.

Current Approaches to Treatment for Depression

There is a substantial economic cost associated with treating those with depression (Andrews, Sanderson, Corry, & Lapsley, 2000). Murray and Lopez (1996) developed the Disability Adjusted Life Years (DALYs); a system for determining the sum of years of potential life lost due to disability, mortality and loss of productive life due to a disability or illness. Using these calculations, Andrews et al. (2000) determined that current treatments for depression would cost \$37,000 for each DALY gained through treatment. Furthermore, out of the total economic burden caused by depression (100%), Andrews et al. (2000) calculated that existing treatments would avert only 13% of the burden of depression, with an additional 23% averted if current treatments were improved to optimal efficiency. These calculations suggest that 64% of the economic burden caused by depression cannot be averted using existing treatments for depression. Furthermore, of the 13% of depression that is averted using current treatment, the cost is

approximately \$37,000 per DALY. This high cost is attributed to the recurrent nature of depression, the large proportion of a person's lifespan affected by depression, often beginning early in adolescence, and the substantial impact depression has on many aspects of life compared with other diseases.

Depression is predicted to become the second leading cause of disease burden worldwide by 2020 (Murray & Lopez, 1997). This is in part due to a decrease in respiratory infections, diarrhoeal and perinatal diseases rather than a sudden increase in depression, yet there is a substantial economic and personal cost of depression that requires additional treatments. In addition, a large number of young people who experience subclinical depressive symptoms account for more of the burden of depression than those suffering from clinically diagnosable MDD (Jorm & Griffiths, 2006; Judd, Schettler, & Akiskal, 2002), and yet appropriate early intervention programs are often not available for these young people. Andrews et al. (2000) concluded that increasing the number and accessibility of early intervention and prevention programs would reduce the burden of depression and also reduce the cost of treating depression to \$10,000 per DALY as opposed to \$37,000, highlighting the need for new methods to reduce the burden of depression with a focus on early stages of depression (The WHO World Mental Health Survey Consortium, 2004).

Current Treatment for Major Depressive Disorder in Adolescents

The continuum of depression can be divided into three groups as indicated in the ICD-10 classification of depression (Janca et al., 1994): (a) mild depressive symptoms; (b) moderate or elevated symptoms in the subclinical range; and (c) severe diagnosable depressive disorders such as MDD (Craighead, Curry, & McMillan, 1994). A vast array of therapies, intervention programs and pharmacotherapies are available to treat MDD. The most common treatments include psychotherapy, medication, self-help and alternative treatments.

Research suggests that using cognitive behavioural therapy (CBT) for young people experiencing MDD is effective (Curry, 2001). CBT involves teaching young people cognitive-reappraisal skills and assertiveness training, and has been shown to significantly reduce depressive symptoms in young people (Kendall, 1993). A meta-

analysis examining cognitive and noncognitive approaches to depression in adolescence (Weisz, McCarty, & Valeri, 2006) examined 35 randomised controlled trials (RCTs) and found that the average treatment involved 13 hours of therapy. The effect size for cognitive approaches (including cognitive therapy and CBT) was calculated as .35. Noncognitive approaches (including relaxation therapy, attachment therapy, family based treatments and interpersonal therapy) had an effect size of .47. There was no significant difference between the effect sizes for cognitive and noncognitive approaches with both having a medium size of effect on MDD. This research suggests that CBT as well as noncognitive therapies are moderately effective for young people suffering from depression. In addition, an Australian meta-analysis also suggested that CBT for under 18 year-olds is effective (Haby, Tonge, Littlefield, Carter, & Vos, 2004), resulting in increased mental health benefits for young people. More patients recovered at the end of CBT than control groups with 62% of young people remitting by the end of CBT when compared with 39% remitting in the control group (Haby et al., 2004).

Research suggests that anti-depressant medications, particularly selective serotonin reuptake inhibitors (SSRIs), may be less effective than CBT for adolescent depression. In the meta-analysis by Haby et al. (2004) mentioned above, which compared CBT, SSRIs and control groups were compared. Haby et al. (2004) calculated effect sizes of 0.41 and 0.29 for CBT and SSRIs respectively. Haby et al. (2004) demonstrated that 46% of young people in the SSRI group remitted compared with 30% in the control group. In addition, SSRIs were not as cost-effective as CBT, costing just under \$50,000 per DALY compared with \$9,000 per DALY for CBT. SSRIs have also been associated with an increase in suicidality, agitation and aggression in young people (Garland, 2004; Woollorton, 2003). In the Treatment for Adolescents with Depression Study (TADS; March et al., 2007), at 36 weeks, 81% in the SSRIs only group and CBT only group had remitted compared with 86% of young people who received a combination of CBT and SSRIs. Suicidal events were 14.7% in the SSRIs only group compared with 6.3% in the CBT only group and 8.4% in the combination group. Therefore, anti-depressant medication is generally not recommended in this age group (Garland, 2004; Jorm et al., 2006; Woollorton, 2003) and no anti-depressant medication, including SSRIs, is currently registered for use with adolescents and children in Australia by the Adverse Drug Reactions Advisory Committee (ADRAC, 2005).

Clinical practice guidelines from *beyondblue*, the national depression initiative, states that in most situations:

Prescription of the SSRI fluoxetine should be considered for acute, short-term reduction of depressive symptoms in adolescents with moderate to severe major depressive disorder, where psychological therapy has not been effective, is not available or is refused, or if symptoms are severe. CBT may be added to/continued with SSRI therapy, to reduce the risk of suicidal thinking and improve functioning in adolescents with major depressive disorder. Tricyclic anti-depressants should not be used for treating major depressive disorder in adolescents. (McDermott et al., 2010, p. 55)

Consequently, the use of SSRIs should only be considered in severe and acute episodes of depression and ADRAC (2005) advises comprehensive management of SSRIs with young people, specifically monitoring of suicidal ideation and behaviour, and using SSRIs in combination with CBT.

Other therapies used to treat MDD include interpersonal therapy, family therapy and psychoanalytic therapies, although there is little research examining the efficacy of these therapies. Psychoanalytic therapy is suggested to be beneficial to young people experiencing emotional disturbance (Tonge, Pullen, Hughes, & Beaufoy, 2009), with the development of insights into the individual's own psyche and their own attachments with others a key characteristic of psychoanalytic therapy. These insights then influence behaviour and defensive mechanisms. There is less research on the efficacy of psychoanalytic therapy than CBT; although, one study suggests that psychoanalytic therapy is associated with a reduction in depressive symptoms in adolescents (Tonge et al., 2009).

Interpersonal therapy is a short-term therapy aimed at improving interpersonal functioning and reducing depressive symptoms, particularly focusing on one or more of these categories: grief, role disputes, role transitions and interpersonal deficits (Mufson et al., 2004). Strategies are then developed to cope with the specific problem.

Interpersonal therapy is not as commonly used or as well researched as CBT, but research shows that it is somewhat effective with depressed young people between 12 and 18 years of age when compared with control groups (Mufson et al., 2004) and is particularly useful for adolescents who experience conflict with their mothers and social

dysfunction among their peer group (Gunlicks-Stoessel, Mufson, Jekal, & Turner, 2010).

Families and family life are intrinsically linked to the wellbeing of adolescents and can be a factor in the development, duration and recovery of adolescent depression (Larner, 2009). Family therapy is another therapy that shows promise in adolescent depression, particularly in combination with CBT or other face-to-face therapy (Larner, 2009). Young people experience a range of family situations including the divorce of parents, poor attachment and conflict with parents or siblings. Family problems such as these may negatively affect young people's mood and lead to depression. On the other hand, a positive relationship with parents and family members may protect the young person from developing depression (Larner, 2009). Family therapy includes processes such as psychoeducation, increasing communication between family members and teaching problem-solving skills (Larner, 2009). The few studies that examine family therapy have demonstrated mixed evidence that family therapy is effective; nevertheless, it is a useful tool in engaging parents and changing family dynamics in disruptive family environments (Larner, 2009).

Self-help therapies, alternative and complementary medicines (such as vitamins, massage and relaxation) are also available for the treatment of depression. Self-help treatments include vitamin supplements, massage, art therapy, bibliotherapy, exercise and relaxation techniques. Exercise, St John's wort, self-help CBT books and light therapy are somewhat effective for adults (Jorm, Christensen, Griffiths, & Rodgers, 2002), although not as effective as CBT or anti-depressant medication. A systematic literature review examining self-help and complementary treatments for young people experiencing depression (Jorm et al., 2006) uncovered few studies focused on the outcomes of these techniques. From this review, there was some support for light therapy for seasonal affective disorder (SAD) or winter depression.

Therefore, the research suggests that there are several treatments available for young people suffering from MDD. Of these, CBT is most effective and there is some support for interpersonal, family and psychoanalytic therapies. Medication is not recommended for adolescents due to the increased risk of suicidality. Furthermore, self-help and complementary treatments may be helpful but further research is needed to determine the effectiveness of these treatments.

Most research focuses on treatments of diagnosed MDD. There are few treatments and services in place for young people suffering from mild to moderate depressive symptoms and to assist young people before the progression to clinically diagnosable depression. To enhance accessibility to services by psychiatrists, psychologists and general practitioners (GPs), The Better Access to Mental Health Care Initiative was established in Australia (Pirkis, Harris, Hall, & Ftanou, 2011) to increase accessibility by increasing the mental health services available for rebate by Medicare. Under Better Access, mental health reviews and treatment plans from GPs or psychiatrists could be claimed on the Medicare Benefits Schedule, and in addition psychologists and other allied health professionals could provide psychological therapy. One of the benefits of this initiative was the increased accessibility to psychotherapy for people experiencing mild, moderate and severe mental health symptoms by reducing the cost of therapy. An evaluation of the Better Access to Mental Health Care in Australia published recently (Pirkis et al., 2011) suggests that more people accessed mental health resources since this initiative began; although, 90% of people accessing mental health resources had a diagnosis of MDD or anxiety disorders. The rates of uptake of mental health resources increased from 1 in 30 receiving mental health care in 2007 to 1 in 19 in 2009; however, there was low uptake of mental health services by people experiencing subclinical symptoms.

There is a lack of appropriate treatments available for the substantial number of young people suffering from mild depressive symptoms, who represent the largest burden of depression (Lewinsohn et al., 1993; Rushton et al., 2002). The next section examines the prevention and early intervention programs currently available for young people and discusses the benefits of prevention interventions.

Stepped Care Model

Providing treatment at all levels of the depression continuum is likely to decrease the number of people with recurrent depression thereby reducing the burden and cost of depression. People with mild depressive symptoms seek treatment less than those with severe depressive symptoms, particularly adolescents (Geisner, 2006). Nevertheless, young people with mild symptoms are at risk of developing MDD. Using a stepped care

model with easily accessible interventions at each step could prevent the progression from mild to moderate to severe depressive symptoms and reduce the recurrent nature of depression.

The stepped care model involves several steps depending on the severity of the problem, beginning with simple and inexpensive interventions for those with mild depressive symptoms and increasing in intensity when needed (Geisner, 2006; Jorm & Griffiths, 2006; van Straten, Seekles, van't Veer-Tazelaar, Beekman, & Cuijpers, 2010). The stepped care model has the potential to assist a large majority of young people who experience mild depressive symptoms and has the advantage of reducing the length and cost of the treatment required (Lynch et al., 2005; Spence et al., 2005).

There is mixed evidence for the effectiveness of programs aimed at preventing depression and to confound the issue further, there is ambiguity in the terms 'early intervention' and 'prevention' (Merry, McDowell, Hetrick, Bir, & Muller, 2004) To address this, Muñoz, Mrazek and Haggerty (1996) describe prevention as "interventions that occur before the initial onset of a clinical diagnosable disorder" (p. 1118) with three levels proposed: (a) universal strategies where whole groups are involved (usually school groups); (b) selective strategies where young people with a common attribute that is associated with an increased risk of development of depression are targeted (i.e., young people with depressed parents); and (c) indicated strategies where young people with slightly elevated or subclinical depressive symptoms are targeted. This definition focuses on the prevention of a severe diagnosable disorder rather than the prevention of mild depressive symptoms and regards programs targeting young people with any depressive symptoms as preventative. Mrazek and Haggerty (1994) developed the prevention intervention research cycle to illustrate the concept of the stepped care model which has been further adapted to include health promotion and early intervention (Commonwealth Department of Health and Aged Care, 2000), as illustrated in Figure 2.1.

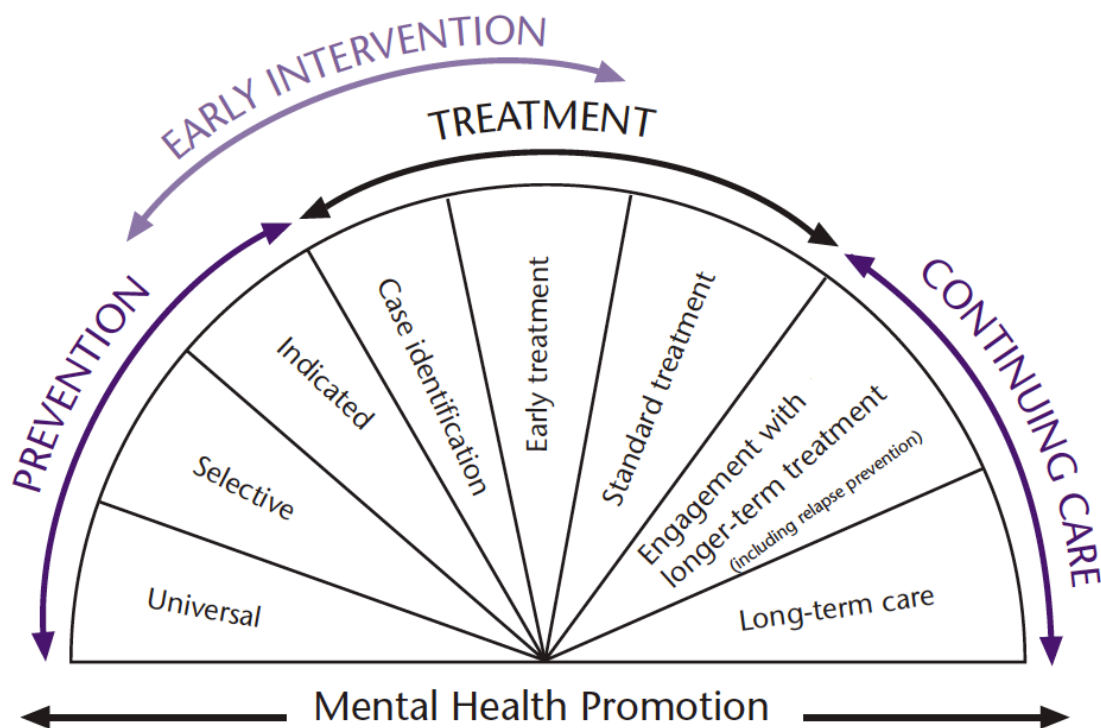


Figure 2.1. The spectrum of prevention and interventions for mental health problems. Adapted from “Promotion, prevention and early intervention for mental health - a monograph” by the Commonwealth Department of Health and Aged Care, 2000, *Promotion, prevention and early intervention for mental health - a monograph*, p. 28.

Prevention consists of universal, selective and indicated strategies whereas early intervention consists of interventions targeting those with subclinical depressive symptoms or in the early stages of their disorders. Figure 2.1 highlights the overlap between *prevention* and *early intervention*. Early intervention programs target mental health problems during the early stages of a disorder including young people with elevated symptoms of depression, during the assessment and diagnosis of a disorder, and in the early stages of a diagnosed disorder. Focusing on prevention and early intervention has the potential to reduce the number of young people who develop MDD.

Universal prevention programs

In the 1990s and 2000s, interest in universal prevention programs for mental health increased. These programs, based on CBT, operated in schools with all students

in a selected year level and usually consisted of between five to eighteen 1-hour weekly sessions (Lewinsohn & Clarke, 1999).

The evidence supporting the effectiveness of universal prevention programs at reducing depressive symptoms in the population is mixed, with some studies demonstrating a reduction in depressive symptoms (Farrell & Barrett, 2007), whilst other research suggests that universal strategies have no effect on the symptoms of depression in young people (Lewinsohn & Clarke, 1999; Merry, 2007; Sheffield et al., 2006). A recent meta-analysis (Merry, Hetrick, Cox, Brudevold-Iversen, Bir, & McDowell, 2011) examining 53 studies and 14,406 participants suggests that universal, selective and indicated prevention strategies effectively reduced depressive symptoms 9-months posttest with indicated and selective prevention programs effective at 12-month posttest. Nevertheless, there are three main limitations with universal prevention programs: (a) they are lengthy with high attrition rates; (b) they are generally adapted from programs designed to treat adults experiencing severe, diagnosed depression (Lewinsohn & Clarke, 1999), often neglecting important metacognitive abilities that develop during adolescence; and (c) as many of the young people participating have no experience with depression they may lose interest, drop out, or have negative connotations with the program and may, in turn, influence their peers who would have otherwise benefited from the program. Despite these limitations of universal strategies, prevention remains an important area for decreasing the burden of depression, with other avenues to explore such as selective and indicated strategies (Horowitz & Garber, 2006).

Selective prevention programs

Selective prevention programs begin by targeting a population 'at-risk' of a disorder due to biological, psychological or social risk factors (Muñoz et al., 1996). Once this target group is identified, potential participants can be screened, to determine if they have early signs of the disorder, and are then invited to participate. Research investigating selective prevention programs suggest that these programs may effectively prevent anxiety disorders in children of parents with anxiety disorders (Kennedy, 2009), prevent psychological problems in siblings of paediatric cancer patients (Prchal, 2009), and prevent depression in young people with depressive parents (Clarke et al., 2001;

Lynch et al., 2005). Drawbacks of selective preventions include: (a) they can be stigmatising due to the attributes used to invite young people to participate in these programs (Spence et al., 2005); (b) as with universal strategies, those participating in selective prevention, although at-risk, may not be experiencing symptoms and may react negatively towards the program; (c) participants must be identified as part of the target group and then screened; and (d) elaborate and time-consuming processes are needed to screen potential participants (Moncher, Holden, & Schinke, 1989).

Indicated prevention programs

As with selective prevention programs, indicated prevention programs target those at-risk of developing a disorder (Muñoz et al., 1996). Whilst selective prevention programs target those with risk factors attributed to the disorder such as hereditary or chronic illness, indicated prevention programs target those who are experiencing elevated symptoms of the disorder but do not meet the criteria for diagnosis of a mental disorder (Muñoz et al., 1996).

Larger effect sizes have been found for selective and indicated prevention programs. This is likely to be due to young people with elevated symptoms targeted in indicated programs whilst universal strategies are often underpowered (Merry et al., 2011). A recent meta-analysis (Horowitz & Garber, 2006) found that indicated prevention programs, with people experiencing mild depressive symptoms, and selective prevention programs, targeting people with a common attribute linked to depression, were more effective than universal strategies. In addition, culturally sensitive and developmentally appropriate strategies as well as strategies guided by theory were found to be most effective at reducing depression (Horowitz & Garber, 2006). Selective and indicated prevention programs are likely to be more clinically viable and cost-effective than universal strategies, with indicated prevention possibly being less confronting and stigmatising for young people than selective prevention as young people are chosen based on their experience of depressive symptoms rather than their parent's depression or other related factors. Indicated prevention programs may also be most cost effective as less screening takes place than selective prevention programs.

Early intervention programs

The goal of early intervention strategies is to reduce symptomatology in people with both subclinical symptoms as well as those in the the early stages of a diagnosed disorder. Early intervention programs, therefore, overlap with the goals of indicated prevention programs (Merry, 2007). Early intervention programs, particularly indicated prevention programs, show promise at reducing depressive symptoms and may also prevent the development of major depressive disorder (Calear & Christensen, 2010; Horowitz & Garber, 2006).

In a study by Rushton et al. (2002), 13,568 adolescents from Year 7 to 12 were interviewed about their depressive symptoms amongst other survey questions and followed up 1 year later. Participants were categorised into four groups at pretest: (a) no or very few depressive symptoms, (b) mild depressive symptoms, (c) moderate depressive symptoms, and (d) severe depressive symptoms. Adolescents with no depressive symptoms at pretest remained in this category at the 1-year follow-up. Of the adolescents with mild symptoms, 17% progressed to the moderate and severe groups. Almost half the adolescents in the no symptoms or mild symptoms groups remained in their category after 1-year follow-up. This study suggests that young people with none or very few depressive symptoms are unlikely to develop depressive symptoms, negating the use of universal strategies as the majority of young people involved are not at-risk of developing depression. These findings also suggest that early intervention programs could be useful in reducing mild to moderate depressive symptoms and prevent adolescents from progressing from subclinical symptoms of depression to a diagnosis of MDD.

Early intervention strategies show promise in reducing depressive symptoms and therefore may prevent the development of MDD. Based upon the research mentioned above, the following guidelines may be useful to increase the efficacy of early intervention programs: (a) early intervention programs must retain the interest and motivation of young people, (b) the program must be quick and easy to use, and (c) the program must have the ability to identify serious symptoms and progress to further intervention if symptoms worsen or are otherwise required. Both Horowitz and Garber (2006) and Pössel (2003) emphasised the importance of understanding mediating and moderating factors underlying prevention and early intervention strategies in order to

discover the mechanism of successful strategies and refine these strategies. Therefore, the content included in prevention and early intervention programs is an important issue to consider.

One of the major developments occurring during adolescence is the continuation of brain development. During adolescence, there is an increase in executive brain functioning (Kuhn, 2006). To date, therapies for adolescents are designed based on adult therapy and do not take into account cognitive and metacognitive abilities that are developed during adolescence (Kuhn, 2006; Lewinsohn & Clarke, 1999). Young people learn to cope and regulate their emotions during adolescence (Gillham, Reivich, & Shatte, 2001), with maladaptive emotion regulation and coping strategies often developing and leading to depressive symptoms. Content focusing on emotions and assisting young people in the development of adaptive emotion regulation may provide a suitable framework for early intervention programs. The development of emotion regulation is critical during adolescence and may play an important role reducing symptoms of depression and other mental disorders.

Emotions and Emotion Regulation

In 1872, Charles Darwin (1872/1921) recognised the importance of emotion as a necessary system for signaling imminent dangers. The ability to instantly recognise dangers, distress or desire, through emotions, is an important process allowing humans and animals alike to respond to stimuli immediately, before fully comprehending the situation (Darwin, 1872/1921; Stegge & Terwogt, 2007). Emotions continually change from one moment to the next and are important motivators (Cole, Martin, & Dennis, 2004), allowing individuals to view experiences and the environment in a meaningful way. The dynamic and subjective nature of emotions, however, can cause difficulties in defining and interpreting emotions in oneself and others.

Research in psychology, animal studies and neurobiology is yet to make a clear distinction between emotions and cognitions (Gray, 1990). Neurochemicals used to treat stress and anxiety, such as benzodiazepines and opiates, also affect cognitions, particularly learning and memory (Gray, 1990). Cognitive processes have developed in response to evolutionary necessity allowing humans to better learn, remember and

process information about the environment in order to aid survival. Neurological studies demonstrate that cortical regions and neural pathways responsible for emotions are also implicated in the production of cognition (Gray, 1990), suggesting that much, if not all, cognitive processes are developed to devise alternative adaptive ways to process emotional stimuli.

Emotions enable people to prepare for action in various situations (Greenberg, 2004) by guiding appraisal of personal goals, concerns and needs. Learning to use emotional knowledge is a necessary skill for survival (Greenberg, 2004). The way individuals interpret and evaluate their thoughts and feelings, in turn, impacts on behaviour. Different emotions influence behaviour in different ways, for instance, fear results in the fight or flight response whereas happiness and joy trigger the behavioural responses of approach and acceptance (Greenberg, 2004). Emotions are elicited by reinforcing stimuli and separate emotions can be defined in terms of the particular reinforcing stimuli that they respond to (e.g., Gray, 1990). Positive emotions are associated with physical and psychological wellbeing and can help build a resilience against anxiety and depression (Fredrickson, 2001) and negative emotions are important from an evolutionary standpoint, providing much of the framework necessary for survival (Greenberg, 2004). Although important and necessary for survival, when prolonged, negative emotion can have detrimental effects on an individual (Stegge & Terwogt, 2007).

Although the importance of emotions to everyday existence is well recognised, there has been ongoing debate about how emotions occur, what emotions are, what factors contribute to an emotional experience and how emotions interact with cognitions and behaviour (LeDoux, 1995). Gross and Thompson (2007) identified three components that combine to produce an emotion: (a) a situation that requires attention by the individual; (b) a unique meaning assigned to this situation; and (c) a response elicited by the individual involving physiological, behavioural, experiential and neurobiological changes. In addition to this description, Pham (2007) described an emotion as a change in the autonomic nervous system and physiological system due to a complex subjective state. Figure 2.2 (adapted from Gross & Thompson, 2007) depicts the process of emotion generation and the role emotion regulation plays in changing and adapting emotion generation.

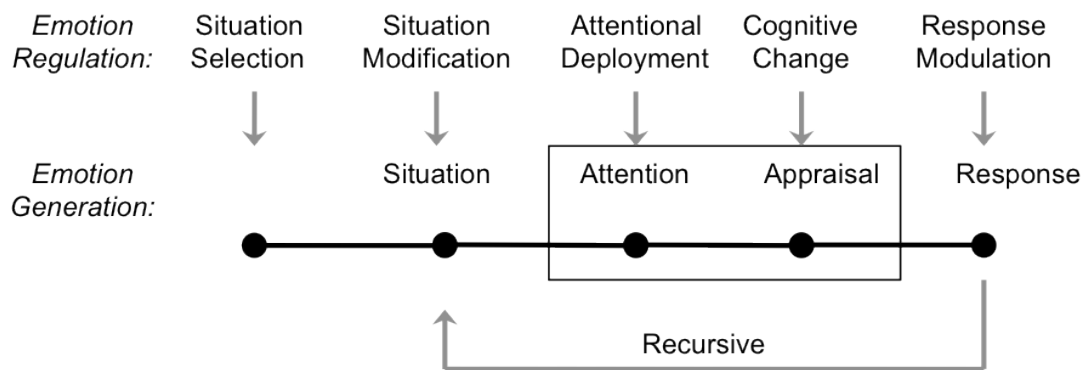


Figure 2.2. Modal model of emotion and emotion regulation strategies. Adapted from “Emotion Regulation: Conceptual Foundation,” by J. J. Gross and R. A. Thompson, 2007, in J. J. Gross (Ed.), *Handbook of Emotion Regulation*. New York: The Guilford Press, p. 10.

Individuals manage their emotional generation and arousal by regulating their emotions in various ways. Difficulties in emotion regulation can result in inappropriate responses to situations leading to externalising disorders, such as antisocial behaviour and aggression (Mullin & Hinshaw, 2007), and mood disorders, such as anxiety disorders and depression (Campbell-Sills & Barlow, 2007). The five strategies, listed in Figure 2.2, occur at different phases during emotion generation and involve: (a) *situation selection*, choosing a situation in which a desirable emotional response is more likely; (b) *situational modification*, directly altering the situation to achieve a desirable emotional response; (c) *attentional deployment*, changing the attention of an individual to result in a more positive outcome; and (d) *cognitive change or re-appraisal*, changing the emotional significance of the situation by re-evaluating thoughts (Gross & Thompson, 2007). After an emotional response is generated, emotion regulation can still occur in the form of *response modification* such as suppression or distraction, where the response itself is directly modified. Medication, relaxation techniques, and other strategies can be used as response modification strategies. Emotion regulation occurs with both positive and negative emotions and can either increase, decrease or maintain emotions. Emotion regulation can be conscious and controlled, unconscious and automatic, and either intrinsic or extrinsic (Gross & Thompson, 2007).

Affective states

No single definition of emotion is universally accepted (Swinkels & Giuliano, 1995). Gross and Thompson (2007) propose that emotion is a subset of affect, which involves four components: emotions, mood, stress and impulses. Emotion regulation is used to regulate emotions and typically focuses on affective responses to a specific event or object, whereas coping is used to decrease stressors over a long period. Defences are employed to control impulses such as anger and anxiety. Swinkels and Giuliano (1995) define mood as “affective states that are nonspecific, pervasive and capable of widely influencing cognitions and behaviour” (p. 35). Mood and mood regulation are similar to emotions and emotion regulation, with some notable differences. Moods are general states whereas emotions focus on a specific stimulus. Moods are longer lasting and more diffuse than emotions thereby affecting general cognitions rather than cognitions related to one specific emotional experience (Gross & Thompson, 2007). Mood regulation and mood repair tend to occur over a longer period of time than emotion regulation and repair. Therefore, mood influences a variety of behaviour and cognitions as opposed to a single instance.

The generation and regulation of moods and emotions is generally processed unconsciously and automatically. The ability to think about these internal states and regulate affect is a learned skill (Gross & Thompson, 2007). Learning to consciously process affective information can assist with a range of stressors and situations that arise during teen years. Adolescence is a critical period for learning to cope with different situations and intrinsic to the development of metacognitions (Gillham et al., 2001; Steinberg, 2005).

Adolescent development

Metacognitions refers to the knowledge about, and regulation of, one’s cognitions (Flavell, 1979); the ability to think about thinking. In a series of memory studies, Flavell discovered that older children were able to study their learning task for a period of time and, when they said they were ready, had perfect recall whereas younger children were unable to determine when they had learnt the memory task and were limited in their knowledge and ability to think about cognitions. Older children also tended to monitor their cognitions more than younger children.

Metacognitions are implicated in the development of affect regulation (Efklides, 2008). Development of emotional competence and regulation begins in early childhood (Gillham et al., 2001). In infancy, extrinsic processes are prevalent with parents' responding to and guiding young children's emotional responses, teaching affective responses early in life. During teen years, young people develop the ability to think about, monitor and internalise these processes and become more independent, relying less on parents and other external processes (Gillham et al., 2001). The development of emotion regulation involves a number of changes that occur during adolescence.

Neurological development responsible for executive functions and decision-making is an important component of affect regulation. In particular, the prefrontal cortex is primarily involved in executive functions such as shifting between different mental tasks, working memory representation, and inhibiting automatic and dominant responses (Miyake, Friedman, Emerson, Witzki, Howerter, & Wager, 2000). MRI and functional MRI studies show that the prefrontal cortex develops gradually from childhood to the mid-twenties and is more active in adolescence than in children or adults (Casey et al., 1993; Luna et al., 2001; Sowell, Trauner, Gamst, & Jernigan, 2002). Furthermore, the pre-frontal cortex is more active during adolescence than in children or adults (Luna et al., 2001). Neurological development responsible for executive functions and decision-making is an important component of affect regulation (Gray, 1990).

Functional MRI studies show that the prefrontal cortex develops gradually from childhood to adulthood and is more active in adolescence than in children or adults (Luna et al., 2001). Recent MRI studies have also emphasised the importance of nonspecific brain development during adolescence. In particular, increases in white matter density in neural pathways are present. Thereby increasing the synaptic responses between different regions of the brain resulting in rapid communication between different brain functions (Luna et al., 2001; Paus et al., 1999; Sowell et al., 2002). Increased development in brain regions results in cognitive development as demonstrated in an experimental study using the Iowa Gambling Task (Crone & van der Molen, 2004). This study demonstrated that adolescents progressively develop a sensitivity to future consequences from early to late adolescence. A further cross-sectional study also demonstrated the relationship between cognitive development and

age, with young adults making significantly more socially responsible decisions when compared with younger adolescents (Cauffman & Steinberg, 2000).

In addition to brain and cognitive developments, changes in motivations and emotional arousal occur with the onset of puberty. For example, Martin et al. (2002) conducted a cross-sectional study and demonstrated that sensation-seeking in the form of nicotine, alcohol and marijuana use was positively associated with pubertal development when controlling for age. Another cross-sectional study (Steinberg, 1987) showed an association between puberty and emotional distance from parents as well as increased conflict with mothers.

Aside from these development issues, there are a number of psychosocial stressors that accompany young people in the transition from childhood to adolescence (Allen & Sheeber, 2008; Larson & Sheeber, 2008). Relationships with family and parents change as adolescents seek more autonomy, often resulting in family conflict and less parental support (Allen & Sheeber, 2008). Interactions and roles change with new peers and different groups of friends. Academic performance becomes a priority for many young people (Larson & Sheeber, 2008).

A review by Steinberg (2005) suggests that adolescent development consists of: (a) changes related to age and experience such as cognitive and neurological development; and (b) changes that are affected by puberty including risk-taking, sensation-seeking and affective arousal. Self-regulation and the ability to make long-term plans is largely due to gradual changes in cognition and neurology (Steinberg, 2005). Therefore, adolescents develop the abilities to reason, process information, learn to abstract and engage in planning gradually throughout adolescence (Steinberg, 2005).

Changes related to puberty precede the development of regulatory competence and therefore young adolescents experience an increase in affective arousal and motivations before they are able to regulate these experiences. Steinberg (2005) uses the following analogy: “The development of early adolescence may well create a situation in which one is starting the engine without yet having a skilled driver behind the wheel” (p. 70). A cross-sectional study on romantic relationships demonstrated this concept, with romantic relationships in early adolescence and later childhood found to predict negative results in academic, job and conduct outcomes (Neemann, Hubbard, & Masten, 1995). There was no significant prediction of negative consequences for romantic

relationships for older adolescents. This research suggests that whilst the experience of sexual arousal and romantic feelings may occur during early adolescence, younger adolescents may not have the cognitive ability to plan and make appropriate decisions about romantic relationships.

Similar to critical periods that occur during early childhood, it seems that adolescence is a critical period for the development of effective emotion regulation (Gillham et al., 2001; Steinberg, 2005), with changes related to increased age and experience as well as hormonal changes that occur during puberty. During this critical period, young people develop intrinsic strategies for coping and regulating affect (Gillham et al., 2001), providing a basis for future affect regulation skills. Effective regulation involves the ability to direct thoughts inwards, focusing on emotions, thoughts and behaviour, and increasing knowledge about emotional experiences.

Many intrinsic strategies are developed during adolescence that allow young people to manage their experiences with emotions and distress. As young people learn different skills to regulate their emotions, an integrated repertoire of regulation strategies develops which are then used throughout the lifetime of an individual. Once developed, emotion regulation strategies can be difficult to change (Thompson, 1994). Typical coping responses for teenagers include problem solving, emotional expression and regulation, positive thinking, cognitive restructuring, acceptance, avoidance, denial, wishful thinking and distraction (Conner-Smith, Compas, Wadsworth, Harding Thomsen, & Saltzman, 2000). Older adolescents have a wider variety of coping strategies than younger adolescents (Aspinwall & Taylor, 1997) due to a combination of increased experience with stressors, increased metacognitive ability and consequently more complex strategies. Research has also demonstrated that young women have a larger repertoire of strategies than young men (Aspinwall & Taylor, 1997).

Coping

Gross and Thompson (2007) distinguish coping from emotion regulation by two key characteristics. First, the goal of coping is to decrease stressors, which are inherently negative whereas emotions can be both positive or negative, therefore the goal of emotion regulation can be to either dampen, intensify or maintain an emotion.

Second, stressors occur over longer periods of time than emotions and, as such, coping is associated with a longer duration than emotion regulation. During adolescence, young people are learning to cope with their changing motivations, roles, responsibilities and increased stressors. Productive regulatory and coping strategies are essential in order to combat stressful experiences and emotional turmoil.

Lazarus and Folkman (1984) viewed coping as an ongoing process, defined as: “constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (p. 141). According to Lazarus and Folkman’s definition, coping is a consciously controlled phenomenon, distinguished from automatic behaviour such as impulsive defensive behaviour. Lazarus and Folkman theorised that coping can result in both productive and detrimental outcomes. Furthermore, Lazarus and Folkman highlight the dynamic quality of coping in their definition. Changes in the environment and emotions lead to reevaluation of the environment thereby affecting coping (Folkman & Lazarus, 1988).

Problem solving, distraction and suppression are among the most commonly reported coping strategies. Lazarus and Folkman (1984) also considered negative processes such as avoidance, minimisation, tolerance and acceptance as coping strategies. Broadly, Lazarus and Folkman categorise coping strategies into either problem-focused coping or emotion-focused coping, described below.

Problem-focused coping

In many situations causing distress, the problem or environment can be changed in order to reduce the stressors. Problem-focused coping such as this is defined as: “coping that is directed at managing or altering the problem causing the distress” (Lazarus & Folkman, 1984, p. 150). Problem-focused coping consists of problem-solving strategies such as: (a) defining the problem, (b) generating alternative solutions, (c) weighing the pros and cons, (d) choosing between options, and (e) acting (Lazarus & Folkman, 1984). Other intrinsic strategies are also involved such as changing the level of desire, reducing the involvement of ego, changing the gratification association, employing new standards of behaviour and learning new skills.

Research predominately focuses on the beneficial outcomes of problem-focused coping. A recent meta-analysis (Penley, Tomaka, & Wiebe, 2002) demonstrated that problem-focused coping was positively associated with mental and physical wellbeing. Similarly, a research study in adolescent psychology indicated that problem-focused coping was associated with positive outcomes, particularly with young people who feel in control of the situation and have the resources to change the situation (Ebata & Moos, 1994).

Lazarus and Folkman (1984) state that problem-focused coping is useful when the problem can be altered or managed, but acknowledge that problem-focused coping is not always advantageous. Situations that cannot be changed (e.g., natural disasters) require strategies that focus on reappraising the situation rather than altering the situation. In these situations, coping can be directed to changing the emotional response to the problem (Lazarus & Folkman, 1984).

Emotion-focused coping

Emotion-focused coping was originally described as: “coping that is directed at regulating emotional responses to problems” (Lazarus & Folkman, 1984, p. 150) with no emphasis on whether the outcome was beneficial or detrimental. Lazarus and Folkman included avoidance of the problem, minimisation, distancing, selective attention and positive comparisons in their definition of emotion-focused coping. Four groups of emotion-focused coping were suggested, including: (a) cognitive appraisals, where the meaning of the situation is changed in order to regulate emotions; (b) selective attention and avoidance, where aspects of the problem are blocked out or ignored in order to regulate emotions; (c) behavioural strategies, where actions that can lead to reappraisal or avoidance such as exercise, alcohol use, drug use or meditation are used; and (d) self-deception, where reality is distorted in order to deny the problem or act as if the problem did not occur (Lazarus & Folkman, 1984).

Emotion-focused coping is often conceptualised as a defence process (Gross & Thompson, 2007) as emotion-focused coping often occurs in situations where the individual has no control over the environment and therefore cannot effectively engage in problem-focused strategies. Despite the lack of valence in Lazarus and Folkman’s (1984) definition of emotion-focused coping, past research tended to conceptualise

emotion-focused coping as a negative coping style and problem-focused coping as positive (Ebata & Moos, 1994; Penley et al., 2002). Theories and research on rumination and worry dominate the literature about emotion-focused coping (Lyubomirsky & Nolen-Hoeksema, 1993, 1995; Moberly & Watkins, 2008; Nolen-Hoeksema, 1991; Rimes & Watkin, 2005), nevertheless, more recent exploration into emotion-focused coping suggests that beneficial outcomes can also occur (Mor & Winqvist, 2002; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Segerstrom, Stanton, Alden, & Shortridge, 2003; Watkins, 2004, 2008). Indeed, emotion-focused coping is particularly useful in situations outside of an individual's control, particularly for adolescents who are restricted in their behaviour by parents, teachers and societal rules. In many of these situations, young people may be unable to use problem-focused coping strategies and therefore rely on emotion-focused strategies such as exercise, selective attention and self-deception. Emotion-focused coping, therefore, is not inherently detrimental but rather a vastly more complex issue, influenced by a range of factors and a wide range of consequences (Austenfeld & Stanton, 2004).

Cognitive Processing of Affective States

The way an individual processes affective states relies on knowledge of the situation and past experiences. Brewin's (2006) theory of retrieval competition proposes that different ways of processing information, such as information about emotions, stressors, impulses and moods, are stored as representations in memory for any given situation. For most situations there are many memories representing different courses of action, based on past knowledge, experiences and beliefs, which inform these representations and compete for retrieval. Successful retrieval of a representation is influenced by how often the memory is retrieved, the number of conflicting representations that are available for the situation, what the triggering cue is and also unique distinguishing features that come to mind about the representation (Brewin, 2006). Memory plays an important role in processing emotional and cognitive information. Nevertheless, distinguishing and defining separate memory processes to account for highly interrelated cognitive and emotional processes has proven problematic in many psychological domains, such as neurobiology and animal studies.

Although, the processing of emotional information is hypothesised to be largely automatic (Gray, 1990). Humans and animals alike respond to the physiological and psychological changes caused by emotions reflexively, without conscious awareness of this process. Two theories about how individuals process affective and cognitive information, the Reinforcement Sensitivity Theory and the Psychotherapeutic Theory, are described below.

Reinforcement Sensitivity Theory

Adapted from Gray's Behavioural Inhibition System (BIS; Gray, 1982, 1990), the Reinforcement Sensitivity Theory (RST; McNaughton & Corr, 2008) provides a comprehensive account of the processing of information by viewing cognition as a process resulting from emotional information. The RST is often used to explain the processes involved in anxiety (Gray, 1990; McNaughton & Corr, 2008) and also depression (Depue & Iacono, 1989; Kasch, Rottenberg, Arnow, & Gotlib, 2002). According to the RST, there are three main systems that affect information processing: the behavioural activation system (BAS), the fight-flight-freeze system (FFFS) and the BIS (Gray, 1990; McNaughton & Corr, 2008). The interaction between these systems is presented in Figure 2.3 (adapted from diagrams in Corr, 2011; Gray, 1990; McNaughton & Corr, 2008).

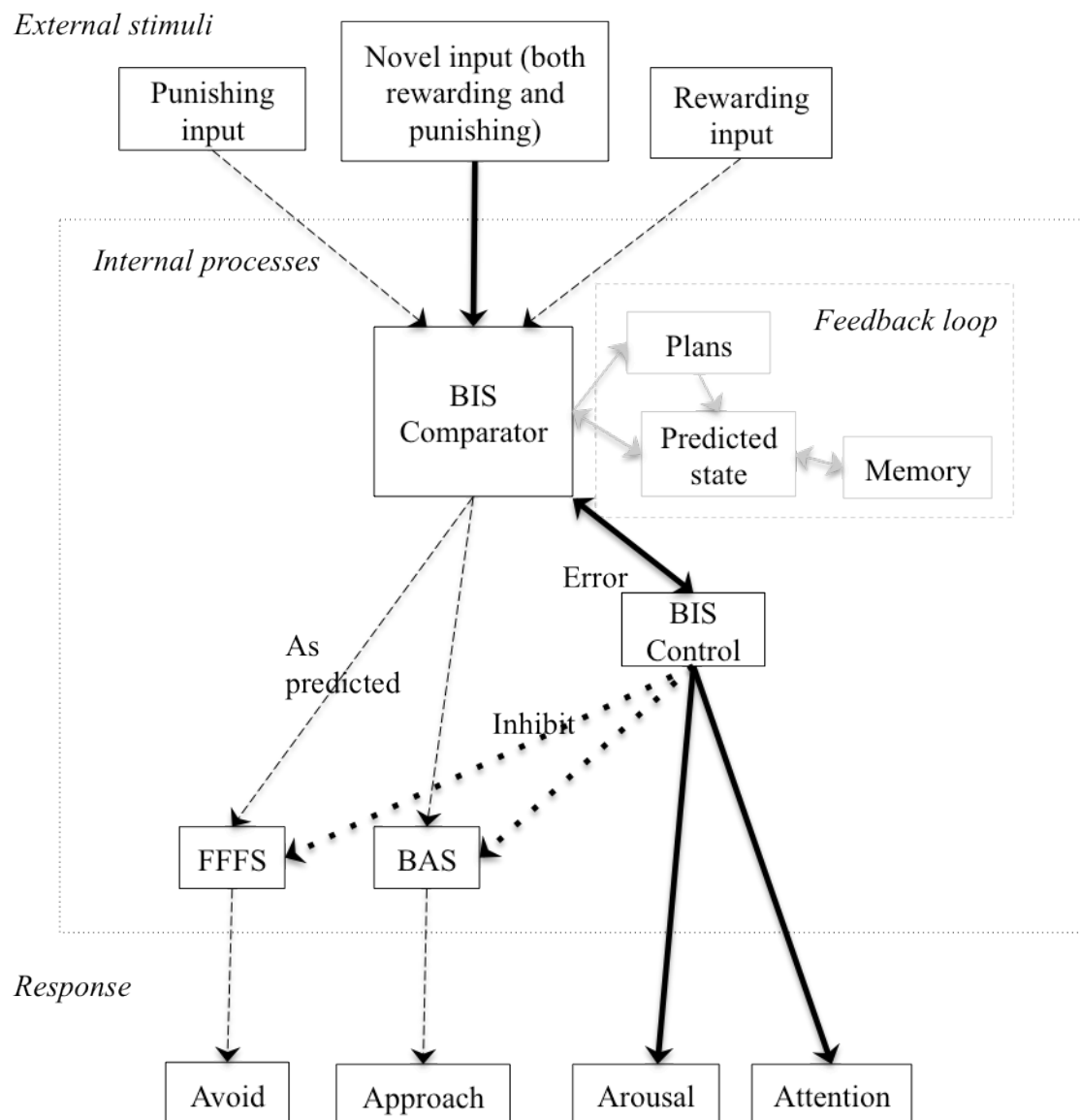


Figure 2.3. The Reinforcement Sensitivity Theory. BIS = Behavioural Inhibition System, FFFS = Fight-Flight-Freeze System, BAS = Behavioural Activation System. Adapted from “The Neuropsychology of Fear and Anxiety: A Foundation for Reinforcement Sensitivity Theory,” by N. McNaughton and P. J. Corr, 2008, in P. J. Corr (Ed.), *The Reinforcement Theory of Personality*. Cambridge: Cambridge University Press, p. 78.

Most behavioural responses occur automatically in response to either the BAS or the FFFS; the BAS processes rewarding information and positive events whereas the FFFS processes information about punishment and negative events. Figure 2.3 highlights these processes via the dashed arrows. Gray (1990), and McNaughton and

Gray (2008), also emphasise that the absence of reward and punishment are also processed accordingly; the BAS therefore processes all rewarding positive events and all positive ‘nonevents’ such as the omission of an expected punishment, whereas the FFFS processes motivating ‘nonevents’ where an expected reward was not received, in addition to punishment.

The BIS, as its name suggests, inhibits the production of automatic, reflexive behaviour that occurs via the FFFS or the BAS and consists of two components: the comparator and the control. The comparator processes information about the actual stimuli and compares this information with the expected stimuli, when there is no discrepancy, behaviour continues uninterrupted as motivated by the FFFS and BAS (as depicted by the dashed arrows in Figure 2.3). Information that is predictable, familiar and does not trigger competing BAS and FFFS systems is processed this way. There are, however, situations in which information attempts to activate both systems. This occurs when there is a discrepancy between actual and expected stimuli, or there are conflicting motivations caused by the competing goals of the FFFS and the BAS, including novel situations. For these conflicting and novel situations, the BIS comparator then triggers an error message, which in turn activates the control mode and detailed processing of the available stimuli occurs (Corr, 2011). The bold arrow pathway in Figure 2.3 represents the processing of novel or conflicting stimuli. The BIS in control mode both inhibits automatic activation of the FFFS and BAS, resulting in behavioural inhibition and also increases attention and arousal by scanning the external environment to assess risks and scanning memory for previous knowledge of the situation (McNaughton & Corr, 2008). A new behavioural response is then generated to resolve the conflict and the cycle repeats. The RST was founded on studies examining anxiety and the effects of anti-anxiety medication on brain regions (Gray, 1982), however, the BIS is primarily adaptive, serving the evolutionary goal of inhibiting nonproductive behaviours and increasing the chances of finding a response that is productive.

Psychotherapeutic theory

The RST suggests that there are both automatic, reflexive processes as well as controlled, reflective processes (Corr, 2011). This idea of dual systems of information processing has long been present in psychological theory with its early beginnings in Freudian psychoanalysis (Freud, 1927). Modern psychotherapy has adapted and changed from its beginnings of Freudian psychoanalysis as new evidence about cognitions and disorders have arisen. Rational-emotive therapy (Ellis, 1969), cognitive behavioural therapy (Beck, 1997) and cognitive-experiential self-theory (Epstein, 1994) all involve similar concepts of dichotomous systems that are responsible for the processing of information (Pacini, Muir, & Epstein, 1998; Salas-Auvert & Felgoise, 2003): the reflexive system and the reflective system. Experiences are often processed automatically without conscious awareness by the reflexive system, including experiential information such as emotions, unconscious habitual behaviours and automatic gestures. Conscious and rational thoughts are processed by the reflective system, as well as detrimental obsessive thoughts such as rumination and worry. These systems differ in properties and the types of information they process. The reflexive system is holistic, focusing on broad patterns whereas the reflective system takes an analytical approach focusing on specific instances or objects (Salas-Auvert & Felgoise, 2003). Reflexive processing, developed for survival in primitive times, is necessarily automatic and rapid in processing whereas the reflective system requires activation of higher cognitive functioning, with effort and deliberation, and is therefore a slower process. The reflexive system is intuitive, focusing on the processing of emotional information as well as other experiences and accounts for most of our unconscious experiences. The reflective system is logical, thereby allowing processing of all available information by considering various situations, emotions, memories, the environment and past experiences in a conscious, often rational, manner. Different information is processed by each system, with the reflexive system generally processing images, metaphors and narratives whilst the reflective system processes higher-order abstract concepts such as numbers, words and symbols.

Both the reflexive and reflective processing systems are necessary for everyday functioning and survival. An individual can react quickly to highly emotional situations, such as being frightened or hurt, using reflexive processing and respond to less emotive

problem-solving tasks by reflecting and thinking about the best course of action using the reflective processing system. The reflexive system dominates most of the time, particularly when information is familiar, and the reflective system responds when new, abstract information arises. Neurological evidence (Gray, 1990; LeDoux, 1995; Lieberman et al., 2007) supports the existence of two systems of processing, with reflective processing taking place mostly in the prefrontal cortex and reflexive processing occurring in the amygdala and other limbic regions. Neurological studies demonstrate that all animals respond to emotions, including humans, with defence mechanisms, and the neural circuitry involved in the detection and defence against danger and fear is similar throughout vertebrate species (LeDoux, 1995). This research demonstrates the evolutionary role emotions play at a subconscious level. LeDoux presents the following example:

A rat exposed to a cat will automatically freeze in order to minimise the possibility of an attack. During the freezing episode, the rat begins planning strategies that might lead to successful escape, using information stored from past experience and expectations about possible outcomes. (LeDoux, 1995, p. 228)

This example demonstrates the immediate automatic response and a more laboured response called risk-assessment behaviour (LeDoux, 1995), a process that also occurs with humans, and is the predecessor of the human system of reflective processing.

Maladaptive processing in depression

Stressors and negative emotions affect the way an individual processes information. In normal everyday situations, the systems of information processing work well, allowing an individual to respond automatically to everyday stimuli with more deliberate processing occurring when the individual is presented with new or conflicting stimuli. Nevertheless, problems can arise resulting in anxiety or depression relating to dysfunctional BIS, BAS or FFFS processes. Gray's BIS (1982, 1990) arose from neurological studies focused on the mechanism involved in anti-anxiety medications on regions of the brain; the septo-hippocampal system in particular is implicated in anxiety disorders. The theory states that anxiety is the result of conflicting or novel stimuli,

which attempts to activate both the BAS and FFFS and therefore produces an error that activates the BIS. As a result, behavioural responses from the FFFS and BAS are inhibited (McNaughton & Corr, 2008), and arousal and attention are increased. It is this increase in arousal and awareness that is associated with feelings of anxiety. Corr (2011) makes the comparison between 'normal' anxiety, in which the BAS, FFFS and BIS work as expected and anxiety disorders which are caused by either an underactive FFFS, an underactive BAS, an overactive BIS or a combination of dysfunctional systems. An underactive FFFS or BAS results in an increase of conflicting stimuli resulting in high activation of the BIS. Anti-anxiety medications work by directly reducing BIS activity (Gray, 1982), thereby increasing automatic responses through the BAS or FFFS.

The BIS and BAS are also implicated in depression (Depue & Iacono, 1989). In a longitudinal study with depressed and nondepressed participants (Kasch et al., 2002), depressed patients reported lower levels of BAS functioning and higher levels of BIS functioning compared with nondepressed controls. Lower self-reported BAS functioning was associated with higher concurrent depressive severity and with higher severity at 8-month follow-up. This research suggests that low activation of the BAS may play a role in severity and maintenance of depression, with people experiencing depression less responsive to rewards and positive stimuli, which in turn, reduces the motivation to experience positive rewards and engage in rewarding activities (Depue & Iacono, 1989; Kasch et al., 2002).

Despite poor BAS and BIS function in depression, cognitive ability is somewhat unimpaired and depressed people can still perform at their peak when the BIS is not activated, leading to a disparate ability for depressed people to perform well on cognitive tasks and poorly with affective tasks. In the 1970's, depressed individuals showed the interesting ability to make more realistic interpretations about situations and their environment compared with their nondepressed counterparts. This notion of 'depressive realism' (Alloy & Abramson, 1979) occurred in controlled laboratory settings where a trivial cognitive task was set (Pacini et al., 1998) that did not involve emotional processing; therefore, the BIS was not involved in the decision-making process. Pacini et al. suggested that depressed people reacted to nonemotive situations by overcompensating with their cognitive abilities. In realistic emotive situations, however, unrealistic negative schemas can be activated resulting in less realistic

interpretations for depressed compared with nondepressed people (Dunning & Story, 1991; Moore & Fresco, 2007; Musson & Alloy, 1988; Pacini et al., 1998).

Nonproductive, repetitive cognitive processes intrinsically linked to the high activation of reflective processing are common characteristics of mental disorders, particularly rumination in depressive disorders (Papadakis, Prince, Jones, & Strauman, 2006; Park, Goodyer, & Teasdale, 2004; Rimes & Watkin, 2005) and worry as a core characteristic of generalised anxiety disorder (American Psychiatric Association, 2000). Rumination, anxiety and worry are three such processes that are commonly associated with regular activation of the BIS. Due to an underactive BAS in depression, rewarding information is inhibited and the BIS increases awareness and arousal in order to find a solution for this information. Although they are conscious and processed cognitively, rumination, anxiety and worry are not rational processes and often occur without rational deliberation. Corr (2011) proposed that rumination, anxiety and worry are evolutionary processes designed to inhibit inappropriate, detrimental automatic behaviour that is not achieving its desired goal, by immediately stopping the automatic processes and subjecting them to detailed controlled and cognitive analysis. In normal situations, this process of bringing automatic behaviour into conscious awareness activates cognitive processing allowing the individual to think over the events and change behaviour to result in a better outcome. Nevertheless, with chronic depression and anxiety, conscious awareness becomes dysfunctional and results in excessive anxiety, rumination and worry with no solution achieved (Corr, 2011). The ultimate aim of conscious awareness is to 'replay' the events that caused the heightened state of emotional arousal and to analyse and adapt the automatic processes produced by the BAS and FFFS for future situations of a similar nature, so that automatic responses to similar stimuli are more appropriate. Corr notes that excessive anxiety is often the result of a sensitive and highly-active BIS, or due to simultaneous activation of conflicting FFFS and BAS routines, with the result of regularly bringing automatic processes into conscious awareness and activating cognitive processing of information which would be processed automatically in normal situations.

Activating cognitive processing of emotions

Psychotherapy, particularly CBT, focuses on promoting rational reflection and awareness of negative obsessive beliefs and automatic thoughts. This is equivalent to reducing activation of the maladaptive BIS processing. A reduction of excessive activation of the BIS processes in turn reduces the amount of anxiety, rumination and worry that occur. CBT can effectively restructure beliefs and help process emotional stimuli in a conscious and rational manner (Curry, 2001). Regular activation of rational cognitive processes strengthens the neural pathways involved in reflective processes and results in more reliance on these processes than maladaptive reflexive processes, which although still available, become less dominant.

Despite the maladaptive processes that can occur, awareness of emotions is necessary for survival and often leads to positive consequences (Darwin, 1872/1921; Stegge & Terwogt, 2007). The primary focus in past research has been the negative implications of emotion-focused coping of the processing of emotional stimuli using reflective processes (Lyubomirsky & Nolen-Hoeksema, 1993, 1995; Moberly & Watkins, 2008; Nolen-Hoeksema, 1991; Rimes & Watkin, 2005), although, more recently researchers have begun looking at the possible benefits of emotional reflective processing (Mor & Winquist, 2002; Nolen-Hoeksema et al., 2008; Segerstrom et al., 2003; Watkins, 2004, 2008). Research in this area suggests that reflective, cognitive processing of emotions can result in positive outcomes as well as negative outcomes, depending on the way emotions are processed, however, more research is needed to explore the positive aspects of emotion-focused coping.

Emotion-Focused Attention

A new term is needed to encompass awareness and attention to emotional and affective content. As per Lazarus and Folkman's (1984) definition of emotion-focused coping, emotion-focused attention is used throughout this thesis and is defined as: *'The process of attending to and focusing on emotional states and factors that are associated with, influence and/or regulate emotional states regardless of the consequences of this attention'*. This definition aims to encompass a wide variety of terms and constructs in the literature regarding emotion-focused attention, such as rumination, depressive

rumination, worry, perseverative thinking, emotional processing, counter-factual thinking, defensive pessimism, reflection, mind wandering, post-event rumination, positive rumination, repetitive thinking and habitual negative self-thinking. As with emotion-focused coping, this definition of emotion-focused attention places no emphasis upon whether outcomes are beneficial or maladaptive; either outcome can be achieved.

Past associations with worry and rumination

In the past, emotion-focused coping was generally considered to be inherently detrimental (Austenfeld & Stanton, 2004). For example, research demonstrated that emotion-focused coping was related to worse adjustment in patients with multiple sclerosis (Pakenham, 1999), to poor adjustment and distress in breast cancer patients (Ben-Zur, Gilbar, & Lev, 2001) and associated with increased emotional and behavioural problems in high school students (Compas, Malcarne, & Fondacaro, 1988). Studies such as these led to the broad conclusion that problem-focused coping led to good adjustment whereas emotion-focused coping lead to poor adjustment. A large body of evidence suggesting that self-focus was related to depression also supported this conclusion (e.g. Ingram, 1990; Just & Alloy, 1997; Kuehner & Weber, 1999; Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky, Tucker, Caldwell, & Berg, 1999; Nolen-Hoeksema, 2000; Pyszczynski & Greenberg, 1987).

Emotion-focused coping encompasses a variety of strategies (Austenfeld & Stanton, 2004) such as wishful thinking, distancing, emphasising the positive, self-blame, self-isolation, and tension reduction. One of the difficulties in researching emotion-focused coping is the relationship between emotion-focused coping and detrimental concepts such as worry and rumination (Watkins, 2008). Problem- and emotion-focused coping, although often reported as opposing strategies, often occur simultaneously (Lazarus & Folkman, 1984) and although some types of emotion-focused coping generally result in negative outcomes, there are also positive outcomes associated with emotion-focused coping (Lazarus & Folkman, 1984). Emotion-focused coping encompasses rumination and worry as well as positive therapeutic types of reflective processing such as consciousness-raising (Prochaska & Diclemente, 1982) and executive control (Corr, 2011). This negative association between emotion-focused

coping with rumination and worry was present to such an extent that symptoms of depression can be found in measures of emotion-focused coping (Treyner, Gonzalez, & Nolen-Hoeksema, 2003), accounting for the strong relationship between depression and emotion-focused coping. Carver, Scheier, and Weintraub (1989) recognised the tendency for researchers to combine all strategies that were not beneficial and label them emotion-focused coping and suggested that further examination was needed to separate out emotion-focused strategies from negative problem-focused strategies.

Recently, positive emotion-focused coping has received attention and when confounding factors such as symptoms of depression and anxiety were excluded, measures of emotion-focused coping were found to result in positive outcomes (Beck, Baruch, Balter, Steer, & Warman, 2004; Carver & Glass, 1976; Grant, Franklin, & Langford, 2002; Mayer & Stevens, 1994; Treyner et al., 2003).

Adaptive emotion-focused attention

Research shows that techniques where an individual consciously focuses on their negative emotions can increase psychological and physical wellbeing (Seegerstrom et al., 2003; Trapnell & Campbell, 1999; Watkins, 2004). These adaptive forms of emotion-focused attention include such concepts as adaptive self-focus, adaptive repetitive thoughts (Seegerstrom et al., 2003), reflective self-attentiveness (Trapnell & Campbell, 1999), and adaptive rumination (Watkins, 2004). Nevertheless, research investigating the specific attributes of emotion-focused attention and how it differs from negative outcomes is scarce.

A recent review of cross-sectional, longitudinal and experimental studies investigated both negative and positive outcomes of 'repetitive thoughts' (Watkins, 2008), proposing three principles that differentiate adaptive forms of repetitive thoughts from detrimental repetitive thoughts, including: (a) the valence of current emotions, (b) the context of the emotion, and (c) the level of abstraction. Watkins proposed that negative consequences were likely if the valence of the emotion was negative and combined with a personal context, particularly when the focus of the emotion was abstract and used overgeneralised concepts. For example, feeling angry (negative valence) at your partner for not doing the dishes is likely to result in an argument if you assume your partner expected you to do the dishes (personal context) and then

extrapolated to broader, abstract, issues, such as thinking, “he never does the dishes, housework, or anything (abstract construal)!”

Watkins (2008) suggested that focusing on concrete goals is more likely to result in positive benefits and problem solving than focusing on abstract concepts. Thinking about the specific, concrete instance; for example, why your partner left the dishes, he may have been late for a job interview, and the length of time since he last left the dishes, rather than relating a specific instance to other broader issues may result in more productive strategies and a reduction in the initial anger response.

Processing information at a concrete or abstract level is of particular interest, as there is potential to therapeutically manipulate the level of abstraction by breaking down high-level abstract thoughts into concrete blocks, which can then be processed rationally without evaluation and overgeneralisation. Rimes and Watkins (2005) found that focusing on the direct experience of cognitions and emotions while they occurred led to less negative self-judgments than broadly analysing and generalising experiences of a similar nature. This concept of concrete processing (Moberly & Watkins, 2008) has also been found in studies that use self-monitoring techniques, which increased participants’ ability to become aware of and label moods without evaluation (Swinkels & Giuliano, 1995). Watkins noted that people generally switch to abstract processing when dealing with novel, unfamiliar or troubling situations and concrete processing when the stimulus was familiar (Watkins, 2008). The interaction between valence, context and level of abstraction interact to influence the direction of emotion-focused awareness leading to productive or maladaptive outcomes.

Early intervention with a Focus on Emotions

Depression is a recurrent lifelong disorder often beginning in adolescence. Developing early intervention programs that focus on young people who experience mild to moderate symptoms of depression, before the development of a clinically diagnosed depressive disorder, has several advantages such as reducing the amount of time young people spend in therapy, the economic burden associated with treatments, reducing the personal cost and disruption to life for the young person, and reducing the likelihood of relapse. Using an early intervention approach, where young people with

mild to moderate symptoms of depression are targeted, is warranted, given the research demonstrating that young people without symptoms of depression do not benefit from universal or selective prevention interventions. Using the psychotherapeutic theory and RST as a framework for indicated prevention and early intervention strategies has the potential to assist young people to increase their awareness of maladaptive reflexive processing, which in turn may also reduce depressive symptoms and prevent progression from mild to clinically diagnosed depression. Additionally, increasing awareness is likely to lead to activation of rational reflective processes and a subsequent reduction in maladaptive reflective processes such as rumination and worry.

To date, there is little research that explores the concept of adaptive emotion-focused attention, specifically focusing on utilising adaptive emotion-focused attention in therapeutic settings to decrease unhelpful strategies and increase adaptive coping in young people with depressive symptoms. More research is needed to explore this concept and better define the characteristics of adaptive emotion-focused attention. To this end, a qualitative approach was used in this thesis to assist in the development of a well-defined concept of adaptive emotion-focused attention, this concept is then empirically tested. Chapter 3, therefore, systematically reviews the current literature of positive awareness and introduces the concept of emotional self-awareness, an adaptive form of emotion-focused attention.

CHAPTER 3

When Self-Awareness of Negative Emotions Leads to Beneficial Outcomes: A Systematic Review of Emotional Self- Awareness

Self-reflection is a uniquely human process (LeDoux, 1995). Emotion-focused attention has been a subject in psychology (e.g., emotion regulation), neurology and the psychiatry of mental disorders such as schizophrenia, depression and anxiety. Theories underlying different types of psychotherapy generally involve a concept related to conscious awareness of emotions (Prochaska & Diclemente, 1982). These include some of the major psychotherapies used today such as psychoanalysis, psychodynamic therapy, CBT and emotion-focused therapy. Emotion-focused attention can take different forms including rumination, worry, self-reflection, self-awareness, emotional processing, conscious awareness, problem-solving, repetitive thoughts, and planning. These various forms of emotion-focused attention contain similarities and differences both in each underlying theory and in definition.

Emotion-focused attention is a necessary component for considering automatic behaviour processed by the reflexive system and activating reflective processing. This can result in either positive consequences such as adapting automatic, reflexive responses so that they are more appropriate in future situations or negative consequences by excessively dwelling on negative emotions without an appropriate solution. The negative effects of emotion-focused attention are well established; rumination and worry are highly correlated with, and probable contributors to, depression and anxiety disorders (Lyubomirsky & Nolen-Hoeksema, 1995; Park et al., 2004). In comparison, research and theories about positive aspects of emotion-focused attention are scarce. This inequitable focus gives the overall impression that emotion-focused attention can only lead to negative consequences. Effective clinical practice, however, relies on increasing patients' self-awareness of their negative emotions (Beck, 1997; Hayes, Luoma, Bond, Masuda, & Lillis, 2006) and may be associated with a reduction in depressive symptoms, uptake of health-promoting behaviours and preparation and planning for future stressful experiences (Watkins, 2008).

Repetitive Thoughts

Only recently has the research from different psychological fields been considered together under the umbrella of *repetitive thoughts* to allow an examination of the constructive and unconstructive consequences of emotion-focused attention (Watkins, 2008). The term *repetitive thoughts* is defined as “the process of thinking attentively or

frequently about one's self or world" (Watkins, 2008, p. 163). In Watkins' review, unconstructive and constructive repetitive thoughts were examined by searching academic databases (e.g., PsycINFO, MEDLINE and the Web of Science – Science Citation Index Extended and Social Science Citation Index) using a specific list of search terms (e.g., repetitive thoughts, rumination, reflection and emotional processing) and searching obtained articles for relevant references. All studies from the beginning of the databases to the end of 2007 were searched. From this extensive process, Watkins identified 136 cross-sectional, longitudinal and experimental studies demonstrating unconstructive consequences of repetitive thoughts, and only 36 studies identified with constructive consequences. Using thematic analysis, Watkins determined that there were three main factors differentiating constructive from unconstructive outcomes including: level of abstraction (concrete or abstract); valence of emotional content (negative or positive emotions); and positive or negative intrapersonal or situational context of the individual's thoughts. Table 3.1 (adapted from Watkins, 2008) describes several forms of repetitive thoughts and their characteristics.

Table 3.1

Classes of Repetitive Thoughts Classified by Valence, Abstraction, Context and Consequence

Class of Repetitive Thought	Valence	Context	Abstraction	Consequence
Depressive rumination	-	-	A	-
Rumination	-/+	-/+	A/C	-/+
Worry	-	- /+	A/C	-/+
Perseverative cognition	-	-	A	-
Cognitive / emotional processing	+/-	-	A/C	+
Planning / problem-solving	-	+	C	+
Counter-factuals	-/+	-/+	A/C	-/+
Defensive pessimism	-	+	C	+
Reflection	+	+	A	+
Mind-wandering	-/+	-/+	A/C	-/+
Post-event rumination	-	-	A	-
Positive rumination	+	-/+	A/C	-/+
Habitual negative self-thinking	-	-	A	-

Note. - = Negative valence, context or consequence; + = Positive valence, context or consequence; -/+ = Both negative and positive valence, context or consequence; A = Abstract; C = Concrete; A/C = both abstract and concrete. Adapted from “Constructive and Unconstructive Repetitive Thought,” by E. Watkins, 2008, *Psychological Bulletin*, 134, p. 196.

Table 3.1 illustrates the complexity of repetitive thoughts and mechanisms that influence whether positive or negative consequences are achieved. Even within a single class of repetitive thought, such as worry, cognitive or emotional processing, and positive rumination, different characteristics were found in the literature (Watkins, 2008). For example, worry was described both as constructive and unconstructive depending upon whether the valence was negative or positive. Worry with concrete level of abstraction was described as having adaptive outcomes whereas abstract worry was described as maladaptive. Watkins (2008) concludes by saying:

There may be two routes by which cognitive processing could be constructive: Following a stressful event (negative situational context), it could be useful to either focus on finding benefits (positive content) in as abstract a way as possible

or to focus on the negative experience (negative content) in as concrete and detailed a way as possible. (Watkins, 2008, p. 196)

These routes to constructive processing following a stressful or negative situation have substantial clinical implications; manipulating abstraction and context of stressful situations can result in therapeutic gains. Beyond these broad distinctions, Watkins (2008) did not explore the attributes associated with adaptive emotion-focused attention in detail. Therefore, expanding on Watkins' work, a review of adaptive emotion-focused attention is warranted to further explore and unravel the characteristics of adaptive emotion-focused attention in different areas of psychology. Identification of specific attributes of adaptive emotion-focused attention may enhance the effects of therapy by enabling current psychotherapeutic treatment to incorporate these attributes into treatment programs. In addition, understanding the underlying features of emotion-focused attention that lead to positive outcomes may provide a framework for developing effective early intervention programs for young people with mild or more depressive symptoms.

Adaptive emotion-focused attention

Promoting a greater awareness of emotions is an important therapeutic process in many psychotherapies including: cognitive (and CBT by extension), psychodynamic, psychoanalytic, emotion-focused and mindfulness therapies. The way each of these psychotherapies conceptualise the therapeutic process of emotion-focused attention is outlined below with definitions to demonstrate the similarities and differences between these concepts.

Cognitive therapy.

In cognitive therapy, *metacognitive awareness* refers to the processes of recognising thoughts as thoughts while they are occurring rather than believing the thoughts to be facts. Teasdale (2002) defines *metacognitive awareness* as “a cognitive set in which negative thoughts and feelings are seen as passing events in the mind rather than as inherent aspects of self or as necessarily valid reflections of reality” (p. 285). Increasing *metacognitive awareness* is an important process in cognitive psychotherapy involving a change in the relationship between feelings and cognitions, and increasing

the understanding that erroneous thoughts and beliefs arising from negative emotions are not inherently realistic (Teasdale et al., 2002). Increasing *metacognitive awareness* may be beneficial during treatment of depression and relapse prevention.

Emotion-focused therapy.

Emotion-focused therapy is based on the premise of *emotional awareness* and helping clients experience and accept emotional experiences fully (Greenberg, 2004). Increasing *emotional awareness* is the primary goal of emotion-focused therapy. The promotion of *emotional awareness* are organised under the broad phases of *Arriving* (awareness and acceptance) and *Leaving* (emotion utilisation and transformation) and consist of the following eight steps. *Arriving* consists of: (a) becoming aware of emotional experiences; (b) welcoming and allowing the experience of emotion to occur; (c) describing emotions using language and words; and (d) determining whether the emotional response is the primary feeling about the situation and if not, discovering what the primary emotion is in regards to that situation. *Leaving* consists of: (e) evaluating whether the emotion is healthy or unhealthy. If healthy, that emotion should continue to be used to guide behaviour; (f) if unhealthy, identifying the negative voice associated with the emotion; (g) finding a healthy emotional response to guide behaviour; and (h) challenging negative thoughts and regulate emotions using the healthy alternative (Greenberg, 2004). *Emotional awareness* is measured using the Levels of Emotional Awareness Scale (Lane, Quinlan, Schwartz, & Walker, 1990) which assesses bodily and physical sensations, the tendency for action, primary emotions, blends of emotions and the capacity to experience and understand the complexity of emotions of self and others (Lane et al., 1990).

Psychoanalysis and psychodynamic therapy.

Freudian psychoanalysis and modern variants of psychoanalysis and psychodynamic therapy often refer to *therapeutic insight*, with four elements identified: (a) an awareness of an internal event (internal seeing); (b) the perception of connections and patterns, involving analysis of causes and reasons; (c) suddenness defined as “the sense of suddenly seeing a previously missed perceptual pattern, or the ah-hah experience of solving a difficult intellectual or personal puzzle” (Elliott et al., 1994, p.

449); and (d) sense of a new previously unidentified discovery. Measurement of *therapeutic insight* is a qualitative iterative process and involves analysing insight events that occur during psychoanalysis.

Mindfulness therapy.

Derived from Buddhist philosophy and meditation, *mindfulness* is a process where attention is focused on experiencing the present moment (Brown & Ryan, 2003) and is most commonly used for relapse prevention and symptom-prevention. *Mindfulness* is the process of attending to and becoming aware of what is taking place at the present moment in a nonjudgemental manner with the intention of responding to emotions and situations reflectively rather than reflexively. Brown and Ryan (2003) conceptualise mindfulness in terms of two types of consciousness: *awareness*, which involves constant background monitoring of the self and environment; and *attention*, which focuses awareness on specific stimuli and increases sensitivity. The Mindful Attention Awareness Scale (Brown & Ryan, 2003) assesses individual differences in *mindfulness*. *Mindfulness* also involves meditation techniques such as deep breathing and relaxation. A recent meta-analysis demonstrated that mindfulness therapy was moderately effective in reducing symptoms of depression and anxiety (Hofmann, Sawyer, Witt, & Oh, 2010).

Clinical insight.

The concept of *insight* and its synonym, *awareness*, is a multidimensional construct in psychosis and severe mental disorders, where psychosis patients have demonstrated lack of insight into their disorder (Amador & David, 2004). The terms *insight* and *awareness* are often used in psychosis research with Beck (2004) defining *emotional insight* as:

Sufficient self-understanding to modify dysfunctional beliefs and their affective and behavioural consequences. Even though patients may honestly accept an explanation and agree that it makes sense (intellectual insight), they may not experience any appreciable change in their underlying delusional belief system (emotional insight). (Beck et al., 2004, p. 320)

Beck et al. (2004) outlines four attributes that are used to assess an individual's *emotional insight* including: awareness of the illness, awareness of pathological

symptoms, awareness of the need for treatment and awareness of the cause of symptoms. Several measures are used to measure this clinical definition of *insight* including the Beck Cognitive Insight Scale (Beck et al., 2004) and the Scale to Assess Unawareness of Mental Disorder (Amador et al., 1993).

Other concepts relevant to emotional processing.

Emotion dysregulation.

Based on the behavioural theory of psychopathology, *emotion dysregulation* has been associated with borderline personality disorder. The Difficulties in Emotional Regulation Scale (Gratz & Roemer, 2004) assesses several components related to adaptive emotion-focused attention including awareness, clarity and acceptance of emotion responses, access to emotional strategies, control of emotional impulses, and goal-directed behaviour.

Emotional intelligence.

Personality factors, such as inter- and intra-personal skills, influence an individual's ability to recognise emotional experiences in themselves and others. Mayer, Salovey and Caruso (2000) call this process *emotional intelligence* which is defined as "the ability to perceive and express emotion, assimilate emotion in thought, understand and reason with emotion, and regulate emotions in the self and others" (p. 396). Several scales measure emotional intelligence such as the Multifactor Emotional Intelligence Scale (Mayer et al., 2000) and the Meta-Experience and Meta-Regulation Scale (Mayer & Stevens, 1994). Emotional intelligence has received a lot of attention in organisational psychology, leadership, and nursing, and is considered to be another form of intelligence, similar to but distinct from general intelligence as measured by the Intelligence Quotient.

The value of a synthesising construct.

The above list is by no means exhaustive; there are several other concepts related to the adaptive nature of emotional awareness such as private and public *self-consciousness* (Trapnell & Campbell, 1999), *consciousness-raising* (Prochaska & Diclemente, 1982), *self-reflection* (Grant et al., 2002) and *adaptive self-focus* (Nolen-

Hoeksema et al., 2008), which are included in the systematic literature review below. These different constructs of self-awareness illustrate the variability of different viewpoints. Yet, the descriptions of the constructs have a number of similar characteristics. Each definition considers emotions alongside cognitions and motivations and in each instance awareness of emotions is framed as a constructive process leading to beneficial outcomes.

Despite the amount of theory and the common understanding in psychotherapy of the importance of becoming aware of emotions (Prochaska & Diclemente, 1982), there is relatively little research on the topic. Watkins' (2008) systematic literature review uncovered only 36 research publications dealing with the adaptive consequences of emotion-focused attention in comparison to 136 publications dealing with the negative consequences of emotion-focused attention. Furthermore, in contrast to Watkins, a review focusing specifically on adaptive emotion-focused attention might assist therapeutic interventions by redirecting focus away from the types of emotion-focused attention that lead to detrimental outcomes. In addition, research focusing on several different theories might be used to develop a more unified model of adaptive emotion-focused attention that is theoretically driven from several perspectives. To simplify matters, instead of using ambiguous terms such as *insight*, *repetitive thoughts* and *emotion-focused coping* that are loaded with differing and complex meanings and can be either adaptive or detrimental, the term *emotional self-awareness* (ESA) will be used when referring to this new construct.

Aims

This current chapter focuses specifically on the ESA that results in adaptive consequences in order to better understand how ESA might be utilised therapeutically. The goal of this review was not to compare and contrast adaptive and maladaptive emotion-focused attention, as previous research focuses on the differences and similarities between positive and negative consequences of emotion-focused attention (Mor & Winquist, 2002; Watkins, 2008). A thematic analysis of research studies with a focus on ESA and related concepts was conducted in the present study and aimed to: (a) review and organise the literature about emotion-focused attention that leads to adaptive consequences; (b) identify themes and develop a thematic schema to explain the

relationship between awareness and positive consequences in order to assist the development of a construct with a clear definition and testable characteristics; and (c) relate the findings to the psychotherapeutic theory and the RST outlined in Chapter 2 as well as Watkins' (2008) mechanisms of context, valence and abstraction.

Methodology

Approach

This systematic literature review was an inductive analysis with the aim of analysing thematic patterns of adaptive emotion-focused attention. The literature review focused on peer-reviewed research studies and a semantic thematic analysis was conducted (as per Braun & Clarke, 2006) to identify explicit patterns in the dataset and provide a rich thematic description of the types of outcomes described as beneficial and common attributes of ESA mentioned in the dataset. The analysis was data-driven with no preconceived notions of what aspects of emotion-focused attention would lead to beneficial outcomes.

Literature search

The purpose of this literature search was to look for dimensions of ESA that led to beneficial outcomes. The search was conducted using the literature databases PsycINFO (CSA), Scopus Version 4 (Elsevier) and MEDLINE (EBSCO) with the addition of other publications that were discovered before commencement of this search. This systematic literature review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses Statement (the PRISMA Statement; Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009). The search consisted of peer-reviewed English articles for all time periods up to January 2011. PsycINFO includes articles beginning from the year 1872, Scopus from 1823 and MEDLINE from 1949. Due to different terms used by the databases, for example, MEDLINE uses Medical Subject Headings (MeSH) and PsycINFO uses descriptor terms, three searches were conducted in the native interface of each database using terms specific to each system. For each search, terms within each group were combined with an '*or*' statement and the groups were cross-referenced together with an '*and*' statement.

For the literature search using PsycINFO, the first group of terms related to ESA and consisted of the following descriptor terms: *awareness, rumination, reflectiveness* and *insight*. The second group was related to positive outcomes and searched for the keywords: *positive, beneficial, helpful* and the descriptor *adaptive behaviour*. Thirdly, to focus the search on mood the following descriptors were included: *emotion, mood disorder* and *affect regulation*. To account for variations in words, wildcards were used for *beneficial* and *emotion* (i.e., *benefi** and *emotion**).

As Scopus does not have descriptor terms such as those used by PsycINFO, this second search varied slightly and used keyword terms in combination with terms that searched through the title, abstract and keywords. The first group of terms searched for concepts related to self-awareness and searched for keywords only, including: *self-focus, self-awareness, rumination, self-reflection, repetitive thoughts* and *emotion-focused*. Secondly, to focus the search on emotions, the following terms were used to search through titles, abstracts and keywords: *emotion, mood, feeling* and *affect*. The third group, searching through titles, abstracts and keywords, consisted of terms related to positive outcomes, including: *positive, beneficial, helpful* and *adaptive behaviour*. Wildcards were used for the following terms: *rumination (ruminat*)*, *self-focused (self-focus*)*, *behaviour (behavio?r)*, *beneficial (benefi*)* and *emotion (emotion*)*. This search was further limited to the keyword *human* and only articles or reviews were included in the search.

The third search conducted using MEDLINE was limited to journal articles only and included three groups of MeSH terms, Group 2 used combined MeSH terms with a search through publication titles. As the MeSH term *rumination* refers to “regurgitating food and re-swallowing it”, which occurs with cattle, some infants and in some eating disorders as opposed to recurrent negative thinking, the term *rumination* was not included in this search as a MeSH term or a keyword. The first group of MeSH terms was included to search for instances of ESA in psychiatric illness and included: *psychiatry, Schizophrenia, Mood Disorders* and *Anxiety Disorders*. Secondly, the MeSH term *awareness* was used in combination with searching through the titles for *awareness* and *insight*. The last group of MeSH terms were used to focus on emotions or awareness of symptoms and included: *emotions, affective symptoms* and *‘signs and symptoms’*.

Selection of publications

Protocol.

The following protocol was used to select publications for review. First, only research studies were included in the review. Three main types of research designs were considered: cross-sectional, longitudinal and experimental designs. Theoretical papers, editorial comments, book reviews, case studies and qualitative studies were excluded. Second, a publication was included when positive consequences of emotion-focused attention were mentioned. These consequences included increased positive mood, decreased depressive symptoms, improvement in wellbeing and an increase in adaptive behaviours or cognitions. Third, the publication needed to include some measurement of emotion-focused attention. Fourth, the emotional content of awareness sought in each article was negative in nature (i.e., sadness, depression, anxiety, anger), neutral or included both positive and negative emotions. Articles with a focus on positive psychology or only positive emotions (i.e., happiness, joy) were excluded. The only publications included in the review were research studies that were designed to measure emotion-focused attention, which was then correlated with positive outcomes (as per Watkins, 2008).

Selection of articles.

An initial screening took place involving all publications identified through the three literature searches. This screening process involved excluding all articles that did not mention emotion-focused attention and positive consequences in their abstract as per the protocol above. After screening, full texts of all selected articles were obtained and read. Only articles meeting the above protocol were included in the review.

All articles were thoroughly examined in terms of the quality of work during the process of screening and selection. Examination of quality involved determining the theoretical rationale of the paper, whether the authors cited evidence appropriately, which areas the authors took into consideration and whether the findings from the study matched the methods used.

Data included in report.

The following information was retrieved for all selected papers: authorship and year of publication; the number and population of the sample; the research design; the measures that were used to assess ESA; which aspects of ESA were assessed; the positive consequences listed in the articles; and the overall findings. The purpose of this review was to examine the qualitative and theoretical construct of ESA with various types of research (e.g., cross-sectional, longitudinal and experimental) in order to determine how ESA can be utilised in therapeutic settings.

Thematic analysis

The open-source qualitative software package, TAMS Analyzer (Weinstein, 2005), was used to enter and analyse data from each study. For each study, the design (i.e., longitudinal, cross-sectional or experimental), the sample size and type (e.g., undergraduates) and overall findings were recorded into the TAMS Analyzer. The analysis was conducted inductively with no preconceived ideas about which themes of ESA would be discovered. The analysis was also semantic in order to discover the meaning and significance of the thematic patterns identified (Braun & Clarke, 2006). Coding was conducted in three phases by the candidate, Sylvia Kauer. First, a manual search of each article was conducted to broadly identify all benefits related to ESA in each study and all instances thought to represent the broad theme of ESA were recorded into the TAMS Analyzer. Second, the broad themes '*ESA*' and '*benefits*' were further examined with the goal of identifying patterns in each category. Third, each article was reexamined to ensure accurate recording of information.

The following steps were implemented for formulation of themes: (a) the themes must be mutually exclusive, (b) five or more instances had to be present for each theme, and (c) the items within each theme had to be related to one systematic idea.

Results

Screening process

In total, 322 publications were found; 134 from PsycINFO, 113 from Scopus, 54 from MEDLINE, seven from previous literature searches and 14 from Watkins' (2008) previous review of constructive and unconstructive repetitive thoughts. Publications dealt with a variety of topics including: abuse or self-harm; aged care and memory; alcohol, medication or anaesthesia; children, infancy and animals; couples and co-rumination; disease, disability and personality; evaluation of scales or therapies; studies about depression and rumination; neurology and physiology; and nursing and leadership. The flow diagram depicted in Figure 3.1 illustrates the selection process using PRISMA guidelines (Moher et al., 2009). There were 18 duplicate articles, which were discarded. Screening took place focusing on titles and abstracts on the remaining 304 articles with a further 203 articles excluded. The full texts were obtained for the 101 remaining articles. Fifty-one articles were not eligible for inclusion, leaving 50 articles remaining. Of these, 16 were longitudinal studies, 15 were cross-sectional studies, and 16 were experimental studies. A further three articles consisted of a range of cross-sectional and longitudinal studies. There were relatively equal numbers of each methodology suggesting that the articles selected were representative of the research published and not biased towards any particular research methodology. Furthermore, the studies selected involved a range of different authors, groups and domains suggesting that there was no substantial bias towards studies conducted by any particular author, group or field of research. Table 3.2 presents these publications, the design and sample, measures used and the main findings in terms of the current analysis.

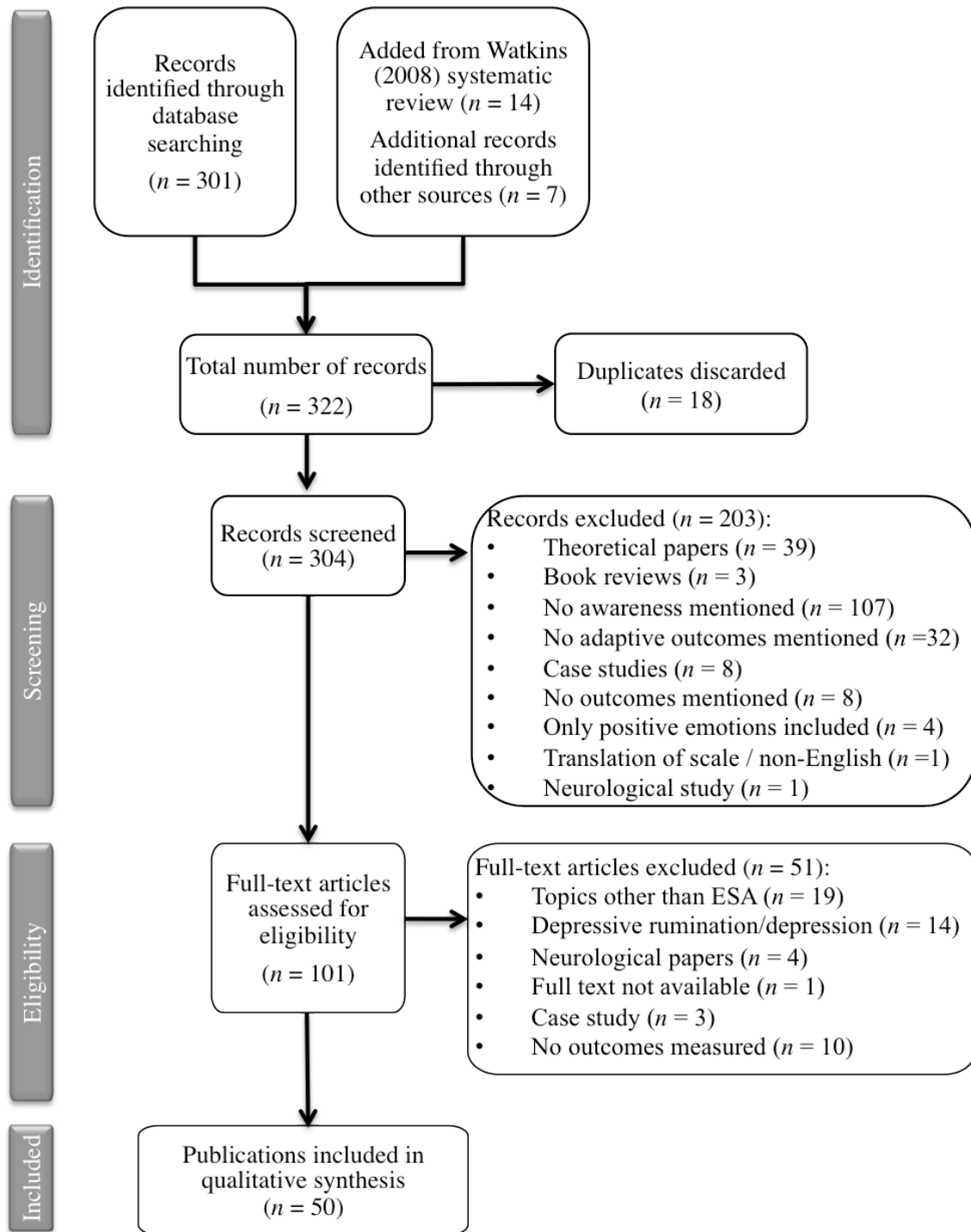


Figure 3.1. The process of selecting articles for the systematic literature review based on the PRISMA Flow Diagram (Moher et al., 2009).

Table 3.2

Studies Demonstrating Positive Consequences of Emotion-Focused Attention

Reference	Sample	Measures	Findings
<i>Cross-sectional studies</i>			
Ayduk and Kross (2010)	Study 2: 71 u/g's recalled anger-eliciting event.	Study 2: ERQ, Total peripheral resistance.	Spontaneous SD of current/past experience was associated with less emotional reactivity (both self-report and physiological measures), interpersonal conflict, rumination and higher constructive problem-solving.
Belzer, D'Zurilla, and Maydeu-Olivares (2002)	353 u/g's.	PSWQ, Catastrophic Worry Questionnaire, SPSI-R, STAI.	Worry was paradoxically related to: rational problem-solving (systematic gathering of facts and information, identification of demands and obstacles, setting of goals, consideration of a variety of solutions, monitoring and evaluating outcomes) and impulsive/careless problem-solving (few options considered, first idea chosen and quick and unsystematic scanning).
Brown and Ryan (2003)	Study 1: 1,179 u/g's. Study 2: 74 members of Zen Centre and 74 matched controls from the community. Study 3 - 5: Adult samples from various locations.	Study 1: Mindfulness / Mindlessness Scale, Need for Cognition and Absorption, RRQ, SCS, SMS, TMMS. Study 2 - 5: MAAS.	The MAAS was related to a variety of positive constructs such as enhanced self-awareness, self-regulated behaviour, positive emotional states and a decline in mood disturbance and stress.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
<i>Cross-sectional studies (continued)</i>			
Crumlish et al. (2007)	60 schizophrenia patients in Malawi.	Tumbuka translations of: GAF, SAI, SANS, SAPS, SCID.	Positive correlation between symptom relabeling and global functioning.
Davey (1993)	Study 1: 105 u/g's. Study 2: 108 u/g's. Study 3: 94 u/g's.	All studies: STAI, SWS. Study 1: ARPNO, HDLF, PPSI. Study 2: AUSD, HDLF. Study 3: MBSS, PPSI.	Worry was associated with adaptive problem-focused coping, information-seeking, monitoring coping and identifying threats.
Elliot and Coker (2008)	123 pts from community sample.	Refined Independent Self- Construal Scale, Subjective Happiness Scale, SRS.	Self-reflection was associated with both increased and decreased happiness.
Feldman and Hayes (2005)	Study 3: 325 u/g's.	Study 3: AAQ, Brief Coping Inventory, CFS, DPQ, MASQ, MMAP, PSWQ, RSQ, SPSI-R, wellbeing.	Plan rehearsal and problem analysis associated with less depression and more wellbeing.
Jermann et al. (2009)	Study 1: Psychometric properties of French MAAS with 190 high school and community pts. Study 2: 240 high school students and community volunteers.	Study 1: BDI-II, DAS, MAAS. Study 2: BDI-II, CERQ, CES-D, MAAS.	Mindful attention and awareness of the present moment was negatively related to depressive symptoms and positively related to wellbeing measures.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
<i>Cross-sectional studies (continued)</i>			
Kelly, Klusas, von Weiss, and Kenny (2001)	Study 1: 137 u/g's.	Study 1: CRF, PANAS, Session Evaluation Questionnaire, TSR.	Study 1: Gaining new insights from revealing secrets to a confidant in the past was associated with feeling more positive about the secret.
Legerstee, Garnefski, Jellesma, Verhulst, and Utens (2010)	9 - 11 year old – 131 with anxiety disorder and 717 control.	ADIS-C, CERQ, Revised Fear Survey Schedule for Children, life events.	Anxiety group scored significantly lower on positive reappraisal, positive refocusing and refocus on planning than control group.
Lyke (2009)	208 community volunteers.	K10, Subjective Happiness Scale, Self-Reflection and Insight Scale, SWLS.	Insight associated with satisfaction with life and happiness whereas self-reflection was not.
Lysaker, Campbell, and Johannesen (2005)	92 schizophrenia patients.	Beck Hopelessness Scale, Positive and Negative Symptom Scale, WCQ, WCST.	High insight and high hope had most adaptive coping preferences. Low hope and high insight has least adaptive coping preferences.
Segerstrom, Stanton, Alden, and Shortridge (2003)	Study 1: 978 u/g's. Study 2: 25 u/g's. Study 3: 62 women with breast cancer.	Study 1: Impact of Event Scale, PSWQ, RRQ, RS, RSQ. Study 2 and 3: Descriptions and rating of RT.	Positive valence, searching, high amounts of RT and personal achievements were associated with wellbeing when compared with negative valence, solving, low amounts of RT and interpersonal context.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
Segerstrom, Roach, Evans, Schipper and Darville (2010)	179 older adults.	CDS, EACQ, GDS, NAART, trait and episodic RT, PSWQ, QOLS, RS, RSPWB, RSQ, PSS, SAV, Trait Making Test.	Positive valenced RT associated with better psychological, cognitive and physical health than negative valenced RT.
Swinkels and Giuliano (1995)	Study 2: 128 u/g's. Study 3: 175 u/g's. Study 4: 116 u/g's.	Mood Awareness Scale.	Mood monitoring was associated with negative consequences whereas mood labeling was associated with positive consequences.
Watkins (2004)	78 volunteers.	Action Control Scale, BDI, IES, Mood Questionnaire.	Abstract thoughts resulted in higher levels of depressed mood and more intrusive thoughts when compared with concrete thoughts.
Yen et al. (2007)	50 bipolar patients.	Community Life Scale, Hamilton Depressive Rating Scale, SAI, YMRS.	Higher insight score and less residual affective symptoms correlated with better psychological adjustment.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
<i>Longitudinal Studies</i>			
Ayduk and Kross (2010)	Study 1: 56 u/g's. T1 and T2 (6 wks later) – Brief spontaneous SD task. Study 3: 52 u/g couples – 21-day diary study.	Studies 1 to 3: Emotional reactivity, SD. Study 1 and 2: Thought content, avoidance. Study 3: ERQ, perceived resolution, hostility with partner.	Spontaneous SD of current/past experience was associated with less emotional reactivity (both self-report and physiological measures), interpersonal conflict, rumination and higher constructive problem-solving.
Beckner, Howard, Vella, and Mohr (2010)	62 in T-CBT and 65 in T-EFT groups. Multiple Sclerosis patients.	T1: UCLA - Social Support Inventory. T1 and T2: BDI-II, Guy Neuological Disability Scale, Hamilton Depressive Rating Scale.	Those with high social support benefited from T-CBT, those with low social support benefited equally from T-CBT and T-EFT. Therapeutic alliance, good rapport, exploring emotional issues within the context of a safe and empathetic bond, and encouraging clients to express emotions all resulted in a reduction of depressive symptoms.
Bower, Kemeny, Taylor, and Fahey (1998)	40 men with HIV.	T1: Coded interview, TIG. For 2 - 3 years: 6-monthly blood samples. T1 and T2 (after 2 - 3 years): CES-D, HIV symptoms and general health, TMAS.	Cognitive processing (deliberate, effortful, long-lasting thoughts about bereavement and implications) correlated with discovery of meaning, shift in values, priorities and perspective, and no mean decline in immunological functioning.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
<i>Longitudinal studies (continued)</i>			
Cantor, Norem, Niedenthal, Langston, and Brower (1987)	147 u/g's transition to college in 1st and 2nd Semesters.	DPQ, grade point average, plan reflectivity.	Focusing on negative aspects (defensive pessimism) functioned as a limited and strategic approach to gain control, manage anxiety and motivate students. T1 reflectivity associated with T2 grades for pessimistic students.
Chambers, Lo, and Allen (2008)	20 volunteers applying for a meditation course and 20 from waiting lists and u/g's.	Beck Anxiety Inventory, BDI, MAAS, PANAS, Rumination Response Scale.	Mindfulness meditation training associated with improvements in self-reported mindfulness, depressive symptoms and rumination compared with waiting list control.
Ciesla and Roberts (2007)	32 MDD patients in Coping with Depression course.	T1: ASQ, BDI, DAS, RSE, RSQ, SCID, SCS-P. 1 2 weekly follow-up: BDI.	High SCS-P resulted in low BDI when a positive cognitive style was used. Rumination predicted low BDI when patient used less self-direct thought, more distraction techniques and focused their attention externally.
Dijkstra and Brosschot (2003)	380 smokers and 324 ex-smokers.	T1: Disengagement beliefs, self-efficacy, worry. T1 and T2: Smoking behaviour.	Worry facilitated the process of smoking cessation for smokers.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
<i>Longitudinal studies (continued)</i>			
Donnelly and Murray (1991)	102 u/g's in either psychotherapy, written expression or control conditions.	Revised Nowlis Adjective Checklist, emotional upset and pain, changes in feelings about topic, coded written or taped therapy.	Written expression and psychotherapy groups reported feeling better about the topic and themselves, they thought differently about the topic and had a decline in pain and upset over the topic.
Feldman and Hayes (2005)	Study 4: 110 u/g's over a semester.	Study 4: Inventory to Diagnose Depression, MMAP, RT.	Plan rehearsal and problem analysis were associated with less depression and more wellbeing.
Hayes, Beevers, Feldman, Laurenceau, and Perlman (2005)	29 patients with depression completed 20 sessions of DTWPP.	Modified Hamilton Rating Scale for Depression, essays coded using CHANGE.	Expressions of negative sense of self and therapeutic processing was associated with more improvement in depression and the expression of more hope.
Kelly, Klusas, von Weiss, and Kenny (2001)	Study 2: 98 u/g's with 1 week writing task.	Study 2: CRF, PANAS, Session Evaluation Questionnaire, TSR.	Study 2: Gaining new insights by writing was associated with more positive feelings.
Kemp and Lambert (1995)	29 patients with schizophrenia hospitalised for 6 months.	T1: CASH, DSM-III-R, Positive and Negative Symptom Scale, SANS, SAPS, Scale for Unawareness of Mental Disorder.	Improvements in psychopathology correlated significantly with increased awareness of past illness, symptoms and attribution of past symptoms, insight into past symptoms, but not awareness of current illness.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
<i>Longitudinal studies (continued)</i>			
Paivio, Jarry, Chagigiorgis, Hall, and Ralston (2010)	Adults with childhood abuse randomised into EFTT-IC ($n = 20$) and EFTT-EE ($n = 25$).	ADH, BDI-II, Childhood Trauma Questionnaire, IES, IIP, Personality diagnostic questionnaire (4th edition), Post Session Questionnaire, PSSI, Resolution Scale, RSE, STAI, Subjective Units of Distress, TCD, TFS, WAI.	Both programs emphasised client experience, expression of feelings and needs, adaptive emotions and their associated meaning; reduced impact of event, interpersonal problems, anxiety, depressive and post-traumatic stress symptoms; and improved self-esteem. EFTT-EE had less drop out than EFTT-IC.
Segerstrom, Schipper, and Greenberg (2008)	14 dementia caregivers and 30 controls, 65 years or older with autoimmunity deficiency. Response to influenza vaccination.	EAC, GDS, influenza antibody titers, interleukin-6, PSWQ, RRQ, RS, RSQ.	Neutral RT (emotional approach coping, self-analysis / pondering and reflection) associated with decreased depression in both groups and increased antibodies in caregivers.
Takano and Tanno (2010)	Experience sampling methodology: Eight emails for 7 days with 34 u/g's.	Concreteness, negative event, PANAS, rumination, and stress.	Increased levels of depression associated with lower levels of concreteness in daily life. Low concreteness increased association between rumination and negative affect.
Treynor, Gonzalez, and Nolen-Hoeksema (2003)	1,130 community sample – 1 year follow-up.	BDI, RSQ.	Reflective pondering associated with less depression over time but more depression concurrently.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
<i>Longitudinal studies (continued)</i>			
van der Houwen, Schut, van den Bout, Stroebe, and Stroebe (2010)	Bereaved pts in structured writing group ($n = 460$) and control ($n = 297$).	Bereavement rumination, BFI-N, CES-D, DGA, ECR-R, loneliness, grief, PANAS, rumination, social support, threatening grief interpretations.	Writing group had decreased loneliness and rumination, and increased positive mood when compared with control group.
Williams, Ciarrochi, and Deane (2010)	60 NSW police officers during transition into police force.	AAQ, DASS, General Health Questionnaire-12, MAAS, Toronto Alexithymia Scale, White Bear Suppression Inventory.	Mindful officers who could identify feelings and did not suppress thoughts had smaller increases of depression during transition. Acceptance increased mental health and wellbeing. Thought suppression increased depression.
<i>Experimental Studies</i>			
Evans, Bowman, and Turnbull (2005)	Gambling task – Compared 19 schizophrenia patients with 19 controls on emotional awareness and complex decision-making.	SANS, SAPS, subjective rating of deck, WASI, WCST.	Greater conscious awareness of emotion-related information was related to better decision-making and problem-solving.
Huffziger and Kuehner (2009)	76 depressed patients 3.5 years after hospitalisation in induced rumination, distraction or mindful self-focus groups.	Freiburg Mindfulness Inventory, MADRS, PANAS, RSQ, SCID-I.	Induced mindful self-focus led to a significant increase in positive mood and a decrease negative mood compared with rumination and distraction, particularly for those with elevated habitual mindfulness.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
<i>Experimental studies (continued)</i>			
Kross and Ayduk (2008)	141 u/g's in manipulated SD, self-immersed or distraction.	Engagement, Self-Assessment Manikin, writing coded by LIWC.	Reconstructing depressed experience from self-distant perspective was associated with less depression than recounting from self-immersed perspective.
Kuehner, Huffziger, and Liebsch (2009)	60 u/g's in induced rumination, distraction or mindfulness.	BDI, DAS, PANAS.	Participants induced to ruminate had higher dysfunctional attitudes than mindful self-focus or distraction groups. Distraction was beneficial compared with rumination and mindful self-focus.
Lo, Ho, and Hollon (2010)	72 u/g's in manipulated analytical, experiential and distraction groups.	ASQ, BDI-II, Visual Analogue Scale.	Analytical self-focus group had higher depression compared with experiential self-focus group.
Lyubomirsky, Sousa, and Dickerhoof (2006)	Study 1: 96 u/g's either wrote, talked or thought about their most traumatic experience.	Medical Outcomes Study Short-Form and Symptoms Checklist, PANAS, SWLS.	Participants in talking or writing conditions reported improved wellbeing and health compared with thinking condition.
McFarland, Buehler, von Revati, Nguyen, and Alvaro (2007)	Study 1a: 109 u/g's. Study 1b: 103 parent-child pairs of students. Induced rumination or reflectiveness.	Study 1a: Rating of past event (negative or neutral) and mood orientation. Study 1b: Quality of relationship.	Openly acknowledging feelings and reflecting on capacity for mood repair led to recovery from stress and more favourable coping.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
<i>Experimental studies (continued)</i>			
Moberly and Watkins (2006)	62 u/g's induced concrete or evaluative mode of thought.	PANAS.	Rumination was associated with decreased positive affect in evaluation mode but not in concrete mode.
Pennebaker, Colder, and Shapr (1990)	Reanalysis of most and least improved from two studies: 64 pts from previous immune study and 2 studies focusing on transition to college.	Essays for 3-4 days coded by LIWC.	Greatest physical improvements were found with expression of anxiety, sadness and negative feelings. An increase of cognitive and insight words was associated with physical benefits.
Pham and Taylor (1999)	Daily monitoring of studying behaviour with 100 u/g's 1 week before exam induced to focus on object or process.	Anxiety, emotional impact, hours studied, performance of exam, planning, self-efficacy, worry.	Envisioning steps leading to successful goal achievement improved performance. Process simulation increased problem-solving activities (mostly planning), emotion regulation, decreased exam anxiety and reduced negative mood.
Rivkin and Taylor (1999)	5 minute writing task for 1 week. 77 u/g's in either event simulation, outcome simulation or control groups.	COPE, emotional rating.	Event simulation correlated with more positive affect, planning and active coping strategies than outcome simulation or control groups.
Sanders and Lam (2010)	30 remitted depressed patients and 30 never-depressed in analytical or experiential self-focus groups.	BDI, depressing experience, FFMQ, MEPS, mood, RS, self-focus.	Higher trait rumination associated with increased social problem solving for experiential self-focus group.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
<i>Experimental studies (continued)</i>			
Vassilopoulos (2008)	29 high anxiety and 29 low anxiety u/g's induced in experiential or analytical self-focus.	BDI-II, mood, FNES, thought-listing.	Experiential self-focus decreased anxiety and increased positive thoughts.
Watkins and Baracaia (2002)	Three groups: depressed, recovered depressed, never depressed. Three conditions: no question ($n = 27$), state-oriented ($n = 29$) and process-focused ($n = 29$).	BDI, MEPS, Mood despondency, Rumination Response Scale.	Process-focused thinking increased problem-solving in depressed and recovered depressed patients.
Watkins and Moulds (2005)	Compared 40 controls with 40 MDD – Abstract vs. concrete self-focus.	Abstract and concrete thinking, BDI, DSC, MEPS, self-focus.	Concrete self-focus increased problem-solving in MDD patients more than abstract self-focus.
Watkins, Moberly, and Moulds (2008)	All: Induced to high or low rumination construal. Study 1: 40 u/g's. Study 2: Added control group, 63 u/g's. Study 3: 40 u/g's with some depressive symptoms.	Study 1 & 2: despondency, MEPS, visual self-focus. Study 3: PANAS.	Study 1 and 2: Those induced to high rumination produced greater despondency than low rumination. Study 3: Decreased negative affect for low rumination when compared with high rumination.

(Table 3.2 continues)

Table 3.2 (continued)

Reference	Sample	Measures	Findings
<i>Experimental studies (continued)</i>			
Yamada, Nagayama, Tsutiyama, Kitamura, and Furukawa (2003)	105 pts with depression. 6 month follow-up after pharmacotherapy.	Coping styles, HRSD, rumination.	Less rumination was associated with reduced depression.

Note. AAQ = Acceptance and Action Questionnaire; ADH = Emotion-focused therapy Adherence checklist; ADIS-C = Anxiety Disorders Interview Schedule for Children; ARPNO = Attribution of Responsibility for Positive and Negative Outcomes; ASQ = Attributional Style Questionnaire; AUSD = Ambiguous/Unambiguous Situations Diary; BDI (or BDI-II) = Beck Depression Inventory (or II); BFI -N = The Big Five Inventory - Neuroticism subscale; CASH = Comprehensive Assessment of Symptoms and History; CERQ = Cognitive Emotion Regulation Questionnaire; CES-D = Center for Epidemiologic Studies Depression Scale; CFS = Cognitive Flexibility Scale; CRF = Counsellor Rating Form; DAS = Dysfunctional Attitudes Scale; DGA = Deliberate Grief Avoidance; DPQ = Defensive Pessimism Questionnaire; DSC = Depressed State Checklist; DTWPP = Depression Treatment and Wellness Promotion Program; EAC = Emotional Approach Coping Scale; EACQ = Emotional Approach Coping Questionnaire; ECR-R = Experiences in Close Relationships-Revised; EFTT-EE = Emotion-Focused Therapy for Trauma with Empathic Exploration of trauma material; EFTT-IC = Emotion-Focused Therapy for Trauma with Imaginal Confrontation of perpetrators; ERQ = Emotion Regulation Questionnaire; FFMQ = Five Facet Mindfulness Questionnaire; GAF = Global Assessment of Functioning Scale; GDS = Geriatric Depression Scale; HDLF = Health and Daily Living Form; IES = Impact of Events Scale; IIP = Inventory of Interpersonal Problems; K10 = Kessler Psychological Distress Scale; LIWC = Linguistic Inquiry and Word Count; MAAS = Mindful Attention Awareness Scale; MADRS = 10-item Montgomery Asberg Depression Rating Scale; MASQ = Mood and Anxiety Symptoms Questionnaire; MBSS = Miller Behavioural Style Scale; MEPS = Means-Ends Problem-Solving Test; MMAP = Measure of Mental Anticipatory Processes; NAART = North American Adult Reading Test;

(Table 3.2 continues)

Table 3.2 (continued)

PANAS = Positive Affect Negative Affect Schedule; PPSI = Personal Problem-Solving Inventory; PSSI = Post-traumatic stress disorder symptom severity interview; PSWQ = Penn State Worry Questionnaire; pts = participants; QOLS = Medical Outcomes Study-Quality of Life Scale; RRQ = Rumination-Reflection Questionnaire; RS = Rumination Scale; RSE = Rosenberg Self-Esteem Scale; RSQ = Response Styles Questionnaire; RT = Repetitive thoughts; SAI = Schedule for Assessment of Insight; SANS = Scale for the Assessment of Negative Symptoms; SAPS = Scale for the Assessment of Positive Symptoms; SAV = Savouring beliefs scale; SCID = Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders; SCS = Self-Consciousness Scale; SCS-P = Self-Consciousness Scale – Private Subscale; SD = Self-distancing; SMS = Self-Monitoring Scale; SPSI-R = Social Problem Solving Inventory – revised; SRIS = Self-Reflection and Insight Scale; STAI = State-Trait Anxiety Inventory; SWLS = Satisfaction with Life Scale; SWS = Student Worry Scale; T-CBT = Telephone Cognitive Behavioural Therapy; T-EFT = Telephone Emotion-Focused Therapy; T1 = initial pretest assessment; T2 = follow-up assessment; TCD = Target Complaints (Discomfort) Scale; TFS = Therapist Facilitating Scale; TIG = Texas Inventory of Grief; TMAS = Taylor Manifest Anxiety Scale; TMMS = Trait Meta-Mood Scale; TSR = Therapy Session Report; u/g's = undergraduate students; WAI = Working Alliance Inventory; WASI = Wechsler Abbreviated Scale of Intelligence; WCQ = Ways of Coping Questionnaire; WCST = Wisconsin Card Sorting Test; YMRS = Young Mania Rating Scale.

Cross-sectional studies

Results from the 18 cross-sectional studies indicate that high emotion-focused attention was associated with increased problem-solving (Ayduk & Kross, 2010; Belzer et al., 2002; Davey, 1993), decreased interpersonal conflict (Ayduk & Kross, 2010), decreased negative mood (Brown & Ryan, 2003; Feldman & Hayes, 2005; Jermann et al., 2009; Watkins, 2004), positive global functioning in schizophrenia patients (Crumlish et al., 2007), increased positive affect and wellbeing (Elliott & Coker, 2008; Feldman & Hayes, 2005; Jermann et al., 2009; Kelly et al., 2001; Lyke, 2009; Segerstrom et al., 2010; Segerstrom et al., 2003; Swinkels & Giuliano, 1995; Yen et al., 2007) and productive coping (Lysaker et al., 2005). Low emotion-focused attention was associated with high anxiety (Legerstee et al., 2010). Most cross-sectional publications drew their samples from the undergraduate population (Ayduk & Kross, 2010; Belzer et al., 2002; Brown & Ryan, 2003; Davey, 1993; Feldman & Hayes, 2005; Jermann et al., 2009; Kelly et al., 2001; Segerstrom et al., 2003; Swinkels & Giuliano, 1995) or adult community samples (Brown & Ryan, 2003; Elliott & Coker, 2008; Lyke, 2009; Watkins, 2004). There were, however, a range of other populations from which samples were drawn including: older adults (Segerstrom et al., 2010), patients with schizophrenia (Crumlish et al., 2007; Lysaker et al., 2005), bipolar disorder (Yen et al., 2007), children with anxiety disorders (Legerstee et al., 2010), dementia, HIV, breast cancer (Segerstrom et al., 2003), and adults who attend a Zen mediation centre (Brown & Ryan, 2003).

Longitudinal studies

The 19 longitudinal studies focused on: the effects of psychotherapy (Beckner et al., 2010; Chambers et al., 2008; Hayes et al., 2005; Paivio et al., 2010); the effects of daily writing or experience sampling methodology (Ayduk & Kross, 2010; Kelly et al., 2001; Takano & Tanno, 2010; van der Houwen et al., 2010); using mindfulness training to facilitate the transition into the workforce (Williams et al., 2010); the relationship between awareness of past psychotic symptoms and hospitalisation or medication (Kemp & Lambert, 1995; Segerstrom et al., 2008; Yamada et al., 2003); emotion coping and auto-immunity functioning (Segerstrom et al., 2008); the effectiveness of both therapy and writing (Donnelly & Murray, 1991); and the change in cognitions, emotions

and behaviour over time (Bower et al., 1998; Cantor et al., 1987; Ciesla & Roberts, 2007; Dijkstra & Brosschot, 2003; Feldman & Hayes, 2005; Treynor et al., 2003).

Again, most samples were derived from undergraduate samples (Ayduk & Kross, 2010; Cantor et al., 1987; Chambers et al., 2008; Donnelly & Murray, 1991; Feldman & Hayes, 2005; Kelly et al., 2001; Takano & Tanno, 2010). Samples also consisted of patients with depression (Ciesla & Roberts, 2007; Hayes et al., 2005; Yamada et al., 2003), schizophrenia (Kemp & Lambert, 1995), multiple sclerosis (Beckner et al., 2010), HIV (Bower et al., 1998), adults with a childhood history of abuse (Paivio et al., 2010), adult caregivers (Segerstrom et al., 2008), smokers and ex-smokers (Dijkstra & Brosschot, 2003), bereaved adults (van der Houwen et al., 2010), trainees transitioning into the police force (Williams et al., 2010) and a community sample (Treynor et al., 2003).

Results from the longitudinal studies suggest that awareness leads to improvements in mental health following hospitalisation for schizophrenia (Kemp & Lambert, 1995). Thought suppression was related to an increase in depression, and acceptance related to an increase in wellbeing (Williams et al., 2010). Psychotherapy was shown to help depressed patients express emotions, leading to reductions in depressive symptoms (Beckner et al., 2010; Hayes et al., 2005; Paivio et al., 2010). Mindfulness training showed similar improvements with a decrease in rumination and depression when compared with a waiting list control group (Chambers et al., 2008). Writing tasks were found to increase problem-solving, decrease interpersonal conflict (Ayduk & Kross, 2010), increase positive affect (Kelly et al., 2001; van der Houwen et al., 2010), decrease loneliness and decrease rumination compared with a control group (van der Houwen et al., 2010). Decreased depressive symptoms were also found when the content of the writing was concrete compared with abstract content (Takano & Tanno, 2010). Processing information reflectively was shown to be associated with a higher grade point average (Cantor et al., 1987), decreased depressive symptoms and increased wellbeing (Feldman & Hayes, 2005), and less depressive symptoms over time but more depressive symptoms concurrently (Treynor et al., 2003). Auto-immune functioning declined when reflexive processing was used compared with no decline when reflective processing was used (Bower et al., 1998). Rumination from a self-distanced approach was also associated with less depressive symptoms when compared

with a self-immersed approach (Ciesla & Roberts, 2007). Worry was shown to facilitate smoking cessation (Dijkstra & Brosschot, 2003) and rumination was associated with a decrease in depression (Yamada et al., 2003).

Experimental studies

The 16 experimental studies focused on: induced experiential versus analytical modes (Lo et al., 2010; Moberly & Watkins, 2006; Sanders & Lam, 2010; Vassilopoulos, 2008; Watkins et al., 2008; Watkins & Moulds, 2005); induced rumination versus reflectiveness (Huffziger & Kuehner, 2009; Kuehner et al., 2009; McFarland et al., 2007); induced process-state versus object-state thinking (Pham & Taylor, 1999; Rivkin & Taylor, 1999; Watkins & Baracaia, 2002); writing tasks (Lyubomirsky et al., 2006; Pennebaker et al., 1990; Rivkin & Taylor, 1999); self-distant versus self-immersed perspectives (Kross & Ayduk, 2008); and decision-making (Evans et al., 2005).

As with the cross-sectional and longitudinal studies, most publications used undergraduate samples (Kross & Ayduk, 2008; Kuehner et al., 2009; Lo et al., 2010; Lyubomirsky et al., 2006; McFarland et al., 2007; Moberly & Watkins, 2006; Pennebaker et al., 1990; Pham & Taylor, 1999; Rivkin & Taylor, 1999; Watkins et al., 2008). A small number of publications included samples from patients with schizophrenia (Evans et al., 2005), depression (Huffziger & Kuehner, 2009; Sanders & Lam, 2010; Watkins & Baracaia, 2002; Watkins & Moulds, 2005) and anxiety disorders (Vassilopoulos, 2008).

Results from these studies suggest that analytical processing was associated with more negative mood (Lo et al., 2010; Vassilopoulos, 2008; Watkins et al., 2008) when compared with experiential processing. Experiential processing was associated with positive affect (Moberly & Watkins, 2006; Vassilopoulos, 2008) and problem-solving (Sanders & Lam, 2010; Watkins & Moulds, 2005) when compared with analytical processing. When compared with rumination, reflectiveness was found to increase positive mood and decrease negative mood (Huffziger & Kuehner, 2009) and lead to recovery from stress and improved coping (McFarland et al., 2007). Those induced to ruminate were found to have higher dysfunctional attitudes compared with those induced to reflect (Kuehner et al., 2009). The studies focusing on writing tasks found

that an induced writing task led to increased wellbeing when compared with induced thinking (Lyubomirsky et al., 2006). General wellbeing was associated with writing particularly when cognitive and insight words were commonly used in the writing task (Pennebaker et al., 1990). Induced process-state thinking or writing (i.e., thinking about the event) was found to lead to increased problem-solving (Pham & Taylor, 1999; Watkins & Baracaia, 2002), increased positive affect and increased coping (Rivkin & Taylor, 1999) when compared with thinking or writing about the outcome (i.e., object-state thinking). Taking a self-distanced approach to thinking about situations and events was found to decrease depressive symptoms when compared with a self-immersed perspective (Kross & Ayduk, 2008). Higher levels of conscious awareness were also found to increase problem-solving and decision-making (Evans et al., 2005).

Heterogeneous publications

It is important to note the high heterogeneity of the studies included in this review. The publications differed in terms of sample; samples consisted mainly of undergraduate students, but also included older adults, adolescents, patients with various mental health problems and physical health problems and sample sizes ranged from 25 to 1179 ($M = 188.8$, $SD = 268.26$, $Mdn = 88.5$). There were also different study designs; cross-sectional, experimental and longitudinal, each with limitations. For example, cross-sectional studies are useful in identifying associations between factors but cannot establish causality. Longitudinal studies may best approximate real-life cause and effect; however, they tend to be smaller due to difficulty in retaining participants over time. Experimental studies can determine causality, although they may not translate into real-life scenarios despite having the strongest internal validity out of all the approaches. There were also many different measures used in the studies to measure similar constructs; depression was measured with various scales including the Beck Depression Inventory, The Center for Epidemiologic Studies Depression Scale, the Depressed State Checklist and others. Emotion-focused attention was measured using many different scales including the Cognitive Emotion Regulation Questionnaire, the Emotional Approach Coping Questionnaire, the Five Facet Mindfulness Questionnaire, the Mindful Attention Awareness Scale, the Rumination Reflection Questionnaire, the Self-Consciousness Scale, and the Self-Reflection and Insight Scale.

The interventions, therapies and control groups used also varied between studies further limiting comparability between the studies. In addition, there are also clearly groups of collaborating authors with more than one article included in this review (e.g., Watkins, 2008), which may affect the results of this review. All these factors must be taken into consideration when analysing the data.

Beneficial outcomes

Fifty publications were reviewed that each referred to at least one beneficial outcome arising from ESA. Broadly, beneficial outcomes were categorised into two themes: general health and psychological wellbeing as depicted in Figure 3.2. Outcomes about psychological wellbeing were most often reported with articles listing one or more of the following benefits associated with ESA: 31 articles reported decreased negative affect, 13 reported increased positive affect, 12 reported an increase in general wellbeing, ten articles reported an increase in problem-solving, six articles reported protection against rumination and four reported improved physical wellbeing.

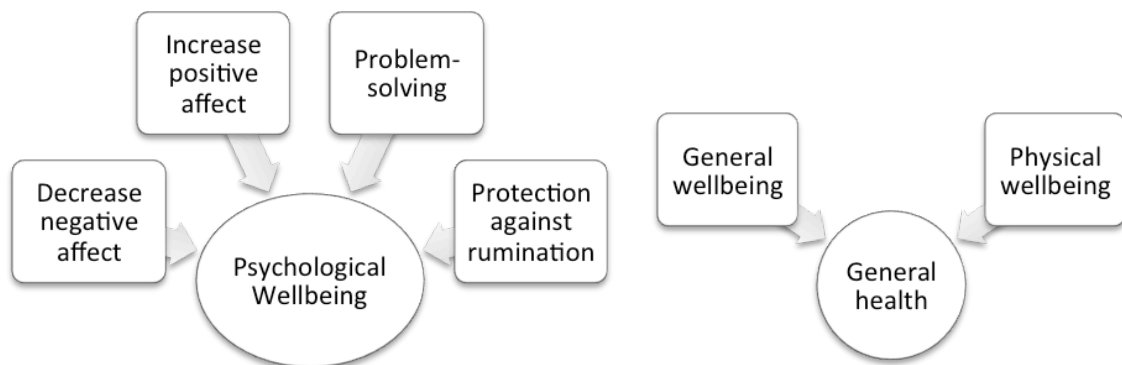


Figure 3.2. Thematic map of the beneficial outcomes identified in the systematic literature review.

Each publication was categorised into one to four of these themes with a mean of 1.5 ($SD = 0.72$) beneficial outcomes per publication. Psychological wellbeing was further divided into four subthemes: decreased negative affect, problem solving, increased positive affect and protection against rumination. General health included two further subthemes: physical wellbeing and treatment compliance.

Decrease of negative affect.

There were a total of 34 publications that examined the relationship between ESA and negative affect including seven cross-sectional studies, nine experimental studies, 13 longitudinal studies, and 2 publications consisting of both cross-sectional and longitudinal study components. Specifically there was a focus of the following themes: reduction of depressive symptoms (Beckner et al., 2010; Chambers et al., 2008; Ciesla & Roberts, 2007; Coffey & Hartman, 2008; Feldman & Hayes, 2005; Hayes et al., 2005; Jermann et al., 2009; Kross & Ayduk, 2008; Lo, et al., 2010; Moberly & Watkins, 2006; Paivio et al., 2010; Segerstrom et al., 2010; Segerstrom et al., 2008; Takano & Tanno, 2010; Treynor et al., 2003; Williams et al., 2010; Yamada et al., 2003); reduction of anxiety (Cantor et al., 1987; Coffey & Hartman, 2008; Legerstee et al., 2010; Paivio et al., 2010; Pham & Taylor, 1999; Vassilopoulos, 2008); decrease in negative mood (Brown & Ryan, 2003; Huffziger & Kuehner, 2009; Pham & Taylor, 1999; Vassilopoulos, 2008; Watkins, 2004); less stress (Brown & Ryan, 2003; McFarland et al., 2007; Segerstrom et al., 2010); improvements in post-traumatic stress disorder (Paivio et al., 2010); reduced loneliness (van der Houwen et al., 2010); and reduced depressive rumination (Ayduk & Kross, 2010a; Chambers et al., 2008; Kuehner et al., 2009).

In the study by Jermann et al. (2009), an increase of mindful attention to and awareness of the present moment was related to a decrease in depressive symptoms. Paivio et al. (2010) found that focusing on emotions during emotion-focused therapy reduced the impact of past child abuse as well as anxiety, depression and post-traumatic stress disorder symptoms in adults with past child abuse. Rehearsal of plans and analysis of emotional problems reduced depressive symptoms (Feldman & Hayes, 2005). Moberly and Watkins (2008) suggest that increasing people's ESA "may limit their emotional vulnerability to upsetting events and reduce the onset and maintenance of depressive symptoms" (p. 289).

Problem-solving.

Ten studies (three cross-sectional and seven experimental studies) examined the relationship between ESA and problem-solving abilities. Evans et al. (2005) found that the conscious awareness in patients with schizophrenia was related to their performance on a gambling task and suggested that “there may be greater conscious awareness of emotion-related information in complex decision-making than has previously been appreciated” (p. 662). In a study examining daily monitoring of exam preparation (Pham & Taylor, 1999), process simulation, such as visualising when, where and how to achieve the best grade, was shown to increase problem-solving, particular the planning process of problem-solving. A further study (Watkins & Moulds, 2005) showed that process-focused thinking lead to increased problem-solving for both depressed and recovered depressed patients when compared to state-oriented thinking. Worry has also been implicated in improved problem-solving (Belzer et al., 2002; Davey, 1993). Davey found that worrying was associated with adaptive problem-solving, information seeking and monitoring of threats. Similarly, Belzer et al. (2002) reported that worrying increased rational problem-solving specifically the systematic gathering of facts and information, identifying demands and obstacles, setting goals, and identification of a variety of solutions. Concrete self-focus (Watkins & Moulds, 2005) and rumination (Sanders & Lam, 2010) were also found to be positively associated with social problem-solving. Awareness of emotional information was found to predict favourable coping (McFarland et al., 2007) and active coping strategies (Rivkin & Taylor, 1999). Furthermore, Lysaker and colleagues (2005) examined insight in association with hope and found that those who experienced high hope alongside high insight had the most adaptive coping strategies when compared to those with low hope and high insight.

Increase of positive affect.

Twelve studies (five cross-sectional, five longitudinal and three experimental studies) found that ESA was related to an increase of positive affect with higher scores on positive affect correlating with higher scores on ESA (e.g., Baslet et al., 2009; Brown & Ryan, 2003). Eight articles examined the effects of ESA on positive mood or thoughts (Brown & Ryan, 2003; Donnelly & Murray, 1991; Elliott & Coker, 2008; Hayes et al., 2005; Huffziger & Kuehner, 2009; Kelly et al., 2001; van der Houwen et

al., 2010; Vassilopoulos, 2008). Writing about emotional experiences increased positive mood in undergraduates (Kelly, 2001). This finding was duplicated for adults suffering from depression (Hayes, 2005) as well as bereaved adults (van der Houwen et al., 2010). Another experimental study (Rivkin & Taylor, 1999) examined writing about the process of the event versus the outcome of the event and found that writing about the process lead to more positive affect compared to writing focused on the outcome. Experiential self-focus was associated with more positive thoughts compared with analytical self-focus (Vassilopoulos, 2008). Self-reflection was shown to increase happiness (Elliott & Coker, 2008; Lyke, 2009), hope (Hayes et al., 2005) and positive emotional states (Brown & Ryan, 2003), improve self-esteem (Donnelly & Murray, 1991; Paivio et al., 2010), increase motivation and control (Cantor et al., 1987) and enhance life satisfaction (Lyke, 2009). In an experimental study (Huffziger & Kuehner, 2009), previously hospitalised patients suffering from depression were induced to one of three groups: mindful self-focus, distraction or rumination. Those in the mindful self-focus group had significantly increased positive mood compared to either the distraction or the rumination groups, particularly when mindfulness was habitual for these participants.

Protection against rumination.

The process of constructively processing emotions was suggested to protect against rumination in three cross-sectional and four longitudinal studies. Experiential self-focus was associated with less intrusive thoughts than analytical self-focus (Watkins et al., 2008). Techniques such as self-distancing that increase ESA were suggested to protect against rumination (Ayduk & Kross, 2010). Disclosure of upsetting experiences was also found to decrease rumination (van der Houwen et al., 2010).

General wellbeing.

Although less commonly reported than psychological wellbeing, there were 11 studies that examined the relationship between more general forms of wellbeing and its association with ESA. These studies suggested an association between ESA and quality of life (Lyke, 2009), positive consequences (Swinkels & Giuliano, 1995), global functioning (Crumlish et al., 2007) (Seegerstrom et al., 2010), and decreased visits to a

physician (Pennebaker et al.1990). For bipolar patients, higher insight scores were associated with better psychological adjustment to their disorder (Yen et al., 2007). General wellbeing was associated with mindful acceptance (Williams et al., 2010), planned rehearsal and problem analysis (Feldman & Hayes, 2005), talking and writing (Lyubomirsky et al., 2006) and positive repetitive thoughts such as self-reflection (Segerstrom et al., 2003). Worry was also found to be associated with positive changes such as increased screening for breast cancer (Hay et al., 2006). The majority of these studies ($n = 7$) were cross-sectional and suggests an association with general wellbeing rather than causality.

Physical wellbeing.

Five studies (three longitudinal studies, one cross-sectional study and one experimental study) examined the relationship between ESA and physical health, and found that ESA was related to better immunological functioning (Bower et al., 1998; Pennebaker, 1993), increased motivation to quit smoking (Dijkstra & Brosschot, 2003), improved physical health (Segerstrom et al., 2010) and maintenance of influenza antibodies after vaccination (Segerstrom et al., 2008).

Emotional self-awareness

Content related to ESA from the literature was categorised under the following five themes: *recognition* of emotional information; *identification* of specific emotions; *contextualisation* of emotions; *communication* of emotional knowledge; and alternative *decision-making*. These themes are described in detail below.

Recognition of emotional information.

Most commonly reported, in 41 of the 50 publications, was the theme of *recognition of emotional information*. Examples of this theme range from the simple description of awareness, such as Evans et al. (2005), who referred to “conscious awareness of emotion-related information” (p. 662). “Neutral repetitive thoughts consisting of emotional approach coping, self-analysis/pondering and reflection” (Segerstrom et al., 2008, p. 747) and the definition of ‘reflective pondering’ by Treynor et al. (2003): “A purposeful turning inward to engage in cognitive problem-solving to

alleviate one's depressive symptoms" (p. 256). Chambers et al. (2008) describe a more elaborate process where "awareness is employed equanimously, in that whatever arises is acknowledged and examined without judgment, elaboration or reaction" (p. 304). Most commonly the idea of turning inwards (McFarland et al., 2007; Treynor et al., 2003) and accessing adaptive emotions (Paivio et al., 2010) was reported with phrases used such as *self-reflection* (Seegerstrom et al., 2008), *focusing on distress* (van der Houwen et al., 2010), *focusing on negative emotions* (Pennebaker, 1993), *deliberate and effortful processing* (Bower et al., 1998) and positively-valenced *repetitive thoughts* (Seegerstrom et al., 2010).

There was an emphasis on the present time in the *recognition* theme, stemming from the theory of mindfulness, where importance is placed on acknowledging and attending to the present moment (Brown & Ryan, 2003). For example, "attention and awareness to what is occurring at the present moment" (Jermann et al., 2009, p. 512), moment by moment awareness (Kuehner et al., 2009) and "an active state of consciousness" (Williams et al., 2010, p. 276) that is nonevaluative (Huffziger & Kuehner, 2009) and nonjudgemental (Chambers et al., 2008). Similar to mindfulness, four articles referred to concrete or experiential processing of emotions as opposed to evaluative, abstract processing. Concrete processing has a focus on specific details (Moberly & Watkins, 2006). Watkins et al. (2008) referred to concrete processing as low-level processing, defined as "more concrete, more experiential and more sensory-focused, describing physical sensations experienced ('wet', 'relaxed', 'grip') and physical objects observed ('glass')" (p. 372). Vivid imagery was also suggested to assist with concrete processing (Watkins & Moulds, 2005).

In addition, research examining awareness of symptoms in psychiatric illnesses referred to *awareness* as "acknowledgement of the presence of a symptom or a sign" (Kemp & Lambert, 1995, p. 23) or the "awareness of being ill, awareness of having a mental disorder" (Yen et al., 2007, p.738). Four articles reported that therapeutic processing was associated with beneficial outcomes such as increased hope and improvements in depressive symptoms (Hayes et al., 2005). Therapeutic awareness-raising involves thinking about thoughts and feelings (Elliott & Coker, 2008), focusing on your deepest thoughts and feelings (Donnelly & Murray, 1991) and enhancing understanding of emotional information (Lyubomirsky et al., 2006). Self-distancing was

also found to have beneficial outcomes ($n = 3$) and was defined as “[a perspective] in which they see themselves in their experience from the perspective of an observer or ‘fly on the wall’” (Ayduk & Kross, 2010, p. 810). Six articles also examined rumination, worry, and defensive pessimism and found beneficial outcomes, demonstrating the complexity of this issue and the difficulty in distinguishing between emotion-focused attention with beneficial and detrimental outcomes.

These themes have been grouped together under the theme *recognition of emotional information* as depicted in Figure 3.3. The theme *recognition of emotional information* refers to becoming aware of emotions at the present moment, attending to the experiential emotional state, recognising that an emotional state is occurring and may involve viewing the emotional information from a self-distanced perspective.

Identification.

This theme was reflected in 16 publications and refers to defining an emotion and attaching a suitable label to it. *Identification* is based upon identifying feelings (Lyke, 2009; Swinkels & Giuliano, 1995; Williams et al., 2010), and has been defined by Swinkels and Giuliano as the ability to label mood states and categorise current mood. Similarly, *labelling* or *identification* is used in psychiatric research to refer to the labelling of symptoms or illness (Crumlish et al., 2007; Kemp & Lambert, 1995; Yen et al., 2007). Some important processes in identifying individual emotions and distinguishing between them included: defining emotions (Watkins et al., 2008), giving emotions specific descriptions (Watkins & Moulds, 2005), systematic searching of emotional knowledge and experiences (Lyubomirsky et al., 2006) and giving a name to the feeling (Swinkels & Giuliano, 1995). Chambers et al. (2008) add that physiological arousal is also involved in the process of identifying and determining differences between various emotional states. Based upon this literature, *identification* of emotional states refers to defining an emotional state, attaching it to a suitable label and being able to distinguish the emotion attached to that label from other emotions.

Contextualisation.

Twenty-seven articles addressed the importance of understanding the relationship between emotions and contextual issues including causes, consequences, situational factors, and individual factors. Beckner et al. (2010) found that exploring contextual

issues during therapy resulted in a reduction of depressive symptoms. Mindfulness psychology (Brown & Ryan, 2003) explored the concept of identification of the events that surround the emotion; for example, identifying the needs of the individual, their concerns and conflicts. Furthermore, psychiatric research refers to the explanation or attribution an individual ascribes to symptoms (Kemp & Lambert, 1995). Examples from this theme range from descriptions of gathering information about the emotion, defining and visualising the problem that is associated with the emotion, exploring the causes and consequences of the problem, and understanding the reasons for the emotion. Five articles referred to gathering information related to the emotional state, such as people who “carefully and systematically gather facts and information about a problem, identify demands and obstacles” (Belzer et al., p. 582) and processing of information related to emotions (Takano & Tanno, 2010).

Contextualisation involves defining the problem (Davey, 1993), techniques involving visualisation of the events surrounding the emotional state that can help define the problem (Pham & Taylor, 1999; Rivkin & Taylor, 1999), exploring contextual issues includes causes or antecedents of the emotion (Feldman & Hayes, 2005; Kemp & Lambert, 1995; Yamada et al., 2003), identification of a possible threat (Dijkstra & Brosschot, 2003) and possible consequences (Lysaker et al., 2005). Based upon this literature, *contextualisation* is defined as gathering information about the context of the emotional situation, defining the situation, exploring triggers and other preceding events that occur to cause the feeling, exploring consequences and understanding the reasons for the feelings associated with the event. As with identification, contextualisation can be facilitated by a self-distanced perspective (Kross & Ayduk, 2008).

Decision-making.

Of the 50 publications, 28 referred to the theme of *decision-making*. For instance, Kelly et al. (2001) reported a correlation between positive affect and ideas for better ways of dealing with people and problems. *Decision-making* is based upon the following central ideas found in the literature: problem-solving (Lyubomirsky et al., 2006) or complex decision-making (e.g., Evans et al., 2005); specific actions or behaviours that can change emotions such as studying to get a better grade (Pham & Taylor, 1999); replacing unhelpful thoughts with helpful thoughts (van der Houwen et

al., 2010); attempting to overcome negative emotions and associated information (Treyner et al., 2003); generating new constructive problem-solving responses and alternative solutions (Ayduk & Kross, 2010; Chambers et al., 2008; Lyubomirsky et al., 2006; Watkins & Moulds, 2005); working through the emotion (Segerstrom et al., 2003); realising the need for treatment (Lysaker et al., 2005; Yen et al., 2007); and understanding the psychosocial consequences of illness (Yen et al., 2007).

Closely related to *decision-making* is the concept of *planning*. Ten articles were identified as relating to planning, including choosing a solution to implement (Dijkstra & Brosschot, 2003) or thinking about what the steps to take and how to handle negative mood (Feldman & Hayes, 2005; Legerstee et al., 2010). Also included in the *decision-making* themes is the concept of acceptance. Six articles referred to accepting that the emotional state is occurring, that the emotion cannot be altered at the present time and will change once the triggers of the emotion are removed or given time (Chambers et al., 2008; Hayes et al., 2005). Repetitive or ‘intrusive’ thoughts may form the first stage of learning to acceptance (Segerstrom et al., 2003) and is nonjudgemental (Kuehner et al., 2009).

From the above concepts in the literature, the theme *decision-making* has been defined as gathering information about emotions and making a conscious, rational decision or plan about the best way of dealing with the emotional knowledge. Decisions can include specific actions, accepting the situation, attempts to change cognitions and emotion regulation.

Communication.

Nineteen articles referred to *communication*, generally in the forms of expressing negative emotions, written disclosure, or daily self-monitoring. Van der Houwen et al. (2010) found that sharing thoughts, feelings and news with deceased loved ones through writing may reduce feelings of loneliness. Writing was found to provide participants with new insights into their emotions and problems (Kelly et al., 2001). Other examples of this theme included: “Attempting to find a phrase or set of words that best describes the quality of what you sense” (Vassilopoulos, 2008, p. 862) and expressing feelings (Lyke, 2009). Daily monitoring was also included in the *communication* theme, with several studies using self-monitoring tasks to record the number of hours studied (Pham

& Taylor, 1999), individuals' deepest thoughts and feelings for three to four days (Pennebaker, 1993) and experience sampling methodology to capture information about negative affect and events (Takano & Tanno, 2010). *Communication* of emotional knowledge refers to the ability to use appropriate labels and phrases to refer to emotional states as well as communicate information related to the emotion such as situations, events, people and places that are involved with the emotion by writing, talking or other means of *communication*.

Emotional self-awareness thematic schema.

A thematic map describing the five themes of ESA is presented in Figure 3.3. One to five themes were identified for each publication with a mean of 2.3 ($SD = 0.98$) themes per publication. Of the 50 publications, 7 included one theme, 18 publications each included two or three themes, 5 included four themes and 2 included all five themes. The majority of publications (81%) included the *recognition* theme ($n = 41$), suggesting that *recognition* is the most common ESA category. Sixteen publications (31%) included the *identification* theme, 27 publications (52%) included the *contextualisation* theme, 28 publications (54%) included *decision-making* and 19 (37%) included the *communication* theme.

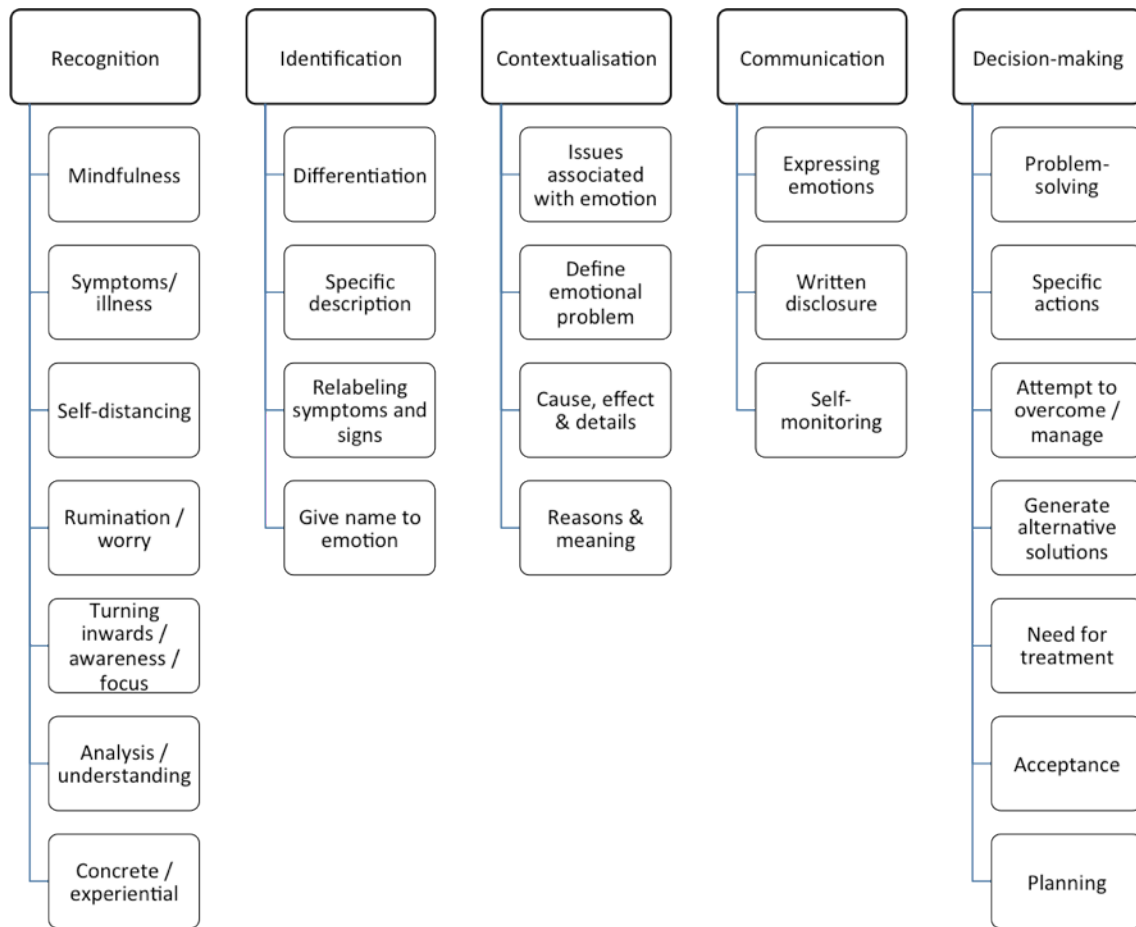


Figure 3.3. Thematic map of emotional self-awareness.

Relationship between ESA and adaptive outcomes

The relationship between the ESA themes and the beneficial outcomes were examined. Table 3.3 lists the beneficial outcomes by the ESA themes. No statistical analysis was conducted due to the small numbers in each category.

Table 3.3

Beneficial Outcomes Listed by the Publications Compared With Emotional Self-Awareness Themes

	REC	ID	CONT	COMM	DM
General wellbeing ($n = 12$)	9	7	5	5	8
Physical wellbeing ($n = 5$)	5	1	4	2	1
Increase positive affect ($n = 12$)	10	4	7	7	6
Decrease negative affect ($n = 30$)	26	7	16	9	13
Protect against rumination ($n = 6$)	6	1	4	3	4
Problem-solving ($n = 10$)	6	4	6	4	8
Any benefit ($n = 50$)	40	15	18	27	17

Note. REC = ESA *recognition* theme; ID = ESA *identification* theme; CONT = ESA *contextualisation* theme; COMM = ESA *communication* theme; DM = ESA *decision-making* theme.

Out of the 50 articles, the *recognition* theme was associated with the most benefits (41/50), followed by *communication* (27/50), *contextualisation* (18/50), *decision-making* (17/50) and lastly *identification* (15/50). The relationship between the benefits and ESA themes are graphically depicted in Figure 3.4. To measure each theme against each other, the count of each theme was divided by the total count of each benefit (e.g., there were nine instances of *recognition* for wellbeing; therefore, the proportion is 9/12 or 0.75). Proportions above 0.5 were considered to be associated with that benefit.

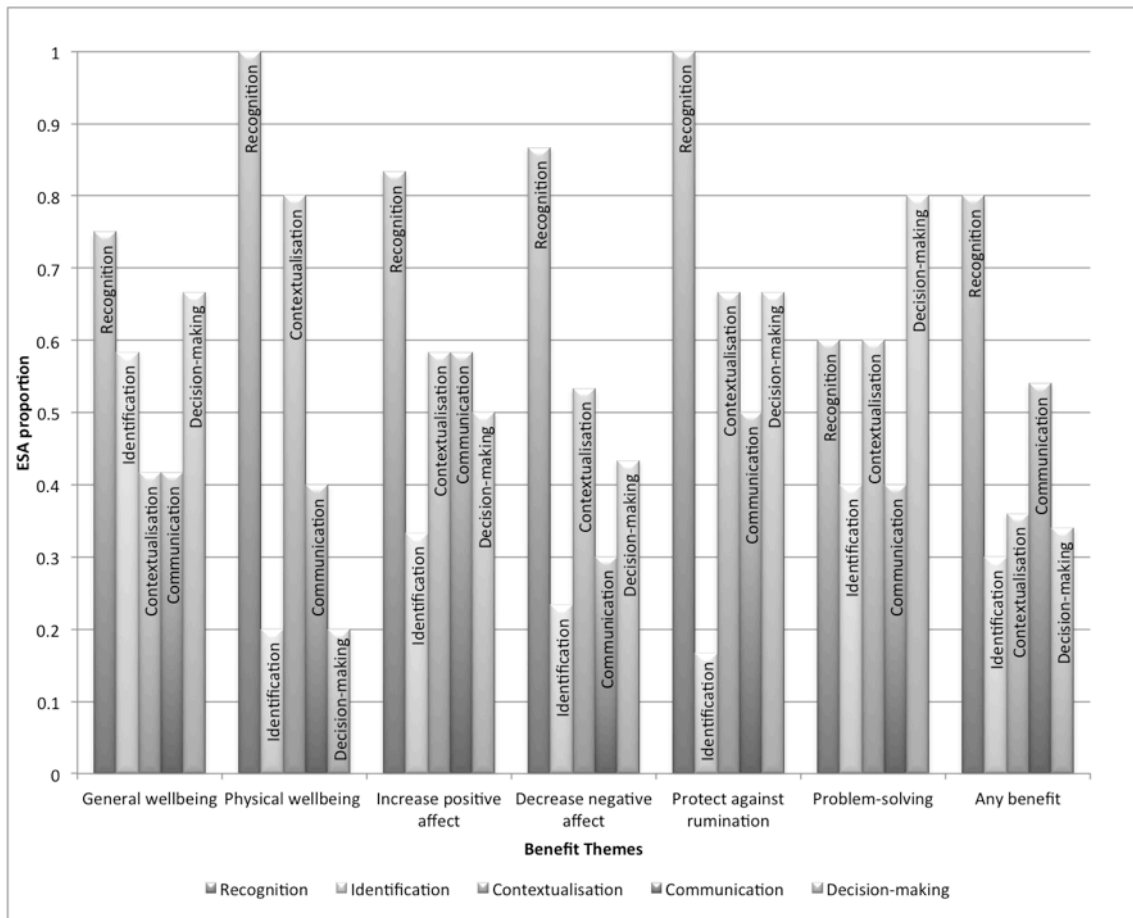


Figure 3.3. Relationship between ESA and benefit themes. The proportion of each theme is depicted.

Figure 3.4 suggests that general wellbeing was associated with the *recognition*, *identification* and *decision-making* ESA themes. Physical wellbeing was associated with the *recognition* and *contextualisation* ESA themes. Positive affect was associated with the *recognition*, *contextualisation* and *communication* ESA themes. Decreased negative affect was associated with *recognition* and *contextualisation* ESA themes. Protection against rumination and problem-solving were associated with the *recognition*, *contextualisation* and *decision-making* ESA themes. The most commonly identified ESA themes associated with any of the benefits were the *recognition* and *communication* ESA themes.

Discussion

ESA was identified in the literature under a number of guises; nevertheless, several themes were consistent throughout the literature highlighting aspects of ESA that lead to beneficial outcomes such as decreasing negative affect, increasing positive affect, protecting against rumination, problem-solving, and improvements in general and physical health. Five ESA themes were identified which focused on: (a) recognition of the presence of emotions, (b) the ability to identify the feeling, (c) identifying contextual factors surrounding the emotions, (d) communicating emotional knowledge to others and oneself, and (e) analysing emotional events to make decisions. It seems that some ESA themes were related to different benefits; in particular *recognition* was associated with each benefit, *contextualisation* was most strongly associated with physical wellbeing and *decision-making* was most strongly associated with general wellbeing and problem-solving. These results are preliminary and therefore tentative. Most publications were identified as consisting of the *recognition* theme, suggesting that *recognition* may be a low-order process in ESA.

Comparison with previous research

In contrast to the current review, previous research generally focuses on the negative outcomes of emotion-focused attention. Previously research and theory has conceptualised self-focus on emotional information as inherently detrimental, with concepts such as rumination and worry highly associated with depression and anxiety respectively (Ebata & Moos, 1994; Lyubomirsky & Nolen-Hoeksema, 1993, 1995; Moberly & Watkins, 2008; Nolen-Hoeksema, 1991; Penley et al., 2002; Rimes & Watkin, 2005). Another school of thought emphasises the therapeutic value of gaining insights into emotions (Beck, 1997). Becoming aware of emotions and problems has long been a core process in psychotherapy (Freud, 1927; Prochaska & Diclemente, 1982). Indeed some therapies such as emotion-focused therapy (Greenberg, 2004) and mindfulness (Brown & Ryan, 2003) involve gaining insights and awareness of emotions as a primary therapeutic outcome. The development of the ESA model unifies concepts related to awareness of emotions in order to provide a concept that may assist

therapeutic interventions by focusing on adaptive emotion-focused attention and limiting the risk of increasing detrimental rumination and worry. One theme identified in the current review was that ESA may be protective against rumination (van der Houwen et al., 2010), thereby suggesting an inverse relationship may exist between negative outcomes of emotion-focused attention and productive forms.

Previously, Watkins (2008) and Segerstrom et al. (2003) identified that the way an individual focuses on their emotions and thoughts affects the type of outcome that is produced with context, valence, and abstraction as the key difference between positive and negative consequences (Watkins, 2008). Following from this, the current review focuses on specific attributes of positive consequences and highlights the importance of Watkins key principles. For instance, the *recognition* theme focuses on concrete aspects of emotions, highlighting Watkins' principle of low abstraction. In addition, *decision-making* is based upon positive valence by focusing on planning, accepting and making decisions about negative emotions in a rational conscious manner. Much of the research explored in the current review is based upon different backgrounds and theoretical underpinnings; nevertheless, there are central concepts that are similar throughout the literature which may enable a more unified perspective of ESA in the future and aid therapeutic interventions.

Theoretical implications of findings

The current chapter extends previous research by elaborating on specific aspects of ESA and can be understood in terms of the Reinforcement Sensitivity Theory discussed in Chapter 2. Conflicting or novel information that simultaneously activates both the FFFS and BAS produces an error and is then diverted to the control mode of the BIS, which inhibits activation of the FFFS and BAS and thereby increases awareness and arousal (Corr, 2011). The current review broadens and specifies the general description of awareness and arousal and provides a comprehensive framework of the productive process of activating the BIS as shown in Figure 3.5.

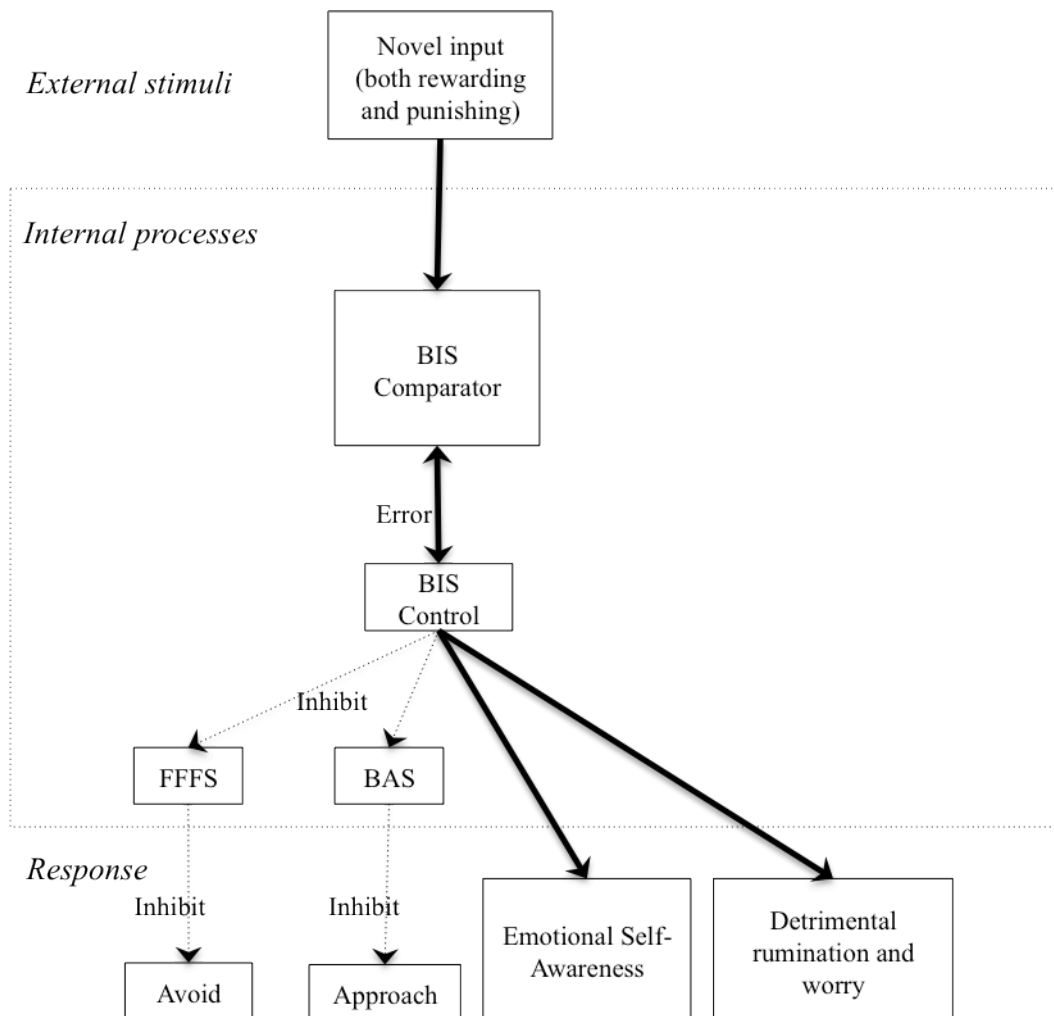


Figure 3.5. Emotional self-awareness in the Reinforcement Sensitivity Theory. BIS = Behavioural Inhibition System. BAS = Behavioural Activation System. FFFS = Fight-Flight-Freeze System.

Activation of the BIS can result in adaptive or maladaptive processes of awareness as shown in Figure 3.5. When an individual thinks about negative emotions and related experiences, aversive reactions are natural, physiological and emotional information is activated and can trigger avoidance or distraction systems (Kross & Ayduk, 2008). This, in turn, can prevent the individual from processing this emotional information. Eliminating aversive experiences is useful in the short-term; however, avoidance of negative emotions can be detrimental in the long-term and lead to rumination, worry and other intrusive thoughts. Research shows that heightened ESA is associated with concurrent depressive symptoms and also with a consequent reduction in depressive symptoms (Treyner et al., 2003), suggesting that although aversive in the short-term,

thinking about negative emotions can be adaptive in the longer-term when compared with avoidance and suppression (Pennebaker et al., 1990).

Limitations of the review

One limitation of this systematic review stems from the publications included in this review. Many of the excluded articles could not be included as they did not provide descriptions or definitions of awareness and provided no details about whether it was a multidimensional or singular construct, or gave vague descriptions. Further research is needed to operationalise the ESA concept so that each theme can be examined in empirical research. It was beyond the scope of this review to explore negative consequences of emotion-focused attention as previously reviewed (Seegerstrom et al., 2003; Watkins, 2008), which may have added another dimension to defining the characteristics of positive and negative emotion-focused attention. Nevertheless, there are previous reviews available that explore this aim (e.g., Mor & Winquist, 2002; Watkins, 2008). A further limitation of this study was that only one coder was involved in conducting the analysis and therefore, the themes may be biased. In addition, the samples analysed in this review were heterogeneous in nature and consisted mainly of undergraduate students and adults. There is little research available focusing on young people with a focus on the metacognitive processes that develop during adolescence. There are likely to be individual differences in ESA, for example some people may have developed or been born with dysfunctional emotional systems (Greenberg, 2004) or have developed a sensitive BAS, FFFS or BIS (Corr, 2011) and may experience ESA differently from one another.

Another limitation was the types of studies reviewed. Many of the studies used in this review were cross-sectional. Cross-sectional studies are useful in establishing prevalences and identifying associations between various factors (Mann, 2003); although they are limited in determining cause and effect. There were also longitudinal studies reviewed which suggest cause and effect relationships between ESA and beneficial outcomes and have greater external validity. Furthermore, the experimental studies reviewed here can better determine a cause and effect relationship.

Future research

Further testing and development of the five ESA themes is needed. Qualitative research to explore the concept of ESA is necessary to refine the themes of ESA and further research developing a scale to measure the ESA themes would allow testing of the relationships between ESA and beneficial outcomes such as those found in this review. Research is also needed to explore individual differences in ESA; for instance, people with depressive symptoms may be more likely to ruminate rather than focus on adaptive ESA themes. Examination of ESA in young people at risk of depression would also be of interest to explore adolescents' experience of ESA. In addition, whilst the current literature review suggests the proposed adaptations to the RST, further research examining whether activation of the BIS can result in both detrimental and adaptive types of awareness is needed to test this hypothesis.

Practical Implications of the research

Using the ESA model as a practical guide, current psychotherapies and early intervention programs may be enhanced by encouraging patients to focus specifically on the five themes of ESA. The development of a clear definition of ESA ensures that insights obtained through therapeutic interventions are adaptive and limit the risk of detrimental emotion-focused attention such as rumination. Increasing young people's ESA may provide a basis for first-step early intervention programs in the stepped-care model. Increasing young people's ESA may reduce mild depressive symptoms and prevent the progression from mild to clinically diagnosed depression. It has been previously suggested that early intervention programs that are based upon a theoretically sound mediating factor are most successful (Horowitz & Garber, 2006; Pössel, 2003). Behavioural techniques are often used to increase ESA such as homework diaries between therapeutic sessions and regular monitoring of thoughts and feelings (Kazantzis, 2000). Research demonstrates that self-monitoring increases awareness of the targeted behaviour (Lipinski, Black, & Nelson, 1975) and could provide a simple, low-cost method to increase ESA in order to prevent depression and other mental health problems. Self-monitoring techniques increase the salience of the subject being monitored and may provide a useful tool in early intervention programs. ESA is an

important process allowing individuals to think about their inner selves and attempt to rectify problematic situations and emotions.

This systematic review explored available publications that focused on ESA, with several themes identified including: *recognition* of emotional information, *identification* of emotional states, *contextualisation* of emotions, *communication* of emotional knowledge and alternative *decision-making* about emotions. Increasing ESA is related to many psychological and general health benefits such as reducing negative affect, increasing positive affect, protecting against rumination, improving problem-solving skills, and improvements in general and physical health. The clear and precise definitions of the ESA categories presented here may assist with psychotherapy ensuring that patients become aware of their emotions in a productive way and limit negative self-focus such as rumination and worry. This concept of ESA may also improve on current early intervention strategies assisting young people with mild or more mental health symptoms to become aware of emotions before the development of clinically diagnosable disorders. To this end, Chapter 4 describes a mobile phone self-monitoring program that was used to collect information about young people's daily experiences. This next study will examine young people's feedback after completion of the program and explore their experiences of ESA.

CHAPTER 4

Observations from a Mobile Phone Self-Monitoring Program Pilot Study: A Post-Hoc Analysis of Young People's Feedback about Emotional Self-Awareness

Prevention programs that are simple and low-cost are fundamental to reducing the economic and personal burden of depression (Andrews et al., 2000). The stepped care model begins with simple and inexpensive prevention programs (that occur before the onset of diagnosed MDD) and has the ability to ‘step up’ to higher intensity programs as needed (Geisner, 2006; Jorm & Griffiths, 2006; van Straten et al., 2010). The stepped-care model has the advantage of providing low intensity early intervention programs with reduced length and cost of the treatment to young people experiencing mild mental health symptoms (Kuehner et al., 2009; Lynch et al., 2005; Spence et al., 2005). Van Straten, Seekles, van’t Veer-Tazelaar, Beekman, and Cuijpers (2010) advocate the use of ‘watchful waiting’ with young people experiencing mild symptoms of depression as a first step in the stepped care model. Current universal prevention programs that focus on intensive computerised or school-based cognitive behavioural therapy-based programs, such as the beyondblue Schools Research Initiative (Spence, Sheffield, & Donovan, 2003) are time-consuming, have high attrition rates and therefore may be better suited to second-step early intervention targeting young people with elevated depressive symptoms. Third-step interventions should involve individualised face-to-face therapy with young people experiencing MDD. Fourth-step interventions should involve the use of anti-depressant medication combined with face-to-face therapy and only used in severe chronic episodes of depression in combination with CBT and regular monitoring for suicidal ideation and behaviour (van Straten et al., 2010).

As a first step intervention, the ‘watchful waiting’ approach has two limitations. First, as GPs are often the first point of contact for people with mild mental health symptoms (Council of Australian Governments, 2006), the onus of watchful waiting would be placed upon GPs. Nonetheless, GPs are under pressure to treat many people within a day and to keep appointment times brief. In Australia, the current average appointment time for GPs is approximately 15 minutes per patient (Britt, Valenti, & Miller, 2002). Second, GPs are more likely to identify mental health problems in young people who are aware of emotion distress (Haller, Sanci, Sawyer, & Patton, 2009); therefore, watchful waiting may not be useful with young people who are unaware of emotional distress until more severe symptoms are developed.

The model of ESA outlined in Chapter 3 is yet to be explored in the research paradigm. Chapters 2 and 3 explored the concept of ESA and proposed that programs

assisting to increase young people's ESA may reduce depressive symptoms. Nevertheless, the use of ESA in early intervention for depression is yet to be fully considered. In order to ensure an adequate knowledge base and to generate theories and ideas particularly to the ESA model, more research is necessary. Therefore a qualitative research methodology is used in the current study. Qualitative research methods, although widely used in sociology and anthropology, are becoming increasingly acceptable in psychological sciences and are useful to discover information about a topic where little is known in order to generate theories (Woolgar, 1996). Qualitative research methods are compatible with quantitative methods and both have roles in science.

This chapter explores self-monitoring as a means of increasing ESA from a qualitative perspective by examining young people's observations of ESA after completing a mobile phone self-monitoring program. To begin with, the therapeutic effects of self-monitoring are discussed, specifically focusing on homework diaries in psychotherapy, expressive writing and momentary sampling.

Approaches to increase emotional self-awareness

Emotions are an essential part of responding to distress and difficult situations in a timely manner to avoid imminent dangers. For a quick response to occur, emotions need to be processed automatically, without engaging the arduous processing of the reflective system. Although emotions are readily processed using the reflexive system, without conscious awareness, there are times when the same response to emotional stimuli is repeated time and time again without any productive change in the emotional reaction or the situation. This can be understood in terms of the Reinforcement Sensitivity Theory described in Chapter 2. In situations where conflicting or novel information occurs, the BIS is activated which in turn inhibits behavioural responses while concurrently increases arousal and awareness (Corr, 2011). Chapter 3 expanded Corr's general concept of arousal and awareness and proposed that the adaptive process of ESA can occur at this stage, involving the following five steps: becoming aware of emotional experiences, identifying the specific feelings and events surrounding the emotions, communicating this emotional knowledge, and reaching a decision about what to do about these emotions. Increasing ESA and bringing emotions into conscious awareness

may allow emotions to be processed reflectively and limit negative reflexive processing of stressful events.

The process of increasing ESA is utilised in most available therapies, in order to increase the information available to individuals so that they can process distressing information effectively (Prochaska & Diclemente, 1982), particularly during the early stages of therapy. Behavioural techniques are often used to increase ESA, such as homework diaries between sessions and regular monitoring of thoughts and feelings (Kazantzis, 2000). Assisting people to think about their thoughts and feelings in a concrete way by answering questions in a diary or being guided by a therapist when processing emotions in a reflective manner can assist individuals to engage in ESA processes with adaptive consequences rather than detrimental types of awareness such as rumination and worry. By increasing ESA, the person becomes more consciously aware of their emotions and can think about how to cope rationally and productively (Prochaska & Diclemente, 1982).

Self-monitoring alone is not likely to provide the support and guidance needed to assist individuals experiencing clinically diagnosed mental health problems, therefore these techniques are typically used in psychotherapy as an adjunct to other therapeutic strategies such as CBT. Using behavioural self-monitoring as part of the therapeutic process has been shown to increase the benefits of therapy more than therapy alone (Kazantzis, 2000), suggesting that self-monitoring may effectively increase ESA. Although rarely used alone for the treatment of clinically diagnosed depression, self-monitoring may provide a simple, low-cost alternative in subclinical populations such as young people suffering from subclinical depression. By self-monitoring, young people may become aware of their emotions earlier than they normally would on their own, thereby increasing their ability to learn productive coping strategies and emotional regulation before the development of clinically diagnosed mental health problems.

Research investigating the effects of self-monitoring between psychotherapy sessions is scarce; although, research focusing on the therapeutic effects of self-monitoring techniques alone is available in the forms of two paradigms. Expressive writing and momentary sampling have been investigated in their own right and can therefore contribute to knowledge about self-monitoring techniques without additional interventions, such as psychotherapy, confounding the results. Therefore, research

investigating self-monitoring is discussed below in three parts: (a) completion of homework diaries in psychotherapy, (b) expressive writing and (c) momentary sampling.

Homework diaries in psychotherapy

The use of homework diaries is a common practice in psychotherapy and generally involves: monitoring thoughts and emotions, and entering this information into a diary; behavioural exercises, in the form of relaxation techniques; or *exposure exercises*, such as practicing specific behaviour (e.g., saying ‘no’ and other assertiveness techniques). Homework diaries assists with the development and testing of coping skills, helping clients learn to identify their emotional experiences and identify occurring thoughts (Garland & Scott, 2002). Homework diaries are purported to promote learning using everyday experiences and therefore increase effective emotional processing via the reflective system (Garland & Scott, 2002). Although widely used, research investigating the utility of homework diaries in psychotherapy is scarce. For instance, in a meta-analysis by Kazantzis (2000) examining the effects of psychotherapy, 719 articles were identified as including a homework diary component. Of these articles, only 31 examined the effects of the homework on the therapy. Furthermore, these studies tended to have small sample sizes with limited power to detect small to medium effects. From this meta-analysis, Kazantzis concluded that client completion of diaries is associated with improvement during therapy with effect sizes ranging from 0.09 to 0.58 found.

Focusing specifically on depression, Burns and Spangler (2000) found that homework compliance had a causal effect on depression with high compliance related to most improvement. Similarly, a more recent study (Rees, McEvoy, & Nathan, 2005) found that both the quality and quantity of homework completed in psychotherapy predicted positive mental health outcomes, which were maintained at 1-month follow-up. Behavioural homework, such as relaxation and exposure exercises, were most effective for depression whilst recording thoughts was most effective for anxiety disorders. There was no association between rates of completion and severity of symptoms at pretest in either study (Burns & Spangler, 2000; Rees et al., 2005).

To my knowledge, there is only one study focusing on homework diaries with young people. This study (Gaynor, Lawrence, & Nelson-Gray, 2006) found the completion of homework diaries decreased over the course of therapy but unfortunately did not report on the effects of homework on mental health outcomes.

Although considered a central component of psychotherapy (Garland & Scott, 2002), there is little research addressing the effects of homework diaries on psychotherapy. Whilst completion of homework during psychotherapy appears to increase the effectiveness of therapy, there is mixed evidence about the effectiveness of homework diaries with small to medium effects found. Furthermore, the research generally focuses on adults with diagnosed mental health problems, with only one study examining the completion of diaries among young people. It is difficult to ascertain the effect that self-monitoring alone has on mental health symptoms from these studies as the effect of psychotherapy is likely to outweigh the effects of self-monitoring. Therefore, it is necessary to explore the effects of stand-alone self-monitoring techniques such as the expressive writing paradigm and momentary sampling techniques.

The expressive writing paradigm

Pennebaker's (1997) inhibition-confrontation approach provides some insight into the relationship between self-monitoring and positive health outcomes. The inhibition-confrontation approach arises from the notion that "not talking about important psychological phenomena is a form of inhibition" (Pennebaker, 1997, p. 164). Pennebaker proposed that inhibiting thoughts and feelings about daily stressors as well as traumatic experiences would lead to activation of distress and depression. This theory suggests that thought suppression involves considerable cognitive resources and may cause the activation of negative emotion-focused attention (Gortner, Rude, & Pennebaker, 2006). As conscious resources are tied up with suppressing these thoughts, automatic thinking can occur, with no awareness of the problem and no exit from the self-focus cycle (Rude et al., 2004). Prolonged thought suppression can cause a low level of distress over a long period of time thereby resulting in an inability to cope with the original distress and any new stressful experiences that arise. Pennebaker theorised that the process of confronting inhibited thoughts and feelings occurs primarily through

translating suppressed thoughts and avoided emotions into language. Thus the individual is thought to obtain a heightened sense of awareness about previously suppressed thoughts. One way to prevent thought suppression, and to understand and organise distress is to write about the experience (Pennebaker et al., 1990).

Pennebaker argued that the expressive writing paradigm (Pennebaker et al., 1990) is one way to prevent emotional problems and help young people learn productive coping strategies. Pennebaker's paradigm involves participants writing about a distressing or traumatic topic for 15 to 30 minutes each day for three to five days (Pennebaker, 1997). By simply writing about a stressful experience or common daily experiences, participants can acknowledge the problem, label it and write about causes and consequences. Two main guidelines are used in expressive writing: (a) focus on and describe the traumatic events, and (b) write down associated feelings, thoughts and experiences. This process is hypothesised to allow the writer to overcome thought suppression by processing and organising information that was previously avoided (Gortner et al., 2006). Whilst Pennebaker et al. (1990) considered expressive writing as a preventative model, few studies investigate expressive writing as a preventative strategy and therefore, empirical research to support this argument is limited.

Pennebaker (1997) reviewed 16 published research studies that used the expressive writing paradigm to investigate the effects of disclosure on mental and physical wellbeing. Each study used a standard laboratory writing technique and involved a control group that was asked to write about superficial topics such as how they spent their time. Expressive writing was associated with many positive outcomes from these studies, including reductions in physician visits being maintained 2 to 14 months after expressive writing, improvements in physiological markers such as viral antibodies and immunity, and self-reported improvements in physical and psychological symptoms. The mechanism of change between expressive writing and these benefits was thought to be a combination of self-reflection (the use of words such as *understand*, *realise*, and *insight*) and causal words (such as *because* or *reason*) being used during writing (Pennebaker, 1997). The more self-reflective words used in the expressive writing, the more likely the individual would experience a beneficial outcome. Another study by Pennebaker et al. (1990) indicated that self-reflection was the most effective means of cognitive change when using the expressive writing paradigm with 76% of

participants spontaneously reporting an increase in insight through expressive writing. Furthermore, expressive writing seems to be most effective with people who were unable to or unwilling to express their emotions (Pennebaker et al., 1990).

Research using the expressive-writing paradigm focuses mainly on physical health and immune function, although, some studies have also found that expressive-writing decreases negative affect and depressive symptoms (Gortner et al., 2006). Furthermore, the benefits associated with expressive writing has been suggested to occur by talking into a tape-recorder or to a therapist (Geisner, 2006), and may be effective with other tools such as using computers or mobile phones. Momentary sampling (MS) may provide a way to improve upon Pennebaker's (1997) expressive writing paradigm by enhancing the accessibility to young people through the use of technology.

Momentary sampling methodology

Momentary sampling (MS) was originally designed to record and describe daily experiences and events (Stone, Shiffman, Atienza, & Nebeling, 2007). Similar to Pennebaker's (1997) expressive writing paradigm, MS has two basic guidelines: (a) identify the target event or experience, and (b) record it and the associated responses (Nelson, 1977). Individuals are prompted to complete brief assessments at random times, several times a day, capturing a variety of information about the target behaviours, such as diet, smoking behaviours, mood or distress. As MS techniques require the user to access the assessments at all times of the day, portable equipment is used, such as paper diaries and pagers, Personal Digital Assistants (PDAs) and, more recently, mobile phones, allowing a variety of settings and activities to be captured in real-time.

The act of reporting and monitoring targeted behaviours was discovered to influence the behaviours being recorded. This phenomenon, referred to as 'reactivity', has been demonstrated in various studies. Reactivity is "the systematic change in an observed target behaviour as a result of a self-recording procedure" (Abueg, Colletti, & Kopel, 1985, p. 322). In three experimental studies, Kazdin (1974) examined the effects of self-monitoring on sentence-construction tasks where each individual was instructed to form sentences based upon words on flash cards. Participants were randomised into self-monitoring or control groups with the self-monitoring group instructed to monitor

the number of times they used the words 'I' or 'we'. In addition, both monitoring and control groups were advised that the use of pronouns was either positively, negatively or not associated with intelligence. The results indicate that self-monitoring was reactive, with participants in the self-monitoring group performing better depending upon their condition. Performance was further improved by setting goals about the desired performance as well as providing feedback. Ewart (1978) conducted three studies with the goal of discovering which conditions maximised the effects of reactivity. In these observational studies, students were asked to continue in their normal activities and to count the number of times they checked the time using a manual counter. Reactivity was demonstrated in these studies and influenced by desirability of time-checking (i.e., whether time-checking was considered a positive or negative behaviour). In addition, Ewart stated that "an almost universal reaction from subjects after the experiment was, 'I never realised how much my life is ruled by clocks'" (p. 54), demonstrating that self-monitoring increased participants' awareness of time-checking. Interestingly, feedback from Hanna's self-monitoring study (1978) indicated that several subjects continued to be aware of the behaviour that they monitored after the completion of the study.

These studies illustrated the reactivity of self-monitoring techniques on mundane behaviours in laboratory settings and demonstrated that simply monitoring behaviour can change the outcome of behaviour. The primary purpose of MS was to record behaviour and experiences. The discovery that MS techniques affected behaviour was, originally, undesirable, as it could no longer be used as merely an observational recording device. Several studies then focused on reactivity and determined that behaviour change could be manipulated by goal setting, such as setting the task of increasing or decreasing a targeted behaviour (Lipinski et al., 1975). Intrinsic manipulation can occur too, such as the motivation of the individual to change their behaviour (Lipinski et al., 1975). Reactive effects also tend to occur in positive, desirable directions (Abueg et al., 1985), so that socially acceptable behaviours are increased when monitored and behaviours that are undesirable are reduced. Nelson (1977) also noted that certain types of data are prone to reactivity; for instance, participants demonstrated reactivity when asked to reflect upon their internal states, for example, emotions and cognitions.

MS techniques are widely used for their reactive effects in order to change behaviour in a therapeutic manner (Lipinski et al., 1975). MS has a broad application in health interventions (Carter, Day, Cinciripini, & Wetter, 2007; Piasecki, Hufford, Solhan, & Trull, 2007). For example, the reactivity effect can assist people by self-monitoring to target behaviours such as weight-loss (Bellack, Rozensky, & Schwartz, 1974; Boutelle, Baker, Kirschenbaum, & Mitchell, 1999; Glanz & Murphy, 2007; Romanczyk, 1974), negative mood (Fernandez & Beck, 2001; Harmon, Nelson, & Hayes, 1980; O'Hara & Rehm, 1979), smoking cessation (Abueg et al., 1985; Rozensky, 1974), anxiety (Hiebert & Fox, 1981) and mental illnesses (Scharer et al., 2002). Feedback from participants indicates that by self-monitoring they became aware of emotions and behaviour earlier than they normally would and engaged in positive coping strategies (Hiebert & Fox, 1981). Adults using MS technology reported enjoying the process (Scharer et al., 2002). Other benefits of MS techniques include: (a) increased accuracy of information as it is recorded in real-time rather than retrospective reports (Nelson, 1977); (b) the ability to include feedback to further manipulate behaviour in a desirable direction (Morris et al., 2010); and (c) clinicians receive accurate information about their patients' daily experiences (Piasecki et al., 2007).

The main differences between Pennebaker's (2007) expressive writing technique and MS are the frequency of reporting and writing style. Expressive writing involves writing once a day for a set amount of time (e.g., 15 to 30 minutes) whereas MS techniques involve several short reports each day (e.g., 2-minute reports, six times a day). Furthermore, whereas expressive writing involves free writing about a given topic with only a few guidelines about what to write, MS techniques are structured and can record several items. For example, in a smoking cessation study (Abueg et al., 1985) participants were asked to record each 'urge to smoke' that occurred during the day, the frequency of exercise performed each day and the intensity of that exercise on a scale from one (minimally tiring) to five (highly aerobic). MS techniques can also include open-ended questions, allowing participants to freely write about a given topic thereby combining the benefits of expressive writing and MS techniques.

Momentary sampling methodology to increase emotional self-awareness

MS may be valuable as a therapeutic intervention to assist individuals to become aware of depressive symptoms in a productive way by structuring MS programs to increase the five themes of ESA by: first, focusing on concrete emotions and objectively assessing emotions and experiences without abstract evaluation, and second, acknowledging the problem and exploring factors relating to it.

Furthermore, focusing on specific aspects of ESA has been suggested to protect against rumination by reducing the amount of time on abstract thinking about general symptoms and their overall causes and consequences (Ayduk & Kross, 2010; 2008; van der Houwen et al., 2010; Watkins et al., 2008). Therefore, targeting ESA using MS techniques may also have the benefit of limiting the obsessive, negative thoughts that are involved in rumination.

A recently published case study indicated that using MS mobile phone techniques (Morris et al., 2010) helped increase positive mood and coping strategies, and decreased negative mood in adult employees suffering from distress. The participants in this study became more aware of their emotions, and internalised the questions and therapies used in the mobile program. Previous studies (e.g., Carter et al., 2007; Lipinski et al., 1975; Piasecki et al., 2007) suggest that the reactive effects of self-monitoring may lead to therapeutic effects. Yet, determining the effect self-monitoring has on mental health with young people requires further research.

MS studies conducted with young people have demonstrated they readily engage with MS technology (Reid et al., 2009; Silk, Steinberg, & Sheffield Morris, 2003) and have high compliance with MS monitoring (Reid et al., 2009; Stone et al., 2007). Young people are sophisticated users of mobile phone technology with 94% of young people owning a mobile phone in Australia (Leech & Onwuegbuzie, 2007).

Previous MS research in the field of mental health generally involves participants suffering from diagnosed mental illness (Carter et al., 2007; Lipinski et al., 1975; Piasecki et al., 2007) and suggests self-monitoring as an adjunct to CBT or other therapeutic intervention. Self-monitoring alone is unlikely to be effective for those suffering from severe mental health problems and research focusing on mild symptoms or early signs of mental illness is limited. A recent meta-analysis (Stice, Shaw, Bohon, Marti, & Rhode, 2009) looking at depression prevention programs found that the use of

homework diaries in prevention programs increased the reduction in depressive symptoms when compared with prevention programs without homework diaries. Furthermore, shorter programs had larger effects than longer programs (Stice et al., 2009). Interestingly, the content of the prevention programs was not associated with the efficacy of the program; programs focused on changing problem-solving skills, decreasing negative affect, behavioural activation and social skills performed equally well (Stice et al., 2009). This research offers a potential alternative first-step approach to ‘watchful waiting’ in the form of short duration self-monitoring programs. Such programs may be completed via mobile phones as a first-step early intervention with the opportunity to ‘step up’ to more intensive treatment programs as needed.

Rationale for a focus on adolescence

The incidence of depressive disorder rises steadily in midadolescence making the early teens a focal point for the development of prevention and early intervention programs (Patton, Coffey, Posterino, Carlin, & Bowes, 2003). In addition, adolescence is an ideal target for the prevention of mental health problems as young people typically develop the ability to cope with everyday stressors and negative emotions during their teen years (Saari, 1997). Programs that are simple and easy to use are necessary to engage young people at risk of developing depression, and content focusing on the concrete processes of ESA identified in Chapter 3 (*recognition, identification, contextualisation, decision-making, and communication*) may be a promising avenue. MS techniques can now be used with mobile phones, engaging young people with a form of technology they are familiar with and rely on for much of their social interactions with peers.

As a data collection device, mobile phones have many advantages over traditional methodologies: Portability allows for data collection in natural settings, young people rarely go anywhere without their phones so they are able to enter data almost anytime; and young people are familiar with phones and quickly able to pick up how to use new phones and applications. As most mobile phones resemble pocket computers nowadays, they have the ability to store data, run sophisticated software, are cheaper and are easier to use than other portable devices such as PDAs and iPads. One challenge with using mobile phones to collect data was that young people generally have prepaid mobile

phones and rarely have credit to make phone calls and text their friends. Therefore, it is important that data collection using mobile phones does not rely on young people having credit on their phones. The *mobiletype* program, used throughout this thesis, was developed around the central concept that: “Participation in the study and use of the mobile phone program must not cost the young person: That is, data collection must not rely on the young person having credit in their mobile phone account” (Reid et al., 2009, p. 503).

With the above rule in mind, the *mobiletype* program was developed as a stand-alone application on the mobile and did not involve mobile internet connection as this would cost the participants. Although SMS messaging could be used, this could only be one-way, from the research assistant to the participants (for reminder calls and so forth). Any SMS originating from participants would have to be free for the participant or reverse-charged back to the *mobiletype* project.

The specific aim of the present analysis was to qualitatively and thematically analyse the unsolicited feedback obtained by the young people who participated in a mobile phone momentary sampling study. A secondary aim of this investigation was to conduct a preliminary analysis to determine the effects of self-monitoring on depressive symptoms and coping skills. These analyses were conducted post hoc with data used in a broader study, which had the overall aim of developing and validating a novel, youth-friendly research tool to capture young people’s daily experiences of mood, distress and coping behaviours. Reid et al. (2009) evaluated and reported on the overall aim, focusing on the development and testing of the program with young people.

Method

Participants

Participants were recruited from four secondary schools in Victoria. Schools were chosen based on their socioeconomic status (SES). SES was determined using the Like School Groups (Standards and Accountability, 2002) for government schools (one low, one medium and one high was selected to represent a low, low-medium and high-medium SES group) and a private school was selected as a high SES school.

Depending on the size of the classes, one to two classes of Year 9 and 11 students from each school attended a 5-minute presentation about the study and were able to have a trial run of the mobiletype program. These students were invited to participate in the study. Students were asked to return a consent form signed by a parent or guardian within a week if they were interested. If more than 20 students were willing to participate in each year level in each school, then 20 students were randomly selected by assigning a number to each consent form and randomly shuffling these numbers using the runiform function in Stata. The first 20 random observations were then selected. Informed written consent was obtained from both young people and their parents. The only exclusion criterion was insufficient written English comprehension as this was necessary for participants to complete questionnaires.

A total of 106 participants were recruited. Of these, one participant withdrew from the study after pretest assessment for unknown reasons and seven participants were excluded from analyses due to insufficient completion of the mobile phone program. A total of 19 Year 9 female students between 13 and 15 years ($M = 14.05$, $SD = 0.41$), 34 Year 11 female between 16 and 17 years ($M = 16.2$, $SD = 0.41$), 35 Year 9 male students between 13 and 16 years ($M = 14.3$, $SD = 1.10$) and 17 Year 11 male students between 16 and 17 ($M = 16.3$, $SD = 0.47$) participated in this study. Insufficient completion of the program occurred for several reasons; three participants' mobile phone data could not be uploaded nor analysed due to malfunction during the course of the study and four participants reported that the program did not work properly during the study period. Therefore, data analysis was conducted with a total of 98 participants.

Materials

Mental health outcomes.

Three scales were used to measure mental health outcomes: the Depression, Anxiety, Stress Scale (DASS; Lovibond & Lovibond, 1995) which is Australian and has Australian population norms; the Negative Cognitive Errors Questionnaire (NCEQ; Leitenberg, Yost, & Carroll-Wilson, 1986); and the Adolescent Coping Scale (ACS; Frydenberg & Lewis, 1991, 1993). Table 4.1 lists each of these measures including information about scoring of the measures, and validity and reliability information.

Table 4.1

Questionnaires Used to Measure Mental Health Outcomes, Information about Scoring, and the Validity and Reliability of Each Questionnaire

Measure	Scores	How variable is calculated	Validity and Reliability
Depression, Anxiety and Stress Scale (Lovibond & Lovibond, 1995)	Subscales of depression, anxiety and stress from 0 to 42 with cut-off scores of normal, mild, moderate, severe and extremely severe available for each of the three subscales.	Depressive symptoms were calculated using the <i>depression</i> subscale of this measure.	This scale is an Australian scale that has been tested for reliability and validity. The DASS is able to discriminate between small differences between depressive, anxiety and stress symptoms.
Negative Cognitive Errors Questionnaire (Leitenberg et al., 1986)	24 items assessing social, academic and athletic domains of functioning 5-point Likert scale (1 = <i>not at all</i> to 5 = <i>almost exactly</i>).	Assesses the negative cognitive errors of Beck's (2002) cognitive model of depression: overgeneralisation, catastrophising, personalisation and selective attention. Includes a total distortion score.	The internal consistency ranges from $\alpha = .75$ to $.91$ and it has been shown to have reasonable test-retest reliability (Leitenberg et al., 1986; Turner & Cole, 1994).
Adolescent Coping Scale (Frydenberg & Lewis, 1991, 1993)	There are three subscales: <ul style="list-style-type: none"> ○ Solving the problem (range = 18 to 90) ○ Reference to others (range = 20 to 100) ○ Nonproductive coping (range = 18 to 90). 	The 'solving the problem' subscale and the 'reference to others' subscale are considered productive coping.	This is an Australian scale that has been tested for reliability and validity in Australian secondary schools and other adolescent populations.

Feedback form.

Spontaneous feedback about ESA was collected via the open-ended general feedback questions after completion of the *mobiletype* program described below. The feedback questionnaire did not directly target information about ESA, rather young people answered the five general questions listed in Figure 4.1.

<p style="text-align: center;">Feedback Questionnaire</p> <ul style="list-style-type: none">◆ What did you like about the diaries?◆ What didn't you like?◆ How can we improve the diaries?◆ What additional information would you be interested in having in the diaries?

Figure 4.1. Qualitative feedback questionnaire.

The mobiletype self-monitoring program

The *mobiletype* program was designed using open source software (J2ME) to allow for future adaptation and use on mobile phones across platforms. There were four versions of the program used during the course of this thesis beginning with *mobiletype* Version 1.1 described in this chapter. Version 1.1 was developed by the software development firm, Object Consulting. Each participant completed Version 1.1 of the *mobiletype* program on Nokia 6630 mobile phones donated to the *mobiletype* project by Crazy John's Mobile Phones.

Subsequent chapters used adapted versions of the program, *mobiletype* version 2.0 to 2.2, developed by the Murdoch Childrens Research Institute Information Technology Department and the Centre for Adolescent Health, with the differences between each version described in the following chapters.

Content of *mobiletype* Version 1.1.

When initiated, various modules of questions were activated which consisted of multiple-choice and free-text questions. These questions assessed current activities, mood, stress, alcohol and cannabis use. The program was updated and adapted between this study and the subsequent studies. Nevertheless, the basic content of the program and structure remained the same. Appendix B contains the complete content of each version of the *mobiletype* program.

Activities.

Four single-choice questions (Shrier, Shih, Hacker, & de Moor, 2007) were used to assess current activity, location, companionship and enjoyment of current activity. Participants could also select 'Other' and branch to a free-text question to type in their current activity if not included on the response list.

Mood and last time.

As in previous momentary sampling research with young people (Whalen, Jamner, Henker, & Delfino, 2001), positive and negative mood was measured by eight 6-point Likert scale items (angry, sad, fatigue, stress, anxiety, happiness, alertness and wellbeing) using adjectives to describe increasing degrees of each mood (see Appendix B, Table B2). In addition, responses indicating either a combination of high anxiety and stress, high fatigue or high sadness branched to the free-text question: "Looks like you're feeling pretty stressed or upset. What do you think you might do now?" Participants who completed this question were asked on the subsequent diary entry to verify whether they did what they said they would and how they felt about it.

Stress.

Participants were asked about their experience of stress since their last *mobiletype* entry. Recent stressful experiences were assessed by a rating of intensity of the event, what the stressful event was, what actions were taken, cognitions about the event and perceived control over the event (Marco, Neale, Schwartz, Shiffman, & Stone, 1999). In addition, two daily stress questions, asked on the last diary entry of the day, captured the most stressful event of each day, via free-text, and how stressful it was considered.

Alcohol and cannabis use.

The previous evening's alcohol and cannabis use was captured using a series of branching questions adapted from Shrier et al. (2007). A multiple-choice question asked about the type of alcohol consumed and branched to the container used and the number of containers consumed. The number of standard drinks consumed was calculated using this information upon completion of the study. There were also questions about whether marijuana was consumed, how it was consumed and the amount consumed. Further questions asked about the main companions, and reasons for drinking and smoking.

Timing of the *mobiletype* program.

Each day was divided into four blocks of time: morning (between 8am and 11am), noon (between 11am and 3.30pm), afternoon (between 3.30pm and 8pm) and evening (between 8pm and 10pm). These times were selected to represent times when young people would be participating in a range of activities at a range of locations (i.e., school between 11am and 3.30pm). The program started automatically once during each of these time-blocks at random times. Each time-block asked questions about current activities, mood, stress and coping responses. Participants were locked out of the diary 8 minutes after activation of the diary. Table 4.2 lists the different modules and the time-blocks during which they were completed.

Table 4.2

Time-Blocks in Which Each Module was Completed

Modules	Morning	Noon	Evening	Night
Activities	✓	✓	✓	✓
Mood	✓	✓	✓	✓
Stress	✓	✓	✓	✓
Alcohol	✓			
Cannabis	✓			
Daily stress				✓

Procedure**Pretest.**

Participants met the researchers at school during class at a prearranged time to complete pretest assessment, which consisted of: demographics, the DASS, the ACS and the NCEQ. Pretest assessment took approximately 20 to 30 minutes for participants to complete. Participants completed the pretest DASS, ACS and NCEQ in reference to the month before the assessment. At this time, participants were lent a Nokia 6630 mobile phone for the duration of the study. Participants were given the choice of using their own SIM card or using one of the study's \$25 prepaid SIM cards. If using their own SIM card, participants were given a \$25 department store gift voucher and those who used a study SIM card were allowed to keep it and use the credit on the card. Each participant was advised that, whilst they should take care not to damage or lose the phone, the researchers were responsible if any damage or losses occurred. Use of the mobile phone and the *mobiletype* program was explained in detail and participants completed a practice diary entry. A study manual describing the research procedure, offering trouble-shooting tips and the contact information for the study coordinator was provided to all participants. Participants were called at a prearranged time on the first day of monitoring to discuss the study procedure and have any queries answered.

The *mobiletype* monitoring period.

Participants were asked to complete the *mobiletype* program for 20 random days in a 1-month period; this was to limit response fatigue. The mobile phone emitted an auditory signal to alert participants to complete the diary four times a day. One reminder signal was emitted after 5 minutes if the diary was not completed. Participants were provided with the researchers' phone numbers and advised to call if they had any questions or problems with the mobile phone or the *mobiletype* program.

Posttest.

At the end of the 1-month period, participants met with one of the researcher to return the mobile phone and complete a posttest assessment containing the DASS, ACS and a feedback form consisting of the five general feedback questions listed in Figure 4.1. Participants completed the posttest DASS and ACS in reference to the fortnight before the posttest assessment rather than a 1-month period as measured in the pretest assessment. Data from the *mobiletype* program were stored on the mobile phones and extracted at the end of the study by a research assistant using Bluetooth.

Qualitative data analysis

Qualitative thematic analysis was used to identify and construct themes based on the ESA themes from the general feedback questions completed at posttest as per Braun and Clarke (2006). Responses from the general feedback questions listed in Figure 4.1 were entered into an open-source qualitative software package called TAMS Analyser (Weinstein, 2005), which was later used to analyse the data. Information about the participants was noted at this time, including their age and gender.

The data were coded in four phases. The coding scheme used was based upon the model of ESA proposed in Chapter 3. A codebook (Appendix C) was constructed during this study using the themes of ESA identified in Chapter 3 with examples from participants' feedback, where the broad category of ESA was defined as one or more of the following five subcategories: an increase in awareness of emotions, the ability to identify and define emotions, communication of moods, understanding the triggers and consequences of different emotions, and making decisions about how to better deal with negative mood and stressors. Each subcategory was also defined with examples

(Appendix C), for instance, the subcategory *recognition* was defined as “recognising and becoming aware of an emotion”. Examples for recognition included: “realised how I was feeling” and “the program helps think about feelings”. Search terms for recognition included ‘think’, ‘notice’, ‘understand’, ‘aware’, ‘reflected’, and ‘analyse’.

Phase 1.

In Phase 1, a manual search was conducted for all words and phrases of each participant’s data that represented the broad theme of ESA. Each answer that contained information relating to ESA was coded under the broad heading of ‘ESA’. Answers that referred to emotions and an increase in awareness were included in this theme. All responses that were not coded under this theme were then temporarily set aside from the analysis.

Phase 2.

Phase 2 involved further division of participant responses from the broad ESA theme into the themes identified during the systematic literature review (*recognition, identification, communication, contextualisation* and *decision-making*). This phase was conducted using the qualitative codebook (Appendix C). Only responses that were explicitly connected to these categories were included. All responses that could not be coded into these themes were set aside under the heading *miscellaneous* for later analysis. Within some of the participants’ answers there were multiple categories mentioned: These answers were then separated into each category they referred to. All coded responses were kept in the analysis, including recurrent categories that occurred within each participant’s responses and responses that were identical in meaning. For example if the *recognition* code was identified three times during one participant’s transcript, this person would be coded as having three instances of the *recognition* theme. These recurrent responses were coded as separate instances of the code in order to determine the importance of the theme to the individual.

Phase 3.

Phase 3 involved searching for responses that may have been missed in the initial manual search. This involved uncovering any new content related to ESA using the following searches. First, the content of all general feedback questions was searched using the search command in the TAMS Analyzer program. For example, words relating to the category, *recognition*, such as *aware*, *thought*, *realise* (see Search Terms in Appendix C) were put into the program. Second, the coded material was checked against the original data for any relevant statements that were missed during the initial coding. Any statements that were discovered using either method were then coded as per Phase 1 and 2. Next, each category was reexamined to identify any subthemes that occurred within each category; these are discussed in the results section.

Phase 4.

The fourth phase involved a thorough examination of the items in the *miscellaneous* category. Items were reexamined in terms of the current categories of ESA and integrated if possible, with changes made to the codebook accordingly. Next, any new themes that emerged from these items were identified, coded and discussed with a second researcher to decide whether it was an important theme in terms of ESA.

For Phases 3 and 4, the following steps were implemented for formulation of new themes: (a) each new theme must be discrete and easily distinguished from other themes, (b) new themes must be mutually exclusive from existing themes, and (c) three or more instances have to be present for new themes.

The coding methodology is described here as four phases to enable a systematic and precise account of the analyses conducted; however, it is important to note that these phases are not necessarily sequential. As qualitative analysis is flexible and rarely sequential (Maxwell, 1998), an iterative process was used where the phases were repeated in order to achieve the best possible coding of the participants' responses (Schilling, 2006). Coding was considered to be completed when each coded segment of text was divided into meaningful units (Locke, 2002), that is, containing enough information to be comprehensible without referring to additional text while containing only one idea (Tesch, 1990).

Validation and reliability.

In qualitative methods, reliability refers to the evaluation of the data in terms of its ability to generate and extend understanding of a phenomenon (Golafshani, 2003). All coding of the general feedback questions was conducted independently by two psychologically trained research assistants: Sylvia Kauer, the author of this thesis, and Alex Crooke, a research assistant involved in the *mobiletype* project. Interrater agreement between the coding of the two researchers was then compared with a kappa coefficient of 0.62, which is considered acceptable in qualitative research (Feixas, Geldschlager, & Neimeyer, 2002; Mostyn, 1990). Both Mr. Crooke and Ms. Kauer had previous training in psychology with qualitative research experience and manually examined the transcripts with reference to the codebook.

Secondary data analysis.

Means, standard deviations and paired-samples *t*-tests were conducted for the DASS and ACS using the software package STATA (StataCorp, 2007) to examine the secondary aim of the effects of self-monitoring on depressive symptomology and coping skills. The NCEQ measures trait negative errors and was therefore only assessed at pretest.

Results**Demographics**

Year 9 and Year 11 students from four secondary schools took part in this study, with a total of 106 students beginning the study and 99 students completing pretest and posttest assessment. The distribution of participants was fairly evenly spread in gender with 51 male participants (48.6%), and in year levels with 53 Year 9 students (50.5%). Participants ranged from 13 to 17 years of age ($M = 15.3$, $SD = 1.09$). Twenty participants (19%) identified with an ethnic background. Pretest NCEQ are listed in Table 4.3.

Table 4.3

Pretest Negative Cognitive Errors of Participants

	<i>M (SD)</i>
Pretest	
Total distortion	91.1 (17.8)
Cognitive Errors	
Catastrophising	23.1 (4.41)
Personalisation	23.3 (5.13)
Selective abstraction	22.3 (4.72)
Overgeneralisation	22.4 (5.23)
Content	
Social	30.8 (6.54)
Athletic	31.4 (5.93)
Academic	29.0 (6.55)

The NCEQ subscales show that participants engaged evenly in the four types of negative cognitive errors of catastrophising, personalisation, selective abstraction and overgeneralisation and fairly evenly across social, academic and athletic content areas, with the most focus on athletic content and the least focus on academic content.

Emotional self-awareness

Of the 98 participants who completed the *mobiletype* program and responded to the feedback questions, feedback from 21 participants (21.4%) was identified as including one or more of the ESA themes. An average of 1.5 ESA themes (ranging between one and four ESA themes) were reported. There were six responses that could not be coded into these existing themes. As these responses consisted of a similar content, they were grouped together under the theme *acknowledgement*. The responses for each theme are outlined below.

Recognition.

There were four responses from participants that matched the theme of *recognition*. Recognition of emotions refers to becoming aware of emotions, attending to emotional states and recognising that an emotional state is occurring. Participants reported that the *mobiletype* program enabled them to think about their feelings and

realise what they were feeling. One student described the *mobiletype* program as: “good at making me realise my feelings” (14-year-old female).

Identification.

The three responses that were identified as related to the theme of *identification*, defined in Chapter 3 as the ability to label mood states and categorise current mood, suggested that these participants found it difficult to identify what they were feeling and would like more response options to facilitate describing their feelings. A 16-year-old female student reported that it was “sometimes hard to describe a situation or feeling” and said that she would like “additional options to describe the way you feel”. Another student would have liked more “graduations in emotions” (16-year-old female student) in order to specify what she was feeling.

Contextualisation.

Identification of the events that surround the emotion; for example, identifying the needs of the individual, their concerns and conflicts was identified in the general feedback of participants. Two participants made a connection between what they were thinking and their actions, such as this 15-year-old male student who said, “it made me think [about] how I was feeling and what I was doing”. One participant would have liked a question in the *mobiletype* program allowing them to enter information specifying the event or situation to which they were attributing their negative feelings and said, “have a question about what you are feeling bad about” (14-year-old male student).

Decision-making.

Although no participants reported experiencing an increase in their ability to make decisions, two participants mentioned that they would like assistance in “how to deal with bad feelings” (14-year-old female student). Another participant wrote that they would like “more information about what you can do in some situations” (14-year-old female student).

Communication.

Eleven participants reported that they liked having the opportunity to write down and express their feelings. A 16-year-old female student wrote “I could talk a little”, another 16-year-old female student wrote that the *mobiletype* program “helped express what was going on”. A 17-year-old female student reported that it helped “not keep things to myself”.

Acknowledgement.

Six responses that were initially coded into the ESA category did not match the description of the previously identified themes of ESA. These responses were grouped together as *acknowledgement* as they described a similar theme of having emotions acknowledged and feeling cared for. Two participants reported that they were able to be honest. A 16-year-old male student wrote that: “It felt kind of like the phone cared”. Another student reported that the *mobiletype* program “made [me] feel like I had a friend” (16-year-old female student).

Depression, anxiety and stress

To examine changes in symptoms pretest to posttest for the group as a whole, paired-samples *t*-tests were conducted for the depression, anxiety and stress subscales of the DASS. There was no significant difference between pretest ($M = 8.5$, $SD = 9.07$) and posttest ($M = 9.6$, $SD = 8.96$) depression scores; $t(96) = -1.605$, $p = .112$. No difference was found in the stress subscale between pretest ($M = 10.7$, $SD = 7.18$) and posttest ($M = 11.9$, $SD = 8.11$) scores; $t(96) = -1.723$, $p = .088$. Nor was there any difference between anxiety scores pretest ($M = 7.4$, $SD = 6.39$) and posttest ($M = 8.2$, $SD = 7.02$); $t(96) = -1.302$, $p = .196$. Based on the population normative data of the DASS subscales (Lovibond & Lovibond, 1995), the mean of the participants’ depression and stress scores both pretest and posttest were within the ‘normal’ range. The anxiety subscale both pretest and posttest was within the ‘mild’ range (Lovibond & Lovibond, 1995), which is interpreted as well below clinical severity although slightly above the population mean. Paired-samples *t*-tests were also conducted focusing on only the 21 participants who reported one or more ESA themes with no significant results. No

significance testing was conducted to compare those who reported ESA and those who did not, as an absence of reporting did not equate to an absence of ESA.

Adolescent coping scale

Three subscales of the ACS illustrate the ways in which young people cope: by problem-solving, reference to others and nonproductive coping. Paired-samples *t*-tests were conducted to determine if coping skills were different pretest to posttest. Participants had a significant decrease in *problem-solving coping* from pretest ($M = 61.4$, $SD = 8.53$) to posttest ($M = 55.63$, $SD = 10.04$); $t(97) = 7.027$, $p < .001$. There was no significant difference in the *reference to others* subscale from pretest ($M = 21.3$, $SD = 9.12$) to posttest ($M = 19.7$, $SD = 9.19$); $t(97) = 1.893$, $p = .061$. Nor was the *nonproductive* subscale significantly different pretest ($M = 62.6$, $SD = 15.30$) to posttest ($M = 61.8$, $SD = 15.88$); $t(97) = 0.561$, $p = .576$. Paired-samples *t*-tests were also conducted focusing on only the 21 participants who reported one or more ESA themes with no significant results. Again, an absence of reporting did not equate to an absence of ESA therefore no significance testing compared those who reported ESA and those who did not.

Discussion

The aim of this chapter was to qualitatively and thematically analyse unsolicited feedback obtained by young people who participated in a mobile phone momentary sampling study. Results showed that over 21% of participants talked about one or more of the ESA themes in general feedback questions. Furthermore, this percentage is likely to be an underestimation as the qualitative data collected were from general feedback questions at the end of the self-monitoring program and did not target ESA per se. Data from the 21 participants who reported ESA were thematically analysed, demonstrating that young people's responses could be coded into the five themes of ESA previously identified in the systematic literature review presented in Chapter 3. A preliminary investigation of symptoms and coping skills found that there was a significant decrease in problem-solving skill but no differences in depression, anxiety and stress scores, nor nonproductive coping skills or reference to others.

Participants reported that the mobile phone self-monitoring program prompted them to realise and become aware of their feelings, think about what they were feeling and make connections between their feelings and their actions. Young people's qualitative responses indicated that they felt that the program assisted them with dealing with negative mood and stress. Most notably, young people's responses were identified as relating to the communication theme, with 40% of responses coded into communication. Some young people felt that they could talk to someone, express their emotions and one participant reported that it helped "not keep things to myself", which is consistent with Pennebaker's (1997) theory that communication and disclosure are key factors in increasing awareness and understanding of emotions. The high reporting of the communication theme is understandable, as the participants were primarily focused on communicating their affective experiences by entering their experiences into the mobile phone.

In addition, some young people reported feeling heard and cared for as a result of monitoring their moods and stressful experiences. These responses were categorised as *acknowledgement*. This effect, often called the Hawthorne effect (Carter et al., 2007; Prochaska & Diclemente, 1982), is well documented between clients and therapists and is thought to be responsible for some of the benefits of therapy. One participant wrote: "It felt kind of like the phone cared". Carter suggested that people may also benefit from the interaction received in online counselling without face-to-face contact, particularly young people, as they are skilled users of technology (Blanchard, Metcalf, & Burns, 2007; Leech & Onwuegbuzie, 2007; Mehta & Chalhoub, 2006; Oliver, Collin, Burns, & Nicholas, 2006) and far more technically minded than previous generations. This finding indicates that young people engaged with the mobile phone program and suggests that using technology with young people may be beneficial.

An interesting finding was that a small minority of young people (three participants) reported that they would like more information or more specific questions. Specifically two participants indicated that more graduations in the mood questions would be useful so they could better describe their feelings, and one participant wanted the program to provide suggestions and information about what to do in certain situations. These young people may have high levels of ESA and are either not in need of therapeutic help or ready to move on to the next step of therapeutic intervention, such

as restructuring cognitions and learning further problem-solving skills (Prochaska & Diclemente, 1982). Further development of the *mobiletype* program is needed to assist young people in getting the information and help they need.

Secondary analyses showed that young people's problem-solving coping skills decreased from pretest to follow-up. With the exception of slightly elevated anxiety scores, possibly due to the age of participants, all symptomatology was within the range of the general population and none of the symptom scores increased in severity from pretest to posttest. Given the small sample in this study with the increased risk of Type I and Type II errors, the *t*-tests were conducted to investigate the pattern of results. A consistent pattern was found with no increase in mental health symptoms nor any changes in other coping styles except for the reduction in problem-solving. This significant result may be due to fewer stressful occasions during the self-monitoring period or spurious significant differences due to the multiple *t*-tests used in these analyses. In addition, the reference period for the ACS was reduced from 1 month in the pretest assessment to 2 weeks in the posttest assessment and may be responsible for the reduction in problem-solving strategies used. Nevertheless, further research is needed to determine whether self-monitoring is related to negative effects on coping styles.

Previous research suggests that the simple act of self-monitoring a target behaviour changes the monitored behaviour in a desirable direction (Boutelle et al., 1999; Carter et al., 2007; Fernandez & Beck, 2001; Piasecki et al., 2007). Qualitative responses from young people in the current study suggest that this may also occur with emotions. The overall aim of the current study was to gather data about young people's experience and as such there were no questions directly related to young people's experience of ESA. Furthermore, the current qualitative analysis was conducted post hoc, examining only the posttest general feedback questions, therefore, it is likely that there was an underreporting of ESA experienced by the participants.

Whilst only 21.4% provided feedback that was examined in this study, it is important to remember when considering these results that the feedback was unsolicited. Young people were asked about their likes, dislikes, suggestions for improvement and general comments about the mobile phone monitoring study, rather than explicitly asked about their experience of ESA, yet still 21.4% of participants indicated that they experienced ESA during self-monitoring. These responses from participants were

readily coded into the five subcategories of ESA proposed in Chapter 3 and were consistent with the multidimensional construct of ESA.

The main limitation of this study was the lack of data specifically focusing on ESA. Some young people commented in their general feedback that the mobile phone self-monitoring program assisted with becoming aware of their emotions; however, as ESA was not assessed before self-monitoring it is difficult to ascertain causality and the extent to which their ESA increased. It is possible that the young people who reported ESA in their feedback had high levels of ESA before the self-monitoring program. In addition, participants in this study had few, if any, symptoms of depression, anxiety or stress. It is likely that self-monitoring is only effective at increasing ESA with young people who are experiencing some signs or symptoms of mental health problems and are actively inhibiting their emotions (Pennebaker, 1997). Research shows that young people who participate in prevention programs with little or mild depressive symptoms do not benefit from programs aimed at preventing depression (Rushton et al., 2002). Self-monitoring may be more beneficial with young people who have elevated depressive symptoms. As young people in this study did not report high levels of problematic mood or depressive symptoms, it is possible that the decrease in problem-solving skills was due to a decrease in problems to be solved rather than an inability to problem-solve. Although there is the possibility that this decrease was an unintended negative effect given the concern that focusing on emotions may lead to negative outcomes. Future research should proceed with caution to mitigate this effect. Furthermore, ESA may mediate the relationship between self-monitoring and depression, and therefore the effects of self-monitoring may be delayed with symptoms decreasing 1 to 2 months after completion of the program. Future research should compare pretest and posttest depressive symptoms between those with high and low ESA. As an absence of reported ESA in the current study did not equate to an absence of ESA *per se*, this difference was not assessed here.

In the current thesis a minority of young people spontaneously reported that self-monitoring increased their awareness of their emotions, lending support to the ESA themes proposed in Chapter 3. Future research should specifically target young people's ESA using an in-depth qualitative interview. Furthermore, as prevention programs are unlikely to be effective for young people without symptoms of mental illness, targeting

those with mild or more depressive symptoms in an early intervention approach may be more valuable.

As this was the first version of *mobiletype* after the prototype there were some difficulties discovered with the program and it was updated and adapted in the subsequent versions. Disadvantages of Version 1.1 included: (a) if the mobile was lost, stolen or the program was deleted, the participant's data were not recoverable; (b) participants were locked out of the program within 5 minutes after initiation, so that if a participant was busy at the time and could not respond to the program immediately, they had no opportunity to complete it until the next random signal; (c) some participants reported confusion with the adjectives used from Whalen et al. (2001) for the mood questions, not realising that it was a scale from high to low and some didn't know the meanings of the words used (i.e., 'fatigue'); and (d) the branching question, 'Looks like you're feeling pretty stressed / upset. What do you think you might do now?' was activated regularly and had the effect of annoying or frustrating many participants with many participants indicating that they were not feeling stressed or upset.

This study provides preliminary support for the use of the *mobiletype* momentary sampling program as a tool to assist young people to increase their ESA. Young people's feedback indicated that they benefited from the program, suggesting that ESA may have potential as an early intervention program against depression. Further research is needed to investigate the effects of self-monitoring on ESA and whether an increase in ESA decreases depressive symptoms. To further analyse the effect of self-monitoring on ESA in an early intervention model, the next chapter provides a targeted, in-depth exploration of young people's experiences of ESA upon completion of the *mobiletype* program in a clinical setting. Again, a thematic analysis was conducted to explore the concept of ESA further. Data from Chapter 5 will allow better definition of ESA to be developed which, in turn, will allow quantification for future studies aimed at testing whether an increase in ESA is related to a decrease in depressive symptoms.

CHAPTER 5

The Effects of Self-Monitoring on Young People's Emotional Self-Awareness: An In-depth Qualitative Thematic Analysis

Becoming aware of emotional problems is a core process in psychotherapy (Prochaska & Diclemente, 1982), particularly during the early stages of therapy. Gaining awareness is also a necessary step for seeking help; you can't ask for help if you are unaware that there is a problem (Rickwood, Cavanagh, Curtis, & Sakrouge, 2004). Nevertheless, there is little research investigating the therapeutic effect of increasing awareness of emotions on mental health outcomes. In general, research focuses on the associations between detrimental processes such as rumination with mental health problems (e.g., Lyubomirsky & Nolen-Hoeksema, 1993; Rimes & Watkin, 2005), or the association between awareness of severe mental health symptoms on the prognosis of schizophrenia, depression and bipolar disorder. These studies demonstrate that patients with awareness of their mental health issues have more favourable outcomes than those without awareness (Amador & David, 2004; Dell'Osso et al., 2002; Yen et al., 2005; Yen, Yeh, Chen, & Chung, 2002). The systematic literature review presented in Chapter 3 suggested several common ESA themes lead to adaptive outcomes including: *recognition, identification, contextualisation, communication, and decision-making*. Furthermore, ESA was found to be associated with an increase in general and physical wellbeing, and an increase in psychological wellbeing, particularly: a decrease in negative emotions, an increase in positive emotions, and an increase in problem-solving skills.

Research suggests that self-monitoring programs increase awareness of the topic being monitored (Nelson, 1977) and that behaviour changes generally occur in a desirable direction (Abueg et al., 1985; Ewart, 1978; Nelson, 1977; Stone et al., 2007). Another interesting finding is that providing the results of self-monitoring data to doctors may increase the doctor's understanding of symptoms, motivations and life situations (Piasecki et al., 2007). Therefore, increasing the ESA of young people who are at risk of depression may prevent the progression from mild symptoms of depression to clinically diagnosed MDD.

There is little research investigating ESA during the early stages of mental illness or exploring young people's awareness of their mental health during the critical period of metacognitive development. To examine the effects of self-monitoring on ESA, a post hoc qualitative analysis of a feedback questionnaire was conducted in Chapter 4 to investigate whether young people experienced ESA during self-monitoring. This

preliminary analysis suggested that young people completing the self-monitoring program became more aware of their emotions. Specifically, young people reported that they experienced the five themes of ESA identified in the literature review. As this was a post hoc analysis, only 21.4% of participants reported one or more ESA category. Two major limitations may have resulted in the under-reporting of ESA including: (a) the study relied on unsolicited feedback from young people with no specific questions targeting their experiences of ESA; and (b) the mental health of the participants was within the 'normal' range (based on population normative data of the DASS; Lovibond & Lovibond, 1995), and therefore young people in this sample were likely to have few negative emotions to become aware of and were unlikely to require psychological support.

Extending the qualitative data analysis from Chapter 4, the current chapter delves further into young people's experiences of ESA after self-monitoring through in-depth qualitative interviews with young people recruited from an adolescent outpatient clinic. The purpose of the current chapter is to gain more knowledge about young people's experience of ESA using a qualitative framework with a group of young people experiencing a range of physical, chronic illnesses, who are therefore at risk of developing depression.

Qualitative methodologies

The role of science is to interpret and make sense of the world (Denzin & Lincoln, 2000). Topics such as cognitions, emotions and ESA are difficult to study whether using qualitative or quantitative methods (Denzin & Lincoln, 2000; Guba, 1990) because of the subjective nature of these topics and each method can contribute and add to knowledge about these phenomena. Qualitative and quantitative research methods are complementary; each assisting the other in the quest for knowledge. Qualitative research is integral to the development of the ESA model, allowing a detailed and rich narrative experiences of ESA with various interpretations of young people's self-monitoring experience. Using both qualitative and quantitative methods adds value and knowledge, and qualitative research methods provide an alternative way to inform research (Lincoln & Guba, 1985). Not all questions can be answered the same way; qualitative and quantitative methodologies can be used to answer different questions about the same

phenomena. For example, qualitative research methods are well suited to generating new knowledge about an existing topic such as the new concept of ESA.

Advantages of qualitative research.

Qualitative research is uniquely suited to applications when the aim of research is: (a) to gather in-depth and detailed information about a particular topic; (b) for discovery of information where little information is known; and (c) for generating new and novel theories (Conger, 1998). Previous chapters have ascertained that there are likely to be several categories of ESA including: *recognition, identification, contextualisation, communication, and decision-making*. Nevertheless, there is still much to be learned about the concept of ESA and much that qualitative research can answer. Qualitative research often results in the identification of new unanticipated themes leading the investigation into new areas. The richness and variety of qualitative research can capture feelings and complex associations between different content areas (Mostyn, 1990).

Criticisms of qualitative research.

Two interrelated criticisms are often made of qualitative research: (a) the lack of reliability and validity (Mostyn, 1990), and (b) the subjective nature of qualitative research (Denzin & Lincoln, 2000). Quantitative research has standard methods for assessing reliability and validity such as hypothesis testing; however, there is no similar standard in qualitative methodology (Denzin & Lincoln, 2000; Lincoln & Guba, 1985). Reliability in qualitative research refers to the ability to evaluate the quality of the data; which, in addition, implies validity (Golafshani, 2003). Furthermore, there are ways to increase the validity and reliability of qualitative results. A systematic approach with detailed, transparent and accurate reporting of qualitative methods allows researchers to assess reliability and validity of their work (Hsieh & Shannon, 2005; Krippendorff, 2004). Whilst qualitative research acknowledges and embraces the subjective interpretation of the researchers, transparent reporting can enable readers to assess the researcher's subjective biases. Objectivity is difficult, if not impossible, to achieve with qualitative research as the subjective interpretation of the researchers affects and biases the results, and therefore replication of results is difficult to achieve (Mostyn, 1990). To counter this bias, qualitative researchers often acknowledge and report factors that

potentially influence their interpretation of the data, such as their background, gender and other characteristics that may influence the results (Maxwell, 1998; Mostyn, 1990).

Using quantitative methodology does not ensure rigour and objectivity (Mostyn, 1990). Quantitative research can be conducted in an equally 'sloppy' (Lincoln & Guba, 1985) fashion as is attributed to some qualitative research. The key to all research is to be systematic, clear in reporting and justify the method used (Mostyn, 1990). Although it is difficult to achieve validity and reliability in the traditional quantitative sense when using qualitative methods, it is possible to conduct qualitative research in a systematic way, using well-defined criteria for categorisation and rules for transcribing. Transparent procedures can ensure that qualitative research is conducted in a systematic and scientific way.

Thematic analysis.

The method of thematic analysis used in this thesis is described in Braun and Clarke (2006) as "a method for identifying, analysing and reporting patterns (themes) within data" (p. 79). A thematic approach is well-suited to the early stages of the model of ESA as it can: (a) provide narrative explanations and definitions of each category of ESA; and (b) allow the categories of ESA to become more concrete, by adding new categories and refining others.

Qualitative research to generate a model of emotional self-awareness

To date, there is little knowledge about ESA and therefore qualitative methods are ideal to gather detailed information about ESA, generate and adapt the model of ESA. For example, qualitative research can be used to narrow down a large quantity of information into concrete categories that can be rated on a Likert scale. This scale can then be used to investigate relationships between the phenomenon and other phenomena such as depressive symptoms. Nevertheless, first it is necessary to gain more information about the topic of ESA and further investigate young people's experience of ESA when they self-monitor. The development of a clear construct of ESA can then be tested empirically and assist in the development of early intervention programs for depression.

Aims

The current study explores the in-depth qualitative experiences of young people upon completion of the *mobiletype* program in a clinical setting, specifically regarding their ESA experiences. The aim of the current study was to further inform the concept of ESA in order to extend and validate the existing theory. A thematic approach was used to analyse young people's experiences of ESA during self-monitoring using in-depth qualitative interviews. A clearly defined construct of ESA allows for quantification for future studies aimed at testing the mediation hypothesis that self-monitoring increases ESA, which, in turn, decreases depressive symptoms.

Method

Participants

Clients from 14 to 24 years of age were recruited from the Centre for Adolescent Health, a specialist adolescent outpatient health clinic in Melbourne. The inclusion criteria for patients was: (a) aged between 14 and 24 years; (b) good English comprehension; (c) over 18 years of age, a mature minor, or had a parent present at appointment and therefore able to consent to participate; (d) willing to participate in the study; and (e) had a follow-up appointment with the doctor within 2 to 4 weeks time. Both new and existing patients were eligible to participate regardless of their mental health symptoms. Consecutive presentations of all young people who met this criteria were recruited from the six doctors at the clinic who agreed to be involved in the study.

Informed written consent was obtained from participants and, if present, their parent as well. As many young people attend the clinic on their own, parental consent was not sought when parents were not present, in order to maintain the young person's confidentiality. Ethics approval was obtained from the Royal Children's Hospital Human Research Ethics Committee (#26027) to allow clients to participate in this study without permission from their parents if they were deemed a mature minor by the treating doctor. Patients were excluded from the study if their treating doctor did not consider them a mature minor or if they did not have good English comprehension. Participants were recruited and interviewed until redundancy of information was reached, i.e., no new information was apparent to the interviewer.

The *mobiletype* program 2.0

Due to difficulties adapting the Version 1.1 of the program to other phones and adapting questions for specific purposes, the *mobiletype* Version 2.0 program was redesigned and reprogrammed for use with ZTE F851 mobile phones. The international telecommunications company, ZTE Corporation, donated 20 ZTE mobile phones to use in this study.

Participant data were transferred via SMS to the *mobiletype* secure website as it was entered. This was a free service and did not cost the young person. Each participant's data were also encrypted and stored on the mobile phones as a back-up. One benefit of real-time data transfer was redundancy; if the phone was lost, stolen or the *mobiletype* program was deleted, the data were not lost. A second major benefit was the addition of feedback via the secure website. The data entered into the program were sent via SMS to the secure website and displayed on the *mobiletype* website for the young person's doctor to view and discuss with the young person. Figure 5.1 provides an example of the data displayed.

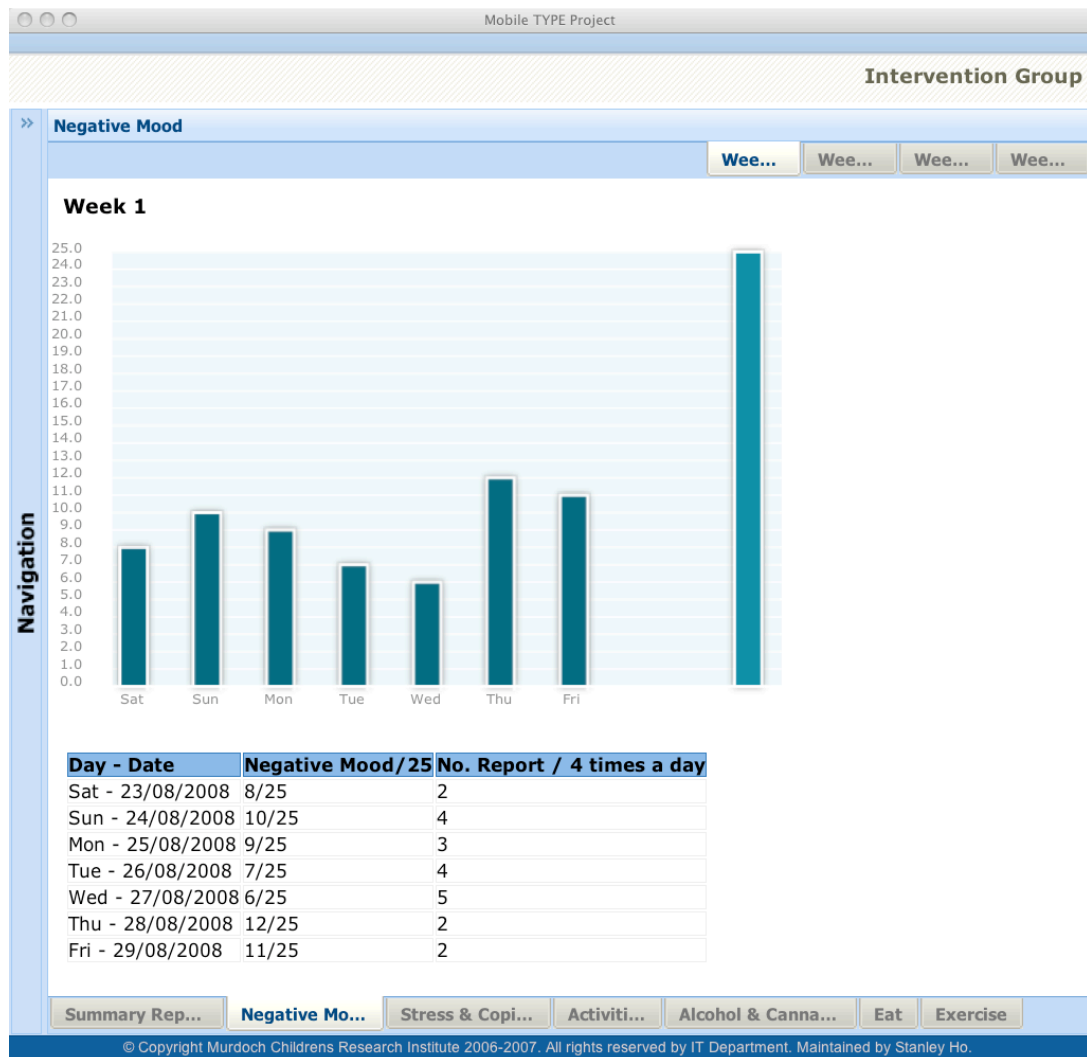


Figure 5.1. Screen shot of the *mobiletype* feedback website.

This graph depicts the mean negative mood for each day in Week 1. The negative mood and number of times participants answered this question is displayed below the graph.

The bar on the right side shows the maximum possible negative mood.

For ethical reasons, young people did not have access to this report directly, but were able to view it with their doctor at their follow-up appointment. Doctors were also given a hardcopy of the summary report displayed on the website, as depicted in Figure 5.2, which highlighted areas of concern and they could log onto the *mobiletype* website for the full report (Appendix D).

Mobile TYPE Project

Intervention Group

>> Summary Report

I - Mood

mood fluctuated across the week: on some days there was little evidence of negative mood, and on others, particularly most days in week 2 she reported moderate negative mood. There were no days of very negative mood.

II - Stress & Coping

Stresses: reported three stressful occurrences in the second week, which may account for her elevated negative mood during that week. Two of these stresses were conflict with her boy/girl friend.

Coping behaviours/actions: reported crying and "didn't do anything" as her two most common coping strategies. She did report the strategies that can be helpful which are relaxing and watching TV or listening to music.

Coping thoughts/cognitions: For each stress she reported blaming herself, catastrophising, and wishing her stresses away. **Importantly, she reported two instances of thinking of hurting herself.** It is notable that there were no positive or helpful cognitive coping strategies.

III - Maintaining Well-being

Activities: appears to spend the majority of her time at home or at work. She reported being with her boy/girlfriend predominantly, followed by being alone or with coworkers. There were very few accounts of spending time with friends which is unusual for someone her age. Many of the activities she reported were watching television, relaxing/resting/sleeping, talking or working. More social activities did not seem to feature very often.

Sleep: reported having between 8-10 hours sleep each night.

Alcohol: reported one drinking occasion across the 2.5 weeks in which she consumed 6 glasses of mixed spirits (approximately 1.5 standard drinks) to feel good or have fun. This equates to approximately 9 standard drinks and falls in the moderate risk drinking for short term harms according to the NHMRC criterion.

Eating: skips breakfast often, but eats lunch and dinner every day. She reported eating snacks and consumes 1-2 serves of junk-food and 2 serves of soft each day.

Exercise: reported two occasions of exercising across the 2.5 week period, one being 1-1.5 hours at the gym and the other was not specified but was for less than 30 mins.

Television/Computer: reported watching up to 4 hours of television in a day, however she mostly appears to watch between 1.5 to 2 hours per day.

IV- Useful Resources / Recommendations

appears to have some low days, and may find it difficult to lift out of these. She has a tendency to blame herself and turn to the worst outcome when faced with stresses, in particular conflict with her partner. She also thinks of harming herself but did not report that she did so. There is a strong sense of hopelessness about her coping behaviours, as she reports crying and not doing anything most commonly. These unhelpful coping strategies may contribute to her low mood, especially in the absence of positive strategies of which she reported none. Her daily activities also seemed a little socially isolated with few reports of spending time with friends. There was little to note in particular concerning her sleeping and drinking patterns. She does not exercise often, and she skips breakfast most days.

Reviewing her coping strategies with an emphasis on helpful coping may be useful. Handouts that may be applicable are:

1. [10 questions to help think about stress?](#)
2. [Problem solving](#)
3. [Depression and thinking](#)

Navigation

Summary Report Negative Mood Stress & Coping Activities Alcohol & Cannabis Eat Exercise

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Figure 5.2. Screen shot of the *mobilitytype* summary page. The name of this participant has been erased for anonymity.

Version 2.0 of the *mobiletype* program contained some considerable benefits over Version 1.1. More data were collected, as participants could complete the program when it suited them as opposed to Version 1.1, which only allowed access at four random times each day. Participants also received feedback from their doctors about their self-monitoring data. Disadvantages of this program were that SMS reminders were reliant on mobile phone reception; therefore, the young person was in an area without reception, he/she was not reminded to complete the program. Although the data were automatically transferred from the phones to the website, many problems occurred with this process, mobile phone reception was needed for automatic transfer and a fault with the ZTE phones was found that prevented data transfer for some participants. Due to these faults, there was often a delay between participants returning the phones and receiving feedback, as the participant's mobile phone had to be retrieved, the data extracted from the handset and manually extracted by a research assistant.

Content of *mobiletype* version 2.0.

Version 2.0 of the *mobiletype* program was developed by Murdoch Childrens Research Institute Information Technology Department and staff at the Centre for Adolescent Health. All the modules in Version 1.1 and listed in Chapter 4, were included in Version 2.0: activities, mood, stress and last time, and alcohol and cannabis use. In addition, Version 2.0 also captured data about young people's diet, exercise and sleep as described below. Appendix B, Table B3 contains the complete content of Version 2.0 of the *mobiletype* program. Generally the content was much the same as for Version 1.1, all modifications are listed in Table 5.1.

Table 5.1

Modifications of mobiletype Version 2.0

-
- The response: “In school / uni / TAFE” to was added to “Where are you now?”
 - Some responses were added to the activities module to reflect the data from Chapter 4 (e.g., Addition of ‘Strangers’ to the question ‘Who are you with?’).
 - Questions in the stress module were changed to single- or multiple-choice answers, instead of free-text. These answers were based upon responses from the free-text data participants entered in Version 1.1. Responses to stress were updated to involve both behavioural responses and cognitive responses to stress and an ‘other’ response giving participants the opportunity to enter free-text.
 - As the current study involved a clinical sample rather than secondary school students, additional modules were included in Version 2.0 about sleep, diet and exercise in order to get a complete picture of the patients’ daily life and wellbeing.
 - The mood responses were changed from a descriptive Likert scale to a 6-point Likert scale (0 = *Not at all*, 1 = *Just a little*, 2 = *Mildly*, 3 = *Moderately*, 4 = *Strongly*, 5 = *Extremely*) as some young people didn’t realise that these adjectives were meant to form a scale from low to high.
 - Due to the high activation of the question “What might you do now?” in response to high negative mood, the branching for this question was changed to exclude responses from the fatigue and anger questions. To simplify the branching to this question further, a high score of anxiety, stress and sadness (above 12) was used in this version.
 - Alcohol and Cannabis questions were changed to include only containers that match the type of alcohol drunk (i.e., Pots and pints for beer, glasses and bottles for wine, and so on).
 - Reminder SMSs were sent to participants four random times a day within the time-blocks instead of the program automatically self-initiating within these time-blocks. This change allowed participants to complete the program at any time, not only when automatically initiated.
 - The *mobiletype 2.0* was redesigned and reprogrammed by MCRI IT.
 - ZTE phones used instead of Nokia.
-

Diet.

A multiple-choice question asked what meals, including snacks, were consumed each day. Additional questions assessed the amount of “junk food” and “soft drink” consumed and a rating of whether the amount of food that was consumed matched the amount needed, rated out of 1 (*Less than I needed*), 2 (*A good amount*) or 3 (*More than I needed*).

Exercise.

Four single-choice questions indicated the type of exercise performed, the amount of exercise completed that day, how enjoyable the exercise was to the participant and the time spent on sedentary activities.

Sleep.

Three questions were adapted from the Pittsburgh Sleep Quality Index (Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) to assess the previous night's sleep. These questions were multiple-choice and determined quantity of sleep, sleep quality and nighttime awakenings.

Timing.

Each day was divided into five blocks of time: morning (between 8am and 11am), daytime (between 11am and 3.30pm), afternoon (between 3.30pm and 8pm), evening (between 8pm and 10pm) and nighttime (between 10pm and 8am). These times were selected to represent times when young people would be participating in a range of activities at a range of locations. Unlike Verison 1.1, instead of automatically starting, young people received four reminder SMSs each day and opened the electronic diary manually in Version 2.0. This change in protocol allowed entry into the diary at any time of the day so that young people had some flexibility in completing entries; they could choose to open the diary at any time or complete it at the random times when they were reminded. This method allowed the young people to fill out the diary when something stressful happened or they were feeling upset. Different modules of questions were asked during different entries as illustrated in Table 5.2.

Table 5.2

The mobiletype Modules and the Time-Blocks When Each Module was Assessed

Modules	Morning	Noon	Evening	Night
Activities	✓	✓	✓	✓
Sleep	✓			
Mood	✓	✓	✓	✓
Stress	✓	✓	✓	✓
Last time	✓	✓	✓	✓
Alcohol		✓		
Cannabis		✓		
Daily stress				✓
Diet				✓
Exercise				✓

One reminder SMS was sent during each of these time-blocks, except the nighttime block, at a random time. Young people were able to complete the diary between 10pm and 8am if they chose to do so. Each time-block asked questions about current activities, mood, stress and coping responses. The other questions about diet, exercise and sleep were asked during different time-blocks to provide variety and so that young people only had to complete this information once a day.

Materials

Two self-report measures were completed pretest and posttest including: the 21-item DASS (Lovibond & Lovibond, 1995) to assess symptomatology; and the ACS Short Form (Frydenberg & Lewis, 1991, 1993) to determine the participants' general coping skills. Chapter 4 provides detailed information about these measures. The

quantitative analyses of these measures are presented in Appendix E. The NCEQ (Leitenberg et al., 1986) was used to assess negative cognitive errors at pretest.

Procedure

Recruitment of participants.

Prior to the commencement of the study, doctors from the Centre for Adolescent Health were invited to participate in the study. Those who volunteered to participate underwent training regarding the study procedure, the use of the mobile phone program and how to interpret the data collected. Doctors were provided with a manual that explained the study procedure in detail and contained handouts about stress, depression and wellbeing to give to young people. Participating doctors were advised that all young people between the ages of 14 and 24 were eligible for entry into the study if they were due to return between 2 to 4 weeks and should be invited to participate during their appointment. The inclusion criteria were attached to the front cover of each participant's medical history as a reminder to doctors that the study was taking place. A research assistant was present during clinic hours to assist doctors and to recruit participants. The research assistant's phone number and name was attached to the inclusion criteria on the medical files so that doctors were able to quickly call the research assistant, located in the building, when needed.

Instructions were given to doctors to briefly introduce the study to young people and ask if they were willing to speak to the research assistant and, if so, the doctor then called the research assistant to come and introduced the study to the patient. The doctors' involvement in recruiting the young person into the study ceased at this point. All further recruitment was undertaken by the research assistant to limit the conflict of interest of the doctor both providing medical care and their involvement in the study.

Pretest assessment.

In a private consulting room, the research assistant explained the study procedure, gave out information statements and answered any participant questions. The research assistant then provided the young person with further details of the study and explained how to use the mobile phone and the program. Those willing to take part then completed a consent form. Only parents who were present with their son/daughter at the clinical

appointment were asked to read the information statement and sign a parent consent form in order to maintain the confidentiality of the young person's appointment.

At this time, participants borrowed a ZTE mobile phone with a Telstra prepaid SIM card to the value of \$50 for the duration of the study. The researcher explained to the participants how to open and use the electronic diary and when they should complete it (i.e., when they received a reminder SMS or anytime they felt they would like to complete an entry). Participants completed a practice entry and the pretest assessment at this time or else a time was arranged to complete the assessment over the phone for participants who had prior commitments, such as school or other appointments. The pretest assessment consisted of demographics, a questionnaire about experiences with mobile phones, the DASS, the ACS and the NCEQ and took around 20 to 30 minutes to complete. A study manual describing the research procedure, offering trouble-shooting tips and including contact information for the study coordinator, was provided to all participants.

The mobiletype monitoring period.

Participants were asked to complete the program at least once a day until their next appointment with the doctor (which was within 2 to 4 weeks from beginning the program). Participants were sent four SMSs each day to remind them to complete the program and they were able to complete the program anytime day or night if they choose to do so. Participants were provided with the researcher's phone numbers and advised to call if they had any questions or problems with the mobile phone or the *mobiletype* program.

At their next appointment, doctors were given a hardcopy summary of the data collected and could log onto a website containing a more detailed report about the patient's data (see Appendix D). Young people were given feedback about their responses by their doctor and given appropriate handouts and referrals if problem areas were identified.

Posttest assessment.

The posttest assessment specifically targeted the monitoring period and consisted of: the ACS Short Form, the DASS 21-item response form, an evaluation form regarding young people's experiences with the electronic diary; and a qualitative interview regarding the experience of ESA during the monitoring program. Young people met with the candidate, Sylvia Kauer, to return the mobile phones after their doctor's appointment and were given the choice of completing the posttest survey and interview then or at a later time over the phone. Most of the interviews were recorded, although, due to technical difficulties with the device, one interview was not recorded; instead comprehensive notes were taken during this interview so that the participant could reiterate and expand on responses.

The interviews were conducted by Sylvia Kauer, the author of this thesis, and consisted of various questions to target the experience of ESA described below. This interviewer has extensive knowledge of the *mobiletype* program and was experienced at data collection with adolescents. Interviews with participants were recorded using an iPod with a microphone attachment. The interviews were conducted to develop an understanding of young people's experience of their ESA during the self-monitoring program, whether they became more aware of their emotions and, if so, in what way.

Five categories of ESA were targeted: *recognition, identification, contextualisation, decision-making* and *communication*. *Acknowledgement* was not targeted as this was considered more of a general therapeutic benefit rather than part of ESA. The interviews contained two sections. The first section of the interview was about the young person's general feedback about the program. All young people were asked: "What did you like about the program?", "what didn't you like?", "any additional information you'd be interesting in having in the program?" and "any suggestions and comments?". Young people were probed for more information (Mostyn, 1990), for example, when asked: "What did you like about the program?" A participant might say "the phone!" This participant would then be asked: "Is there anything else you liked about the program?"

In the second part of the interview, young people were guided to answer questions more specifically relating to their ESA. Several questions were asked including:

- “Can you describe your experiences filling out the diaries?”
- “How did you feel and what did you think when going through the questions?”
- “How did you find answering the questions about your mood/stress?”
- “What did you learn about yourself?”
- “What did you notice about your thoughts and feelings?”
- “Was it a positive or negative experience and why?”
- “How did answering the questions change your awareness of your moods?”
- “What about the triggers of your stressors or negative moods?”
- “How did answering the diaries change your understanding of how you dealt with stress and negative moods?”

Specific probes were also used in this part of the interview; for instance, when participants only answered ‘yes’ or ‘no’ to main questions, they would be asked: “Can you please explain?”

Transcribing

The recordings from the iPod were then transcribed and analysed using TAMS Analyzer (Weinstein, 2005) by the interviewer. As in Chapter 4, information about the participants was noted at this time, including their age, gender, and the date and time of the interview. All words that were spoken by the interviewer and interviewee were transcribed including main questions and responses and also specific probes that were used. Observations about behaviour, gestures and hesitation that were made during the interviews were not preserved or analysed. Although these observations can add value to the responses of participants (Mostyn, 1990; Silverman, 2000), they are also difficult to interpret and ambiguous (Schilling, 2006), and were therefore not recorded. During initial coding, observations and sounds made by participants that were not words, such as ‘um’ and ‘er’ were not found to add any great value to the content of the interviews and were therefore discarded. Schilling suggested that analyses are easier, more pragmatic and coherent when the focus is on participant responses rather than researcher observations and subtleties in language. Any names mentioned by the participants were

replaced by descriptive terms as per Schilling. Terms such as ‘friend’, ‘doctor’, and ‘parents’ were used instead of names.

Data analysis

An inductive, semantic, thematic analysis was conducted in order to provide a rich thematic description of ESA (as described by Braun & Clarke, 2006) and identify explicit patterns in the dataset. Similar to Chapter 4, the analysis was theory-driven in order to determine whether the participants described the previously identified themes of ESA, whilst also maintaining a broad scope in order to identify any new themes elicited by participants. The thematic analysis was described in detail in Chapter 4. To reiterate, transcripts were coded according to the qualitative codebook (Appendix C) in four phases.

Phase 1 involved a manual search to code for all words and phrases in each transcript that broadly represented ESA. Phase 2 involved further division of the data extracts in the ESA themes listed in the codebook (*recognition, identification, communication, contextualisation and decision-making*). Data extracts that didn't fit into these themes were set aside under the heading *miscellaneous* for later analysis. Recurrent themes within an individual's transcript were coded separately to assess the importance of this theme to the individual. In Phase 3, the responses previously set aside were then searched to uncover any new content related to ESA manually and also by using the TAMS Analyzer search command and the keywords for each ESA category listed in Appendix C. New data extracts were then coded into relevant themes. Phase 4 involved analysis of the items in the *miscellaneous* category to develop new themes or integrate into current themes.

As described in Chapter 4, new themes must be discrete and easily distinguished from other themes, mutually exclusive and have three or more instances pertaining to the theme. Analysis was conducted using a cross-question method (Mayring, 2004), by analysing one complete interview before continuing to the next interview. This method was used as per Mayring, who suggests that this is the best method to obtain the full complexity of each interview when information overlaps between questions and the focus is on one overarching topic.

Two common methods were used to test the reliability of this research. First, in accordance with accepted procedure (Hsieh & Shannon, 2005), an auditor review took place. This review involved PhD supervisor and lead investigator of the *mobiletype* program, Dr. Sophie Reid, manually examining 20% of the transcripts using the codebook (presented in Appendix C). Dr. Reid was familiar with the model of ESA and the study protocol. Rather than attempting to chunk each unit into the categories of ESA, which is time-consuming and rarely results in meaningful scores of interrater agreement (Schilling, 2006), Dr. Reid read through the transcripts and coded each transcript in terms of whether each of the ESA categories were present, on a 2-point scale (where 0 = not present and 1 = present). The results from the two coders were then compared using a Kappa coefficient in STATA (StataCorp, 2007). A kappa's coefficient of 0.6 is considered acceptable in qualitative research (Mostyn, 1990).

Second, any discrepancies identified were then discussed between the coders to develop a common understanding between researchers, these were documented (Appendix F) and the codebook was changed accordingly. All discrepancies were examined according to the original data to determine the meaning of the data. All qualitative interviews were examined to comply with the modified codebook. This methodology is well accepted in qualitative research (Erener & Dunn, 1990).

Results

Demographics

Thirty-seven out of 38 participants completed the full study procedure. The final participant completed the posttest assessment 4 months after completion of the *mobiletype* program. Due to this delay in completion, the qualitative interview was not conducted, as the person was unlikely to remember much about the program. This participant was therefore excluded from the current analysis.

The majority of participants were female; $n = 31$ (81.6%). As participants were recruited from a clinical setting, this was expected as young women seek treatment more often than young men (Bertakis, Azari, Helms, Callahan, & Robbins, 2000). The mean age of participants was 15.6 years ($SD = 1.17$). Participants had a range of physical problems and other disorders which included: 12 (32.4%) with eating disorders, four

(10.8%) with chronic illness, two (5.4%) with Chronic Fatigue Syndrome, three (8.1%) with depression, and 16 (43.2 %) with undisclosed illnesses. Eleven participants (29.7%) identified with a minority ethnic background. Baseline means for the DASS, the ACS and the NCEQ subscales for the 37 participants who completed the full procedure are listed in Table 5.3.

Table 5.3

Baseline Mental Health, Coping and Negative Cognitive Errors of the Participants

	<i>M (SD)</i>
DASS	
Depression	12.0 (9.68)
Anxiety	11.3 (8.67)
Stress	15.6 (9.64)
ACS	
Problem-solving	44.0 (10.84)
Reference to Others	32.4 (11.01)
Nonproductive coping	31.6 (10.37)
NCEQ	
Cognitive Errors	
Catastrophising	13.8 (5.38)
Personalisation	13.9 (6.02)
Selective abstraction	14.8 (5.31)
Overgeneralisation	15.3 (6.00)
Content	
Social	18.4 (7.44)
Athletic	18.6 (6.96)
Academic	20.7 (7.95)
Total Distortion	57.8 (20.84)

Note. Total $N = 37$.

Compared to the general population, participants were classed in the 'normal' range for the stress subscale. For the anxiety and depression subscales, participants were in the 'mild' range suggesting that participants were slightly above the population mean but were nevertheless well below a diagnosable disorder. Data from the *mobiletype* program were collected for 37 of the 38 participants; the data from one participant could not be extracted due to a software error. For these 37 participants, 1 to 30 days of self-

monitoring were completed ($M = 11.8$, $SD = 7.35$) and from 1 to 17 mobiletype entries were completed each day ($M = 3.9$, $SD = 1.98$). Participants were asked to complete at least two entries each day for at least 2 weeks. Twenty-one participants (56.8%) met this requirement. Fourteen participants (37.8%) completed entries twice daily for only 1 to 2 weeks and two participants (5.4%) completed entries twice daily for less than 1 week of self-monitoring. Thirty-five participants (94.6%) completed at least 7 days, 21 participants (56.8%) completed at least 14 days and 11 participants (29.7%) completed at least 21 days of the mobiletype program.

Thematic analysis of emotional self-awareness

Qualitative interviews took between 3 to 10 minutes to complete with a mean of 6.09 minutes ($SD = 0.074$). Thirty-four of the 37 participants who took part in the qualitative interview were identified as reporting at least one instance of ESA, with a total of 204 instances of the ESA categories identified overall.

Recognition.

In total, there were 73 instances of the theme *recognition* identified in the transcripts overall. Seven participants indicated that they experienced *recognition* in the nontargeted component of the interview and 31 reported *recognition* in the targeted interview. Participants often talked about how they became more aware of their moods, realised how they were feeling, took notice of their moods, reflected, analysed emotions, and were able to understand their emotions better. Most commonly, the idea that self-monitoring increased awareness of emotions was identified. One 16-year-old female participant said that self-monitoring made her “aware of moods better than before, way more aware.” A 17-year-old female said: “It [self-monitoring] kind of made me much more aware of my mood, just because usually I don’t really think too much about it at all, I just act however I’m acting but then, when I was filling out the diary, I’d notice I’m a bit cranky today or I’m feeling a little bit rotten or something”.

‘*Realisation*’ was another common word used in association with recognition of emotions. Participants talked about how self-monitoring: “made you realise how you felt and the different moods you were in” (from a 16-year-old female). A 17-year-old female participant said: “I suppose I thought that it was pretty useful because it was

getting me to think about my moods. Usually it would make me stop and think. It made me realise when I was in a bad mood, usually I wouldn't realise that at all, just because it was asking me how I was feeling. It kind of told me that sometimes I had background stress that I didn't really realise was there before”.

Participants reported that the self-monitoring program enabled them to take more notice of, reflect upon and analyse their emotions. In response to the question: “Were there any benefits to completing the program?” Participants said: “It does make you notice your feelings a lot more” (from a 16-year-old female), and “It made you reflect on what you're feeling” (17-year-old female). Another participant stated that: “I wouldn't usually pay attention to it, yeah, but thinking about it, you probably notice more [when using the program]” (16-year-old female). Participants also spoke about the self-monitoring program as a chance to “analyse and step back and recognise your moods and recognise what's wrong” (17-year-old female). Another participant reported: “It was good to sit down and analyse it [her feelings] and to realise everything” (17-year-old female).

As well as becoming aware of emotions and recognising that an emotion is occurring, some participants reported that self-monitoring made them think about how they were feeling. A 14-year-old female participant reported that “it made me think about how I was feeling, because like sometimes I actually don't feel how stressed I am. Then when it said ‘how stressed are you?’ and I'm actually very stressed now, but I wouldn't actually [usually] think about that”. When asked if she noticed anything about her thoughts or feelings during self-monitoring, another participant said: “Just more that I was thinking about it, instead of just feeling it, I was thinking about it too” (16-year-old female). A 14-year-old male participant said: “It makes you think about yourself... Instead of just feeling 'oh I feel like this' you actually have to think about it: ‘Do I really feel like this?’”

Identification.

Twenty-four participants reported having an increase in the ESA category *identification* with one participant reporting identification in the nontargeted component of the interview. Participants reported that the self-monitoring program helped them identify what emotion they were feeling: "When you figure out what you were feeling

it's like, 'yeah I feel like that. Oh cool!'" (15-year-old male) and: "I learnt that I go through lots of different moods" (15-year-old female). Mostly participants reported that the program helped them identify variations in mood. One participant said: "Sometimes you didn't know exactly ... what spectrum you were actually feeling" (17-year-old female). Another commented that: "It [the program] would give you a variety of how you feel, like so-so or good ... instead of just saying I feel good or bad it really gave you a variety on how you exactly feel" (16-year-old female). Another said: "I feel ... a lot of moods, ranging from stressed to happy" (16-year-old female). Identifying and differentiating moods was difficult for some participants. A 16-year-old female participant said: "It was good in the sense that ... [when asked] 'do you feel angry?' and I was like 'I don't think so' but then I thought about it and I kind of did feel a little bit angry". Another participant said: "Sometimes it was hard because you'd say you're feeling like this a bit, but not enough for this, but too little for this" (15-year-old female).

Contextualisation.

In total, 22 participants were identified as reporting an increase in the ESA category *contextualisation*. Five participants reported contextualisation in the nontargeted component of the interview and all 22 reported contextualisation in the targeted interview. A 15-year-old female summarised *contextualisation* as: "When I was writing down what I was feeling, it made me more aware of why I was feeling that way". Participants realised that different events and people made them experience different feelings: "[The program] made you think ... each time what is actually happening to you." (14-year-old female) and from another: "You could see how much certain things affected you and how often it was" (16-year-old female). Participants spoke about different aspects of *contextualisation*: (a) causes of negative mood and distress, (b) consequences of negative mood and distress, and (c) difficulty in attributing a cause to negative mood and distress.

Three main types of causes of distress and negative mood were identified. First, young people commonly listed situations and events that caused distress during the self-monitoring program such as: "Exams, being sick" (15-year-old male) or "Fights with parents. Sad thing at work. Something happening at school" (16-year-old female).

The second cause that many participants spoke about was underlying distress and little things that frustrated or angered them. One participant said: “When I'd fill out, 'are you stressed?' I'd be like, 'Yeah' and then I'd look back and look what happened to get me that stressed and it was something so little, like my mum wouldn't let me go out or something” (16-year-old female). Another 16-year-old female participant said: “Sometimes it could be lots of little things ...” Another participant said: “I kind of noticed things that I wouldn't normally notice, just background things like if I wasn't stressed about something in particular. Like if you said you were stressed it would ask you ‘what is it?’ and it would make me think, hang on a second, what is it really?” (17-year-old female). A 14-year-old female extrapolated further and said that: “If I didn't have reasons [for feeling stressed] I'd be like ‘OK I'm actually not so stressed’”, indicating that this participant thought that the absence of an obvious cause of distress meant she must have mistaken what she was feeling.

Third, the time of day seemed to affect many participants' mood: “Just at certain times of the day I was feeling more stressed. Like in the morning” (19-year-old male). “The summary at the end really put it into perspective what I get stressed about. Times of the day, why I'm stressed” (17-year-old female), and “[my] mood was totally different in the morning to what it was at night” (16-year-old female).

Less often, participants spoke about what they did in response to negative mood and distress. A 16-year-old female said that the self-monitoring program: “kind of made me aware of how I act and the way I express how I feel”. Another 16-year-old female spoke of avoiding negative mood: “[I realised] what I was doing and what types of things [I was] doing to try and get away from those feelings”. Yet another 16-year-old female said: “When ... angry or upset ... you tend to be a bit irrational and get yourself worked up”.

Participants indicated that thinking about why emotions and distress occurred was often difficult; when asked how they found thinking about causes of stress, one participant replied: “Sometimes I'd have to stop and think but I suppose it was something at the back on my mind most of the time. It wasn't really hard but it wasn't something that came automatically. I just had to stop and wait a second” (17-year-old female). Once the process of thinking about the causes of stress and negative mood was learnt, one 16-year-old female participant indicated that it became easier: “I actually

now without it [the self-monitoring program], sit back and think about those kind of things ... about the different things that factor into your mood” (16-year-old female).

Communication.

Fourteen participants were identified as reporting about the ESA category *communication*, all of whom reported *communication* in the targeted interview, except one who only reported *communication* in the nontargeted interview. There were three main themes identified relating to *communication*: (a) the therapeutic benefits of communicating emotions, (b) communicating as a means to release negative feelings, and (c) communicating through text as opposed to talking to someone in person.

First, *therapeutic benefits* were most commonly identified with young people talking about how the process of self-monitoring was therapeutic: “It was like having someone to talk to” (14-year-old male). Being able to express feelings as they occurred was also identified as therapeutic: “Once I’d wrote it down, it calmed me down. I don’t know [why], just telling someone else about it” (16-year-old male). Another participant said that the program: “helped me explain my problems and stuff” (14-year-old female). Knowing that the information would be shared with their doctors was also identified as a therapeutic process. One 16-year-old female participant said: “It was good, it was sort of like being able to tell someone by filling out the diary. You knew that you could reflect on it when you finished”. Another participant said: “When I was in a bad mood and I had to fill it out, it would make me feel better because I knew that people were going to be looking at it and reading it, reading the mood chart. It just made me feel better” (15-year-old male).

Second, only male participants were identified as using *communication* as a means of releasing negative emotions. A 14-year-old participant said: “It was better to sit there and answer that, instead of punching stuff” (14-year-old male). Another said: “I reckon, just writing it down as a way of relieving stress.” (16-year-old male).

Thirdly, participants were identified as preferring to use their mobile phones as a means of expressing themselves rather than talking to someone in person.

I liked the benefit of not having to talk, just doing it. I liked that part of it. The ‘no talking’ thing. It was just like a quiet thing... I personally find it hard to talk to someone about it... how I feel and things like that. Whereas you’re not really

talking, you're just expressing how you feel ... and I liked that better than talking. That's what I liked about it, because I just don't get along with the talking thing. But the writing thing was good. (16-year-old female)

Participants spoke about the ease of writing down their emotions rather than talking about them. One participant said: "I guess it's just easier to text it than to actually talk to someone about how you're actually feeling" (15-year-old female). Another participant said: "I thought it was easy to say how I was feeling because it was over a message-type thing, if I was to tell somebody face-to-face, I probably wouldn't be able to do it as easy as over the phone" (16-year-old female).

Decision-making.

Nineteen participants reported decision-making. Only one instance of decision-making was identified in the nontargeted interview, with all 19 participants reporting decision-making in the targeted interview. Decision-making was identified as occurring in several ways during the self-monitoring process. Participants thought about their current *repertoire* of productive coping strategies: "I usually listen to music or read or something when I get stressed. I figured that out because ... one of the questions was ... 'If you're stressed, what are you going to do now?' So I realised that I listen to music a lot when I get stressed" (16-year-old female).

Nonproductive strategies were also mentioned: "When I was angry, I used to punch, now I go for walks or listen to music" (another 16-year-old female). Another participant said: "I [now] just let things go. If mum says I can't go somewhere I just leave it, I don't hassle, hassle, kick up a big stink and chuck tantrums" (16-year-old female). One participant summarised this process as: "I just would get angry and turn on my music and vent. And then with this [the *mobilitytype* program] it goes 'what will you do now?' Like, I never really think what am I going to do because I'm angry, because I'm really angry. I think the survey really helped you with different ideas on what you can do and then it'd always ask you if you did that" (16-year-old female).

The *mobilitytype* program helped give ideas about different strategies to try; one participant said: "I'd try one thing and if it didn't work I'd try another. I tried all the different things" (16-year-old female). Another participant said: "It made me think of how I deal with things and other ways to maybe deal with them that would be better"

(15-year-old female). Relaxation was identified as being an important coping process for young people. One participant said: “My mum wouldn't let me go out or something and that's why I was angry... and I just realised I've got to chill a little bit and just relax a little bit more.” (16-year-old female). Another participant spoke about trying coping techniques rather than trying to ignore the problem: “I guess different ways to cope with different stresses, instead of just blocking it all out” (16-year-old female).

Thematic map

The qualitative interviews provided additional knowledge about the themes of ESA previously identified. In Figure 5.3, a thematic map is illustrated with elaborations included from the current qualitative analysis.

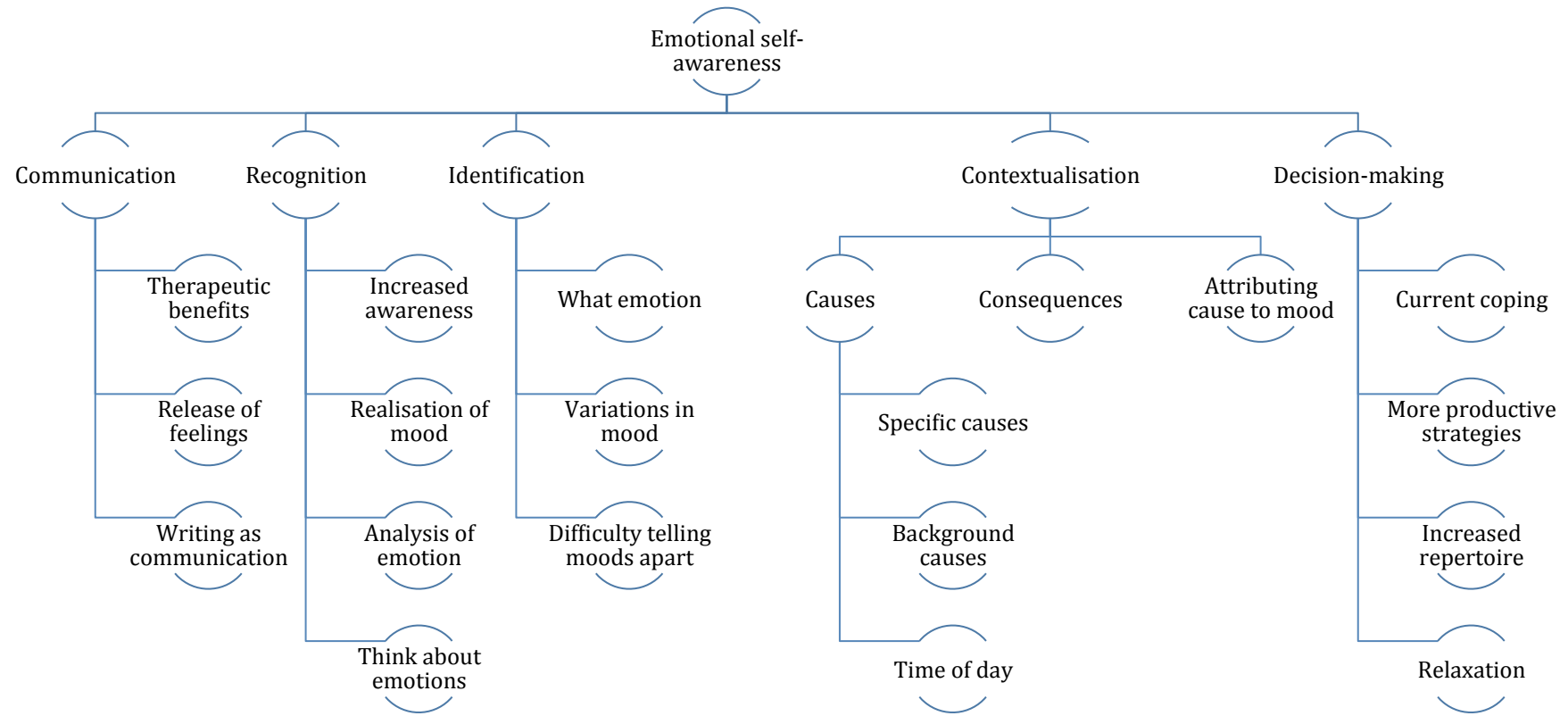


Figure 5.3. The thematic map of emotional self-awareness from the qualitative interviews.

Reliability and frequency

To test for reliability of the coding, a second coder (Dr. Sophie Reid) examined and coded the transcripts of 21.6% of participants (8). Percentage of agreement was higher than expected by chance (77.5% vs 50.8%, $\kappa = 0.54$, $p < .001$). All discrepancies were then discussed amongst the two raters to develop a common understanding between the researchers and these were documented (see Appendix F). The first coder then reviewed all the qualitative transcripts to ensure that they complied with the decisions reached by the two coders. This methodology is well accepted in qualitative research (Erener & Dunn, 1990). After discussion between the two raters most discrepancies were resolved and interrater agreement between the modified coded transcripts of both coders were compared. Kappa scores are listed in Table 5.4.

Table 5.4

Interrater Agreement After Discrepancies were Resolved

Code	% Agreement	Expected Agreement ^a	Kappa	SE	Z	p	No. of discrepancies
Recognition	100.0%	62.5%	1.0	0.354	2.83	.002	0
Identification	87.5%	50.0%	0.8	0.342	2.19	.014	1
Communication	100.0%	62.5%	1.0	0.354	2.83	.002	0
Contextualisation	87.5%	68.8%	0.6	0.324	1.85	.032	1
Decision-making	100.0%	53.1%	1.0	0.353	2.83	.002	0
Overall ESA	95.0%	51.1%	0.9	0.158	5.68	< .001	2

Note. $N = 8$ (20% of transcripts).

^a Percentage of agreement expected by chance

There were only two out of 40 (.08%) data extracts that were not resolved between the researchers, resulting in an overall kappa of 0.90 which is acceptable in qualitative research (Mostyn, 1990). In these two unresolved cases, the first rater's coding was used. Each participant had from zero to five instances of ESA identified with a mean of 2.6 ESA categories ($SD = 1.38$). Table 5.5 shows the frequency of ESA categories reported.

Table 5.5

Frequency of ESA Categories Reported

Category	<i>N</i>	Frequency %
Recognition	21	56.8%
Identification	14	37.8%
Contextualisation	24	64.9%
Decision-Making	18	48.7%
Communication	14	37.8%

Contextualisation was the most commonly reported ESA theme with 24 participants (64.9%) reporting this theme. The least commonly reported themes were *identification* and *communication* with 14 participants (37.8%) reporting these themes.

Discussion

Thematic analysis of emotional self-awareness

The aim of the current study was to conduct an in-depth qualitative examination of ESA to extend and add to the existing ESA model. Thirty-four of the 37 participants (95%) reported an increase in at least one of the categories of ESA. The current investigation supported the multidimensional construct of ESA outlined in Chapter 3. The themes of *recognition*, *identification*, *communication*, *contextualisation* and *decision-making* were identified during analysis. Furthermore, thematic analysis suggested that ESA is a complex process with several cognitions occurring within each of the ESA categories.

During the process of developing a thematic map, ESA was conceptualised as a process. Young people in this study seem to begin by recognising and becoming aware of the experience of emotions, then progress to identifying which emotion they are experiencing and putting the emotion into context with the surrounding environment. Once they have gained this knowledge about their emotions, they then made decisions about how best to deal with the emotion. The ESA category *communication* seems to work alongside informing each process; for example, when the *mobiletype* program asked young people if they were stressed, the young person then had to think about how they were feeling and then identify what they were feeling. The process of

communicating emotional experiences via the self-monitoring program, specifically focusing on the various aspects of ESA may provide an opportunity for young people to reflect upon their experiences and communicate what they are experiencing.

Communicating this information may in turn result in an increase of ESA. Figure 5.4 illustrates the proposed relationship between *recognition, identification, contextualisation, decision-making* and *communication*.

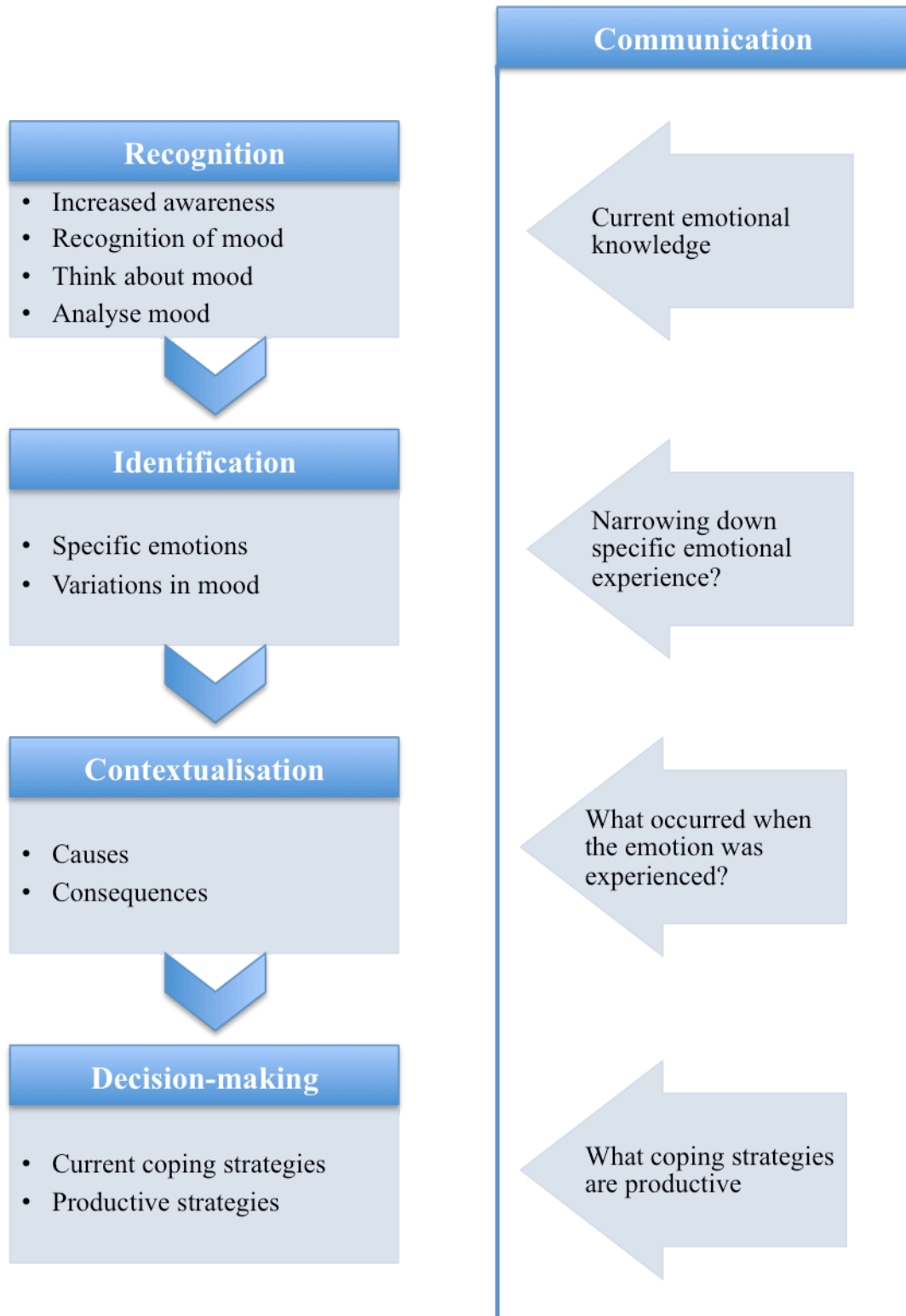


Figure 5.4. Process of emotional self-awareness and interaction with communication.

The ESA model supports previous research (Watkins, 2008) suggesting that productive emotion-focused attention is multidimensional. Similarities between the transtheoretical stages of change theory (Prochaska & DiClemente, 1982) and the current concept of ESA are apparent particularly in the precontemplation to preparation stages of Prochaska and DiClemente's model. Prochaska and DiClemente theorised that consciousness-raising was necessary in the early stages of therapy in order to assist clients to progress from the precontemplation stage to contemplation. The ESA model outlined in Figure 5.4, suggests that becoming aware of emotions is a complex, multidimensional process, containing various levels of awareness. In the precontemplation stage, young people may recognise that they are experiencing an emotion and be able to identify which emotion they are feeling. In contemplation, young people begin to identify the contextual factors associated with emotions, such as the causes and consequences. In the preparation stage, young people identify the effectiveness of their responses to emotions, learn to think about other strategies, and begin to make decisions about how to best deal with emotional experiences. In addition, the self-monitoring program used in the current study focuses young people's attention on direct and concrete experiences of negative mood and stress. Previous research suggests a concrete approach is likely to lead to more positive outcomes than high levels of abstraction when focused on negative emotive content (Watkins, 2008).

Limitations

Qualitative research where interviews directly approach the topic may result in bias as participants may be cued by the interviewer (Hsieh & Shannon, 2005). Although interviews were delivered in two stages, first a nontargeted component then a component directly targeting ESA in order to limit bias, there was little information gained in the nontargeted component of the interview; therefore, these results may be biased. Schilling (2006) suggests that in qualitative interviews, as the interviewer gains experience in interviewing and the subject matter, the questions change over time. This was avoided by structuring interviews as described in the methods section; nevertheless, it is worth noting that there may be an under-reporting of ESA categories in the earlier interviews conducted. The small sample size in this study is not representative of patients presenting for care and therefore may bias the results. Nevertheless, given that

this is a qualitative study, this sample size was deemed sufficient as it achieved informational redundancy (Sandelowski, 1995). There is a risk with large sample sizes that too much information is collected to be properly processed and analysed (Sandelowski, 1995).

A further limitation was that due to the clinical nature of this study, there were more young women than young men who participated in this study; thereby, limiting the amount of information regarding young men. Nevertheless, the distribution of men to women in this sample was proportional to the population who attends clinical settings. Doctors participating in this study were asked to record the number of young people invited to participate, including the age and gender of those who declined and also to record if and why a patient wasn't asked to participate, this information was rarely recorded by doctors as is often the case in primary care studies, therefore it is difficult to gauge the representativeness of this sample.

Although this was primarily a qualitative analysis, quantitative results are presented in Appendix E which examined depressive symptoms and coping skills and demonstrated that self-monitoring and higher levels of ESA was associated with a decrease in coping skill and an increase in mental health symptomatology, this may be due to some of the limitations discussed in Chapter 4, such as the difference in the reference period for the Adolescent Coping Scale from 4 weeks at baseline to 2 weeks at follow-up; therefore, there may have been a reduction in problems over the shortened time period rather than a decrease in coping skills. However, as with Chapter 4, all mental health symptomatology was fairly low, either in the normal or mild range, although there was a significant increase in symptomatology from pretest to posttest, this was not clinically significant with participants remaining in the same normal or mild categories as pretest. A measure of rumination would have strengthened this study, particularly given the potential for increased rumination as demonstrated by the positive association of ESA and depressive symptoms as shown in Appendix E. This association between ESA and depressive symptoms raises the possibility of an unintended negative effect of increased rumination and a positive correlation between ESA and rumination. Future studies should include a measure of rumination in order to examine this possibility.

Future research

Further research is needed to determine whether ESA can assist in reducing depressive symptoms in young people, with a follow-up assessment of at least 1 month to assess the longer-term effects of self-monitoring. Further research is also needed to test the overall hypothesis that self-monitoring increases ESA, which, in turn, decreases depressive symptoms. To do this, pretest and posttest scores of depression, anxiety and stress, as well as the coping strategies young people use, should be measured. A quantifiable measure of ESA is also needed so that ESA can be measured pretest and posttest to determine whether young people's ESA increases during self-monitoring. The next chapter examines existing scales measuring constructs similar to ESA and explores the development of an ESA scale.

Participants in this study also spoke about a preference for engaging with technology over talking about their emotions with another person, supporting previous research (Reid et al., 2009; Silk et al., 2003), and demonstrating that using technology with young people may be beneficial. Further research is needed to compare young people's preference for technological devices and face-to-face treatment.

Practical implication of the ESA model

Becoming aware of emotions is the first stage in the therapeutic process (Prochaska & Diclemente, 1982). The current study demonstrates that there are several dimensions to ESA that may be important in therapeutic interventions as well as early interventions. The mobile phone self-monitoring program was designed to increase ESA by focusing young people's attention on concrete and specific instances of negative emotion and distress as per Watkins' (2008) recommendations, thereby assisting young people to become aware of their negative emotions and seek treatment before the development of severe mental health symptoms. In addition, the self-monitoring program may be useful as a first step in the stepped-care approach instead of watchful waiting (van Straten et al., 2010); doctors can gather more information about young people at risk of mental health problems by simply downloading the program onto young people's mobile phones and uploading the summary report 2 to 4 weeks later to assess young people's mental health and use this information to determine the need for further treatment.

Summary

The current chapter suggests that ESA is a complex and multidimensional construct progressing from recognising the occurrence of an emotional experience, identifying and differentiating emotions, discovering the emotional context and making decisions about emotions. Furthermore, communication of emotional knowledge is an important process assisting with progression from one stage to the next. The focus of the current chapter was a thematic analysis of ESA. Chapter 6 focuses on developing an empirical measure of ESA to further understanding of the relationship between ESA and depressive symptoms.

CHAPTER 6

Mixed Methods Exploration of Emotional Self-Awareness and Development of an ESA Scale

Previous chapters of this thesis have examined the first aim of this thesis, which was to explore the concept of ESA using a qualitative framework, providing a rich, in-depth description of the ESA model. The second aim was to investigate the utility of increasing ESA in an early intervention self-monitoring program to prevent diagnosable depression in young people aged 14 to 24 years with mild or more depressive symptoms. A quantitative framework is needed to test this second aim as quantitative methods allow for exploration of amount, intensity, frequency and relationships between phenomena (Guba, 1990). Before quantitative examination between ESA and depression occurs, however, first a quantifiable measure of ESA needs to be developed. A mixed methods approach is used in this current chapter to develop a preliminary measure of ESA.

The qualitative investigations thus far suggest that there are five core characteristics of emotion-focused attention with adaptive consequences: recognising emotional content, identifying emotional states, understanding the context surrounding emotions, communicating emotional experience, and arriving at a decision using this emotional knowledge. In the previous chapter, young people completed a self-monitoring program and described their experiences of ESA. Young people reported gaining an understanding about the causes, consequences and attributed meaning to the emotions, also noting that monitoring and writing about emotional experiences helped them realise what they were feeling in a therapeutic way and was a good way of communicating with their doctors. Young people also reported that they gained an understanding about the productive and unproductive coping strategies they use and learned more productive strategies to increase their coping repertoire (e.g., relaxation techniques).

Following this research, it was concluded that a quantitative approach was now needed to develop an understanding about whether self-monitoring increases ESA and whether a self-monitoring program designed to increase ESA could be used to reduce depressive symptoms. In short, the development of a measurable and testable construct of ESA was warranted.

Current measures of emotion-focused attention

One difficulty in investigating whether an increase in ESA decreases depressive symptoms is the lack of empirical measures focusing on the beneficial outcomes of emotion-focused attention (Gratz & Roemer, 2004). As discussed in Chapter 2, most research on emotion-focused attention focuses on negative aspects such as rumination and worry; therefore, measures of emotion-focused attention are often confounded with symptoms of depression (Trapnell & Campbell, 1999). When Gratz and Roemer developed a scale for emotion dysregulation, they noted a lack of measures that assess awareness and regulation of emotions. In the systematic literature review presented in Chapter 3, a variety of measures were used to assess positive emotion-focused attention including: the Self-Reflection and Insight Scale (SRIS; Grant et al., 2002); the Ruminative Response Scale (Treynor et al., 2003) which measures both reflective pondering and negative brooding subscales; the Meta-Experience Scale (Mayer & Stevens, 1994); and the Beck Cognitive Insight Scale (Beck et al., 2004). As with the various concepts of emotion-focused attention with adaptive outcomes, items in these measures reflect many of the themes of ESA. Most notably, several of the items in the SRIS scale (Grant et al., 2002) relate to the ESA themes of *recognition*, *identification* and *context*. For example, items in the SRIS *self-reflection* subscale include: “I frequently take time to examine my feelings” and “I frequently take time to reflect on my thoughts”, which are related to the ESA theme *recognition*. In addition, of the five items of the RRS subscale, *reflective pondering* (Treynor et al., 2003), three items relate to the ESA theme *contextualisation*, one relates the *communication* and one relates to the *recognition* theme. A mixed methods approach was used in the current chapter to develop an empirical measure of ESA, using qualitative responses from young people, in addition to items from existing measures that relate to ESA themes.

Mixed methods

There are two traditional schools of thought in favour of either qualitative or quantitative research methods (Teddlie & Tashakkori, 2009). *Positivism* or *postpositivism* favour objective, quantitative methods as the standard for testing the true nature of reality. *Constructivism*, at the opposite end of the spectrum, favours more subjective, qualitative research methods, believing that there are several versions of

reality as experienced by the individual. The dominant position in social research has been held by positivists and postpositivists in favour of quantitative research methods with the view that social phenomena should be treated as objective and use scientific methods to analyse and approximate the best objective reality possible (Teddlie & Tashakkori, 2009).

On the other hand, qualitative researchers view the world from a constructivist philosophy, where reality is subjective and depends upon the view the researcher holds (Johnson & Onwuegbuzie, 2004). Therefore, each individual's subjective ideas can provide information about their reality. Both ends of this continuum (i.e., the positivist and constructivist purists) support the 'incompatibility thesis'; the notion that only one paradigm of research can be used to make sense of the world (Howe, 1988).

For the past 20 years, a third methodological movement, positioned in between positivism and constructivism has evolved called *pragmatism*. Pragmatists have become a distinct group of researchers who believe that both qualitative and quantitative research methods can be used together to better understand the underlying reality of the world. Therefore, a *mixed methods approach* has been developed enabling researchers to use both qualitative and quantitative methodologies as appropriate to investigate the research question at hand. Pragmatism, in contrast to positivism and constructivism, agrees with the positivist philosophy that an external reality exists independent of the subjective nature of research, but denies the positivist view that the true reality can ever be determined (Teddlie & Tashakkori, 2009), instead holding the philosophy that all knowledge from both quantitative and qualitative methods can inform and approach the true state of reality. In mixed methods, qualitative data can provide rich detail about a phenomenon with illustrations, explanations and elaborations. The addition of quantitative methods can further knowledge about relationships between phenomena, causality and frequency, thereby providing a descriptive and extensive understanding of a topic (Denzin & Lincoln, 2000). A mixed methods approach is an appropriate methodology for constructing quantifiable measures of phenomena that are based in theory such as the ESA model.

Mixed methods research has been widely criticised by both qualitative and quantitative prescribers as the "whatever works" approach (Howe, 1988, p. 10). Nevertheless, the ongoing debate about which method best captures a sense of reality

has dwindled in the last decade, with most researchers choosing the practicality of the mixed methods approach over idealised philosophical reasoning (Teddlie & Tashakkori, 2009) and, in true pragmatic style, using research methods most suited to the research question at hand. Nevertheless, Teddlie and Tashakkori identified that there is a tendency to solely, or at least predominantly, use either qualitative or quantitative methods, depending on initial training.

The mixed methods approach is becoming increasingly common (Teddlie & Tashakkori, 2009). Most commonly, publications using mixed methods involve a quantitative questionnaire with a qualitative, semistructured interview (Bryman, 2006). As with both qualitative and quantitative methods, there are several ways to conduct a mixed methods research study. For example, there are several types of quantitative methods such as cross-sectional, longitudinal or experimental studies. Similarly, there are several types of mixed methods, which integrate qualitative methods with quantitative methods in various ways: triangulation, where corroboration between the two methods is sought; complementarity, where one method is used to elaborate, illustrate and enhance results from the other; development, using one method to develop or inform the other method; initiation, developing new perspectives and frameworks in one methodology with questions that arise out of the other; and expansion, extending the scope by including both methods (Greene, Caracelli, & Graham, 1989). Mixed methods are well suited to this stage of the development of the ESA model, assisting in two fundamental ways: firstly in the construction of an empirical measure of ESA and secondly, by overcoming some of the limitations of the qualitative study presented in Chapter 5.

Limitations of the previous qualitative studies

The previous chapter showed that young people report experiencing ESA upon completion of a self-monitoring program and provided detailed narrative descriptions of their experiences of the ESA categories. Nevertheless, due to the qualitative methodology, it is difficult to ascertain whether young people experienced an increase in ESA during the self-monitoring program. Although the qualitative interviews suggested that self-monitoring assisted young people in becoming more aware of their emotional experiences, the results are not definitive. An empirical measure of ESA,

measuring young people's ESA before and after self-monitoring, would enable further testing of the hypothesis that self-monitoring increases ESA. Another limitation to the previous qualitative study was that the relationship between depression and ESA could not be investigated. The overall hypothesis of this thesis is that self-monitoring increases ESA, which, in turn, decreases depressive symptoms. In order to test this hypothesis, a quantifiable measure of ESA is needed. Furthermore, a measure of ESA would assist in understanding whether there are long-term or delayed effects between self-monitoring, an increase in ESA, and a reduction in depressive symptoms.

Another limitation in the study described in Chapter 5 was that few young people had elevated symptoms of depression, anxiety or stress. Previous research suggests that programs aimed at preventing depression have no effect on participants who have no or very mild symptoms of depression (Rushton et al., 2002). Therefore, this current chapter describes a small-scale pilot study focused on young people with mild or more mental health symptoms in a rural Victorian general practice as a prelude to the randomised control trial presented in Chapter 7.

Aims

The aims of this study were: (a) to investigate whether items from the RRS and SRIS could be used to measure the five categories of ESA; (b) to compare young people's qualitative experiences of ESA with an initial ESA measure based on items from the SRIS and RRS; (c) to create additional items for the ESA scale using qualitative responses from the young people's in-depth interviews; and (d) to provide an initial investigation of the effects of self-monitoring on depression, anxiety, stress, rumination and coping strategies with young people experiencing mild or more depressive symptoms.

Method

Participants

Twenty young people aged between 14 and 24 years of age were recruited from a General Practice Clinic in Bendigo by two general practitioners (GPs). The consent protocol was the same as for Chapter 5: Informed written consent was obtained from

participants and, to maintain the young person's confidentiality, only obtained from parents if present at the clinic with their son or daughter. Participants were recruited according to the following inclusion criteria: (a) they must be between the ages of 14 and 24 years, (b) they must be considered a mature minor by their treating doctor, (c) the GP must consider them to have a mild or more mental health problem, and (d) they must have good comprehension of English.

The *mobiletype* program Version 2.1

The self-monitoring program used in this chapter was an updated version of *mobiletype* Version 2.0 described in detail in Chapter 5. To reiterate, the monitoring program was downloaded onto ZTE mobile phones to capture data about a range of young people's daily experiences including mood, stress and coping strategies, diet, exercise, alcohol and cannabis use, and quality of sleep.

Young people received four reminder SMSs each day at random times in four time-blocks (morning, daytime, afternoon and evening) and opened the electronic diary manually. Questions about mood, stress and coping were asked each time the young person completed the program and questions about food, exercise, sleep, alcohol use and cannabis use were only asked once a day in different time-blocks.

The firmware of the mobile phones was updated in this version, which greatly increased the reliability of real-time data transfer, so that participant data were transferred to the *mobiletype* secure website in real-time at no cost to the young person. Data from the *mobiletype* entries were uploaded onto the secure server and accessible to the young person's GP in the form of a summary report of the young person's mood, stress, daily activities, diet, alcohol use and exercise.

The only variation in content between *mobiletype* Version 2.0 and Version 2.1 used in this study was the addition of a high-risk alert. The high-risk alert was activated when both of the following conditions were met: (a) the sum of negative mood was above 12, and (b) responses to coping questions indicated that the young person was thinking about and taking actions to harm themselves. Once activated, an SMS containing the name and phone number of the person who activated the high-risk alert was sent to a research assistant on the project, a PhD student on the project (Sylvia Kauer) and the lead investigator of the project who is also a trained psychologist. An

email was also sent to the researchers with the complete contents of the *mobiletype* entry that activated the alert.

The protocol for responding to a high-risk alert is presented in Appendix G and consisted of the following steps. First, the lead investigator, or when she was unable to respond, Sylvia Kauer, who is trained in telephone counselling, would respond to the call within 30 minutes of the entry being uploaded onto the secure server. Second, the email would be checked to validate the contents of the entry and determine if there was any concerning content in the entry. Third, if there was concerning content, the participant would be called to assess the risk of self-harm or an SMS would be sent if the contents did not indicate a risk of self-harm. Fourth, the Crisis Assessment Team in the participant's area would be alerted and a note made in the participant's file to be included in the participant's summary report if deemed necessary and appropriate by Dr. Sophie Reid, the lead investigator of this project and a child psychologist. This system was tested weekly by a research assistant who completed a 'dummy' entry to ensure that the system was operational. No high-risk alerts were activated by the participants during the course of this study.

Materials

Mental health symptoms and coping.

The 21-item DASS (Lovibond & Lovibond, 1995) was used to assess mental health symptoms. The ACS General Short Form (Frydenberg & Lewis, 1991, 1993) and the NCEQ (Leitenberg, 1996) were used to assess coping strategies. These scales were used in previous studies and were described in detail in Chapter 4.

Emotional self-awareness.

Chapter 3 identified several measures used to capture emotion-focused attention. The measures were reviewed to determine those most relevant to ESA and two scales, the Self-Reflection and Insight Scale (SRIS; Grant et al., 2002) and the Ruminative Response Scale (RRS; Treynor et al., 2003) were selected for use in this study to measure the ESA categories.

The SRIS consists of two subscales: *self-reflection*, with 12 items rated on a 6-point Likert scale summed to give scores ranging from 12 to 72; and *insight*, with 8

items rated on the same scale, summed to give scores ranging from 8 to 48. The two subscales have been tested for reliability and validity (Grant et al., 2002) and were found to have good internal consistency for both the self-reflection subscale ($\alpha = .91$) and the insight subscale ($\alpha = .87$). Test-retest correlation was .77 for both scales ($p < .001$) with good convergent and discriminant validity (Grant et al., 2002).

The RRS contains two subscales with five items each, which are rated on a 4-point Likert scale, giving scores ranging from 5 to 25. These subscales measure *ruminative brooding*, considered to be a negative type of emotion-focused attention and *reflective pondering*, a positive type of emotion-focused attention. Reliability and validity has been tested for the RRS in a community sample of adults (Treyner et al., 2003) and demonstrated good internal consistency for reflective pondering ($\alpha = .72$) and for ruminative brooding ($\alpha = .77$). Test-retest reliability was also acceptable for reflective pondering ($r = .60$) and ruminative brooding ($r = .62$).

Other measures.

In addition to these measures, the pretest assessment included general demographics (age, gender, date of birth, nationality, language spoken at home and experience with mobile phones) and posttest assessments included a feedback questionnaire about how the participants enjoyed the program, general comments about the program and suggestions for improvement.

In-depth qualitative interviews.

The procedure for the qualitative interviews was the same as detailed in Chapter 5. Sylvia Kauer, in her role as a PhD student, conducted all interviews over the phone at the participants' convenience and recorded them on an iPod with microphone attachment. First, participants were asked general questions about their likes, dislikes and suggestions for the program. Second, ESA was targeted by focusing on participants' experiences, how they felt, and what they noticed about their thoughts and feelings as detailed in Chapter 5. The recordings of the interviews were then transcribed into TAMS Analyzer (Weinstein, 2005), noting the date and time of the interview as well as the participants' age and gender.

Procedure

The procedure of this study was similar to the procedure outlined in Chapter 5. A brief description of the protocol and the differences from the previous protocol are presented here.

GPs from the Bendigo Division of General Practice were approached to participate in this study. Two of the GPs willing to participate were selected and given a *mobiletype* manual that contained: a description of the project; useful handouts and referrals to give out to young people; and step-by-step instructions to the study procedure and how to interpret the data collected. The two GPs were trained and supported by the *mobiletype* team.

The larger *mobiletype* study, of which this analysis is a subset, was concerned with investigating whether the *mobiletype* program could be implemented in general practice settings. Therefore, unlike Chapter 5, researchers were only present to recruit participants and were not present at the clinic at all times. Doctors, nurses and reception staff were provided with the necessary materials. Research assistants could be contacted by phone to assist doctors and nurses in setting up and trouble-shooting. The doctor introduced the study to young people and invited them to participate. Those who were willing to be involved were given an information statement and booked-in to meet with a research assistant on a designated day. A reminder call was made to all participants 1 day prior to the appointment. The pretest assessment process is detailed in Chapter 5. In summary, participants completed a consent form, a battery of questionnaires including demographics, the DASS, the ACS, the NCEQ, the SRIS and the RRS. Participants received a ZTE mobile phone with a \$30 prepaid SMS card and the *mobiletype* program downloaded onto it and they completed a practice entry. Participants were instructed to complete an entry at least once a day until their next appointment and were given a manual about how to use the program. Young people were given the option of completing pretest assessments during this appointment or over the phone with a research assistant at a later time. The day after this pretest assessment, participants began the monitoring program. Participants were sent four reminder SMSs each day to prompt completion of the program, although they could complete entries at anytime of day or night. The monitoring period lasted between GP appointments ranging from 2 to 4 weeks in length.

At their next appointment, the young person reviewed the information from the program with their doctors. The doctor provided the young person with feedback about their responses, and assisted them by providing handouts and referrals if necessary. At this time, the young person returned the mobile phone to the reception. The young person completed the posttest assessment over the phone with Sylvia Kauer, which consisted of the DASS, the ACS, the SRIS, the RRS, a feedback form and an in-depth interview. Data from the qualitative interviews were transcribed as outlined in Chapter 5. Follow-up assessments were also completed over the phone approximately 6 weeks after completion of the self-monitoring program with a research assistant. Six-week follow-up assessments consisted of the DASS, the ACS, the SRIS and the RRS.

Data analysis

Qualitative analysis.

The coding of the qualitative responses was conducted first, before quantitative analyses began. Therefore, the qualitative analyses were conducted independently of the quantitative analyses. A thematic analysis was conducted specifically focusing on the five themes of ESA, but also with the aim of identifying new patterns in the data. Data extracts were coded based on the codebook developed in Chapter 5 (Appendix C), using the procedure reported in Chapters 4 and 5 and the software package TAMS Analyzer (Weinstein, 2005). Coding of the transcripts involved examining each interview and determining whether there was a presence or absence of the five a priori ESA categories: *recognition*, *identification*, *contextualisation*, *communication* and *decision-making*. Validity and reliability were assessed by interrater agreement with coding by Sylvia Kauer compared to coding by Dr. Sophie Reid. Thirty percent of transcripts were coded by both raters.

Mixed methods analysis.

Items from the RRS and the SRIS were selected as relating to the ESA themes by consensus between two researchers, PhD student, Sylvia Kauer, and the lead investigator of the mobiletype program, Dr. Sophie Reid, to create a scale of ESA. The statistical software program, STATA (StataCorp, 2007), was used for all quantitative analyses. Due to the differences in the scales used in the RRS and the SRIS (the SRIS

uses a 5-point Likert scale and the RRS uses a 4-point Likert scale), Cronbach's alpha is reported for the items in each theme and the total ESA score, with the standardised Cronbach's alpha calculated when items from both scales were tested for internal consistency. The standardised Cronbach's alpha standardises items in the scale to a mean of zero and a variance of one (StataCorp, 2007). Items were then standardised using z scores and summed together to form each ESA subscale and the total ESA score. Participants in the upper and lower 30th percentiles were then selected and qualitative responses between the two groups were compared. In order to develop a well balanced scale, at least 3 items were required for each of the ESA themes. Qualitative responses were then analysed for themes with less than 3 items to develop additional items in the ESA scale to be used in Chapter 7 to measure ESA in the RCT

Quantitative analysis.

Quantitative data analysis consisted of paired-samples t -tests with the pretest, posttest and follow-up assessments of the DASS as an initial investigation of whether young people's depression, anxiety and stress scores reduced from pretest to posttest and if this reduction was maintained at the 6-week follow-up. Pretest, posttest and 6-week follow-up measures of the ACS, the SRIS and the RRS were also examined using paired-samples t -tests.

Results

Demographic information

A total of 22 participants were recruited into this study. Of these, one participant was arrested and therefore unable to complete the posttest surveys (incidentally, this participant did manage to return his study mobile phone to the researchers). One participant could not be located for the 6-week follow-up assessment and one participant was excluded from the qualitative analysis due to a technical malfunction with the recording equipment so that the qualitative interview was not recorded and could not be analysed. Due to these exclusions there were 22 participants at pretest, 22 completed the *mobiletype* entries for up to 4 weeks, 21 completed posttest assessment, 20 completed the 6-week follow-up assessment and 19 completed the qualitative interview.

As generally found in clinical research (Bertakis et al., 2000), the majority of participants were female; $n = 16$ (72.7%). Only one participant (4.6%) identified with a minority ethnic background. The mean age of participants was 19 ($SD = 3.2$). Participants had a range of mental health problems as recorded by their GPs including: 12 (57.1%) with depressive symptoms, four (19.1%) with anxiety and depressive symptoms, three (14.3%) with mood fluctuations, one (4.8%) with anxiety symptoms, one (4.8%) with substance abuse, and one (4.8%) with an undisclosed illness. Table 6.1 presents the mean NCEQ for the 22 participants who completed this study.

Table 6.1

Pretest Negative Cognitive Errors of the Participants

	<i>M (SD)</i>
Cognitive Errors	
Catastrophising	16.0 (7.00)
Personalisation	15.5 (6.60)
Selective abstraction	16.8 (5.61)
Overgeneralisation	17.3 (7.32)
Content	
Social	22.0 (9.41)
Athletic	20.5 (7.68)
Academic	23.1 (8.87)
Total Distortion	65.64 (25.00)

Note. $N = 22$

Participants completed from 12 to 26 days of self-monitoring ($M = 17.9$, $SD = 74.35$) and from 1 to 12 *mobiletype* entries were completed each day ($M = 4.1$, $SD = 1.57$). All participants completed two entries a day for two weeks and 15 (68.2%) participants completed entries twice daily for more than two weeks.

Nineteen participants completed the qualitative interview. Participants had a range of one to five categories of ESA identified in the transcripts, with a mean of 3.6 ($SD = 1.02$). Most commonly, participant responses were coded as experiencing the ESA category *recognition*. *Contextualisation*, *decision-making* and *identification* had an equal number of reports, followed by *communication*.

One third of participants (6 participants) were tested for interrater agreement and coded by two raters. For the *recognition* category, each rater had 100% agreement. For *identification*, *contextualisation*, *communication* and *decision-making*, there was only one discrepancy between raters. For all these categories except *recognition*, the kappa coefficient was the same, there was 83.3% agreement between raters resulting in a κ of 0.67 ($Z = 1.73, p = .042$).

Initial ESA scale

Items from the SRIS and RRS were used to construct an initial scale of ESA. Items were categorised into each theme of the ESA by consensus between two researchers. Table 6.2 presents the initial ESA scale drawn from items in the SRIS and RRS.

Table 6.2

Initial Emotional Self-Awareness Scale

ESA Scale	Content
Recognition subscale	I don't often think about my thoughts (<i>reverse</i>) ^a I rarely spend time in self-reflection (<i>reverse</i>) ^a I frequently examine my feelings ^a I am usually aware of my thoughts ^a I frequently take time to reflect on my thoughts ^a Go someplace alone to think about your feelings ^b
Identification subscale	I'm often aware that I'm having a feeling, but I often don't quite know what it is ^a Thinking about my thoughts makes me more confused (<i>reverse</i>) ^a It is important to me to try and understand what my feelings mean ^a Often I find it difficult to make sense of the way I feel about things (<i>reverse</i>) ^a
Contextualisation subscale	I don't really think about why I behave in the way I do (<i>reverse</i>) ^a I often think about the way I feel about things ^a I am not really interested in analysing my behaviour (<i>reverse</i>) ^a It is important for me to evaluate the things that I do ^a I'm often confused about the way that I really feel about things (<i>reverse</i>) ^a I usually have a very clear idea about why I've behaved in a certain way ^a I usually know why I feel the way I do ^a Analyse recent events to try to understand why you are depressed ^b Go away by yourself and think about why you feel this way ^b Analyse your personality to try to understand why you are depressed ^b
Communication subscale	Write down what you are thinking and analyse it ^b

Note. ^aAdapted from the SRIS (Grant et al., 2002); ^bAdapted from the RRS (Treyner et al., 2003); (*reverse*) = reverse scored items.

There were six items categorised under *recognition*, four items were categorised as *identification*, ten items were classified as *contextualisation*, and one item related to *communication*. No items related to decision-making. Means and standard deviations for the ESA subscales and the total ESA score are listed in Table 6.3.

Table 6.3

Means and Standard Deviations of the ESA Scale for Pretest, Posttest and 6-Week Follow-Up

Subscale	Pretest <i>M (SD)</i>	Posttest <i>M (SD)</i>	6-week <i>M (SD)</i>	Range
Recognition	14.5 (4.10)	14.3 (3.59)	14.7 (4.86)	5.1 – 23.3
Identification	6.5 (2.80)	6.9 (2.57)	7.1 (3.00)	2.2 – 14.5
Contextualisation	19.3 (5.18)	21.4 (4.47)	21.3 (4.34)	9.4 – 31.3
Communication	5.2 (4.90)	4.5 (4.25)	5.6 (6.11)	1.3 – 20.0
Total ESA	45.6 (11.22)	47.2 (8.80)	48.8 (10.74)	25.4 – 74.2

Recognition.

Paired-samples *t*-tests were conducted to compare scores between pretest, posttest and 6-week follow-up. There was no significant difference between pretest and posttest scores; $t(20) = -0.42, p = .679$. Similarly, there was no significant difference between pretest and 6-week follow-up scores; $t(19) = -0.268, p = .792$, nor was there a significant difference between posttest and 6-week follow-up; $t(19) = 0.304, p = .764$. Standardised Cronbach's alpha for these six items was also calculated for pretest ($\alpha = .60$), posttest ($\alpha = 0.54$) and 6-week follow-up ($\alpha = .81$).

Identification.

Paired-samples *t*-tests were conducted to compare scores between pretest, posttest and 6-week follow-up. There was no significant difference between pretest and posttest scores; $t(20) = 0.496, p = .625$. Similarly, there was no significant difference between pretest and 6-week follow-up scores; $t(19) = 0.795, p = .436$, nor was there any significant difference between posttest and 6-week follow-up scores; $t(19) = 0.736, p = .477$. Only items from the SRIS were used to measure the *identification* category and therefore Cronbach's alpha was not standardised for these four items; pretest ($\alpha = 0.63$), posttest ($\alpha = 0.36$) and 6-week follow-up ($\alpha = 0.63$).

Contextualisation.

Paired-samples *t*-tests were conducted to compare means from pretest, posttest and 6-week follow-up scores. There was a significant difference between pretest and posttest scores; $t(20) = 2.278, p = .034$, suggesting that contextualisation increased from pre to posttest. There was no significant difference, however, between pretest and 6-week follow-up scores; $t(19) = 1.678, p = .110$, nor between between posttest and 6-week follow-up scores; $t(19) = 0.081, p = .937$. Standardised Cronbach's alpha for these ten items was calculated for pretest ($\alpha = 0.63$), posttest ($\alpha = 0.53$) and 6-week follow-up ($\alpha = 0.61$).

Communication.

As there was only one item, no further tests were conducted.

Total ESA scale.

Paired-samples *t*-tests were conducted to compare the pretest, posttest and 6-week follow-up means. There was no significant difference between pretest and posttest scores; $t(20) = 0.546, p = .591$, between pretest and 6-week follow-up scores; $t(19) = 0.943, p = .357$, or between posttest and 6-week follow-up scores; $t(19) = 0.913, p = .373$. Internal consistency for the total ESA scale was assessed using standardised Cronbach's alpha for the 21 items and calculated for pretest ($\alpha = 0.79$), posttest ($\alpha = 0.60$) and 6-week follow-up ($\alpha = 0.79$). These scores indicate that internal consistency was good for pretest and follow-up and acceptable for posttest.

Comparison of low and high ESA scores

Due to the small sample size, mixed methods analyses consisted of comparing qualitative responses from participants who reported high levels of ESA on the initial ESA scale and those with low levels of ESA. The total ESA score was used as it had better internal consistency than the separate subscales. As the qualitative interview was conducted at posttest, the posttest scores of ESA were used as a comparison. Low and high groups were devised by taking the lower and upper 30th percentiles. Figure 6.1 illustrates the distribution of the ESA scores with a normal distribution curve.

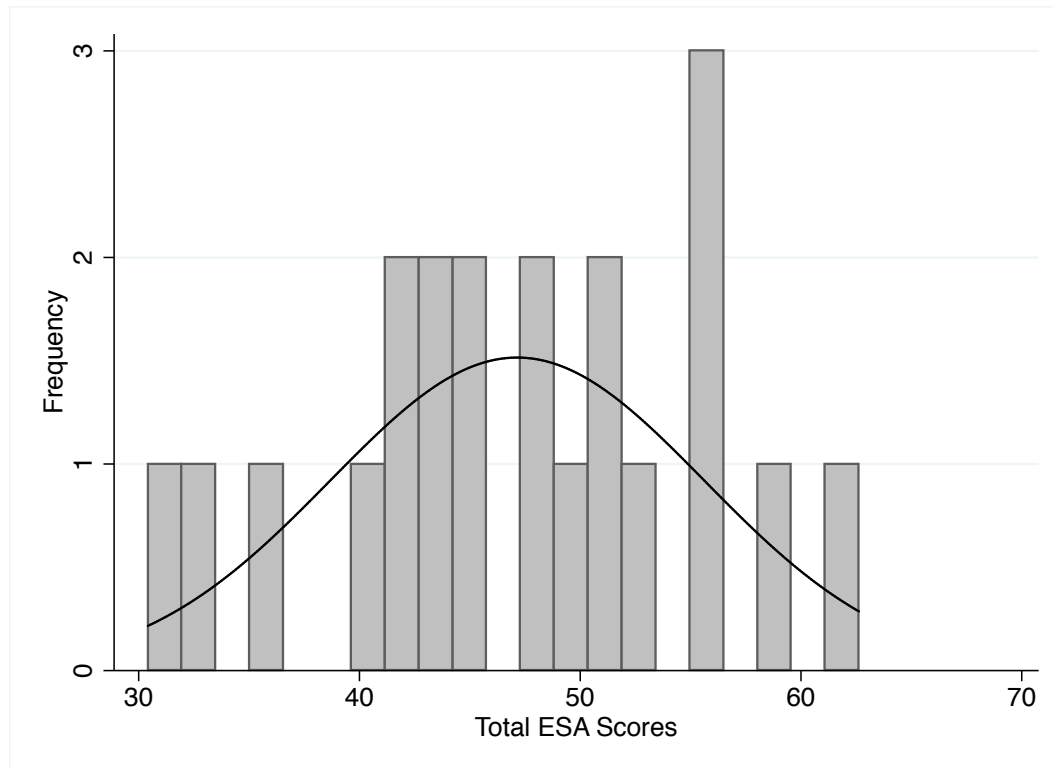


Figure 6.1. Distribution of the posttest ESA scores with normal distribution curve.

As shown in Figure 6.1, there is a normal distribution of the 21 participants' ESA scores. There were seven participants in the 70 to 100th percentile, selected for high ESA levels with a range of scores from 51.9 to 62.6. There were six participants in the lowest 30th percentile, selected for low ESA levels with scores ranging from 30.4 to 42.3. The mean trajectory across the three time-points for the low and high ESA groups is presented in Figure 6.2.

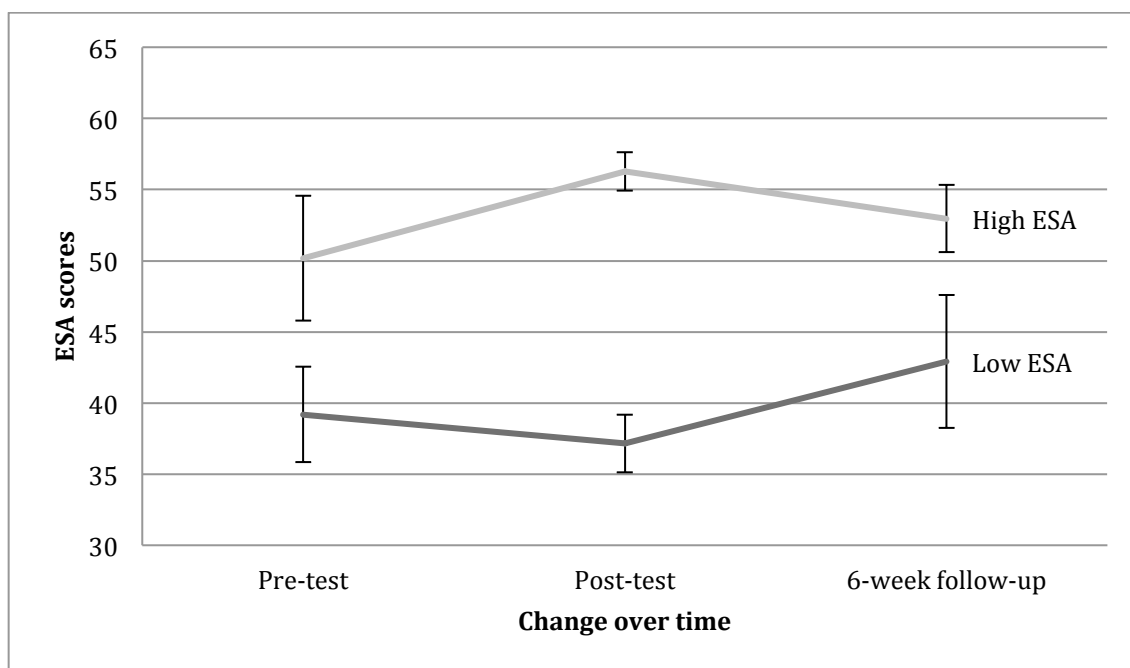


Figure 6.2. ESA scores for the lower and upper 30th percentile of ESA scores over time. Standard error of the mean was used to calculate error bars. Error bars are smaller for the posttest because the posttest scores were used to calculate the high and low groups.

Figure 6.2 shows that the low ESA group had lower scores of ESA over time and did not increase in ESA from pretest to posttest whereas the high ESA group had an increase in ESA scores from pretest to posttest which declined from posttest to 6-week follow-up, although still maintaining an increase from pretest. This effect, however, may be a result of regression-to-the-mean. The low ESA group had a slight increase from posttest to 6-week follow-up. This illustration suggests participants in the high ESA group experienced an increase in ESA during the self-monitoring program whereas participants in the low ESA group may have experienced a delayed increase in ESA after completion of the self-monitoring program. In this illustration it appears that participants in the high ESA group experienced an increase in ESA while participating in the self-monitoring program whereas participants in the low ESA group may have experienced a delayed increase in ESA after completion of the self-monitoring program. This finding is speculative given the very small sub-groups of patients available for this analysis and may be due to random variation in responses. The qualitative responses for each of the high and low ESA groups were compared. A complete list of the coded responses are listed in Appendix L.

Recognition.

Five of the six participants in the low ESA group reported that the program made them more aware of what they were feeling, and helped them think about and reflect on their feelings. One participant reported that:

It gave me an opportunity to reflect on my thoughts even when I know that I normally wouldn't have... Sometimes I would be so confused that I didn't know if I was down or depressed or not. So filling out the diaries helped me be aware of it. (18-year-old female)

Three participants in the low ESA group reported that they would not normally pay attention to their feelings and they were often confused by what they feel. For example, one participant said that the program: "Helps [me] think about what feelings and emotions are there. I would never have noticed or realised before... it brought things out that I would never have paid attention to before" (20-year-old female).

There were many comments about this theme in the qualitative interview with six of the seven participants in the high ESA group reporting *recognition*. Similar to those in the low ESA group, participants spoke about the program helping them to realise what they were feeling, reflect on feelings, and think about feelings. One of the high ESA participants reported that she paid more attention to emotions than she normally would.

You knew they'd [the self-monitoring program] be asking a question about all the different emotions so you paid more attention to them, even when I wasn't filling out the diary. I did find that I was examining my emotions more... it gave me a couple of moments to myself and they made me examine how I was feeling in a degree that I usually wouldn't. (23-year-old female)

Participants in the high ESA group reported already being aware of their mood but still thought they benefited from self-monitoring. One participant in the high ESA group said: "It confirmed, it reflected quite accurately how I was feeling and how I did react to certain situations. I thought it was very accurate" (17-year-old male). Another reported, "I was already aware of my mood but now I'm just more aware. I kind of needed a routine. I was like yep, yep, yep, real fast and yep. Like I told the truth and all but I was just real fast" (21-year-old female).

Participants with high and low ESA scores both used similar words to reflect the *recognition* theme such as *think, realise, reflect* and *attention*. Participants in both groups also reported that they did not normally pay attention to their mood. There were some differences in the qualitative experience of ESA between the high and low ESA groups as well. For instance, one participant in the low ESA group reported that she was often confused by her emotions, whereas most participants in the high ESA group reported already having some awareness of their emotions and that the program accurately reflected what they were feeling.

Identification.

Four participants in the low ESA group reported that identifying what they were feeling when self-monitoring got easier over time: “It got easier as I did it a bit more. I couldn't tell if I was stressed out and stuff. But I can sort of tell now” (17-year-old male). Another participant expressed surprise that they experienced several emotions at one time:

It was easy most of the time. It was confusing that a lot of the time I'd be a little bit angry, a little bit sad and happy at the same time. That was kind of strange finding out that I'm feeling mixed emotions most of the time. I guess ... I'm often feeling more than one set of emotions. (19-year-old male)

One participant identified an underlying negative mood during self-monitoring and said: “I never noticed before that I have an underlying angry, mad, upset thing constantly. I noticed that, so it was helpful to see that it was actually there because I wouldn't have noticed otherwise” (20-year-old female).

There were only two participants from the high ESA group who reported *identification*. Both these participants expressed difficulty “pinpointing” (23-year-old female) and “trying to gauge level of mood” (20-year-old male).

Participants in the low ESA group seemed to learn more about identifying their feelings during self-monitoring than the high ESA group, including learning that they could experience more than one emotion at any given time and learning about underlying negative moods. They expressed that it was easy to identify their emotions and that this process became easier over time. In comparison, those in the high ESA

group reported little experience of *identification*; the two participants who did comment about *identification* of emotions reported that they had difficulty identifying emotions.

Contextualisation.

Five low ESA participants reported that they thought about the causes of their negative mood, why they felt that way and analysed their behaviour or reaction. For example, one participant said: “It [self-monitoring] just showed me the way I was reacting and I kind of stopped and thought about how I was reacting” (22-year-old female). One participant said that the diaries helped her to think about “...things that trigger negative thoughts and how to turn negative thoughts into positive thoughts” (18-year-old female). Another participant identified specific, concrete causes for her negative moods, stating that:

I realised maybe I don't spend a whole lot of time around friends and things but I try and make myself think that I do but then it really reflected that myself, for my age, I don't spend enough time around friends, being social or leisure things.
(20-year-old female)

Five participants from the high ESA group also reported contextualising their emotions. There were no obvious differences in the qualitative responses regarding contextualisation between the high and low ESA groups. Overall, participants spoke about the causes of stress and negative mood, their reactions to negative mood and stresses and why they reacted that way. One participant in the high ESA group said: “I tried to think about why I feel a certain way more. Try to look back and think about what had happened leading up to my mood” (20-year-old female). Another participant said:

One thing I did discover that I feel very anxious about, which would explain a lot of things, was with the shopping ... household grocery shopping and that. That was always a very anxious experience and usually because I'd go with my mother and that would involve leaving my daughter. So whenever my daughter is at daycare or something, I discovered I'm very anxious. So, even though she's always been going to daycare and they are qualified and all that, when she's not with me I'm very anxious about it.... It makes you sit down and actually examine

how your feeling on things you normally wouldn't ask yourself. (23-year-old female)

Communication.

Five participants in the low ESA group reported information related to *communication* of emotions. When asked what he liked about the program, one participant said: "Being able to tell other people that I don't know what I feel like" (17-year-old male). One participant from the low ESA group reported that they felt better speaking about their feelings: "I felt better 'cause I felt like I'd sort of spoken to someone even though I hadn't" (18-year-old female). Three participants in the low ESA group reported that they enjoyed getting their problems off their chest. For example, one participant said:

It actually made me feel better to get things of my chest but not have to talk to anyone. If I didn't want to answer it, to fill it out, I didn't have to. It's a great way of expressing yourself and dealing with it without thinking that it's an over the top thing. (20-year-old female)

There were four participants in the high ESA group who reported communicating their emotional experiences. One participant spoke about how they expressed what they were feeling and weren't inhibiting their thoughts about emotions:

The responses [in the program] were actually quite open so it was easy enough to express. [I liked] just being able to talk really. Like if you want to speak just in general, normally, you are less likely to express your feelings when asked. I was a lot calmer just being able to express myself. My mum spoke to the doctor about that as well, she feels that I was a lot more open and loving and stuff because I was not bottling anything up at all. I was open and more fun and stuff because I wasn't bottling everything up. (16-year-old female)

There were markedly different responses between the low and high ESA group about how the participants communicated their emotions. People in the low ESA group generally spoke about releasing their feelings and getting things off their chest. One participant also said that he liked telling people he didn't know what he felt. In comparison, the high ESA group spoke about not suppressing their thoughts and feelings, and expressing their feelings.

Decision-making.

Two participants in the low ESA group reported making decisions related to their emotions. Both participants spoke about accepting that there was a problem and learning about ways to cope with stress and negative mood. One participant said:

Just admitting to myself that there is something wrong and then because I've filled the survey [the self-monitoring program] in, I'm like 'oh wow, I am feeling a bit down, maybe I should talk to someone or change my thinking and habits'.... [I was] able to look at how I behaved and [how] I've been feeling over the past few weeks. It helped you to work out strategies about how to be more positive or how to deal with whatever the problem is and also it helps to indicate which areas are worse. (18-year-old female)

Four participants reported making decisions about their emotions in the high ESA group. All of these participants spoke about learning coping strategies, and having the ability to choose what to do to have a positive experience. One participant said: "A lot of doing nothing doesn't help... a lot of dealing with it later doesn't help" (23-year-old female). Participants spoke about specific ways to improve their mood. For example, one participant said:

Hang around my friends more and make more of an effort and make sure everyday that I text-message people throughout the day. I'm a lot more positive and with [the self-help] sheet that the doctor gave me. If something's stressing me out or whatever I'm just like thinking about it and forget about it if it's nothing big. Like if something was stressful I was like 'this isn't a big deal' and then I stopped worrying. (21-year-old female)

Participants in the both low and high ESA groups spoke about using coping strategies to change the way they react to negative emotions and stressors. The low ESA group spoke in particular about accepting the problem and then thinking about how to change it, whereas the high ESA group spoke about thinking about various strategies to improve the way they thought about the problem and not catastrophising over little problems.

Additional items in the emotional self-awareness scale from the qualitative interview

All items listed above in Table 6.3 were included in the initial ESA measure, as Cronbach's alpha was generally acceptable (above 0.7) for the total ESA score. In addition to these items, another 10 items were developed using responses from the qualitative interviews for the communication and decision-making categories as there were less than 3 items from the SRIS and the RRS for these themes.

Communication.

A further five items were constructed by examining the qualitative interviews for the *communication* theme. The item "I can talk about my mood to others" was developed from comments about talking to others about feelings such as this comment from a 14-year-old female participant: "If I do communicate about my problems then people can actually help you with your problem".

Participants referred to writing down their feelings instead of talking. One participant said: "I felt better because I felt like I'd sort of spoken to someone even though I hadn't" (18-year-old female). This was easier to do than talking to someone: "I knew that it was confidential. It was fine to be honest and you could say that you were having a really bad day rather than just when an actual person asks you, you say I'm fine. Whereas if it's an SMS you can say 'nah, I'm having a crap day'" (18-year-old female). Another participant said: "The responses that they had for you were actually quite open so it was easy enough to express" (16-year-old female). Two items were developed referring to the ease of writing down feelings as opposed to talking about emotions. The items "I find it easy to write down how I feel" and "It's difficult to communicate what I feel" were developed in response to young people's comments.

Participants often spoke about the process of talking as beneficial, even without having someone there to talk to. For example, a 24-year-old female said: "It's better to be talking about it than not... it doesn't help to bottle things up. The more of it you can get out the less it eats away at you inside. It's a good thing. It's important to talk about things and think about your behaviour and stuff." A 20-year-old male participant said: "It actually made me feel better to get things off my chest but not have to talk to anyone. If I didn't want to answer it, to fill it out I didn't have to". From these responses, the

item “I often ‘self-talk’ to think about my feelings” and “I verbalise my feelings” was developed.

Decision-making.

Five items were developed for the *decision-making* category from the qualitative interviews. The item “When feeling bad, I try to deal with problems and concerns” was developed from comments about fixing problems when feeling down; one 18-year-old female participant said: “I guess because I realised that there was something wrong and I was like ‘I’ve got to work on fixing it’”. Another item: “Sometimes I can’t figure out how to make myself feel better” was also developed. A 19-year-old female participant said: “When I was feeling down and I’d type it in then I’d think like ‘I should go do something so I’m not feeling like this’”. Participants spoke about how the *mobiletype* program gave them ideas about what would help improve their mood, one 22-year-old female participant said: “[The program] helped me think about different things that I could do that I haven’t thought of.” This suggests that this participant had difficulty improving her mood and the item “I often have trouble deciding what will improve my mood” was developed. Participants spoke about little things they could do to improve their mood. An 18-year-old female participant said: “Admitting to myself that there is something wrong and then because I’ve filled the survey I’m like ‘oh wow, I am feeling a bit down, maybe I should talk to someone or change my thinking and habits’”. From this comment, the items: “I examined my feelings and decided what to do”, and “I often think about ways to make me feel better” were developed.

Mental health and coping outcome

Table 6.4 presents the descriptive summary statistics of the DASS, the ACS, the SRIS and the RRS for pretest, posttest and 6-week follow-up.

Table 6.4

Descriptive Summary Statistics

	Pretest (<i>n</i> = 22)	Posttest (<i>n</i> = 21)	6-Week (<i>n</i> = 20)
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)
DASS			
Depression	21.7 (12.53)	17.0 (10.29)	11.7 (5.96)
Anxiety	12.6 (8.36)	10.9 (7.86)	7.8 (4.89)
Stress	21.8 (10.16)	16.7 (8.18)	15.2 (5.60)
ACS			
Problem-solving	36.4 (10.20)	40.3 (9.47)	43.2 (7.24)
Reference Others	34.1 (15.56)	33.8 (12.74)	33.0 (12.18)
Nonproductive	37.3 (11.49)	31.2 (9.20)	26.4 (7.96)
SRIS			
Self-reflection	52.2 (9.40)	54.3 (10.52)	54.7 (10.88)
Insight	22.4 (7.76)	24.0 (7.67)	24.7 (6.51)
RRS			
Reflective	11.3 (3.36)	11.0 (2.12)	11.4 (2.95)
Brooding	13.4 (4.05)	11.7 (3.30)	11.7 (2.12)

Note. DASS = Depression, Anxiety, Stress Scale; ACS = Adolescent Coping Scale; SRIS = Self-Reflection and Insight Scale; RRS = Ruminative Response Scale.

Based on the population normative data for the DASS subscales (Lovibond & Lovibond, 1995), the mean of the participants' depression scores was in the 'severe' range at the pretest assessment, the 'moderate' range at posttest and the 'mild' range at the 6-week follow-up assessment. Anxiety and stress were in the 'moderate' range at the pretest assessment and decreased to the 'mild' range at posttest and 6-week follow-up assessments, suggesting that young people had a clinically meaningful decrease in depression, anxiety and stress during self-monitoring and at 6-week follow-up.

A series of paired-samples *t*-tests compared scores of the DASS subscales, the ACS subscales and the RRS brooding subscale over time for all participants. No *t*-tests were conducted for the SRIS subscales and the RRS reflective subscale as items from these subscales are included in the ESA scale as this would inflate Type I error by using multiple tests on the same data. Table 6.5 presents the results from these *t*-tests.

Table 6.5

Paired-Samples t-tests for Each Subscale Over Time

	T1 and T2		T1 and T3		T2 and T3	
	<i>t</i> (20)	<i>M diff</i> (SE)	<i>t</i> (19)	<i>M diff</i> (SE)	<i>t</i> (19)	<i>M diff</i> (SE)
DASS						
Depression	-2.41	-5.1 (2.1)*	-3.86	-10.7 (2.8)*	-2.45	-5.8 (2.4)*
Anxiety	-1.19	-2.1 (1.8)	-3.01	-5.1 (1.7)*	-1.60	-3.1 (1.9)
Stress	-2.46	-5.0 (2.1)*	-3.22	-6.9 (2.1)*	-1.07	-2.1 (2.0)
ACS						
PS	1.75	3.6 (2.1)	2.61	6.3 (2.4)*	-1.71	-3.0 (1.8)
RO	-0.52	-1.7 (3.2)	-0.74	-2.8 (3.7)	0.0	0 (3.4)
NP	-3.80	-6.9 (1.8)*	-5.18	-11.9 (2.3)*	2.08	4.5 (2.2)
RRS						
Brooding	-2.94	-1.8 (0.6)*	-2.91	-2 (0.7)*	-0.29	-0.2 (0.7)

Note. A negative *t* statistic indicates a decrease over time.

T1 = Time 1; T2 = Time 2; T3 = Time 3; DASS = Depression, Anxiety and Stress Scale; ACS = Adolescent Coping Scale; PS = Problem-Solving; RO = Reference to Others; NP = Nonproductive; RRS = Ruminative Response Scale.

* $p < 0.05$.

The results presented in Table 6.5 show that there was a significant decrease in depressive symptoms, stress symptoms, nonproductive coping and brooding from pretest (T1) to posttest (T2). There was also a significant decrease in these subscales from pretest (T1) to 6-week follow-up (T3), as well as a significant decrease in stress symptoms and a significant increase in problem-solving. The only significant difference between posttest (T2) and 6-week follow-up (T3) was a decrease in depressive symptoms.

Discussion

In this study, an initial ESA scale was developed using items from two existing measures. Young people's qualitative experiences were then compared with their quantitative responses. Additional items for the ESA scale were also created from young people's qualitative responses. Paired-samples *t*-tests demonstrated that there were clinical and statistically significant improvements in mental health outcomes over time. Self-monitoring may have contributed to this change.

The first aim of the study was a preliminary investigation of the ESA subscales developed from items from the RRS and SRIS. Based on consensus between two researchers, items from the RRS and SRIS were selected for the ESA categories, *recognition*, *identification* and *contextualisation*. Only one item was related to *communication* and no items related to *decision-making*.

Internal consistency was acceptable for the total ESA scale at pretest and 6-week follow-up, based on the generally acceptable level of $\alpha = 0.79$ (Schmitt, 1996) and questionable for posttest ($\alpha = 0.60$). For the subscales recognition, identification and contextualisation, internal consistency was low, however these scores must be interpreted with caution due to the small sample size.

Paired-samples *t*-tests showed that there was a significant increase in the *contextualisation* category during self-monitoring between pretest and posttest, but no significant changes in the other subcategories or for the total ESA score.

The second aim was to compare young people's qualitative experiences of ESA with the initial ESA measure as measured by items from the SRIS and RRS. Those with low ESA scores seemed to experience a qualitative difference in ESA compared with those with high ESA scores. Some participants with high ESA levels posttest reported that the program accurately reflected their experiences, that they sometimes found it difficult to identify their emotions, the program helped them confront their feelings and problems and not suppress them, they were able to express what was going on to others and develop strategies to improve their mood. In comparison, some participants with low posttest levels of ESA reported that they were often confused by their emotions, found identifying their emotions easy and progressively easier over the course of the program, they were able to get things off their chest, liked being able to tell people that

they didn't know what they were feeling and accepted what they were feeling. This analysis suggests that young people with low and high ESA scores may have qualitatively different experiences of ESA during self-monitoring.

The third aim was to use qualitative responses to develop further items for the ESA scale. Thematic analysis of the qualitative interviews with the young people suggests that there are five distinct themes of ESA. Although there were no items in the RRS and SRIS that focused on the *decision-making* theme, and only one item with a focus on *communication*, young people provided substantial qualitative material that was able to form items for these two subscales. Ten items were developed using young people's qualitative responses, five with a focus on *communication* and five with a focus on *decision-making*.

The fourth aim was a preliminary investigation of the effects of self-monitoring on depression, anxiety, stress, rumination and coping strategies. Results show that depressive symptoms significantly decreased during self-monitoring from pretest to posttest for the 22 participants and was still significant when comparing pretest with the 6-week follow-up scores, suggesting that young people who completed the self-monitoring program had a reduction of depressive symptoms over time. There was also a significant decrease between posttest and 6-week follow-up depressive symptoms, suggesting that a continued decrease in depressive symptoms occurred after completion of the *mobiletype* program. In addition, there was a significant decrease in anxiety from pretest to 6-week follow-up, as well as a significant decrease in stress symptoms from pretest to posttest that was also significant when comparing pretest scores with 6-week follow-up scores. Negative rumination as measured by the RRS brooding subscale also significantly decreased during self-monitoring when comparing pretest scores with both posttest and 6-week follow-up scores. These results tentatively suggest that self-monitoring may decrease mental health symptoms of young people with elevated depressive symptoms at pretest. Young people also had a significant decrease in nonproductive coping strategies during self-monitoring between pretest scores and both posttest and 6-week follow-up scores, and a significant increase in productive coping strategies from pretest to 6-week follow-up which may be related to self-monitoring and improvements in mood. In addition, qualitative responses suggest that many young

people were learning to respond to negative mood in more productive ways during the self-monitoring period.

Comparison with previous research

The significant decrease in mental health symptoms during and after self-monitoring is consistent with previous research that suggests self-monitoring is reactive and changes behaviour in a desirable way (Abueg et al., 1985; Ewart, 1978). Self-monitoring techniques are often used in conjunction with psychotherapy in the form of homework diaries between sessions and research suggests that self-monitoring increases the effects of therapy (Kazantzis, 2000). These results provide support for using short-duration self-monitoring programs as a tool to assist young people with mild or more mental health symptoms (Stice et al., 2009).

The results suggest that there may be two forms of emotion-focused attention; an adaptive form measured by the ESA scale and a maladaptive form measured by the ruminative brooding subscale. Rumination decreased over time, whereas the ESA scale did not. The significant increase in *contextualisation* from pretest to posttest suggests that rumination and *contextualisation* may be negatively correlated; however as this was not the purpose of this study and the sample size was small, this association was not directly tested.

Previous research (Rushton et al., 2002) suggests that universal prevention programs do not benefit young people with few symptoms of depression. This result was replicated in previous chapters in this thesis, where on average the participants' mental health symptomatology scores were in the *normal* or *mild* categories based upon population normative data (Lovibond & Lovibond, 1995) and did not decrease after self-monitoring. The current study further supports this finding, demonstrating that self-monitoring with young people experiencing elevated levels of depression may reduce their depressive symptoms.

Interestingly, young people with high posttest ESA scores increased from pretest to posttest and then had a slight decrease to 6-week follow-up whereas those with low posttest ESA scores had a slight increase in ESA from posttest to 6-week follow-up. This result is preliminary due to the small sample size and may be a result of a regression-to-the-mean effect. Nevertheless, this finding is consistent with previous

research demonstrating that there are differences in the way individuals attend to cognitions and emotions. For example, Greenberg (2004) suggested that some individuals may have dysfunctional emotional systems resulting in variations in emotion dysregulation. Corr (2011) also noted that differences occur in the sensitivity of the fight-flight-freeze system, the behavioural activation system and the behavioural inhibition system, particularly for individuals with a vulnerability to anxiety, depression and other mental health problems.

Limitations of the study

This study was a small-scale pilot study designed as a prelude to the randomised control trial reported in Chapter 7. Due to time, funding and the limited number of GPs available at the time of data collection, the sample size was small thus restricting the types of analyses that could be conducted. Due to the small sample size there was only preliminary testing of the ESA measure conducted; a recent statistical paper determined that a sample size of at least 50 participants is needed to test a new measure (Javail, Gudaganavar, & J, 2011). In addition, due to the large number of tests conducted on the items in this scale, Type I and II errors are likely to be high and the results may be due to chance, therefore individual tests such as the internal consistency of the ESA subscales must be interpreted with caution. Nevertheless, the overall pattern of the results consistently suggests that the items in the initial ESA measure relate to the ESA themes, providing preliminary support for this measure. A further limitation of this study was that the sample largely consisted of young women, reducing the generalisability of this study to young men. Further research is needed to test the validity and reliability of the ESA scale developed here and to test the relationship between the measure of ESA and constructs such as depression, rumination and self-monitoring.

Implications of findings

McNaughton and Corr (2008) proposed the Reinforcement Sensitivity Theory where the fight-flight-freeze system is responsible for processing punishing stimuli and the behavioural activation system is responsible for processing rewarding stimuli. Novel and conflicting information causes an error which activates the behavioural inhibition system (BIS). One of the outcomes of BIS activation is an increase of awareness and

attention resulting in a state of anxiety (Corr, 2011). Whilst increasing awareness and attention can result in negative consequences such as anxiety and depression, this process has evolutionary value and is generally adaptive and necessary for survival (Stegge & Terwogt, 2007). Chapter 3 theorised that activation of the BIS may lead to an increase in ESA and, by using self-monitoring techniques, this increased arousal and awareness can be manipulated and steered towards increasing adaptive forms of awareness, and due to the possible negative correlation between adaptive and maladaptive awareness, limit rumination and worry.

It is necessary to develop a quantifiable measure of ESA to measure the core characteristics encompassing adaptive awareness, in order to better understand the relationship between self-monitoring, ESA and depression. In this preliminary mixed methods analysis, the total ESA scale had better internal consistency than the subscales. This may be an effect of having more items in the total score than the subscales, however, it suggests that the total ESA scale may be the best way to measure ESA.

The self-monitoring program used in this study was also of importance. Young people are avid users of technology (Leech & Onwuegbuzie, 2007) and previous research suggests that young people engage and comply with monitoring techniques using mobile phones (Reid et al., 2009; Silk et al., 2003; Stone et al., 2007). Increasing young people's ESA may mediate the relationship between self-monitoring and depressive symptoms; however, it is unethical to help young people gain a better understanding of their emotions without providing them with assistance along the way. Hence, self-monitoring techniques that aim to increase ESA are best suited to primary care settings where young people have support from a GP. In addition, the program can be used as an early mental health detection tool for GPs, assisting in the detection and prevention of mental health problems.

Some young people with high ESA scores spoke about self-monitoring as a means of 'not suppressing thoughts', supporting Pennebaker's inhibition-confrontation approach (Pennebaker et al., 1990). Pennebaker proposed that communicating about emotional content is an efficient way of organising thoughts surrounding stress and negative mood via the process of translating emotional experiences into language. Pennebaker proposed that confronting emotive material is particularly effective when the topic has been avoided or suppressed over a long period of time. Pennebaker also

noted in qualitative analysis of participants' expressive writing that venting about emotions was not as beneficial as writing using 'insight terms', similar to ESA. This finding was supported by the current study as some young people with low ESA levels spoke about "getting things off my chest", whereas some young people in the high ESA group spoke about "not suppressing thoughts".

Summary

Despite the small sample size, this study developed a preliminary measure of ESA, demonstrated that young people who scored low on this measure had a qualitatively different experience of ESA compared with those who scored high on the ESA measure, and demonstrated that self-monitoring with young people experiencing elevated symptoms of depression may result in beneficial outcomes. Of course, given the small sample size, all results must be interpreted with caution and further confirmation of these findings is necessary. Chapter 7 is the last study in this thesis and investigates the hypothesis that self-monitoring increases ESA, which, in turn, decreases depressive symptoms.

CHAPTER 7

A Randomised Controlled Trial Investigating the Use of a Mobile Phone Self-Monitoring Tool to Increase Young People's Emotional Self-Awareness and Reduce Depressive Symptoms

A number of studies have been carried out investigating the *mobiletype* program including: a pilot study (Reid et al., 2009); a school-based study with 106 students; a pilot study in a clinical setting (Kauer, Reid, Sanci, & Patton, 2009); a feasibility study in an adolescent outpatient clinic (Reid et al., in press); and a small-scale pilot study in a rural general practice setting. Feedback from the small-scale study run in rural general practice, described in Chapter 6, suggests that the program may be beneficial for young people with elevated depressive symptoms. Furthermore, more than 80% of participants reported that their doctor understood them better as a result of using the *mobiletype* program (Reid et al., in press). In addition, a key outcome observed in each of the *mobiletype* studies was that young people reported that completing the program increased their ESA and believed that this increase in ESA was beneficial and led to better understanding and management of their emotional state. The aim of the current study was to examine the effects of self-monitoring on ESA and determine if an increase in ESA results in a reduction of depressive symptoms. To this end, a randomised controlled trial (RCT) was conducted.

Psychological science, and indeed scientific methodology in general, has long considered RCTs the gold standard of research aimed at making causal inferences. Self-monitoring has the potential to become a useful tool in the management of adolescent mental health in primary care settings in the following ways: by increasing young people's awareness of their emotions and other mental health problems; by engaging young people into treatment; and by providing doctors with the resources to manage these problems. Young people are expert users of mobile phone technology and therefore using mobile phone devices may also assist to engage young people in early intervention programs.

The *mobiletype* program captures data on mental health in a nonintrusive youth-friendly manner and provides GPs with individualised feedback reports from their patients' monitoring data. The program's website also provides GPs with resources and support to manage mental health problems. Using self-monitoring techniques with young people at-risk of depression has the potential to increase the rates of detection of mental health problems in the coal-face settings where at-risk young people first present and improve the mental health management for young people with subclinical depressive symptoms.

Increasing young people's ESA may potentially help young people better understand their emotions and therefore better manage their mental health. Whilst previous research has suggested that emotion-focused attention can have beneficial outcomes, with various and differing concepts and categories of emotion-focused attention, this is the first time that the unified and theory-driven model of ESA with the five themes of *recognition, identification, contextualisation, communication* and *decision-making* has been empirically tested. Several approaches have been used to explore the concept of ESA during the course of this thesis, including a systematic literature review, a qualitative analysis of unsolicited feedback from young people, an in-depth qualitative analysis with young people completing the mobile phone self-monitoring program, and a mixed methods study aimed at developing an ESA measure. These studies suggested that young people experience ESA during the program and the mixed methods analysis, in Chapter 6, showed that young people scoring high on the ESA measure have a qualitatively different experience of ESA during self-monitoring from those who scored low on the ESA measure.

This earlier work from the previous chapters suggests that young people may experience an increase across the five ESA themes of *recognition, identification, communication, contextualisation* and *decision-making*. The primary goal of the current RCT was to test the hypothesis that self-monitoring increases ESA which, in turn, decreases depressive symptoms. The theory-driven Emotional Self-Awareness Scale (ESAS) developed in Chapter 6 using items from previous measures of self-reflection, insight and reflective pondering (Grant et al., 2002; Mayer & Stevens, 1994; Treynor et al., 2003) as well as items adapted from qualitative responses from young people in Chapter 6 was used and tested via latent growth curve modelling.

Mediation

Mediation analyses in psychology most commonly consist of Baron and Kenny's (1986) multiple regression mediation model as depicted in Figure 7.1, where group is the independent variable, ESA is the mediating variable, and depression is the outcome.

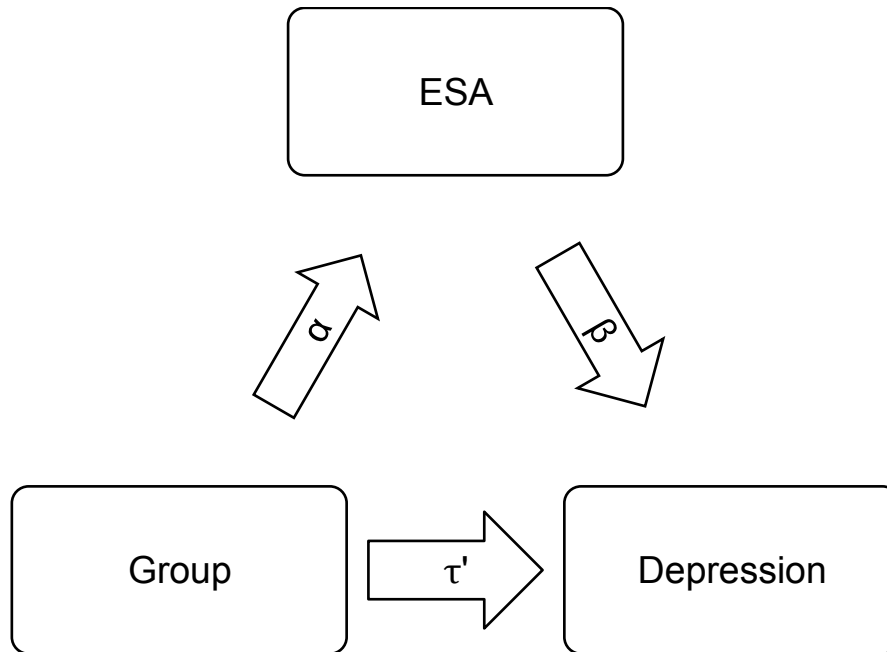


Figure 7.1. Simple mediation diagram. Adapted from “The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations,” by R. M. Baron and D. A. Kenny, 1986, *Journal of Personality and Social Psychology*, 51, p. 1176.

In Figure 7.1, the indirect effect is calculated by combining the pathways labelled α and β , while τ' is the direct effect of group on depressive symptoms. The total effect is calculated as $\alpha\beta + \tau'$. In Baron and Kenny's (1986) original description of this mediation analysis, the first step to testing mediation was to test for a direct effect. If significant, then the indirect test could then be examined. Recently, 'modern' methods of mediation testing have been devised (MacKinnon, Fairchild, & Fritz, 2007) using structural equation modelling (SEM) that include resampling techniques such as percentile or bias-corrected bootstrapping in order to obtain confidence intervals for the indirect pathway (Taylor, MacKinnon, & Tein, 2008). Bootstrapping has the benefits of providing more accurate results with less assumptions (such as normal distribution)

about the data (MacKinnon et al., 2007). This modern approach also proposes that requiring a significant direct pathway lowers power and requires a larger sample size and therefore a direct pathway is not a necessary component when testing for mediation (Fritz & MacKinnon, 2007; Hayes, 2009). Newer techniques, such as latent growth curve models (LGCM), have benefits over multiple regression models as LGCM can accommodate the use of longitudinal data where both the outcome and the mediator change over time, while allowing for examination of interpersonal and intrapersonal changes. Selig and Preacher (2009) recommended LGCM for examining the relationship between variables between and within groups. The model used to test the current hypothesis that self-monitoring would increase ESA, which, in turn, would decrease depressive symptoms, was based upon Cheong's (2003) parallel process LGCM. The major advantage of parallel process LGCM over Baron and Kenny's multiple regression method is that change over time can be measured for both the mediator and the outcome variables and the interrelations between mediator and outcome can be analysed. Furthermore, a significant direct effect is not a requirement for examining indirect effects, thereby allowing examination of variables that have no direct effect such as is often the case in prevention and early intervention programs, which generally aim to increase protective factors known to protect young people from developing depression.

Aims

The current analysis is secondary to the overall aim of the RCT which was to investigate the utility of the *mobiletype* program as a first-step intervention program. The overall hypothesis was that young people who completed the *mobiletype* intervention program would have lower depressive symptoms than those who completed the attention-comparison program. This primary aim was examined in Reid et al. (2011) using a mixed method model, and found that depressive symptoms significantly decreased over time for both the intervention and the attention-comparison groups and no significant difference was found in mental health symptoms between groups. The lack of difference between groups in mental health symptoms was attributed to the unanticipated effect of the training, resources and support given to young people and GPs over the course of the study for both the intervention and the comparison group

using mixed methods analysis. Interestingly, the intervention group was found to have a significant increase in ESA compared with the comparison group. As both groups were found to have significantly decreased mental health symptoms posttest, there was reduced power to detect a difference in mental health symptoms between groups.

The primary aim of this current analysis was to further examine the effects of a mobile phone self-monitoring program on ESA with young people suffering from mild or more depressive symptoms as a first-step treatment of depression; specifically, the effects of self-monitoring on ESA and the association between ESA and depressive symptoms (see Appendix H for the published paper on these analyses; Kauer et al., in press). The hypothesis for this current analysis was that self-monitoring mood, stress and coping strategies would increase ESA which would then lead to a decrease in symptoms of depression. More specifically, the following hypotheses were tested:

- Young people in the intervention group would have an increase in ESA over time compared with the attention-comparison group, and
- The increase in ESA would predict a decrease in depressive symptoms.

A parallel process LGCM (Cheong, MacKinnon, & Khoo, 2003; von Soest & Hagtvet, 2011) was estimated to investigate whether there was an indirect relationship between the group (i.e., the intervention or comparison group) and depressive symptoms via ESA. A secondary aim compared the effects of the *mobiletype* intervention and comparison programs on rumination with the hypothesis that the intervention group would have decreased rumination when compared with the comparison group.

Methods

Trial design

The data presented here were from the *mobiletype* RCT conducted from 2009 to 2011. This was a multicentre, multiregional, stratified (according to region), single blind, attention-comparison study with balanced (1:1) individual randomisation into parallel-groups. This study was conducted in Victoria, Australia adhering to the reporting recommendations from the CONSORT statement (Schulz, Altman, & Moher, 2010).

Sample

General practitioners.

All GPs in the Goulburn Valley Region and the Albury/Wodonga Regions were invited to participate in the study via the Regional Division of General Practice (these divisions are responsible for supporting and servicing the clinical practices within that region). GPs in Melbourne were recruited via the local Divisions of General Practice. Clinics listed on the Melbourne General Practice Network (www.mgpn.com.au) as having an interest in adolescent health were targeted. Participating GPs were trained to use the *mobiletype* website and were provided with a study manual, which included the study procedure, and a variety of clinical materials to use with young people, including: referral details of adolescent-friendly allied health professionals and services; youth-friendly internet, email and phone support; and youth-focused psychoeducation handouts and worksheets on a range of mental health problems. This information was also available on the *mobiletype* website for GPs and young people. Continuing professional development quality assurance points were available to GPs for their participation in the study.

Participants.

A sample size of 200 young people aged 14 to 24 years was anticipated, recruited from several general practices (with participants evenly distributed across practices). This sample size was based upon Cohen's (1992) statistical testing for multiple regression with two independent variables (to account for the group and the mediating variable, ESA).

In primary care settings in Australia, young people aged between 14 to 18 years can attend treatment services without informing their parents and fully consent to treatment without parental approval if they are considered to be a mature minor by their GP. The doctors invited to participate in this study all had extensive experience in adolescent health and therefore they were able to ascertain that all participants under the age of 18 were mature minors and capable of consent. This was an important ethical consideration for this study as securing parental consent may breach confidentiality between young people and their GP, and may also have prevented many young people from participating and compromised the generalisability of the study. Therefore,

following the protocols of previous *mobiletype* research, as well as research conducted by Dr. Dagmar Haller-Hester of the Centre for Adolescent Health and approved by the Royal Children's Hospital Human Research Ethics Committee (Haller-Hester, 2006), parental consent was not sought from those aged between 14 and 18 years who were deemed to be mature minors by their treating doctor and fully capable of understanding and giving consent. The one exception to this protocol was when a parent was present at the clinic with their son or daughter.

Inclusion criteria.

The study aimed to best approximate 'real world' primary care settings and therefore a broad inclusion criteria were set. These criteria were that patients have to: (a) be aged 14 to 24 years (inclusive), (b) have proficient English comprehension, and (c) have an emotional or mental health issue according to their GP's judgment or screened to have at least a mild mental health problem as indicated by a score of 16 or above on the K10 Symptom Scale (Andrews & Slade, 2001).

Young people considered by their GP to have severe emotional or mental health issues were still eligible to participate even if the GP referred them to specialist care, as young people were unlikely to obtain a specialist appointment for at least 2 weeks (see exclusion criteria for the exceptions). In these cases where eligible young people were waiting more than 2 weeks for a specialist appointment (which was often the case given delays with specialist waitlist), completing the *mobiletype* program was considered to be part of the GP's assessment of the young person's mental health, adding further information for the specialist referral.

Exclusion criteria.

Young people were excluded from participation if they met the following criteria:

- 1) They had a severe psychiatric or medical condition that prevented them from complying with either the requirements of informed consent or the study protocol.
- 2) They were referred to a mental health specialist by their GP and obtained a specialist appointment during the *mobiletype* study period (2 to 4 weeks).

Sample size.

The recruitment of 200 participants was anticipated. This sample size was based upon Cohen's (1992) statistical testing for multiple regression with two independent variables (to account for the mediating variable and the group) to detect a medium effect with 80% power and a probability of a Type I error of .05. A large effect size (approximately 0.75) was anticipated as results from the application of the *mobiletype* program indicated that 34 out of 37 participants reported an increase in ESA after completing the *mobiletype* study. Furthermore, a significant effect of mental health outcomes in Chapter 6 with only 22 participants indicates a large effect of self-monitoring on depressive symptoms. The sample size was conservatively estimated using a medium effect size of 0.5 with 80% power and a probability of a Type I error of .05. Using Cohen's power tables, a sample size of 67 participants in each group was required. Previous studies using the *mobiletype* program in clinical settings have indicated that an effect size of .75 is probable; therefore, power to detect an effect size of 0.5 should be sufficient to capture a significant effect. A medium effect size was selected as this was likely to be clinically significant. Using Fritz and MacKinnon's (2007) statistical tests, a sample size of 71 participants inclusive should be sufficient to detect a medium indirect effect with 80% power with bias-corrected bootstrapping (see below). The anticipated sample size of 200 was not met due to some delays in recruitment that occurred during school holidays and due to the H1N1 influenza pandemic, which occurred during recruitment (Denholm et al., 2010). As a result, a deadline was set for stopping recruitment, and a total of 118 participants were recruited by this deadline.

The *mobiletype* program

This study used Version 2.2 of the *mobiletype* program (see Appendix B) created using the Java Platform, Micro Edition in-house by the Murdoch Childrens Research Institute and had only minor differences from Version 2.0 and Version 2.1, described in detail in Chapters 5 and 6. Sony Ericsson Z750i mobile phones were used with Version 2.2 of the *mobiletype* program. The minor changes to this version include two added options to the companion question including: "housemates", and "with young child", reflecting the variety of the participants. The responses to alcohol and cannabis

questions: “How many did you have?” was converted into a scale ranging from “1” to “10 or more”. This change was made so that the standard drinks could be calculated for the summary reports. This version contained two branches: the intervention program and the comparison program. The intervention program contains all modules listed in Table 7.1 and the comparison program consisted of an abbreviated version consisting only of the Activities, Sleep, Diet and Exercise modules. Different modules of questions were asked in the Intervention and Comparison groups as illustrated in Table 7.1. In addition, not all modules were asked at all time periods, Table 7.1 indicates which modules were included in each entry. Chapters 4, 5, and 6, and Appendix B, provide further details about the program.

Table 7.1

The mobiletype Modules and the Time-Blocks When Each Module was Assessed

Modules	Morning 8 – 10.59am	Noon 11am to 3.29pm	Afternoon 3.30 – 7.59pm	Evening 8 – 10pm
<i>Intervention Program</i>				
Current Activity	✓	✓	✓	✓
Stress	✓	✓	✓	✓
Mood	✓	✓	✓	✓
Alcohol Use		✓		
Cannabis Use		✓		
Sleep	✓			
Diet				✓
Exercise				✓
<i>Comparison Program</i>				
Current Activity	✓	✓	✓	✓
Sleep	✓			
Diet				✓
Exercise				✓

The attention-comparison group was designed to provide a data collection process similar to the intervention group by controlling for the amount of time spent engaged in the research study and the attention given to them by health care professionals and research staff (Lindquist, Wyman, Talley, Findorff, & Gross, 2007). The comparison

group monitored themselves using an abbreviated version of the *mobiletype* program which assessed only current activities, location, companions, quality and quantity of sleep, quantity and type of exercise, and diet (meals, snacks, “junk-food,” and “soft-drinks” consumed). Importantly, the modules pertaining to ESA and mental health as per Table 7.1 (i.e., mood, stress, alcohol and cannabis use) were removed.

The mobiletype website.

The *mobiletype* website was described in detail in Chapter 5. The only change from the detailed description in Chapter 5 was that GPs only had access to their own patients, who were identified by name due to some confusion in the previous study where identification numbers were used. This procedure ensured that data from participants was secure. All access to the database was tracked to ensure appropriate use and no breaches were discovered.

Data collected by the *mobiletype* program (for both the intervention and comparison group) on the mobile phone was sent via SMS to a secure website constructed and hosted by MCRI, where it was automatically collated and each area of assessment was displayed using graphs (i.e., daily mood graphs) or tables (i.e., daily alcohol intake). Dr. Sophie Reid, a registered psychologist and the lead investigator of the *mobiletype* studies, wrote individualised summary reports of the data for each participant. Appendix D provides an example of the summary report. On a few occasions when Dr. Reid was unavailable, Sylvia Kauer wrote the reports following structured prescriptive guidelines created by Dr. Sophie Reid. The *mobiletype* website also included the same extensive range of clinical supports (i.e., referral options, psycho-education handouts) as was provided to GPs in their study manuals.

Measures

Participant questionnaires.

Young people individually completed four online assessments before, immediately after, 6-weeks after and 6-months after completing the self-monitoring program. To ensure participants understood the content of the questions, and to accommodate young people without access to computers and the internet, a time was made with a research assistant so that participants were able to complete the survey

online at the clinic. If the young person was unable to do this, they were able to complete the survey over the phone with a research assistant. All assessments took approximately 20 to 30 minutes (except the pretest survey which took slightly longer, around 30 to 45 minutes) and collected information including the 21-item Depression, Anxiety and Stress Scale (Lovibond & Lovibond, 1995, described in Chapter 3) and the Adolescent Coping Scale General Short Form (Frydenberg & Lewis, 1991; 1993, described in Chapter 3).

ESA is a relatively new concept with considerable theoretical reference, as described in the previous chapters, but little empirical research. Therefore, to capture the five areas of *recognition, identification, communication, contextualisation* and *decision-making*, 32 items pertaining to these areas were adapted from the 20-item Self Reflection and Insight Scale (SRIS; Grant et al., 2002, described in Chapter 6), the 10-item Ruminative Response Scale (RRS; Treynor et al., 2003, described in Chapter 6), the 39-item Meta-Experience Scale (MES; Mayer & Stevens, 1994) and 10 items that were developed from young people's qualitative responses in Chapter 6 (see Appendix K). The MES consists of two scales, the Meta-Evaluation Subscale with six items each for clarity, acceptability, typicality and influence, and the Meta-Regulation Subscale with five items each for repair, maintenance and dampening. This scale was developed using factor analysis and has been validated with a group of undergraduate students.

Thirty-two items from the SRIS, the RRS, the MES and adapted from young people's qualitative responses in Chapter 6 were then combined to create a total ESA scale with reasonable internal consistency (Cronbach's alpha = .72, .69, and .76 for pretest, posttest and 6-week follow-up respectively). The total ESA score ranged from 0 to 128 with higher scores indicating more ESA. The development of the ESAS has been driven by theory, and based on the qualitative and mixed methods studies conducted in previous chapters.

Other measures used in this study, but not examined in the analyses presented here, are described in Appendix K and included: the Short-Form 12 Health Survey (Ware, Kosinski, & Keller, 1996), Questions 10 and 11 from the General Practice Assessment Questionnaire (Mead, Bower, & Roland, 2008), The Session Rating Scale (Duncan et al., 2003), and selected questions from The Party Project's Exit Interview (Sanci, 2009).

In addition to these items, the pretest assessment also included demography questions such as age, gender, date of birth, nationality, language spoken at home, experience with mobile phones, questions adapted from the Alcohol Use Disorder Identification Test (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), and substance use questions adapted from the Victorian Adolescent Health Cohort Study (Patton et al., 1995).

The posttest survey also included selected questions from The Party Project's 3-month Follow-Up Interview, Part B: Health Service Use (Sanci, 2009) and a feedback questionnaire regarding the validity of the self-monitoring questions in capturing the experiences and behaviours of young people. This form included questions about: the extent to which participants' answers were truthful; their experience of answering the program, including timing, interference, and confidentiality; the extent to which they felt the questions adequately captured their mood, stress, and responses during the day; and whether questions were answered in a particular manner so as to avoid branching and reduce the length of the assessment.

The 6-week and 6-month follow-up survey included selected questions from The Party Project's 3-month Follow-Up Interview, Part B: Health Service Use (Sanci, 2009). The 6-month follow-up survey is not reported in this thesis due to time-constraints.

General practitioners' questionnaires.

GPs also provided information about each participant both before the *mobiletype* study and after they completed the feedback session with the young person. These questionnaires are described in Appendix K and were not analysed in this thesis. Briefly, the GP questionnaires consisted of current diagnosis, the GP questionnaire (Haller-Hester, 2006), confidence in dealing with the patient adapted from the SHO Appraisal Form (Federation of Royal College of Physicians, 2003), and a posttest survey containing questions about their satisfaction with the *mobiletype* program.

Procedure

Doctor recruitment.

General practice clinics in Melbourne, Shepparton and Albury/Wodonga were invited to participate in this study. Those agreeing to participate received: a *mobiletype*

manual that contained a description of the project; useful handouts and referrals to give to young people; and step-by-step instructions about the study procedure and how to interpret the data collected. All GPs were advised to ensure that their insurance policies covered participation in research studies, as their participation in this study was not covered by Royal Children's Hospital insurance. All doctors who were willing to participate in the study undertook a training session and were supported by the *mobiletype* research team. A research assistant provided doctors, nurses and reception staff with the materials needed and was available via phone to assist doctors and nurses in setting up and trouble-shooting. During the training session with the doctor, the researchers asked about the following aspects of the GP's practice as a requirement from the Royal Children's Hospital Human Research Ethics Committee to assess the GP's capacity and experience regarding assessment of mature minors and they were given criteria for assessing the mature minor clause as listed in Figure 7.2.

Mature Minor Assessment

- The young person must have the capacity to understand the risks that are associated with the medical treatment provided by the doctor.
- The young person must be able to make reasoned decisions about their health care.
- The young person must be sufficiently mature to understand, discern and appreciate the benefits and risks of their medical treatment.
- When the study was introduced to the young person, he or she must show sufficient understanding and cognitive capacity to enable him or her to understand fully what is proposed in this study.

Assessment of GPs Capacity and Experience of the Mature Minor Clause

- Has the GP treated young people between 14 to 17 years under the mature minor clause before, without the young person's parents present?
- How was the young person assessed by the GP to be 'maturely minded' and able to make reasoned decisions?
- How has the GP assessed, in the past, whether the young person understood the risks and benefits of treatment?

Figure 7.2. Assessment of the mature minor clause.

Doctors were also encouraged to ask young people to repeat the study protocol in their own words, ask any questions they have, think about problems that may occur and how they could be resolved. Only GPs who showed an understanding of the mature minor rule and had previous experience in treating young people under this rule were recruited into this study.

Recruitment.

In addition to treatment as usual, GPs screened their patients for eligibility into the study, organised an appointment for willing participants with a research assistant using an online booking form, a faxed referral form or by phone, and completed a pretest questionnaire. Participants met with a *mobiletype* research assistant within 5 days of

referral to learn the study process, completed consent forms and the pretest questionnaire package, reviewed the *mobiletype* program and other features of the phone, and complete a practice entry of the *mobiletype* program. Participants were provided with a study manual that described the research procedure and offered troubleshooting tips.

Participant consent procedure.

Young people who met the inclusion criteria were introduced to the study by their GP. Young people interested in participating then met with the research assistant attending the clinic, at which point the full study procedure and requirements were explained. Those still wishing to participate were recruited and completed the pretest questionnaires. Written, informed consent was obtained from all participants. For minors accompanied to their medical appointment by a parent, parental consent was also obtained.

Randomisation.

Participants were randomised to either: (a) the *mobiletype* monitoring intervention program group, or (b) the attention-comparison program group. Randomisation occurred at the individual-level, stratified according to area (Melbourne, Goulburn Valley, and Albury/Wodonga), was conducted electronically, and set up by a computer programmer using randomly seeded algorithm. Study mobile phones were allocated identification numbers within areas (i.e., Melbourne01, Melbourne02) and either the intervention or comparison *mobiletype* program was loaded consecutively in a blinded fashion according to the programmer's concealed randomisation list. This programmer was not involved in any data collection or analysis. The randomisation list was constructed for 100 Melbourne, 50 Goulburn Valley and 50 Albury/Wodonga participants. A research assistant downloaded each program onto the mobile phones by selecting the next consecutive link for the next study mobile phone and was blinded to the allocation as only they knew the identification number and area to load onto study mobile phones (i.e., Melbourne01, Melbourne02). Research assistants, participants, and GPs were blind to randomisation at pretest. GPs and participants became aware of the group allocation at the posttest review when the summary reports were reviewed. This study had Royal

Children's Hospital Human Research Ethics Committee approval (HREC: 28113) and was registered at ClinicalTrials.gov (Reference: NCT00179422).

Reimbursement.

Participants were given a SIM card containing \$30 in credit as partial reimbursement for their time and phone calls made to research personnel during the study. This credit was so that participants felt able to call the researchers if any problems with the phone or program arose at no cost to themselves. Participants were also reimbursed for completion of surveys; a \$20 gift card for each follow-up survey (maximum of three gift cards for all assessments completed). These gift cards were received after completion of the full study procedure and participants were not aware of this reimbursement prior to completion of the surveys. The GPs who participated in this study did not receive any payment for participation.

Pretest assessment.

Each participant completed a battery of questionnaires including demographics, the DASS, the ACS, the ESAS and the RRS brooding subscale. Each participant was given a study manual describing the research procedure with trouble-shooting tips and contact numbers for research staff.

Self-monitoring period.

All participants were lent a Sony Ericsson 7501i mobile phone containing the *mobiletype* program for the duration of the study. Information regarding the development and testing of the *mobiletype* program has been previously published (Reid et al., 2009). Participants were requested to complete at least two *mobiletype* entries a day until they returned for their medical review in 2 to 4 weeks. Participants and GPs were advised that 2 to 4 weeks was the ideal monitoring period. The participants were called at a prearranged time on the first and eighth day of monitoring to discuss the study procedure and answer any participant questions.

Participants could also get a letter signed by their doctor explaining why the participant was using the phone at school or in work situations if required. This letter stated that the participant was involved in a mobile phone monitoring program at their

local GP clinic and needed the use of the mobile phone to complete the monitoring program. The name and contact details of the lead investigator were also provided. This method has been successfully used in previous research with adolescents (Whalen et al., 2001) and no calls were received during the study period.

Follow-up review with clinician and researchers.

At the next clinical appointment, participants met with their doctors and discussed the mobile phone monitoring period and reviewed the data on the *mobiletype* website. Following this appointment, participants completed a posttest survey with the option of completing this assessment either online (at the clinic or at home), or over the phone with a research assistant. The method of completing the interview was arranged during the recruitment process, with a reminder telephone call to ensure that the arrangement organised was suitable for the young person. This assessment specifically referred to the monitoring period. Young people were informed that the study would be responsible for losses or damages to mobile phones. GPs also completed a posttest questionnaire immediately after the appointment.

Six-week and 6-month follow-ups.

Participants completed a follow-up survey 6 weeks and 6 months after completion of the study. Participants were contacted before the appointment, and again given the choice to complete the survey either over the phone or online at home.

Data analyses

Data analyses were conducted using STATA (StataCorp, 2005), Mplus (Muthen & Muthen, 2010) and R (Hornik, 2011). Three waves of data were used in the current analyses: pretest (Week 0), posttest (Week 2 to 4) and 6-week follow-up (Week 8 to 10). Parallel process LGCM (Cheong et al., 2003; Muthen & Muthen, 2010) was estimated using the software program Mplus Version 6.11 (Muthen & Muthen, 2010). Two latent variables, the *intercept* and the *slope*, were estimated from the repeated measures for each variable that changes over time. The intercept for both ESA and depression had factor loadings set to 1 to represent the starting point of the trajectory at pretest and the factor loadings of the slope were fixed to 0, 3, and 9, respectively to

represent the time in weeks between tests. The slope calculated was linear change over time. Following recommendations (Jackson, Gillaspay, & Purc-Stephenson, 2009; Schermelleh-Engel, Moosbrugger, & Muller, 2003), a combination of at least three of the following cut-off values were used to determine the goodness-of-fit of the model: Comparative Fit Index (CFI) < .95, Tucker-Lewis Index (TLI) < .95, Root Mean Square Error of Approximation (RMSEA) < .06, and Standardised Root Square Mean Residual (SRMR) < .08. Another statistic considered was χ^2 divided by degrees of freedom (*df*), with values less than two indicating a good fit and values up to three acceptable (Schermelleh-Engel et al., 2003). A significant intercept indicated individual differences in pretest measures of the DASS and ESAS, whereas a significant slope indicated change in the measures over time. The total ESAS was used as the mediator and the DASS subscales were used as the outcomes. Observed items were used to calculate the latent intercept and slope for each variable. Maximum likelihood estimation was used, with missing data accounted for by the estimator in Mplus.

Several LGCMs were estimated: (a) the five subscales of the ESAS, (b) the total ESAS score, (c) the depression subscale of the DASS, (d) the anxiety subscale of the DASS, (e) the stress subscale of the DASS, and (f) the parallel process LGCM with each DASS subscale as the outcomes and total ESAS as the mediator. Fit indices are reported for each LCGM. An indirect pathway was determined by calculating the pathway between group and the slope of ESA (α), as well as the pathway between the slope of ESA and the slope of depression (β), using the *indirect* command in Mplus. Variance was constrained to be equal over time for the outcome and the mediator with covariance between the outcome and mediator allowed to vary. The following regressions were calculated: the slope and intercept of depression on group, the slope and intercept of ESA on group, the slope of ESA on the intercept of ESA, and the slope of depression on the intercept of depression. Bias-corrected bootstrapping was used with resampling at 5000 (recommended by Fritz & MacKinnon, 2007) with bias-corrected confidence intervals reported. Indirect effect sizes were calculated using the statistical program R (Preacher & Kelley, 2011).

Results

Recruitment

Data collection took place between the 16th April 2009 and 28th January 2011. Of the 103 GPs who agreed to participate, 35 actively recruited young people for the study. These contributing GPs were from 26 different practices in the three recruitment areas: 12 in greater Melbourne, seven in Albury and Wodonga, and seven in the Goulburn Valley. Rural areas were overrepresented in this study as 75% of Australian general practices are located in capital cities and suburbs (Australian Bureau of Statistics, 2011, July). Only 0.1% of Victorians live in remote areas and therefore were not targeted in this study (Australian Bureau of Statistics, 2004, February). As seen in Figure 7.3, 137 young people accepted the invitation to join the study, of whom 118 began the recruitment process. Four participants were excluded post randomisation (three became too unwell to participate, and one gave invalid responses to all pretest measures), resulting in a final sample of 114 young people, which was sufficient to detect the primary aim of a medium-sized indirect effect (Fritz & MacKinnon, 2007). Due to a failure to recruit the expected sample of 200 participants, there is a difference in the number of participants in the comparison and intervention groups. Nevertheless, a test of the binomial distribution indicated that this difference was not significant with 69 out of 118 participants randomly allocated to the intervention group ($p = .080$). The total number of participants assessed for eligibility was difficult to establish as the GPs rarely recorded information about patients who met the inclusion criteria but were either not approached to participate or who declined when invited to participate. Therefore, the number of patients assessed for eligibility presented in Figure 7.3 is likely to be underrepresented.

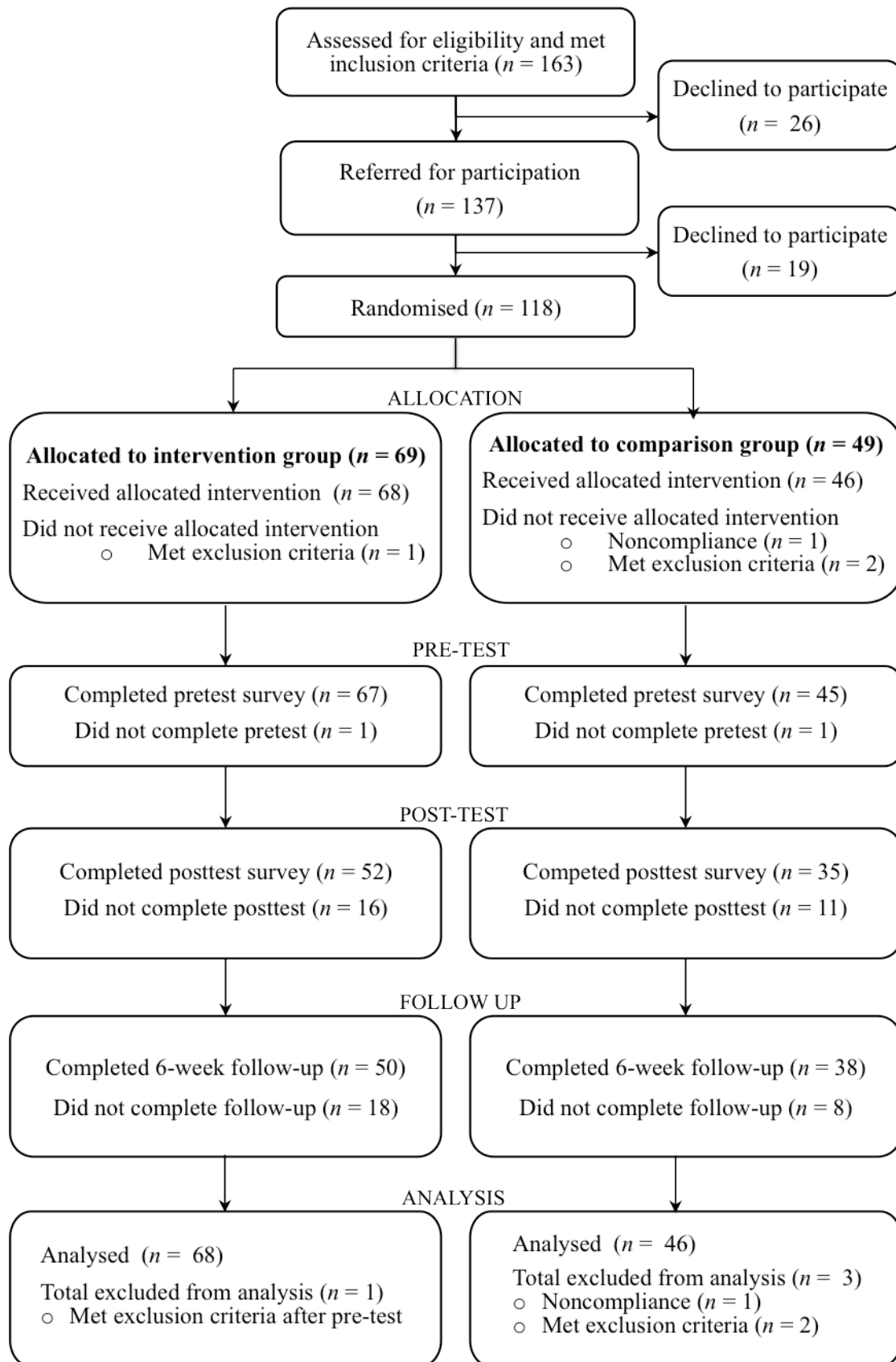


Figure 7.3. Flow diagram of the study process.

In total, 66.7% of participants (76 out of 114) completed all questionnaires and 85.1% of participants (97 out of 114) completed questionnaires at two or more time-points. Two out of 114 participants (1.8%) did not complete the pretest questionnaire, but went on to complete the *mobiletype* entries and posttests. Twenty-seven participants (23.7%) could not be contacted for the posttest questionnaire but went on to complete the 6-week follow-up questionnaire. Several independent-samples *t*-tests and chi-square tests were conducted with no significant differences in demographic characteristics found between participants who completed all questionnaires and those who missed questionnaires. Therefore, all 114 participants were included in the analyses using the missing routines in Mplus.

Demographics

Participants ranged from 14 to 24 years of age. Participants in the comparison group had a mean age of 17.4 years ($SD = 3.2$) and participants in the intervention had a mean age of 18.5 ($SD = 3.2$) with no difference in mean age between groups; $t(116) = -1.76, p = .081$. There were no statistically significant differences in demographic characteristics between the intervention and comparison groups on any pretest measures as listed in Table 7.2.

Participants in the intervention group completed an average of 3.3 ($SD 1.42$, range 1–8) *mobiletype* entries each day and completed the program from 1 to 34 days with a mean of 17.7 ($SD 6.69$) days completed. In the comparison group, participants completed an average of 4 ($SD 1.77$, range 1–12) *mobiletype* entries per day, and completed the program for 8 to 25 days with a mean of 16.8 ($SD 4.03$) days completed. The minimum dose of the program was completion of at least two *mobiletype* entries a day for at least 14 days. As Table 2 shows, 64 (56%) participants in intervention group and 36 (52.9%) in comparison received a minimum dose.

Table 7.2

General Demographics of Participants in the Comparison and Intervention Groups

	Comparison Group <i>n</i> (%)	Intervention Group <i>n</i> (%)	<i>p</i>
Total Number ^a	49 (41.5%)	69 (58.5%)	.080
14 days completed ^b	28 (59.6%)	36 (52.9%)	.330
Area			
Melbourne	15 (32.6%)	45 (38.8%)	.296
Goulburn Valley	20 (43.5%)	41 (35.3%)	
Albury/Wodonga	11 (23.9%)	30 (25.9%)	
Male Participants	17 (37.0%)	15 (22.1%)	.082
Ethnic Identification ^c	4 (9.1%)	10 (22.7%)	.365
Employment			
Employed	7 (15.2%)	18 (26.5%)	.212
Unemployed	4 (8.7%)	9 (13.2%)	
Student	35 (76.1%)	41 (60.3%)	
Drug related items ^c			
Ever had alcohol	38 (86.4%)	59 (88.1%)	.792
Ever been drunk	31 (70.5%)	53 (79.1%)	.299
Ever had a cigarette	25 (56.8%)	38 (56.7%)	.992
Ever tried marijuana	18 (40.9%)	33 (49.3%)	.388
Ever tried other ^d drugs	10 (22.7%)	26 (38.8%)	.077

Note. ^a Binomial test; ^b Completed *mobiletype* entries at least twice daily for 14 days; ^c N=111; ^d sedatives, tranquilisers, amphetamines, analgesics, inhalants, cocaine, LSD and heroin.

There was no significant difference between groups for pretest depression or anxiety symptoms on the DASS subscales. The mean depression subscale for the comparison group was 19.4 ($SD = 10.8$) and for the intervention group was 20.4 ($SD = 11.0$); $t(109) = -0.488, p = .626$. The mean anxiety scores for the comparison group was 11.0 ($SD = 8.0$) and for the intervention group was 14.1 ($SD = 9.7$); $t(108) = -1.709, p = .090$. The intervention group reported significantly higher stress ($M = 20.3, SD = 8.9$) than the comparison group ($M = 16.9, SD = 7.9$), with a mean difference of 3.4; $t(109) = 2.06, p = .042$. Only participants with mild or more severe mental health problems as assessed by the GPs or by the K10 were included in this study. Analyses of the DASS

depression scale confirmed GPs' initial assessment that participants had mild or more mental health problems, with 21 participants (45.7%) in the comparison group and 35 participants (51.5%) in the intervention group scoring in the mild, moderate or severe range on the pretest DASS depression subscale. Similarly, 13 participants from the comparison group (28.3%) and 20 from the intervention group (29.4%) scored in the extremely severe range. Previous studies indicate that people with a clinical diagnosis of MDD have scores in the extremely severe range on the DASS depressive symptoms subscale (Antony et al., 1998; Brown, Chorpita, Korotitsch, & Barlow, 1997).

Descriptive statistics

Observed scores were used for Table 7.3. Some participants could not be included in the mean differences analysis as they had missing data for some of the variables, although they may have partially completed the survey. As complete cases were used for the main analyses (Intervention $n = 68$; Comparison $n = 46$) with maximum likelihood estimation used to account for missing data, the numbers of completed surveys listed in Figure 7.3 may differ from the numbers listed in Table 7.3. Mean differences at each time-point were assessed using independent-samples t -tests and are listed in Table 7.3. No significant differences between groups were found except ESA at 6-week follow-up, which showed a significant mean difference of -6.61, indicating that at 6-week follow-up, the intervention group demonstrated greater ESA than the comparison group; $t(80) = 2.60, p = .01$.

Emotional self-awareness

The means and standard errors are illustrated for the five subscales of ESA in Figure 7.4. A difference between groups can be seen in Figure 7.4, most notably in the *recognition* and *decision-making* categories, with a steeper positive slope of the intervention group when compared with the comparison group.

Table 7.3

Descriptive Statistics for, and Mean Differences Between, the Intervention and Comparison Groups of Depression Scores and ESA Scores at Pretest, Posttest and 6-Week Follow-Up

	Comparison Group			Intervention Group			Difference	
	<i>n</i>	<i>M (SD)</i>	95% <i>CI</i>	<i>n</i>	<i>M (SD)</i>	95% <i>CI</i>	<i>M diff</i>	<i>p</i>
Depression								
Pretest	44	19.4 (10.85)	16.1 – 22.7	67	20.4 (11.04)	17.8 – 23.1	-1.04	.63
Posttest	33	15.2 (8.85)	12.1 – 18.3	50	16.3 (10.76)	13.3 – 19.4	-1.11	.63
6-week	36	12.5 (11.79)	8.5 – 16.5	50	13.5 (10.50)	10.5 – 16.5	-0.98	.69
ESA								
Pretest	42	59.4 (11.52)	55.8 – 62.9	62	60.1 (11.47)	57.2 – 63.0	-0.58	.81
Posttest	32	61.3 (10.54)	57.5 – 65.1	46	62.4 (10.49)	59.3 – 65.5	-1.01	.69
6-week	35	60.3 (11.43)	56.4 – 64.2	47	66.8 (10.82)	63.7 – 70.0	-6.61	.01

Note. Observed scores provided; Mean difference calculated using paired-samples *t*-tests.

n = number of participants used; *M* = mean; *SD* = standard deviation; *CI* = 95% confidence interval; ESA = Emotional Self-Awareness.

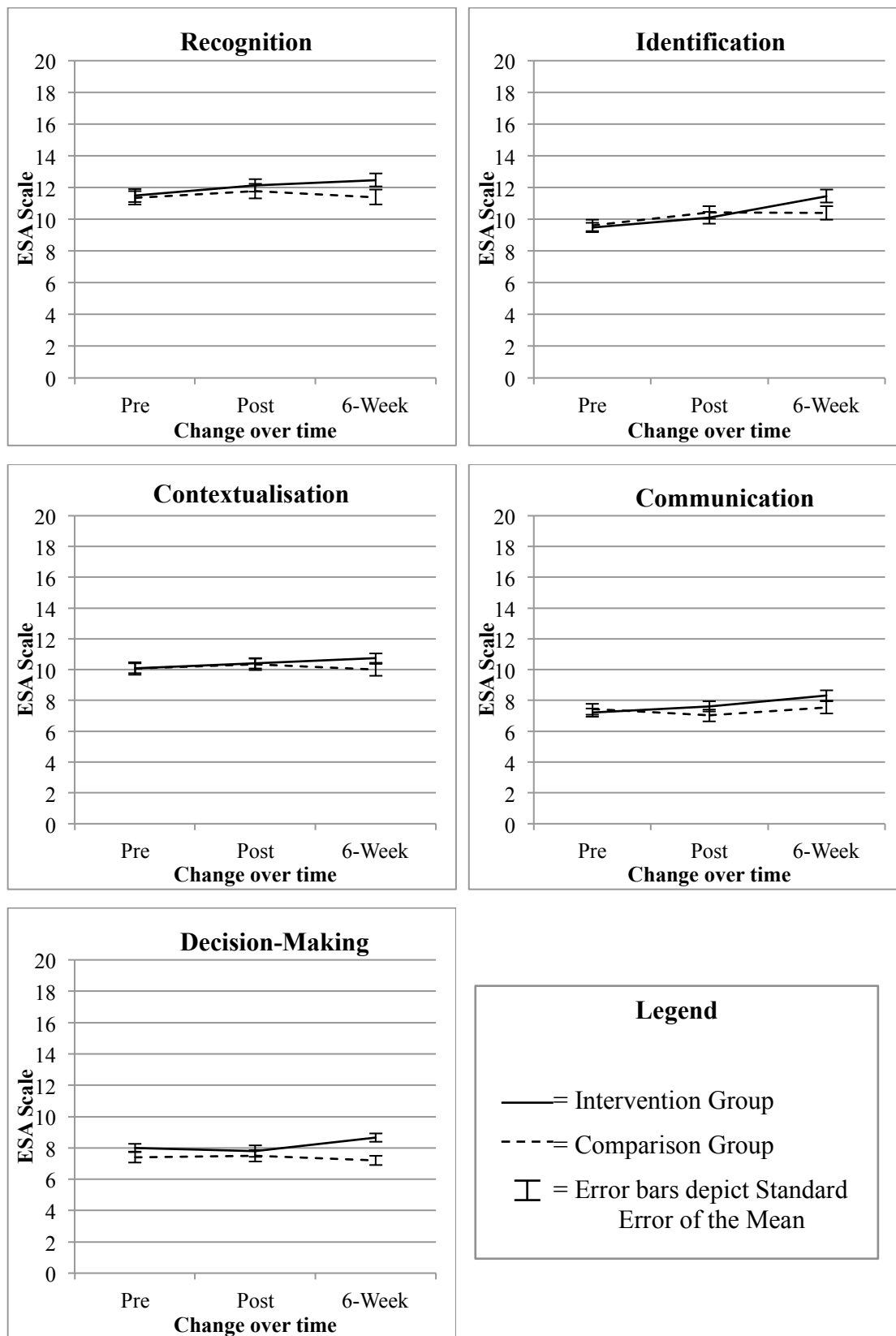


Figure 7.4. Intervention and comparison group means of five ESA categories.

A LGCM was used to determine whether these changes over time were significant and whether there were differences between groups. A LGCM was estimated for all subscales with error correlated between subscales at each time-point. The latent slope of each subscale was regressed onto group and its own intercept to control for pretest level of each ESA categories. Variance was set to 0 for the latent slopes. Overall, the fit indices for this LGCM indicated that the model was a good fit for the data ($\chi^2 = 88.616$, $df = 70$, $p = .07$, CFI = .958, TLI = .928, RMSEA = .048, SRMR = .089). Table 7.4 summarises the parameters of the latent growth curve model.

Table 7.4

Latent Growth Curve Model of the Emotional Self-Awareness Categories

ESA Category	Intercept	Intervention slope	Comparison slope
Recognition	11.6 (0.28)	0.12 (0.093) *	-0.01 (0.028)
Identification	9.6 (0.21)	0.24 (0.144)	0.04 (0.080)
Communication	7.2 (0.20)	0.12 (0.104) *	0.00 (0.049)
Contextualisation	10.1 (0.22)	0.11 (0.080) *	0.00 (0.029)
Decision-Making	7.7 (0.19)	0.27 (0.612) *	0.12 (0.557)

Note. Standard error in parentheses; Unstandardised estimates; slope coefficient estimated is the change per week; posttest scores were estimated as 3 weeks from the intercept and 6-week follow-up scores were estimated as 9 weeks from the intercept.
* $p < .05$.

There was a significant coefficient between groups for the slope of *recognition*, *communication*, *contextualisation* and *decision-making*, suggesting that participants in the intervention group showed an increase in these subscales over time when compared with the comparison group. There was no significant change over time for the comparison group for any ESA categories nor was there a significant change over time for the *identification* category for the intervention group. The means and standard errors are graphically depicted for the total ESAS score in Figure 7.5.

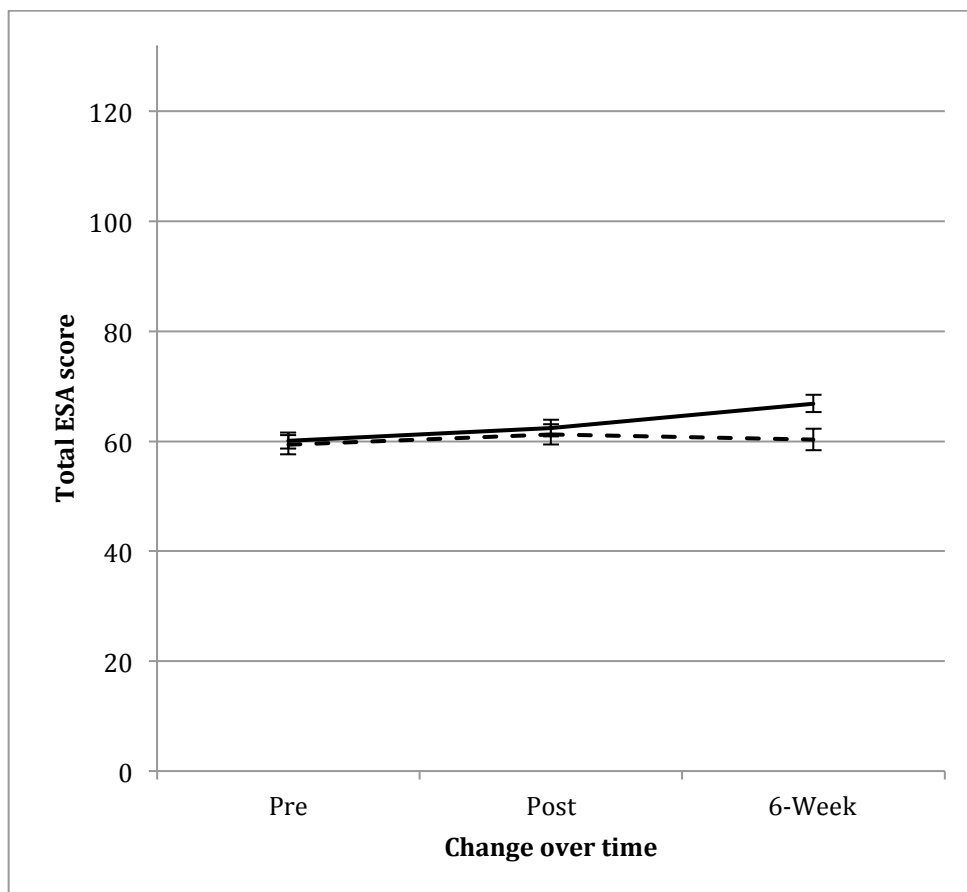


Figure 7.5. Intervention and comparison group means of total Emotional Self-Awareness Scale. Error bars depict standard errors of the means. Solid line depicts the Intervention Group; dashed line depicts the Comparison Group.

Figure 7.5 shows that there was no difference between the comparison and intervention groups in the total ESAS score until the 6-week follow-up. A second LCGM was estimated for the total ESAS scale, with the latent slope of the ESAS total score regressed onto group and its own intercept to control for pretest level of ESA. Variance was set to 0 for the latent slope. Overall, the fit indices for this LGCM indicated that the model was a good fit for the data ($\chi^2 = 0.137$, $df = 3$, $p = .99$, CFI = 1.00, TLI = 1.14, RMSEA = .00, SRMR = .013). There was a significant coefficient estimated between groups for the slope (slope = 0.68, $SE = 0.25$, $p = .006$), indicating that participants in the intervention group showed an increase in the total ESAS score over time when compared with the comparison group. There was no significant change over time for the comparison group (intercept = 59.95, $SE = 1.037$, slope = 2.151, $SE =$

1.892, $p = .26$). These estimates suggest that there was an increase in ESA for the intervention group but not for the comparison group.

A preliminary examination of the ESA measure was conducted using confirmatory factor analysis (CFA); however, as the sample size of this study did not meet recommendations of the required sample size to test psychometrics (Javali et al., 2011), the results for this CFA are tentative. The full analysis of this CFA is presented in Appendix I. To summarise, two models were tested: Model 1, where all items were used to measure the total ESAS; and Model 2, where each subscale of the ESA was measured by specific items with subscales correlated. For both models, only chi-square divided by the degrees of freedom and RMSEA met the goodness of fit criteria, suggesting that neither model was a good fit for the data. Failure to find a good fit for the data was likely to be due to the small sample size. Of these two models, Model 2 had the best fit indices. Further improvements to this model could be made removing items with critical ratio values (the estimate divided by the standard error) of less than 2.0 although, due to the small sample size, no improvements were attempted.

Mental health outcomes

A LGCM was estimated to examine the three mental health outcomes using the DASS subscales; depressive, anxiety and stress symptoms. The subscales were allowed to covary at each time-point and the variances of the latent slopes were fixed to 0. Group was added as a time-invariant covariate with the latent slopes and latent intercepts regressed onto group. The fit indices indicated that the model was a good fit ($\chi^2 = 25.21$, $df = 27$, $p = .56$, CFI = 1.00, TLI = 1.01, RMSEA = .00, SRMR = .062). The coefficients for the slope regressed onto the intercept were -0.05 for depression ($p < .001$), -0.03 for anxiety ($p = .049$), and -0.02 for stress ($p = .18$), indicating that there was a significant decrease in depressive and anxiety symptoms over time.

The coefficient of slope of depression, anxiety and stress regressed onto group were -0.041 ($p = .86$), -.232 ($p = .20$) and -0.011 ($p = .95$) respectively, indicating that there was no difference between the intervention and comparison groups in the growth of anxiety, depression or stress. This analysis concurs with the mixed methods analysis of this data published in Reid et al. (2011).

Parallel process latent growth curve model**Depressive symptoms.**

The path diagram illustrated in Figure 7.6 shows the parallel process LGCM used to test for the indirect pathway of the self-monitoring program on depressive symptoms via ESA. The fit indices for Figure 7.6 suggest that the model is a good fit for the data ($\chi^2 = 10.65$, $df = 6$, $p = .10$, CFI = .962, TLI = .87, RMSEA = .082, SRMR = .038).

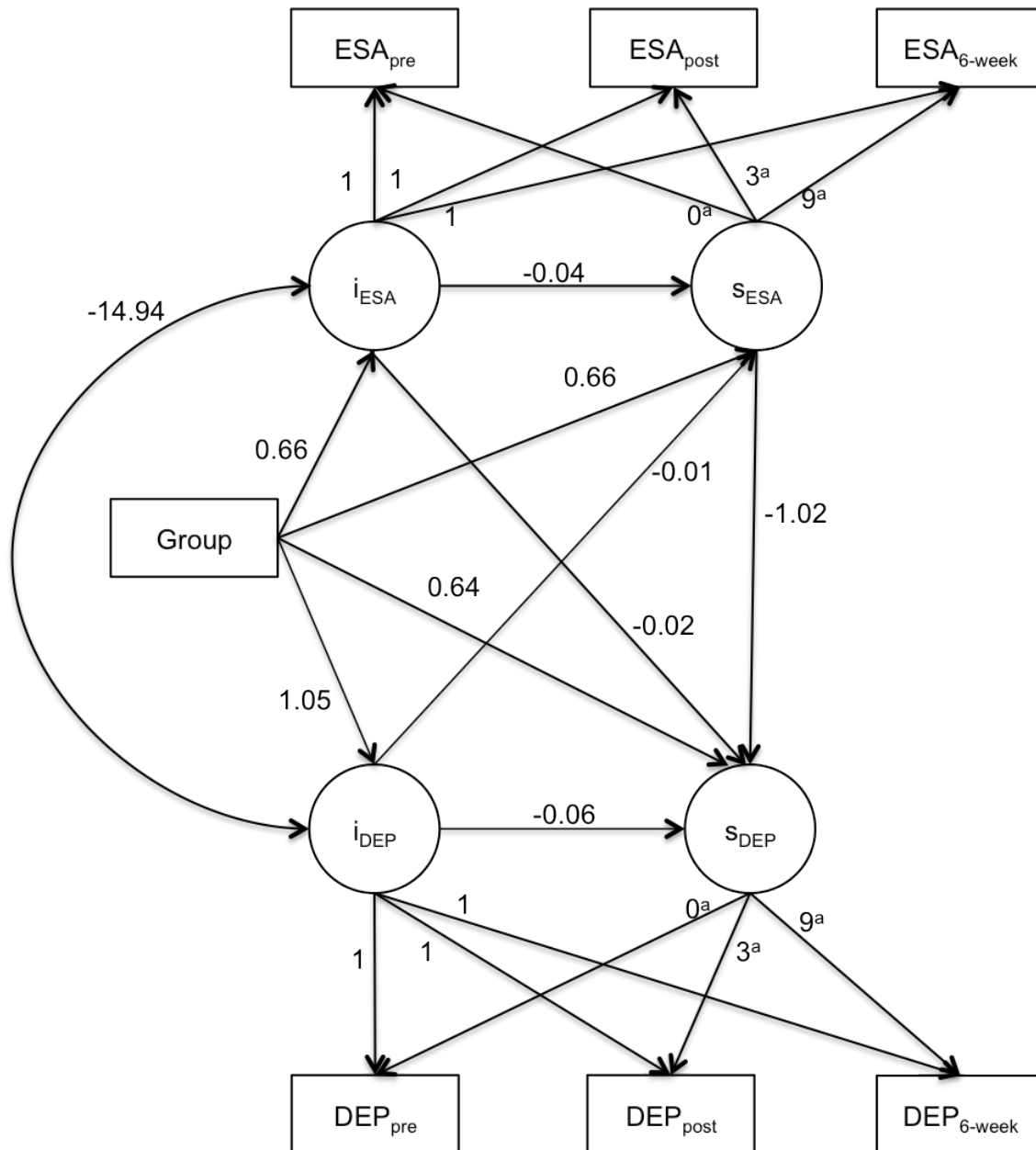


Figure 7.6. Parallel process latent growth curve model of the group, depressive symptoms and emotional self-awareness. Unstandardised estimates reported; i_{ESA} = latent intercept of ESA; s_{ESA} = latent slope of ESA; i_{DEP} = latent intercept of depression; s_{DEP} = latent slope of depression; DEP_{pre} , DEP_{post} , DEP_{6-week} , ESA_{pre} , ESA_{post} and ESA_{6-week} = the observed score of DASS depression subscale and ESA scale at pretest, posttest and 6-week follow-up respectively; Group = Intervention program condition; ^a Time interval from pretest by week.

All possible pathways were calculated and are illustrated in Figure 7.6. The first step to testing an indirect effect was conducted by regressing the slope of ESA onto

group. The positive coefficient indicates that there was a greater increase in ESA across time in the intervention group than the comparison group. The second step to testing mediation was conducted by regressing the slope of ESA onto the slope of depression. The negative coefficient here indicates that an increase in ESA led to a decrease in depressive symptoms. Table 7.5 lists the coefficients of all pathways and the indirect effect of group on the slope of depression via two pathways: the slope of ESA and the intercept of ESA.

Table 7.5

Coefficients and Bias-Corrected Bootstrapping Confidence Intervals of the Parallel Process Latent Growth Curve Model

	Point estimate	95% Bootstrap CI	
		Lower	Upper
Direct effects on the slope of depression			
Slope of ESA	-1.02 *	-7.80	-0.21
Intercept of depression	-0.06 *	-0.15	-0.03
Intercept of ESA	-0.02	-0.27	0.03
Group	0.64	-0.004	5.72
Direct effects on the slope of ESA			
Intercept of ESA	-0.04	-0.08	0.38
Intercept of depression	-0.01	-0.04	0.06
Group	0.66	-0.05	1.22
Direct effect of group on the intercept			
ESA	0.66	-3.41	4.87
Depression	1.05	-2.90	5.23
Indirect effect of group on the slope of depression			
Via the slope of ESA	-0.67 *	-6.99	-0.10
Via the intercept of ESA	-0.02	-0.62	0.05
Total indirect effect	-0.69 *	-7.24	-0.11

Note. CI = Confidence interval; * = 95% bootstrap confidence interval does not contain zero and indicates a significant effect.

As shown in Table 7.5, the indirect effect of group on the slope of depression via the slope of ESA was statistically significant (95% bootstrap confidence interval did not contain zero) with an unstandardised estimate of -0.67, indicating that participants in the

intervention group had a decrease in depressive symptoms via the slope of ESA when compared with the comparison group. There was no significant direct effect from group to depressive symptoms based upon the 95% bootstrap confidence interval, indicating that the intervention did not have a direct decrease in depressive symptoms when compared with the comparison group. There was a significant direct effect of the intercept of depressive symptoms on the slope of depressive symptoms, indicating that those with a higher severity at pretest had a larger decrease in depressive symptoms than those with less severity at pretest. This effect may, however, be attributed to the regression-to-the-mean effect.

Figure 7.7 illustrates the relationship between the change in depressive symptoms and the change in ESA for both the intervention and comparison groups.

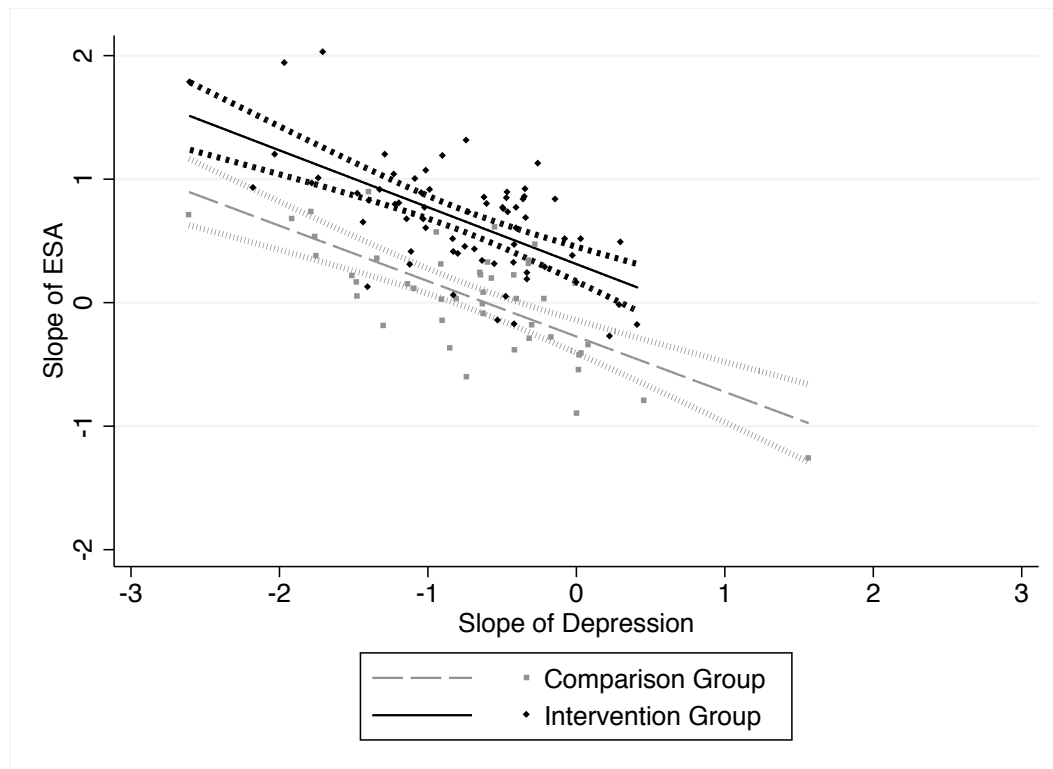


Figure 7.7. The relationship between self-monitoring, the slope of depressive symptoms and the slope of emotional self-awareness. The points represent individuals' estimated slopes and the lines represent the line of best fit with 95% confidence intervals.

There was a negative relationship between changes in ESA and changes in depressive symptoms for both groups. Accordingly, an increase in ESA was associated with a decrease in depressive symptoms as seen in Figure 7.7. The intervention group

had larger increases in ESA when compared with the comparison group, which was associated with a greater decrease in depressive symptoms.

Anxiety symptoms.

A parallel process LGCM was estimated to test for the indirect pathway of the self-monitoring program used on anxiety symptoms via ESA. The fit indices for the anxiety model were $\chi^2 = 13.14$, $df = 6$, $p = .04$, CFI = .95, TLI = .81, RMSEA = .10, SRMR = .060. Only two fit indices met the criteria for good fit suggesting that the model is a poor fit for the data. Results for this model are presented in Table 7.6.

Table 7.6

Coefficients and Bias-Corrected Bootstrapping Confidence Intervals of the Parallel Process Latent Growth Curve Model for Anxiety Symptoms

	Point estimate	95% Bootstrap CI	
		Lower	Upper
Direct effects on the slope of anxiety			
Slope of ESA	-1.45 *	-8.08	-0.43
Intercept of anxiety	0.01	-0.07	0.29
Intercept of ESA	-0.03	-0.29	0.02
Group	-0.54	-0.18	5.63
Direct effects on the slope of ESA			
Intercept of ESA	-0.03	-0.07	0.35
Intercept of anxiety	0.01	-0.06	0.10
Group	0.61	-0.17	1.20
Direct effect of group on the intercept			
ESA	0.54	-3.51	4.48
Anxiety	2.67	-0.61	5.78
Indirect effect of group on the slope of anxiety			
Via the slope of ESA	-0.89 *	-7.63	-0.26
Via the intercept of ESA	-0.02	-0.63	0.06
Total indirect effect	-0.91 *	-8.38	-0.26

Note. CI = Confidence interval; * = 95% bootstrap confidence interval does not contain zero and indicates a significant effect.

The results for anxiety mirror those for depression with a significant indirect effect of group on the slope of anxiety via the slope of ESA (95% bootstrap confidence interval did not contain zero). The unstandardised estimate was -0.89, indicating that participants in the intervention group had a decrease in anxiety symptoms via the slope of ESA when compared with the comparison group. There was no significant direct effect from group to anxious symptoms based upon the 95% bootstrap confidence interval, indicating that the intervention did not directly decrease anxiety symptoms when compared with the comparison group. Figure 7.8 illustrates the relationship between the change in anxiety symptoms and the change in ESA for both the intervention and comparison groups.

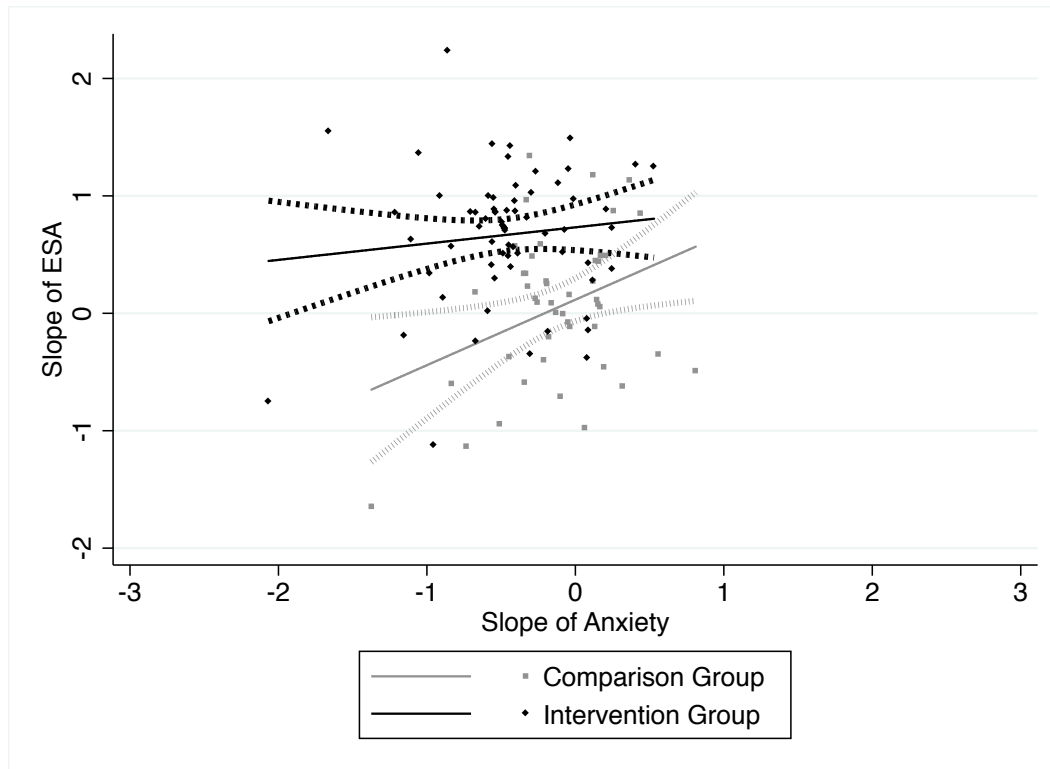


Figure 7.8. The relationship between self-monitoring, the slope of anxiety symptoms and the slope of emotional self-awareness. The points represent individuals' estimated slopes and the lines represent the line of best fit with 95% confidence intervals.

For the intervention group, the mean change of ESA remained consistently around 0.67 ($SD = 0.560$) regardless of the change in anxiety symptoms as shown in Figure 7.8, indicating that the change of ESA was not related to the change in anxiety symptoms for the intervention group. There was a positive relationship between changes in ESA and changes in anxiety symptoms for the comparison group. Accordingly, an increase in ESA was associated with an increase in anxiety symptoms for the comparison group. Overall, the intervention group had significantly higher ESA changes than the comparison group and larger decreases in anxiety.

Stress symptoms.

The parallel process LGCM estimated to test the indirect pathway of the self-monitoring program used on stress symptoms via ESA had a good fit for the data ($\chi^2 = 7.31$, $df = 6$, $p = .29$, $CFI = .99$, $TLI = .95$, $RMSEA = .044$, $SRMR = .040$). Results for this model are presented in Table 7.7.

Table 7.7

Coefficients and Bias-Corrected Bootstrapping Confidence Intervals of the Parallel Process Latent Growth Curve Model for Stress Symptoms

	Point estimate	95% Bootstrap CI	
		Lower	Upper
Direct effects on the slope of stress			
Slope of ESA	-3.00 *	-8.83	-1.38
Intercept of stress	0.10	-0.02	1.60
Intercept of ESA	-0.04	-0.41	0.01
Group	1.30 *	0.45	6.10
Direct effects on the slope of ESA			
Intercept of ESA	-0.03	-0.06	0.73
Intercept of stress	0.04	-0.01	0.17
Group	0.52	-0.36	1.03
Direct effect of group on the intercept			
ESA	0.49	-3.59	4.51
Stress	3.01	-0.21	6.04
Indirect effect of group on the slope of stress			
Via the slope of ESA	-1.54 *	-6.11	-0.69
Via the intercept of ESA	-0.02	-0.84	0.07
Total indirect effect	-1.56 *	-6.31	-0.70

Note. CI = Confidence interval; * = 95% bootstrap confidence interval does not contain zero and indicates a significant effect.

The results for stress mirror those for depression and anxiety with a significant indirect effect of group on the slope of stress via the slope of ESA (95% bootstrap confidence interval did not contain zero). The unstandardised estimate was -1.54, indicating that participants in the intervention group had a decrease in stress symptoms via the slope of ESA when compared with the comparison group. There was also significant direct effect from group to stress symptoms based upon the 95% bootstrap confidence interval, indicating that the intervention had a direct increase in stress symptoms when compared with the comparison group. Figure 7.9 illustrate the relationship between the change in stress symptoms and the change in ESA for both the intervention and comparison groups.

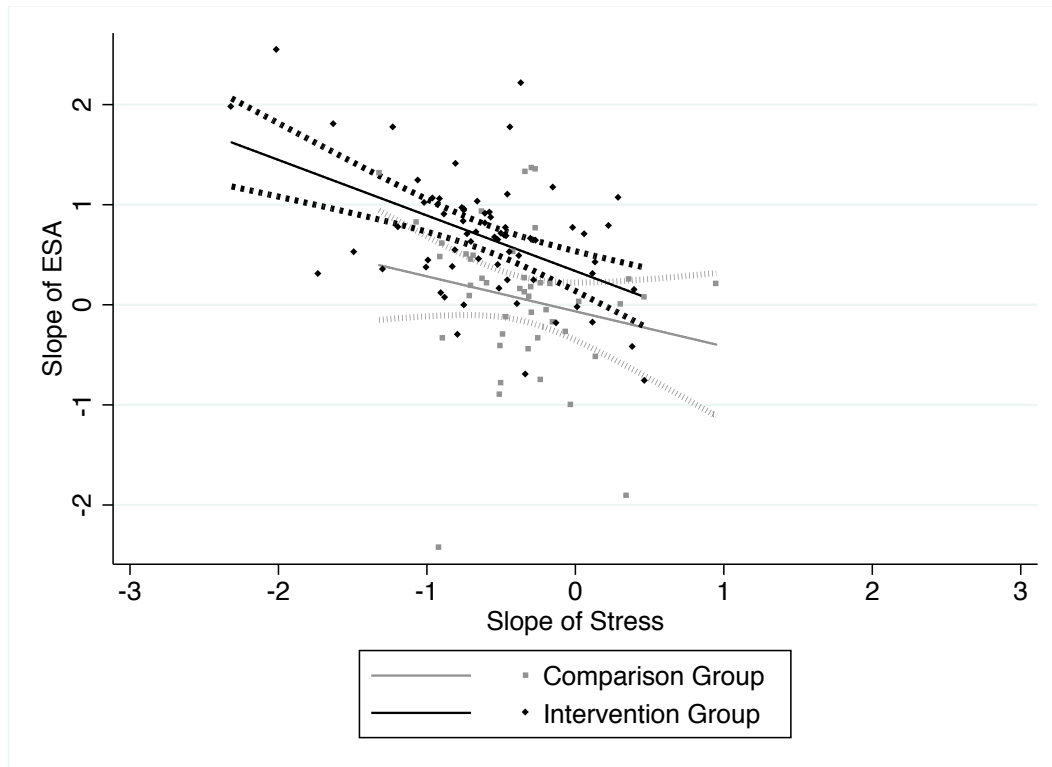


Figure 7.9. The relationship between self-monitoring, the slope of stress symptoms and the slope of emotional self-awareness. The points represent individuals' estimated slopes and the lines represent the line of best fit with 95% confidence intervals.

As with depressive symptoms, there was a negative relationship between changes in ESA and changes in stress symptoms for both groups, accordingly, an increase in ESA was associated with a decrease in stress symptoms as seen in Figure 7.9. The intervention group had larger increases in ESA when compared with the comparison group, which was associated with a greater decrease in stress symptoms.

Indirect effect sizes.

The indirect effect sizes were calculated using the statistical program R which produces several estimates, listed in Table 7.8. These indirect effect sizes indicate the linear change in symptoms each week for the intervention group indirectly through mediation of the linear slope of ESA when compared with the comparison group. The unstandardised indirect effect sizes can be interpreted on the DASS depression, anxiety and stress subscales (on a scale from 0 to 42). The proportion of the maximum possible

indirect effect (κ^2) has similar properties to and can be interpreted on a similar scale to Cohen's r^2 (Preacher & Kelley, 2011). Other estimates of indirect effect sizes are reported in Table 7.8 to allow for comparison with other mediation models; nevertheless, these effect sizes are not comparable with commonly used effect sizes.

Table 7.8

Indirect Effect Sizes of Group on the Slope of ESA on the Slope of Depressive, Anxiety and Stress Symptoms

Indirect effect size	Scale	Estimate	95% CI
Unstandardised	DEP	-0.61	-0.86 to -0.40
	ANX	0.09	-0.04 to 0.22
	STR	-0.17	-0.31 to -0.05
Partially Standardised	DEP	-0.92	-1.20 to -0.65
	ANX	0.19	-0.08 to 0.47
	STR	-0.33	-0.58 to -0.11
Index of mediation	DEP	-0.45	-0.59 to -0.32
	ANX	0.10	-0.04 to 0.23
	STR	-0.16	-0.28 to -0.06
R^2	DEP	0.14	0.08 to 0.21
	ANX	0.01	0.00 to 0.04
	STR	0.02	0.00 to 0.07
κ^2	DEP	0.44	0.32 to 0.56
	ANX	0.09	0.01 to 0.24
	STR	0.15	0.05 to 0.27

Note: CI = 95% Confidence Intervals reported are bias-corrected and accelerated; κ^2 = proportion of the maximum possible indirect effect and is comparable with Cohens r^2 ; R^2 as recommended by Preacher and Kelley (2011); DEP = Depressive symptoms; ANX = anxiety symptoms; STR = Stress symptoms.

The estimated κ^2 was 0.44 for depressive symptoms weekly, indicating that there is a medium indirect effect for depressive symptoms per week indirectly through ESA when compared with the comparison group. Stress symptoms had a small indirect effect

size of 0.15 and there was no indirect effect for anxiety symptoms ($\kappa^2 = 0.09$). The unstandardised indirect effect sizes listed in Table 7.8 show that the intervention group was estimated to have a linear decrease in depressive and stress symptoms of 0.61 and 0.17 on the DASS scale per week, respectively, indirectly through mediation of the linear slope of ESA when compared with the comparison group. There was a slight increase in anxiety symptoms (0.09) on the DASS scale per week indirectly through mediation of ESA, suggesting that ESA and anxiety symptoms may be positively related.

Rumination.

A secondary analysis was conducted to determine whether rumination decreased over time between groups. The mixed model analysis of the RRS brooding subscale showed a significant main effect of time; $\beta = -0.16$, $p = .016$, indicating an overall decrease in rumination over time for both groups. There was no significant main difference between groups ($\beta = 1.01$, $p = .105$), nor was the interaction between group and time significant, ($\beta = -0.07$, $p = .390$). This finding suggests that self-monitoring did not impact levels of rumination.

Discussion

The current study examined the use of a mobile phone self-monitoring program on depressive symptoms via the indirect pathway of ESA with young people suffering from mild or more depressive symptoms, and supported the hypothesis that self-monitoring mood, stress and coping strategies can increase awareness of emotions. The second hypothesis that an increase in ESA would predict a decrease in depressive symptoms was also supported. Based upon Preacher and Kelley's (2011) proportion of the maximum possible indirect effect, there was a medium effect of the intervention program on depressive symptoms indirectly via ESA. A small indirect effect size was found for stress symptoms and no effect was found for anxiety symptoms.

The parallel process LGCM used in these analyses suggests that the mobile phone self-monitoring program increased the mediating variable, ESA, in young people experiencing mild or more depressive symptoms. Participants in the intervention group

were found to have higher ESA scores than the comparison group each week from pretest to 6-week follow-up. This finding supports previous research that self-monitoring increases ESA (Beitman & Soth, 2006; Brown & Ryan, 2003; Chambers et al., 2008; Morris et al., 2010; Swinkels & Giuliano, 1995). Participants in the current study demonstrated an increase in recognition of emotional experiences, understanding of the context of emotions, communicating this emotional knowledge, and planning and making decisions about the emotions. There was no difference between groups in identifying emotional states over time. Intuitively, identification of emotions would be a low-order ESA skill and necessary to develop other ESA skills. The high scores on the *recognition* subscale, compared with the other subscales, reflect the possibility that recognition is also a low-order category and it is likely that the young people were entering into the study already able to recognise and identify the emotions they were feeling.

The secondary hypothesis that the intervention program would produce a decrease in rumination when compared with the comparison program was not supported. Further research is needed to determine whether there is an inverse relationship between rumination and ESA. Nevertheless, rumination decreased over time, as did depressive symptoms (Reid et al., 2011), providing further support for the positive relationship between depression and rumination.

Traditionally, testing for mediation models has involved using Baron and Kenny's (1986) multiple regression model depicted in Figure 7.1. In this model, a direct effect between self-monitoring and depression would be necessary in order to test for an indirect effect. Recently, statisticians have determined that requiring a significant direct pathway lowers the power and is, furthermore, not a necessary component for testing mediation using modern LGCM techniques (Fritz & MacKinnon, 2007). For instance, in some situations the indirect and direct pathways have opposite effects resulting in an '*inconsistent*' mediator (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Sheets & Braver, 1999). The LGCM for stress symptoms is an example of an inconsistent mediator where the pathway between self-monitoring and stress symptoms was positive and the indirect pathway via ESA was negative. In addition, prevention and early intervention studies are particularly prone to having an insignificant direct effect and a significant indirect effect as prevention programs recruit participants with

subclinical depressive symptoms at pretest (Fritz & MacKinnon, 2007). Therefore, no direct effect or at least only a small direct effect is to be expected. Furthermore, in the current study, the indirect effects for depressive and anxiety symptoms were not inconsistent with the direct effect, rather, a significant decrease in depressive and anxiety symptoms was found for both groups, suggesting that other mediating or moderating variables caused a reduction in depressive symptoms for the comparison group as well as the partial mediation of ESA in the intervention group.

This study supports previous research that suggests that self-monitoring techniques effectively increase self-awareness, in this case, awareness of one's own emotions (Morris et al., 2010; Pennebaker, Zech, & Rime, 2001). Metacognitions, such as self-awareness, are developed during adolescence (Saari, 1997) and interventions can be developed that target young people's ability to recognise emotions, identify emotional states, understand the contextualisation of emotions, communicate this emotional knowledge, as well as plan and make constructive decisions about emotions. Increasing awareness of emotions is a core process in the early stages of therapy (Prochaska & Diclemente, 1982). This current study explores the potential for targeting ESA in early intervention for young people with mild or more depression. This RCT was conducted with the aim of representing a wide variety of young people who visit GPs with a range of medical and psychological problems, and a range of severity of problems. Therefore, the results of this study are applicable to this age group in general.

Self-monitoring techniques may provide an alternative to watchful waiting as a early intervention program. Mobile phones are ideally suited to this purpose as the *mobiletype* program can be downloaded to patients' own mobile phones to assist young people to understand and manage subclinical depressive symptoms. Detailed information about patients' mental health in recent weeks is then uploaded to GPs in an easy-to-read format, saving time in appointments and allowing progression to more intensive second-step interventions when needed. Young people often fail to recognise mental health problems (Rickwood et al., 2004) and instead attend GP clinics for somatic complaints rather than mental health symptoms (Tylee, Haller, Graham, Churchill, & Sanci, 2007). Using self-monitoring techniques with young people who present with underlying somatic complaints may increase their ESA and assist young people to initiate treatment for depression.

Nevertheless, it is important to note that there was an overall decrease in mental health symptoms over time, regardless of group allocation. This effect was larger than one would expect from retest or regression-to-the-mean effects (Jorm, Duncan-Jones, & Scott, 1989; Longwell & Truax, 2005). The most likely explanation for this effect was that GPs were acting to manage mental health during the pretest review without waiting for further information from the self-monitoring data. Post hoc analyses, presented in Reid et al. (2011), indicated that GPs were providing participants with at least one form of treatment or a mental health management plan for 92% of participants on this initial appointment. Furthermore, there are two main reasons for changes in comparison groups in depression trials (Andrews, 2001). First, the encouragement from being in an intervention program may have resulted in a decrease in depressive symptoms. In this study, GPs were trained in the full study procedure and given a study manual with clinical support materials, which may have increased the saliency of detecting mental health problems and providing support to the young people in the comparison group as well as the intervention group. As randomisation occurred at the individual level rather than clustered by GP or clinic, this may have caused contamination, resulting in a decrease in depressive symptoms for the comparison group. Second, research suggests that spontaneous recovery may have an effect in depression treatment trials, particularly with episodes of depression lasting for less than 8 weeks (Andrews, 2001) and this may have contributed to the decrease of depressive symptoms in the current trial. Furthermore, the reduction in depressive symptoms may have contributed to an increase in ESA, although this was not tested in the current study.

Further studies should use a study design randomised by GP or clinic rather than at the individual level to reduce this contamination. It is apparent that there are mediating factors other than ESA at work in the program, which lead to an overall decrease in depressive symptoms for both the intervention group and the attention-comparison group. The therapeutic relationship with the GP and other components of the program, such as the clinic support manuals provided to the GPs or the review of daily activities, diet and exercise, may have been enough to reduce depressive symptoms. Although beyond the scope of the current study, future studies involving clustered RCTs with a waiting-list control group rather than the attention-comparison

group and examination of multiple mediating and moderating factors may determine what components of the program can be used for early intervention.

Based upon recommendations (Fritz & MacKinnon, 2007), a sample size of 114 should be sufficient to detect a medium size of effect; however, due to the decrease of symptomatology in the attention-comparison group as well as the intervention group, there was insufficient power to detect the small difference between the groups (Lindquist et al., 2007).

One of the overall aims of this study was to aid GPs by increasing the amount of information they had about patients within their limited appointment times; however, the research questionnaires required to evaluate the success of the intervention may have been perceived as prohibitive to their ability to participate in the study given the fast-paced environment of general practice. Nevertheless, it is encouraging to note that the majority of the GPs that did recruit one participant into the study went on to recruit several more, suggesting that the perception of the demands of the study did not match the actuality.

One of the limitations of this study is the lack of validation of the ESAS. A confirmatory factor analysis of the scale was inconclusive (see Appendix J) as this study lacked the statistical power to explore the psychometrics of the ESAS. Another limitation was the lack of questionnaires completed at posttest and follow-up. Young people may have been deterred from completing the posttest and follow-up questionnaires by their length, given that fatigue and lack of motivation are indeed two of the core symptoms of depression (American Psychiatric Association, 2000). Anecdotally, some participants also reported ceasing participation in the study because they were feeling better, which precluded analysis of the reasons underlying this increased sense of wellbeing. Primary care is a particularly difficult setting in which to conduct randomised controlled studies (Page, French, McKenzie, O'Connor, & Green, 2011; Williamson et al., 2007). In this study, recruitment delays were experienced during school holidays as young people tend to attend clinics during the school term, and overall, recruitment was delayed and ceased before the complete randomisation list was allocated due to the H1N1 influenza pandemic which was first detected in Melbourne on the 9th May 2009 (Denholm et al., 2010). These delays resulted in uneven numbers in the two groups. Future studies should proceed with caution when

recruiting from primary care settings. It is strongly recommended that extra time be allocated for recruitment in primary care compared with other settings, particularly in youth-focused studies. Nevertheless, general practice is the ideal setting to implement self-monitoring early intervention tools with young people and in turn can assist young people with obtaining further treatment if necessary in the stepped-care model. The results from the parallel process LGCM for anxiety symptoms must also be interpreted with caution as the fit statistics indicated that the model was not a good fit for the data.

Mobile phone mental health assessment and monitoring tools may assist young people and GPs to manage mental health problems in primary care settings by engaging young people into treatment, increasing the detection of depression and other mental health problems, and by providing doctors with the resources to manage these problems. To my knowledge, this is the first RCT examining the use of a mobile phone self-monitoring program as an intervention tool for young people with depressive symptoms. Further investigation into the effects of self-monitoring on mental health outcomes and ESA is warranted, however a more robust measure of ESA is needed and demonstrating that there is a direct effect on the mental health outcomes is necessary for self-monitoring to be considered an effective intervention. The program provided GPs with information about a young person's daily activities and can be used to detect early signs of mental health problems, such as elevated negative mood, stress and causes of stress, maladaptive coping strategies, isolation from peers, diet and exercise as well as other risk and protective factors. The mobile phone self-monitoring program has the advantage of being low-cost, quick and easy to use. Mobile phones are well suited to first-step care providing an alternative to 'watchful waiting' (van Straten et al., 2010) and allowing young people to provide accurate information to their GPs about their mood and stress (Reid et al., 2009) as well as shortening the length of time it would take to relay this information to GPs in a usual appointment. Mobile phone self-monitoring programs should be considered before suggesting more time-consuming and expensive interventions to young people with mild or more depressive symptoms.

CHAPTER 8

Emotional Self-Awareness Model and its Role in Mediating Self-Monitoring and Depressive Symptoms: Final Discussion

The development of the ESA model began with an initial exploration of adaptive emotion-focused attention in past literature and from the perspective of young people. From this research, a five-faceted theoretically driven model of ESA was developed, complete with a preliminary measure of ESA. An RCT was also conducted demonstrating that an early intervention self-monitoring program run on mobile phones may assist in reducing depressive symptoms via the mechanisms of ESA in young people with elevated depressive symptoms.

Much of the previous research exploring emotion-focused attention consisted of rumination, worry and the detrimental consequences of negative emotion-focused attention (Nolen-Hoeksema, 2000). Only recently have the benefits of emotion-focused attention been explored in research (Watkins, 2008), although the therapeutic benefits of emotion-focused attention have been long acknowledged in clinical settings (Beck, 1997). A recent systematic literature review (Watkins, 2008) compared the adaptive and maladaptive consequences of emotion-focused attention and identified that differences in the abstraction, the context and the valence of the attention distinguished positive outcomes from negative outcomes. Despite this new area of research, there is a gap in knowledge investigating how this information may be used for the betterment of humankind.

The World Health Organization predicted that depression will be the second leading cause of disease burden worldwide by 2020 (Murray & Lopez, 1997), indicating the need for new methods to reduce the burden of depression. Research suggests that prevention and early intervention may decrease the economic burden and longevity of depression (Andrews, Szabo, & Burns, 2002); however, there is a noticeable gap in the literature marrying the concept of ESA with early intervention in order to help young people experiencing mild or more depressive symptoms by increasing their awareness of their emotions, and consequently, decreasing their depressive symptoms. With this in mind, the overall aim of this thesis was to explore the concept of ESA and investigate the utility of increasing ESA in an early intervention self-monitoring program to prevent diagnosable depression in young people aged 14 to 24 years with mild or more depressive symptoms. The overall hypothesis of this thesis was that self-monitoring would increase ESA, which in turn, would decrease depressive symptoms. These overarching aims led to the more specific aims explored within each chapter: (a) to

define the characteristics of ESA, (b) to explore young people's qualitative experiences of ESA after self-monitoring, (c) to develop a preliminary quantifiable measure of ESA, (d) to explore the relationship between self-monitoring and ESA, and (e) to determine whether ESA mediates the relationship between self-monitoring and depressive symptoms.

With these aims, several studies were conducted including: a systematic literature review examining the existing literature on the therapeutic benefits of ESA (Chapter 3); a nontargeted qualitative study examining young people's general feedback upon completion of a self-monitoring program (Chapter 4); an in-depth qualitative study focusing on young people's experience of a self-monitoring program and their awareness of their emotional experiences (Chapter 5); a small-scale mixed methods study combining an in-depth qualitative interview and quantitative measures of ESA (Chapter 6); and an RCT to examine the effects of self-monitoring on depressive symptoms when mediated by ESA (Chapter 7). The following discussion summarises the main findings of the studies in this thesis in relation to the five aims listed above.

The Characteristics of Emotional Self-Awareness

During the course of this thesis, the model of ESA was developed beginning with the systematic literature review conducted in Chapter 3. This review systematically reviewed 50 publications in order to identify common characteristics of positive emotion-focused attention consistent throughout the literature. Five common themes were identified including: (a) *recognition*, the recognition of the presence of affect; (b) *identification*, the ability to identify specific feelings; (c) *contextualisation*, identifying the contextual factors surrounding emotions; (d) *communication*, communication of emotional knowledge; and (e) *decision-making*, analysing emotional events to make decisions. Preliminary analysis of the beneficial outcomes associated with these themes in research to date suggests that *contextualisation* was associated with physical wellbeing, *decision-making* was associated with general wellbeing and problem-solving, and *recognition* was associated with all the benefits identified; decreasing negative affect, increasing positive affect, problem solving, protection against rumination, general wellbeing and physical wellbeing.

These themes were corroborated in Chapter 4 with feedback from 21.4% of the 98 secondary school students spontaneously reporting several of the ESA themes upon completion of the self-monitoring program. In addition, young people reported feeling cared for and heard as a result of self-monitoring, suggesting a sixth theme of *acknowledgement*.

Research suggests that emotion-focused attention, such as rumination and worry, is highly associated with and a possible contributor to depression and anxiety disorders (Lyubomirsky & Nolen-Hoeksema, 1995; Park et al., 2004). In contrast, the research conducted in this thesis suggests that focusing on negative emotions may also lead to beneficial consequences when the focus is on particular aspects of emotions such as *recognition, identification, contextualisation, communication* and *decision-making*. This supports the findings from the systematic literature review in Chapter 3 that examined various beneficial outcomes arising from emotion-focused attention and provides additional support that emotion-focused attention can decrease depressive symptoms (Beckner et al., 2010; Hayes et al., 2005; Kross & Ayduk, 2008; Paivio et al., 2010; Takano & Tanno, 2010).

The systematic review conducted in Chapter 3 extends upon earlier work conducted by Watkins (2008) examining the constructive and unconstructive outcomes of 'repetitive thoughts'. Watkins identified three key characteristics that distinguish constructive from unconstructive thoughts: concrete versus abstract, positive versus negative emotions, and positive versus negative interpersonal or situational context. Combinations of these three characteristics interact to predict constructive or unconstructive outcomes. Watkins found that focusing on negative emotions results in constructive outcomes when the focus is on concrete, discrete aspects of the emotion.

Similarly, this investigation of ESA demonstrates that focusing on concrete events can result in a decrease in depressive symptoms. Furthermore, the current investigation expands on Watkins (2008) key distinguishing characteristics of constructive and unconstructive emotion-focused attention and outlines the five core characteristics of ESA.

Qualitative Experience of Emotional Self-Awareness After Self-Monitoring

Young people's qualitative experience of ESA after self-monitoring was investigated to determine whether young people experienced the five themes of ESA identified in the literature review. To this end, in-depth interviews were conducted with 37 patients at an adolescent health clinic after completion of a self-monitoring program. This study, presented in Chapter 5, gave further support to the five categories of ESA and provided a rich narrative description about each theme of ESA from young people's perspectives as summarised below.

Most commonly, young people talked about *recognition* of affective states such as becoming more aware of their moods, realising how they were feeling, taking notice of their moods, as well as reflecting, analysing and understanding their emotions better. The *identification* theme consisted of reports about being able to identify the feelings young people were experiencing, including variations in mood and that sometimes they had conflicting feelings that were difficult to distinguish from one another. Young people reported *contextualisation* in terms of either specific or background causes, and the influence that the time of day played on their mood. Consequences of negative mood and difficulty in attributing specific causes to feelings were also described under the contextualisation theme. The main themes identified relating to *communication* were the therapeutic benefits of communicating emotions, communication as a means of releasing negative feelings, and communicating through text as opposed to talking to someone in person. *Decision-making* was reported in terms of the current coping strategies used, planning to use more productive strategies, planning to increase the amount of strategies used, and using relaxation techniques.

Previously, research focused on the topic of emotion-focused attention has used vague and often ambiguous terms such as insight (Amador & David, 2004; Elliott et al., 1994), awareness (Greenberg, 2004) and consciousness (Prochaska & Diclemente, 1982). Terms such as these are loaded with differing and complex meanings. In addition, whilst many of the theories and concepts of emotion-focused attention have clinical value, there is much overlap between these concepts, with many similar characteristics. Therapeutic insight (Elliott et al., 1994), mindfulness (Brown & Ryan, 2003), emotional intelligence (Mayer & Salovey, 1997) and consciousness-raising

(Prochaska & Diclemente, 1982) name a few of these concepts. This research extends and develops previous research focused on emotion-focused attention and presents a unified concept of ESA by consolidating various descriptions of ESA from previous research and enriching them with narratives from young people.

Previous research suggests that adolescents develop better knowledge about their cognitions and emotions from childhood to adulthood (Flavell, 1979; Gillham et al., 2001). Nevertheless, completing a self-monitoring program may assist young people in this developmental period by enhancing their development of metacognitions and emotion regulation in a productive way.

The Preliminary Emotional Self-Awareness Scale (ESAS)

A preliminary measure of ESA was developed in order to quantitatively measure ESA. An ESA measure was developed in Chapter 6 using a mixed methods design with 22 patients from a rural primary care practice. Qualitative responses of participants with low and high ESA scores were compared. This study suggested that there were differences in the qualitative reports of ESA when comparing low and high ESA groups. Those scoring low on the ESA scale were often confused by their emotions, found identifying their emotions easy, were able to get things off their chest, didn't know what they were feeling, and they accepted their feelings. In contrast, those scoring high on the ESA scale reported that the program accurately reflected their feelings, that it was often difficult to identify their feelings, that self-monitoring allowed them to confront their feelings, and that self-monitoring helped express their feelings in order to develop strategies to improve their mood.

A preliminary longitudinal confirmatory factor analysis of the ESA measure was conducted in Appendix J. This analysis suggested that the ESA measure performs slightly better as a multidimensional construct rather than unidimensional; although, further exploration of the psychometrics of this scale is needed.

Most scales used to measure emotion-focused attention contain items with a maladaptive focus such as rumination or worry (Trapnell & Campbell, 1999). Measures focusing on positive attributes of emotion-focused attention, or indeed, neutral scales are scarce (Gratz & Roemer, 2004). There are few scales that measure adaptive

emotion-focused attention including the Self-Reflection and Insight Scale (Grant et al., 2002), the Rumination Response Scale (Treynor et al., 2003) and the Meta-Experience Scale (Mayer & Stevens, 1994). Whilst these scales have been reported to have reasonable reliability, validity and psychometric properties, the subscales do not match the categories of ESA identified in the systematic literature review presented in Chapter 3. Existing measures also do not address developmental issues that occur during adolescence such as metacognition and emotional awareness issues. Furthermore, the five categories of ESA matched Watkins' (2008) criteria of concreteness and positive context and therefore a new scale was developed to specifically measure the five categories of ESA based on young people's experiences and descriptions of ESA. As the categories in the ESAS were developed by exploring ESA in previous research, this new scale has the potential to unify this area of research and allow comparisons of ESA between different interventions such as cognitive-behavioural therapy, mindfulness and emotion-focused therapy.

The Effects of Self-Monitoring on Emotional Self-Awareness

To examine the effects of self-monitoring on ESA, a mobile phone self-monitoring program was used with young people's ESA experiences examined both qualitatively and quantitatively. A preliminary examination of general feedback from young people completing the program (Chapter 4) showed that 21.4% of participants reported an increase in ESA. Due to the unsolicited nature of the feedback questions, this study was likely to underrepresent the experience of ESA during self-monitoring. Based on these initial results, in Chapter 5, in-depth qualitative interviews were then conducted with 37 young people experiencing mild or more depressive symptoms after completing the self-monitoring program. These targeted qualitative interviews indicated that 95% of participants reported an increase in one or more of the ESA categories after self-monitoring.

A preliminary examination of the ESA measure with 22 participants (Chapter 6), showed a slight increase in all ESA categories; however, these increases were not significant. Further examination using an RCT design (Chapter 7) indicated that total ESA scores increased in the self-monitoring intervention group when compared with the

attention-comparison group over time from pretest to 6-week follow-up. The intervention group also had significantly increased *recognition*, *contextualisation*, *communication* and *decision-making* subscales from pretest to 6-week follow-up when compared with the comparison group. *Identification* was not statistically different between groups over time. These studies suggest that self-monitoring is likely to increase young people's ESA over time.

Early research on momentary sampling techniques discovered that self-monitoring caused changes in the behaviour being monitored (Nelson, 1977). This behaviour change was attributed to an increased awareness of the monitored behaviour or cognition. Subsequently, this *reactivity* effect was shown to have substantial health intervention implications (Carter et al., 2007; Piasecki et al., 2007). Nevertheless, although noting that self-monitoring increases awareness of the targeted behaviour (Hiebert & Fox, 1981), there has been a substantial gap in the literature addressing this phenomenon and researching the possible mental health implications of using self-monitoring techniques. Therefore, to the author's knowledge, the current studies are the first attempt at unifying, quantifying, and measuring ESA, and using this concept as the mechanism in a momentary sampling program.

Previous research exploring the effects of self-monitoring has primarily focused on behavioural outcomes such as weight-loss (Bellack et al., 1974; Boutelle et al., 1999; Glanz & Murphy, 2007; Romanczyk, 1974) and smoking cessation (Abueg et al., 1985; Rozensky, 1974). The current research supports and adds to the limited research focusing on the effects of self-monitoring on cognitions and emotions (Fernandez & Beck, 2001; Harmon et al., 1980; Hiebert & Fox, 1981; O'Hara & Rehm, 1979; Scharer et al., 2002). Furthermore, in a previous study examining transcripts from participants in an expressive writing study, Pennebaker et al. (1990) noted that many participants expressed awareness and insight into their thoughts and feelings. Similarly, Chapters 4 and 5 present qualitative interviews with young people in which participants often expressed an increase in awareness of their emotions that they attributed to self-monitoring.

The Indirect Effect of ESA on Self-Monitoring and Depressive Symptoms

The parallel process LGCM presented in Chapter 7 demonstrated that self-monitoring significantly increased ESA in the intervention group when compared with the comparison group. An increase in ESA also significantly decreased depressive symptoms, thereby supporting the hypothesis that self-monitoring would increase ESA, which in turn, would decrease depressive symptoms. A medium indirect effect size was found for depressive symptoms and a small effect for anxiety symptoms. There was no significant indirect effect of self-monitoring on stress symptoms via ESA. Furthermore, results from Chapters 6 and 7 suggest that self-monitoring directly decreases depressive symptoms over time; however, there was no significant difference in depressive symptoms between the intervention and attention-comparison groups in the RCT as both groups experienced a significant decrease in depressive symptoms. Therefore, participation in research and other factors may have contributed to this effect for both the intervention and comparison groups. Despite this decrease in both groups, there was a further decrease in depressive symptoms for young people in the intervention group indirectly through ESA. Results show that the intervention group increased ESA significantly more than the comparison group, which in turn, led to a significant decrease in depressive symptoms. Modern mediation models using structural equation modeling (Fritz & MacKinnon, 2007) no longer require a significant direct effect to test for indirect effects. Indeed, this requirement has been found to lower the power to detect indirect effects (MacKinnon et al., 2002; Sheets & Braver, 1999). This is particularly the case for prevention and early intervention trials where small effects in the primary outcome are expected as participants tend to have mild depressive symptoms at pretest (Fritz & MacKinnon, 2007).

Self-monitoring techniques are a core component of psychotherapy and are thought to increase the benefits of therapy (Garland & Scott, 2002). Research investigating the use of homework diaries has had mixed results; nevertheless, several studies suggest that the completion of homework diaries increases positive mental health outcomes after therapy (Burns & Spangler, 2000; Kazantzis, 2000; Rees et al., 2005). The current finding that self-monitoring increased ESA and through this pathway led to a decrease in depressive symptoms provides additional support for the use of

homework diaries in psychotherapy. The current model of ESA may have the potential to enhance homework diaries currently used in psychotherapy by specifically incorporating the five categories of ESA in order to increase their effectiveness in therapy. Furthermore, utilising the mobile phone self-monitoring program may assist with young people's compliance with homework diaries. In a small-scale study by Gaynor et al. (2006), a mean of 56% of homework diaries were completed over eight weeks, with 67% completed in the first eight sessions and 41% after eight sessions. In comparison, the compliance rates calculated in Chapter 5 were slightly higher with a mean compliance of 94.6% for Week 1, 56.8% for Week 2, and 29.7% for Week 3, averaging 74.5% compliance across these 3 weeks. Therefore, involving self-monitoring tools developed for mobile phones may increase compliance with homework diaries.

As outlined in Chapter 3, much of the previous research investigating ESA used samples from undergraduates, limiting the generalisability of the research. In addition, one-third of the studies were cross-sectional and therefore could only report on associations between benefits and emotion-focused attention. The current research explores self-monitoring as an early intervention for young people with mild or more depressive symptoms and suggests that self-monitoring techniques have the potential to decrease depressive symptoms. There are few research studies focusing on the use of self-monitoring programs as early intervention for depression. A recent meta-analysis (Stice et al., 2009) suggested that prevention programs using self-monitoring were associated with larger decreases of depressive symptoms when compared with programs without self-monitoring techniques. The current study offers a new early intervention program exclusively focused on self-monitoring and demonstrates that self-monitoring may effectively decrease depressive symptoms. One of the advantages of the current research over previous research is that a population of young people with mild or more depressive symptoms was targeted from a broad range of backgrounds and locations; therefore, the current studies demonstrate the effects of self-monitoring in an indicated prevention population where early intervention is most critical.

In addition, the current studies lend support to research suggesting that early intervention strategies are more effective than universal programs (Horowitz & Garber, 2006; Rushton et al., 2002). Research suggests that universal prevention programs have limited effectiveness (Lewinsohn & Clarke, 1999; Merry, 2007; Sheffield et al., 2006).

Three main problems with universal strategies include: (a) the high attrition rates attributable to the length and time commitment, (b) the assumption of high levels of metacognitive ability that young people may not have developed yet, and (c) many young people involved have never experienced depressive symptoms and cannot relate to the content.

The benefits of early intervention programs, such as the self-monitoring program presented in this thesis, are that: (a) young people most in need of intervention are targeted, (b) intervening before the development of severe depressive symptoms may result in reducing the economic and personal cost of depression, (c) young people have some experience of elevated depressed mood and are therefore able to use their own experiences as a guide and learn from them rather than hypothetical scenarios, and (d) self-monitoring programs can be used to assess mental health and step-up to higher level intervention as needed.

There are two paradigms that focus exclusively on the benefits of self-monitoring, without additional therapy or interventions: momentary sampling techniques and Pennebaker's (1997) expressive writing technique. Research on Pennebaker's expressive writing technique suggests that writing about traumatic events each day for 15 to 30 minutes may result in positive physical and psychological outcomes (Gortner et al., 2006). The current studies support this research, further suggesting that structured digital tools can also be used for beneficial psychological outcomes. Pennebaker et al. (1990) suggested that words pertaining to *self-reflection* and *insight* may lead to beneficial cognitive change, findings which are further supported by those in Chapter 7, with ESA mediating the relationship between self-monitoring and depressive symptoms. Intriguingly, the expressive writing paradigm was described as a preventative model (Pennebaker et al., 1990), yet there is scarce research exploring the abilities of expressive writing to prevent depression or other mental, or physical, health problems. Nevertheless, based upon the current findings, it is likely that self-monitoring techniques could be used in prevention and early intervention of mental health problems such as depression.

There are broad applications for health interventions with momentary sampling techniques. The reactivity that occurs by simply monitoring a targeted behaviour has led to weight loss (Bellack et al., 1974; Boutelle et al., 1999; Glanz & Murphy, 2007;

Romanczyk, 1974), decreased negative mood (Fernandez & Beck, 2001; Harmon et al., 1980; O'Hara & Rehm, 1979), smoking cessation (Abueg et al., 1985; Rozensky, 1974), decreases in anxiety (Hiebert & Fox, 1981), and improvements in mental illnesses (Scharer et al., 2002). Leaders in the field of prevention research emphasised the importance of understanding the mediating and moderating factors underlying prevention and early intervention strategies (Horowitz & Garber, 2006; Pössel, 2003). The current studies have responded to this call by demonstrating that self-monitoring has the potential to decrease depressive symptoms indirectly via the mediating variable of ESA.

Limitations of the Investigation

Limitations of each study are presented in each chapter; however, there are a few overarching limitations that are worth noting here including: problems with the samples and generalisability to the population; and the lack of psychometric testing of the ESAS and the implications this has on the RCT analyses. Due to the methodology of recruiting through primary care and an adolescent outpatient clinic, the samples included in this thesis have a disproportionate number of young women compared with young men. This is a common finding, with women attending health care clinics more than men (Bertakis et al., 2000). As such, no comparison testing between men and women was conducted in this study. More qualitative responses from young men would have been ideal with an analysis of the differences in ESA between young men and young women to compare gender differences of the ESA categories. It is likely that some categories relate more to women than men and visa versa; however, this could not be determined in the current analyses. In addition, a larger proportion of young men in the RCT would have allowed for adding gender as a covariate to examine whether ESA occurred more with women and whether high ESA scores were predictive of reduced depressive symptoms for young women when compared with young men.

The size of the samples was also fairly small for most studies, particularly the mixed methods analysis and the RCT. Although the RCT sample was large enough to detect a medium indirect effect, a larger sample size would have allowed further testing of individual ESA categories, testing of the hierarchical structure of the ESA model, examination of the relationship between the ESA subscales with depression, stress and

anxiety symptoms. These analyses were not possible due to the small sample size. The hypothesis that ESA would have a negative relationship with rumination was not supported, possibly due to the lack of power in the studies.

A major limitation of the current thesis was the lack of psychometric testing of the ESAS. The number of tests conducted in Chapter 6 also increase the chance of Type I and II errors and therefore need to be interpreted with caution. Unfortunately, due to time and funding constraints, large-scale reliability and validity testing was not possible. Furthermore, an investigation of the relationship between ESA and depressive symptoms was thought to be more informative and important to understand than testing of the psychometrics at this stage of the development of the ESA model. Therefore the RCT was conducted without further psychometric testing. It is important to note that the lack of information about validity and reliability of the ESAS reflects upon the testing of the mediation model presented in Chapter 7, although this model fits the data well, it is important to understand that this is a preliminary investigation and further research is needed after psychometric testing of the ESAS.

Theoretical Implications of Findings

The research presented in this thesis can be understood in terms of the reinforcement sensitivity theory (RST) and further expands the descriptions of awareness and arousal presented by Corr (2011). According to the RST, novel or conflicting information attempts to activate both the flight-fright-freeze system (FFFS), and the behavioural activation system (responsible for rewards), resulting in activation of the behavioural inhibition system (BIS); which, in turn increases awareness and arousal. Activation of the BIS is implicated in anxiety disorders (Gray, 1982, 1990; McNaughton & Corr, 2008). Nevertheless, activation of the BIS is also a normal and essential process that inhibits nonproductive reflexive thinking and increases rational processes. Consequently, productive responses often occur as a result of BIS activation. The current research supports the theory that activation of the BIS can result in the productive process of ESA. Watkins' (2008) systematic literature review suggested that activation of productive ESA or activation of detrimental rumination and worry depends upon the characteristics of emotion-focused attention, such as abstraction, valence and

context. Therefore, focusing on concrete instances, positive contexts and positive emotions is likely to result in activation of productive processes, whereas abstract instances, negative context and negative emotions are likely to result in activation of detrimental processes. The current study did not support this theory with results presented in Appendix E indicating that ESA, a concrete process, was related to an increase in depressive symptoms and a decrease in coping skills and further results in Chapter 7 demonstrating no relationship between rumination and ESA rather than the negative relationship predicted by Watkins (2008).

According to the RST and neurological studies, dysfunction in the BAS, the FFFS or the BIS are implicated in anxiety disorders and depression (Corr, 2011). In particular, neurological studies suggest that depression is a result of low activation of the BAS, which is responsible for rewards. This suggests that people prone to depressive symptoms are less responsive to positive rewarding information, which, in turn is likely to reduce their motivation to seek rewarding stimuli (Depue & Iacono, 1989; Kasch et al., 2002). The underactive BAS results in increased activation of the BIS, which increases detrimental arousal and awareness.

Whilst well articulated and based in neurological research, the concept of RST is not unprecedented. Many years before the development of the RST, psychotherapeutic theory postulated that different systems are responsible for processing information: reflexive processes were identified akin to both the BAS and the FFFS, as they are automatic and process most day-to-day information; and reflective processes, which are akin to activation of the BIS in which information is only brought to conscious awareness when cognitive processing is required and can result in either positive or negative outcomes. The current research extends upon these two theories and highlights the similarities between them. Although coming from different backgrounds, the underlying components of the RST and psychotherapeutic theory are similar with both theories involving automatic and conscious processes. Automatic processes are responsible for processing most day-to-day information. Conscious processes are activated in order to stop unproductive automatic processes by bringing automatic processes into awareness and can result in either adaptive or maladaptive outcomes.

The current research adds to these theories by focusing on adaptive reflective processes and conceptualising ESA in a way that is quantifiable and contains concrete

aspects that can be incorporated into self-monitoring techniques. In addition, several key categories of ESA were identified in order to promote productive processing of affective information, with a hierarchical structure beginning with *recognition* of emotional experiences, then learning to *identify* specific feelings and the context of these feelings, and then progressing to *decision-making*. The communication of emotional knowledge appears to occur at each stage, allowing the individual to progress through the stages of ESA.

Practical Implications of the Research

Depression in adolescence is common with up to 30% of young people experiencing mild or more mental health symptoms in their teen years (Lewinsohn et al., 1993; Rushton et al., 2002). In addition, over half of those experiencing a single episode of depression will have subsequent episodes (Rude et al., 2004). Whilst cognitive-behavioural therapy is effective for treatment of major depressive disorder in adults and adolescents (Curry, 2001; Haby et al., 2004), there are few strategies in place to support the large majority of young people suffering from mild or moderate depressive symptoms (Lewinsohn et al., 1993; Rushton et al., 2002). Although there are various treatments for depression, including therapy and antidepressants, early intervention is the key to reducing the burden of depression among youth. Prevention and early intervention programs consist of universal, selective and indicated approaches with varying degrees of success. Given that young people without symptoms of depression do not generally develop depressive symptoms (Rushton et al., 2002), early intervention focusing on young people with mild or more symptoms of depression is warranted.

Self-monitoring programs provide simple and easy-to-use techniques to help young people in the early stages of depressive disorders, and may prevent the development of severe diagnosable symptoms of depression. With the advent of smart phones and smart phone applications, self-monitoring programs that run on mobile phones can be sophisticated and appealing to the younger generation. Young people are avid users of mobile phone technology and are rarely away from their phones, giving mental health service providers a rare opportunity to connect with young people and

engage with young people using a format they are familiar with and which is a vital tool in their day-to-day lives. Self-monitoring may increase communication between young people and health-care providers, allowing instant relay of mental health information to health providers. Self-monitoring programs provide simple and easy-to-use techniques to help reduce the burden of depression.

Future Research

The most important task to accomplish next in regards to the ESA model is psychometric testing of the ESAS with a large-scale sample to test the reliability and validity of this measure. A cross-sectional study that focuses exclusively on ESA and related phenomena, including other scales of emotion-focused attention, rumination and worry, would further identify the similarities and differences between these concepts. An investigation of the associations of each category of ESA on mental health is needed to further narrow down the effective components of ESA and refine the ESA hierarchical model. Using a large-scale heterogeneous sample would also allow for determining the individual differences of ESA, such as whether men generally have lower ESA than women, and allow for testing of developmental differences in metacognitions and emotion regulation, such as examining whether younger adolescents have less developed *decision-making* than older adolescents. The severity of depressive symptoms may also have an impact on ESA and on the effectiveness of self-monitoring strategies, and should be explored in the future. Young people experiencing severe depressive symptoms may have less ESA, more rumination and therefore may require more self-monitoring or additional therapeutic intervention than those with mild or moderate symptoms.

Second, a large-scale RCT is needed to confirm the preliminary findings presented in this thesis. An RCT clustered by general practice, with a waiting-list control group rather than an attention-comparison group, would have more power, less contamination within general practice settings, and provide a more conclusive test of the mediation of self-monitoring and depressive symptoms via ESA.

A third avenue of exploration warranted is further testing of the self-monitoring program with young people in order to determine optimal duration and frequency of

self-monitoring. From the current studies, a duration between 2 and 4 weeks was used. Further research is needed to determine the frequency and duration with the most impact on depressive symptoms. There are, however, competing factors to consider when determining the optimal length of the program, including personal preference and attrition rates. This will no doubt differ between individuals, some may like to monitor several times a day and others may like a shorter frequency program. It is important to ensure that young people don't feel that self-monitoring is a burden, so determining the maximum length of the program may be beneficial.

In Chapter 7, the therapeutic effects of self-monitoring were present at the 6-week follow-up. It was beyond the scope of the current investigation to determine how long the effects of the self-monitoring program would last upon completion. Further research is required to determine the longevity of these effects. The duration of the program (e.g., a 2-week versus a 4-week program) may affect how long the program is effective and may demonstrate that a 4-week self-monitoring program maintains a reduction in depressive symptoms considerably longer than a 2-week program. Furthermore, the utility of a second round of self-monitoring during stressful times or after a designated period of time as a relapse-prevention strategy warrants exploration. All these questions require further research.

More broadly, research exploring the benefits of ESA in psychotherapy could also be explored by incorporating the model of ESA into therapeutic settings and exploring whether self-monitoring can add to the benefits of therapy in young people with severe depressive symptoms. Previous research suggests that homework diaries may contribute to the effects of therapy (Kazantzis, 2000). Further investigation of self-monitoring programs specifically designed to increase ESA could be explored, and may improve the quality and effectiveness of therapy.

It must be noted that self-focus can result in negative effects which has been clearly explored and demonstrated in past research (e.g., Lyubomirsky & Nolen-Hoeksema, 1993, 1995; Moberly & Watkins, 2008; Nolen-Hoeksema, 1991; Rimes & Watkin, 2005). Self-monitoring programs therefore have the potential to do harm by increasing rumination in young people with elevated symptoms of depression. The program used in the current body of research attempts to limit the negative effects of self-monitoring by using Watkins' (2008) principles of a concrete focus and a positive

context by focusing on one specific instance of stress that has occurred whilst assisting young people to think about the best way of coping with the situation. Nevertheless further research is needed to test these principles and provide further evidence for the negative relationship between adaptive and maladaptive self-focus. Self-focus is also a large component of therapeutic intervention and therefore the potential to do harm is mitigated.

Conclusion

The concept and model of ESA presented in this thesis suggests that a multidimensional process of becoming aware of emotions may effectively decrease depressive symptoms when used in a self-monitoring program. ESA has clinical implications in therapeutic and preventative settings and further research is needed to cultivate the preliminary concept investigated here.

To my knowledge, this is the first RCT examining the use of a mobile phone self-monitoring program as an early intervention tool for young people with mild or more depressive symptoms. There is preliminary evidence to support the theory that self-monitoring may decrease depression via the mechanism of ESA, and may provide a useful framework for first-step care in depression. The program provided GPs with information about a young person's daily activities and may be able to detect early signs of mental health problems, such as elevated negative mood, stress and causes of stress, maladaptive coping strategies, isolation from peers, diet and exercise, as well as other risk and protective factors. The mobile phone self-monitoring program has the advantage of being low-cost, quick and easy to use. Mobile phones are well suited to early intervention programs, providing an alternative to 'watchful waiting' (van Straten et al., 2010) and allowing young people to provide accurate information to their GPs about their mood and stress (Reid et al., 2009), as well as shortening the length of time it would take to convey this information to GPs in a usual appointment. Mobile phone self-monitoring programs should be considered instead to taking a 'wait and see' approach and before suggesting more time-consuming and expensive interventions to young people with mild or more depressive symptoms.

The concept of ESA presented here is quantifiable and may assist in measuring the effects of therapy on young people's ESA. This preliminary body of work suggests that ESA may be a useful concept in prevention and early intervention of depressive disorders. There is also the possibility that the concept of ESA could be useful in therapeutic settings. However, further research is needed. Mobile phones are an integral part of young people's social networks and, as such, young people are readily accessible through these devices. This thesis demonstrates an exciting new area for early intervention research using a digital medium that young people enjoy using and are rarely without. Self-monitoring using mobile phones decreases the burden of participating in self-monitoring programs and allows young people to complete the program anytime and anywhere.

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Appendices

APPENDIX A

Abstracts and Posters from Conference Presentations

Using mobile phones in the prevention of adolescent depression: A randomised controlled trial examining emotional self-awareness as a mediating variable

Sylvia D. Kauer, Sophie C. Reid, Anthony Jorm, Henry Jackson and George Patton

Presented (2011) at the *International Society for Research on Internet Interventions*

Conference: Sydney, Australia and the *European Psychiatric Society Congress:*

Vienna, Austria

Abstract

BACKGROUND: Behavioural therapy often involves self-monitoring techniques to increase awareness about mood and stressful events. In turn, emotional self-awareness (ESA) is likely to decrease symptoms of depression and has potential as an early intervention tool for young people, particularly when mobile phones are used as a medium. A pilot study indicated that self-monitoring via mobile phones increased ESA with five categories proposed: awareness, identification, communication, contextualisation and decision-making.

OBJECTIVES: This RCT investigates the relationships between self-monitoring, ESA and depression using an early intervention mobile phone self-monitoring tool with young people at risk of developing depression.

METHODS: 118 young people (between 14 and 24 years of age) identified by 33 GPs as being at risk of depression were recruited in rural and metropolitan Victoria and randomly assigned to either the intervention group (where they monitored their mood, stress and daily activities) or the comparison group (where the questions about mood and stress were excluded). Participants completed baseline and follow-up measures of depression as well as measures of emotional self-awareness.

RESULTS: Participants in the intervention group demonstrated a greater decrease in depressive symptoms compared with the comparison group. A significant relationship between self-monitoring and depressive symptoms was found when ESA was added into regression model.

CONCLUSION: This RCT demonstrates mediation by ESA in the relationship between self-monitoring and depressive symptoms and provides support for using mobile phones and simple self-monitoring techniques to reduce depressive symptoms in early stage depression. The implications for early intervention with young people are discussed.

2010 Poster Presentation. Presented at the Australasian Society of Psychiatric Research: Bondi Beach, Australia.



EMOTIONAL SELF-AWARENESS

Preliminary analyses of an RCT using a mobile phone self-monitoring program (*mobiletype*) to decrease early symptoms of depression

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The Centre for Adolescent Health, Murdoch Childrens Research Institute, Royal Children's Hospital, University of Melbourne and Orygen Youth Health

Background

Depression is a severe, recurrent disorder often beginning with mild symptoms in adolescence. 36% of the disease burden of depression cannot be averted using current treatments, therapies and prevention programs¹.

Adolescence is the ideal target for early intervention as:

- Young people are learning to cope with stress and negative mood
- Depression generally begins during adolescence

Self-monitoring (keeping a diary for several days focusing on a target area such as mood):

- Potentially increases awareness of mood and stress².
- Has beneficial therapeutic effects³
- Shows promise as an early intervention tool for teens

Theoretical Model of Emotional Self-Awareness (ESA)

Self-monitoring may reduce depressive symptoms via the process of ESA as shown in Figure 1.



Figure 1. Emotional self-awareness model.

Five key elements of ESA:

- Ability to **communicate** emotions to others or oneself
- Awareness** of emotional experiences
- Identifying** emotions
- Contextualisation** of emotions; causes and consequence
- Emotional **decision-making**; learning to react to emotions productively

Aims

Preliminary investigation of the emotional self-awareness (ESA) model, using mediation regression analyses and focusing on:

- The relationship between self-monitoring and depressive symptoms and,
- The mediation effect of ESA on this relationship



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Methods

Young people identified by their GP as being at risk of depression were recruited in rural and metropolitan Victoria and randomly assigned to:

- The intervention group (where they monitored their mood, stress and daily activities using the mobiletype program⁴)
- Or the control group (only monitored daily activities using a modified mobiletype program).

Participants in both groups self-monitored up to 4 times a day for 4 weeks on a study mobile phone.

The study, designed using CONSORT guidelines, is illustrated in Figure 2.

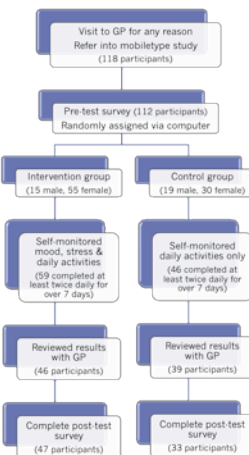


Figure 2. Randomised Controlled Trial Procedure

Results

There was significant regression of self-monitoring group on ESA ($r^2=1.3$, $F(2,81) = 10.36$, $p=0.011$).

Figure 3 shows an increase of the ESA category communication after self-monitoring by the intervention group and a decrease in the control group.

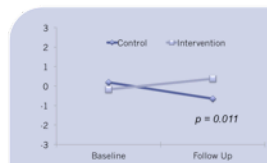


Figure 3. Comparison of control and intervention ESA Communication subcategory.

Baron & Kenny's model⁵ was used to test for mediation, using 3 regression equations:

- Self-monitoring group on depressive symptoms (total direct effect).
- Self-monitoring group on ESA and,
- Self-monitoring group and ESA on depressive symptoms (mediated effect).

Mediation is determined if the mediated effect reduces the total direct effect of self-monitoring group on depressive symptoms.

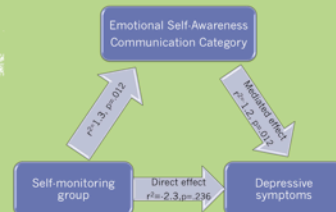


Figure 4. Mediation model of self-monitoring with ESA category Communication and depressive symptoms

Figure 4 illustrates significant regression equations between self-monitoring and ESA and between self-monitoring group, ESA and depressive symptoms.

In addition the direct relationship between self-monitoring and depressive symptoms ($r^2 = -3.5$, $F(2, 85) = 17.41$, $p = .062$) was reduced when the mediator was included ($r^2=-2.3$, $F(4,78) = 11.19$, $p = .236$).

Although the total direct effect of self-monitoring on depressive symptoms was not significant, there was a trend in the expected direction.

Figure 4 demonstrates that ESA partially mediates the relationship between self-monitoring group and depressive symptoms.

Conclusions

Preliminary conclusions:

ESA category 'communication' partially mediates the relationship between self-monitoring group and depressive symptoms.

This study suggests that self-monitoring via mobile phones has potential as an early intervention tool for teens with mild/moderate depression.

The relationship between self-monitoring and depression is likely to be mediated by ESA, providing a useful framework for enhancing self-monitoring programs.

Further analyses are underway which will include 6-week and 6-month follow up data from participants and explore all ESA categories.

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**Emotional Self-Awareness: A Qualitative Exploration of the Mechanism
Underlying a Mobile Phone Self-Monitoring Program (*mobiletype*)**

Sylvia D. Kauer, Sophie C. Reid, Anthony Jorm, Henry Jackson and George Patton

*Presented (2008) at the Adolescent Health Conference: Melbourne, Australia and the
Australasian Society of Psychiatric Research: Melbourne, Australia.*

Abstract

Background: Self-monitoring is a behavioural technique often used in therapy to increase awareness about moods and stressful experiences. Self-monitoring has potential as an early intervention tool for young people at-risk of depression, particularly when combined with young people's favourite accessory, the mobile phone. To date, little research explores the mechanism underlying self-monitoring.

Aims: This study qualitatively explored the emotional self-awareness model using a mobile-phone self-monitoring tool (the *mobiletype* program) with young people at-risk of developing depression and other mood disorders.

Methods: Thirty-seven young people, presenting at a clinical setting with a range of illnesses, self-monitored their mood and stressors using the *mobiletype* program for 2-4 weeks. A 10-minute interview was conducted with the participants to explore their experiences using the program, specifically targeting emotional self-awareness. Directed content analysis was used to analyse the qualitative data.

Results: The data supports the model of emotional self-awareness with 95% of participants reporting an increase in awareness of emotions after self-monitoring. These responses fell under the five proposed subcategories of: (i) awareness, (ii) identification, (iii) communication (iv) contextualisation and (v) decision-making. Further refinements to the model are provided with descriptive evidence and examples.

Conclusions: These findings supported and refined the theory that self-monitoring via mobile phones increases emotional self-awareness. Nevertheless, the relationship to depressive symptoms is yet to be explored. Further research is needed to determine whether increasing emotional self-awareness is related to a decrease in depressive symptoms. Plans for a randomised controlled trial involving quantitative measures of emotional self-awareness are suggested.

2007 Poster Presentation. Presented at the Australasian Society of Psychiatric Research: Sydney, Australia.

The phenomenon of insight and preliminary findings for preventing depression: Self-monitoring via mobile phones

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Background

Depression is predicted to be the leading cause of disability by 2020 (Murray & Lopez, 1997) and up to 30% of young people experience depressive symptoms (Patton et al., 2003). With the increasing rate of depression, it is imperative that new strategies are developed that prevent the occurrence of depression in young people.

Adolescence is the ideal target for prevention as young people learn to cope with everyday stresses and negative mood as well as express their emotions appropriately in their teen years.

One mediating factor that has preventative value is insight or emotional self-awareness. This concept of emotional self-awareness is widely used in a variety of therapeutic interventions and is critical for help-seeking behaviour to take place.

Emotional self-awareness

A core process in many psychological interventions such as:

- Psychoanalysis
- Cognitive behavioural therapy
- Cognitive-experiential self-theory
- Expressive writing (inhibition-confrontation approach).

Emotional self-awareness is defined as an internal process that allows individuals to:

- Recognise and become aware of an emotion
- Label the emotion and use this label when referring to that emotional state
- Understand the triggers and consequences of the emotions
- Determine the best way to deal with the emotion.

Other terms for emotional self-awareness are:

- Emotional understanding
- Adaptive self-focus
- Insight
- Conscious awareness
- Consciousness-raising.

related to emotions

The physical and psychological benefits that occur during therapies are often attributed to the process of emotional self-awareness.

New methods that help young people become aware of their negative moods and stressful experiences will allow young people to develop better coping strategies and prevent the occurrence of depressive symptoms.

Simple, easy to use and engaging strategies are necessary for young people at risk of developing depression.

By monitoring emotions and stressful experiences, young people can increase their emotional self-awareness, and learn to better manage their negative moods and stressful experiences. Self-monitoring strategies have demonstrated effects at reducing negative moods and increasing positive coping strategies (Pennabaker, 1997).

These effects are mediated by emotional self-awareness as illustrated in Figure 1. Self-monitoring increases emotional self-awareness, which in turn, increases productive coping strategies and decreases negative mood.

Figure 1. The mediation effects of emotional self-awareness on the relationship between self-monitoring and negative mood/coping strategies.



Aim

To qualitatively analyse the effects of a mobile phone self-monitoring tool on emotional self-awareness with young people at-risk of developing depression and other mood disorders.

Methods

An innovative, youth-friendly, mobile phone monitoring program developed by Dr Sophie Reid and the mobiletype team (Reid et al., submitted) was trialled with 100 Year 9 and Year 11 students from 6 Victorian secondary schools.

The mobiletype program

- mobiletype is an electronic diary loaded onto mobile phones.
- The diary captures a range of daily activities including:
 - ◊ Current activities (location, activity and company)
 - ◊ Moods (anxiety, stress, depression, anger and fatigue)
 - ◊ Stressful experiences (what occurred, responses to stress)
 - ◊ Alcohol and cannabis use.
- Young people answer the questions by selecting from a list of response options or texting in their answers.
- The program starts automatically at four random times a day.
- The program has been designed in collaboration with young people to ensure that it is easy to use, relevant to them and enjoyable.

Procedure

- Each participant was given:
 - ◊ A Nokia 6630 mobile phone with the mobiletype program to use for the duration of the trial
 - ◊ And either pre-paid Telstra SIM card or a Coles/Myer Gift Voucher to the value of \$25 for participating.
- Participants completed the program for 20 random days in a one-month period; this was to limit response fatigue.
- At the end of the study, participants completed a feedback form that included:
 - ◊ Likes/dislikes
 - ◊ Additional information
 - ◊ General comments about the program.

All appointments were conducted at school during a suitable time for participants and teachers.



Results

In response to general feedback questions, 20% of participants reported that self-monitoring helped:

1. Recognise and express feelings.
2. Become aware of connections between feelings and responses.
3. Understand a need for change.

Table 1 lists the participants' responses about emotional self-awareness. There were no differences between age, gender or socioeconomic status of the participants that reported an increase in emotional self-awareness.

Table 1. Feedback from participants about their emotional self-awareness.

Awareness/expressions of feelings	Awareness of connections between feelings & triggers/consequences
I could be open about anything.	It made me think how I was feeling and what I was doing.
That they made me feel like I had a friend. Cause I could talk a little.	If you say you're feeling bad, have a question asking what you are feel bad about eg: sick, sad,...
They helped express what was going on.	It was really good at making me realise my feelings. Often I would realise I wanted to do something else. This was an opportunity to start thinking about how I really felt.
I was able to think about my feelings.	I enjoyed the diary it helped me.
It felt kind of like the phone cared.	Sometimes hard to describe a situation/feeling.
Easy to use, you got to tell someone/something how you felt.	They made me recognise how I felt and then I would do something to make me feel better.
It was a good way to express my feelings.	Understanding of need to change
It was a good thing to be able to write down your feelings.	Maybe (include in the diary) how to deal with some problems and to write down how you feel.
Maybe more questions about how people write down how they feel.	Have more information about what you can do in some situations etc.
It was a great experience to write down your feelings.	
It gave you a chance to write down what you were feeling.	
I was able to be honest and not keep things to myself.	
You could be honest because you know that no one you know will read it.	
Additional options to describe the way you feel.	
You could express your feelings.	
They ask you how you felt.	

Conclusions

It is important to consider that 20% of participants spontaneously reported that the experience of monitoring increased their emotional self-awareness. Young people were not prompted to respond about their feelings or the benefits of self-monitoring.

Self-monitoring is likely to benefit young people by increasing their awareness and insight into their moods and coping responses.

As this study was not designed to specifically target emotional self-awareness, further research is needed to determine the effects of self-monitoring on emotional self-awareness. Future studies will include targeted questions relating to:

- Whether self-monitoring increased awareness of emotions
- The benefits of self-monitoring
- The participants' feelings.

Further research is also needed to determine if an increase in awareness and understanding of moods and stressors helps prevent the occurrence of depression. To do this, it would be helpful to investigate pre- and post-monitoring scores of depression, anxiety and stress scales as well as coping strategies used.

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APPENDIX B

Content of the different *mobiletype* programs

Table B1

The Different Modules and Time-Blocks in Which Each Module was Completed for Each Study Group.

Modules	Morning	Noon	Evening	Night
Activities	4,5,6 and 7	4,5,6 and 7	4,5,6 and 7	4,5,6 and 7
Sleep	4,5,6 and 7			
Mood	4,5,6 and 7 *	4,5,6 and 7 *	4,5,6 and 7 *	4,5,6 and 7 *
Stress	4,5,6 and 7 *	4,5,6 and 7 *	4,5,6 and 7 *	4,5,6 and 7 *
Last time	4,5,6 and 7 *	4,5,6 and 7 *	4,5,6 and 7 *	4,5,6 and 7 *
Alcohol	4	5,6 and 7 *		
Cannabis	4	5,6 and 7 *		
Daily stress				4,5,6 and 7 *
Diet				5,6 and 7
Exercise				5,6 and 7
Daily positive				7 *

Notes. 4 = Modules were used in the *mobiletype* program in Chapter 4 (*mobiletype* Version 1.1); 5 = Modules were used in the *mobiletype* program in Chapter 5 (*mobiletype* Version 2.0); 6 = Modules were used in the *mobiletype* program in Chapter 6 (*mobiletype* Version 2.1); 7 = Modules were used in the *mobiletype* program in Chapter 7 (*mobiletype* Version 2.2); * = these modules were not used in the comparison group in Chapter 7 (*mobiletype* version 2.2 comparison program).

Complete Content of Each *mobiletype* Program

Table B2

The mobiletype Version 1.1 Program

Module	Question	Response	Next Question	
Activities	a1	Where are you now?	At home	a2
			In school	a2
			At work	a2
			In a public place	a2
			At friend's house	a2
			In a car	a2
			At sport	a2
			Other place	a2
			a2	Who are the MAIN people you are with?
	Friends	a3		
	Class mates	a3		
	Boy / girlfriend	a3		
	Parents	a3		
	Family	a3		
	Coworkers	a3		
	Other acquaintances	a3		
	a3	What is the MAIN thing you are doing now?		
			Working	a5
			Eating / drinking / cooking	a5
			Exercising / sport	a5
			Resting / sleeping	a5
			Travelling	a5
			Listening to music	a5
			Computer games / playstation / xbox	a5
			Thinking	a5
	TV	a5		
	Phone	a5		
Shopping	a5			
Smoking, drinking alcohol or other drugs	a5			
Intimacy with boy / girlfriend	a5			
Hanging out	a5			
Internet	a5			
Phone / SMS	a5			
Grooming / self-care	a5			
Other	a4			

(Table B2 continues)

(Table B2 continued)

Module	Question	Response	Next Question		
Activities	a5	Are you enjoying what you are doing?	Loving it		
		Pretty alright			
		Neither fun nor bad	Next Module		
		Bit of a pain	Next Module		
Mood	c0	The next 8 items are words that describe feelings and emotions. Indicate to what extent you felt each way just before hearing the signal.	Hating it		
			Next Module		
			Next Module		
			Next Module		
			c1		
		c1	Anxiety?	Overwhelmed	c2
				Pressured	c2
				Worried	c2
				Tense	c2
				Uneasy	c2
		c2	Alertness	None	c2
				Hyper	c3
				Energetic	c3
				Alert	c3
				Attentive	c3
				Aware	c3
				None	c3
		c3	Happiness	Overjoyed	c4
				Thrilled	c4
				Happy	c4
Glad	c4				
Content	c4				
None	c4				
c4	Fatigue?	Exhausted	c5		
		Sleepy	c5		
		Tired	c5		
		Sluggish	c5		
		Blah	c5		
		None	c5		
c5	Stress?	Intense	c6		
		Strong	c6		
		Moderate	c6		
		Mild	c6		
		Just noticeable	c6		
		None	c6		

(Table B2 continues)

(Table B2 continued)

Modules	Question	Responses	Next Question	
	c6	Anger?		
		Furious	c7	
		Pissed	c7	
		Mad	c7	
		Annoyed	c7	
		Cross	c7	
	c7	Sadness?	None	c7
			Devastated	c8
			Depressed	c8
			Sad	c8
			Down / Low	c8
	c8	Wellbeing?	Unhappy	c8
			None	c8
			Fantastic	c9
			Excellent	c9
Great			c9	
Good			c9	
c9.1	Looks like you're feeling pretty anxious / stressed. What do you think you might do now?	So-so	c9	
		None	c9	
		free text	next module	
c9.2	Looks like you're feeling pretty worn out. What do you think you might do now?	free text	next module	
c9.3	Looks like you're feeling pretty sad / depressed. What do you think you might do now?	free text	next module	
Stress	d1	Since the last signal, have you been hassled or has something stressful happened?	Yes	d2
		No	Next module	
	d2	How bad / negative / stressful was this hassle?	Not bad / stressful	Next module
			Kind of bad / stressful	Next module
			Pretty bad / stressful	d3
d3	What was the MAIN stress? What happened?	Very bad / stressful	d3	
d4	Why do you think it happened?		d4	

(Table B2 continues)

(Table B2 continued)

Modules	Question	Responses	Next question	
	d5	How much do you feel you can control the outcome of this event?	Not at all Kind of Mostly Definitely	d6 d6 d6 d6
	d6	What, if anything, did you do about it?	Free text	Next module
Last time	e1	Last time you said you might do (response from last entry), did you end up doing it?	Yes No	e2 next module
	e2	How did it make you feel when you did?	Devastated Depressed Sad Down/low Unhappy So-so Good Great Excellent Fantastic	next module next module next module next module next module next module next module next module next module
Alcohol	f1	Did you drink alcohol last night / yesterday?	Yes No	f2 Next module
	f2	What kind of alcohol did you drink (can select more than one)	Beer Wine Mixed spirits (eg Stolis, Barcadi Breezer) Pure spirits (eg Vodka, Whiskey, Scotch) Wine cooler (eg. Tropicana) Alcoholic cider (eg. Strongbow)	f2.1 f2.1 f2.1 f2.1 f2.1 f2.1
	f2.1	What container did you drink (response from f2) in?	Shot / ounce (30ml) Glass (300ml) Big bottle (750ml) Can/small bottle (375ml)	f2.1.1 f2.1.1 f2.1.1 f2.1.1
	f2.1.1	How many drinks did you have of (reponse from f2) in (response from f2.1)?		f3

(Table B2 continues)

(Table B2 continued)

Modules	Question	Response	Next Question	
Cannabis	f3	Who were the MAIN people you were with when drinking?	Alone	f4
			Friends	f4
			Boy/girlfriend	f4
			Parents	f4
			Family	f4
			Coworkers	f4
			Strangers	f4
			Other or acquaintance	f4
	f4	What was the main reason you drank alcohol?	To feel good / have fun	Next module
			To relax	next module
			Peer pressure	next module
			To get away	next module
			To feel less depressed	next module
			To get drunk	next module
			To distract myself	next module
			Other	f5
	f5	Please describe why you drank alcohol?		Next module
g1	Did you use marijuana last night / yesterday?	Yes	g2	
		No	Next module	
g2	What was the main way you used marijuana?	Ate it	g3	
		Pipe	g3	
		Bong / Cone	g3	
		Joint	g3	
g3	How many did you have?		g4	
g4	Who were the MAIN people you used marijuana with?	Alone	g5	
		Friends	g5	
		Boy/girlfriend	g5	
		Parents	g5	
		Family	g5	
		Coworkers	g5	
		Strangers	g5	
		Other or acquaintance	g5	

(Table B2 continues)

(Table B2 continued)

Module	Question	Response	Next Question	
	g5	What was the main reason you used marijuana?	To feel good / have fun To relax Peer pressure To get away To feel less depressed To get stoned To distract myself Other	Next module next module next module next module next module next module Next module g6
	g6	Please describe why you used marijuana?		Next module
Daily Stress	h1	Overall how stressful would you rate today?	Not stressful Kind of stressful Pretty stressful Very stressful	h1.1 h1.1 h1.1 h1.1
	h1.1	What was the most stressful thing that happened today? If you've already written it down then hit yet, if not please write it now.	Have not written about it Yes, I've already written about it	h2 next module
	h2	What was the most stressful thing that happened today?	free text	next module

Table B3

The mobiletype Versions 2.0 and 2.1 Program

Module	Question	Response	Next question	
Activities	a1	Where are you now?	At home	a2
		In school	a2	
		At work	a2	
		In public place	a2	
		At friend's house	a2	
		In a car	a2	
		At sport	a2	
		Other place	a2	
		a2	Who are the main people you are with?	Alone
	Friends			a3
	Class mates			a3
	Boy/girlfriend			a3
	Parents			a3
	Family			a3
	Coworkers			a3
	Strangers			a3
	Other or acquaintances			a3
	a3			What is the main thing you are doing now?
		Working	a5	
		Eating / drinking / cooking	a5	
		Exercising / sport	a5	
		Resting / sleeping	a5	
		Travelling	a5	
		Listening to music	a5	
		Computer games / playstation / xbox	a5	
		Thinking	a5	
		TV / Movies	a5	
		Phone / SMS	a5	
	Shopping	a5		
	Smoking / drinking / drugs	a5		
Intimacy with boy / girlfriend	a5			
Talking / Hanging out	a5			
Internet	a5			
Dressing / bathroom / Toilet	a5			
Reading	a5			
Other	a4			

(Table B3 continues)

(Table B3 continued)

Module	Question	Response	Next Question	
	a4	What are you doing now?	a5	
	a5	Are you enjoying what you are doing?	Loving it Pretty alright Neither fun nor bad Bit of a pain Hating it	Next module Next module Next module Next module Next module
Sleep	b1	How many hours did you sleep last night?	Less than 2 2 to 4 4 to 6 6 to 8 8 to 10 10 to 12 12 or more	b2 b2 b2 b2 b2 b2 b2
	b2	If you woke up during the night, how long were you awake?	Less than 15 minutes 15 to 30 minutes 30 mins to 1 hr 1 to 2 hours 2 to 3 hours 3 hours or more	b3 b3 b3 b3 b3 b3
	b3	Rate your sleep quality last night.	Very good Fairly good Fairly bad Very bad	Next module Next module Next module Next module
Mood	c1	How anxious are you?	Extremely Strongly Moderately Mildly Just a little Not at all	c2 c2 c2 c2 c2 c2
	c2	How alert are you?	Extremely Strongly Moderately Mildly Just a little Not at all	c3 c3 c3 c3 c3 c3

(Table B3 continues)

(Table B3 continued)

Module	Question	Response	Next Question
c3	How happy are you?	Extremely	c4
		Strongly	c4
		Moderately	c4
		Mildly	c4
		Just a little	c4
		Not at all	c4
c4	How tired are you?	Extremely	c5
		Strongly	c5
		Moderately	c5
		Mildly	c5
		Just a little	c5
		Not at all	c5
c5	How stressed are you?	Extremely	c6
		Strongly	c6
		Moderately	c6
		Mildly	c6
		Just a little	c6
		Not at all	c6
c6	How angry are you?	Extremely	c7
		Strongly	c7
		Moderately	c7
		Mildly	c7
		Just a little	c7
		Not at all	c7
c7	How sad are you?	Extremely	c8
		Strongly	c8
		Moderately	c8
		Mildly	c8
		Just a little	c8
		Not at all	c8
c8	How well do you feel?	Extremely	c9
		Strongly	c9
		Moderately	c9
		Mildly	c9
		Just a little	c9
		Not at all	c9
c9	Looks like you've been feeling pretty stressed / upset. What do you think you might do now?		

(Table B3 continues)

(Table B3 continued)

Module	Question	Response	Next Question	
Stress	d1	Since the last signal, have you been hassled or has something stressful happened?	Yes	d2
		No	Next module	
	d2	How bad /negative /stressful was this hassle?	Not bad/stressful	Next module
			Kind of bad/stressful	d3
			Very bad/stressful	d3
	d3	What was the MAIN stress? What happened?	Exams	d5
			Too much homework	d5
			Teased / bitched about / rejected	d5
			Work hassles / job loss	d5
			Unable to sleep / bad dreams	d5
			Lost / stolen property	d5
			You are sick / physically hurt	d5
			In trouble with teacher / other adult	d5
			Conflict with parents / parents fighting with each other	d5
			Conflict with friends / brother / sister	d5
			Someone close to you is having problems or sick	d5
			Bullied / physically hurt by someone	d5
			Conflict / break-up with boy/girlfriend	d5
			Don't know / Unsure	d5
			Nothing	d5
Other			d4	
d4			Please describe the stress?	
d5	How much do you feel you can control the outcome of this event?	Not at all	d6	
		Kind of	d6	
		Mostly	d6	
		Definitely	d6	

(Table B3 continues)

(Table B3 continued)

Module	Question	Response	Next Question
d6	Did you do any of these things because of the stress (can select more than one)?	Talked to someone about it	d7
		Watched TV, listened to music or played computer games	d7
		Drank alcohol or used drugs	d7
		Exercise / sport	d7
		Hung out with friends to distract myself	d7
		Ate something	d7
		Tried to relax or sleep	d7
		Studied / did homework	d7
		Worked	d7
		Didn't do anything	d7
		Asked for help from a doctor / counsellor / responsible adult	d7
		Walked away / avoided problem	d7
		Yelled at or hit something	d7
		Cried	d7
		Hurt myself	d7
d7	Did you think any of these things about the stress (can select more than one)?	I thought of ways to solve it	d8
		I felt it was all my fault	d8
		I just gave up and accepted it	d8
		I worried a lot about all the bad stuff	d8
		I thought about the all the good stuff	d8
		I thought about hurting myself	d8
		I tried to put it into perspective	d8
		I thought of the worst outcome	d8
		I feel like its someone else's fault	d8
		I thought 'this isn't happening to me'	d8
		I thought of people worse off than me	d8
		I wished it would go away	d8
		I made jokes to make it less serious	d8
		I tried not to think about it	d8
		I let everyone know how I felt	d8
		I planned to deal with it later	d8

(Table B3 continues)

(Table B3 continued)

Module	Question	Response	Next question
	d8	Have we missed anything else you did / thought / felt about the stress?	Next module
Last time	e1	The last time you said you might do "\$LASTRESPONSE". Did you end up doing it?	Yes No
	e2	How did it make you feel when you did?	e2 Next module Next module Next module Next module Next module Next module Next module Next module Next module Next module Next module Next module
Alcohol	f1	Did you drink alcohol last night / yesterday?	Yes No
	f2	What kind of alcohol did you drink (can select more than one)	f2 Next module
	f2.1	What container did you drink beer in?	f2.1 f2.2 f2.3 f2.4
	f2.1.1	How many pots did you drink?	Pot glass (285ml) Pint glass (568ml) Stubby/can (330 - 375ml) Big bottle / long neck
	f2.1.2	How many pints did you drink?	f2.1.1 f2.1.2 f2.1.3 f2.1.4
	f2.1.3	How many stubbys / cans did you drink?	free text
	f2.1.4	How many long necks did you drink?	free text
	f2.2	What container did you drink wine in?	free text
	f2.2.1	How many small glasses of wine did you have?	Small glass (100ml) Big glass (200ml) Big bottle (750ml) Small bottle (330 - 375ml)
	f2.2.1	How many small glasses of wine did you have?	f2.2.1 f2.2.2 f2.2.3 f2.2.4 f3

(Table B3 continues)

(Table B3 continued)

Modules	Question	Response	Next Question
f2.2.2	How many big glasses of wine did you have?	free text	f3
f2.2.3	How many big bottles of wine did you have?	free text	f3
f2.2.4	How many small bottles of wine did you have?	free text	f3
f2.3	What container did you drink mixed spirits in?	Glass (about 200ml)	f2.3.1
		Can/small bottle	f2.3.2
f2.3.1	How many glasses of mixed spirits did you have?	free text	f3
f2.3.2	How many cans/small bottles of mixed spirits did you have?	free text	f3
f2.4	What container did you drink pure spirits in?	Shot glass	f2.4.1
		Glass (about 100ml)	f2.4.2
		Small bottle / half bottle (375ml)	f2.4.3
		Big bottle (750ml)	f2.4.4
f2.4.1	How many shot glasses of pure spirits did you have?	free text	f3
f2.4.2	How many glasses of pure spirits did you have?	free text	f3
f2.4.3	How many half bottles of pure spirits did you have?	free text	f3
f2.4.4	How many bottles of pure spirits did you have?	free text	f3
f3	Who were the MAIN people you were with when drinking?	Friends	f4
		Boy/girlfriend	f4
		Parents	f4
		Family	f4
		Coworkers	f4
		Strangers	f4
		Alone	f4
		Other or acquaintance	f4

(Table B3 continues)

(Table B3 continued)

Modules	Question	Response	Next Questions	
	f4	What was the main reason you drank alcohol?	To feel good / have fun To relax Peer pressure To escape To feel less depressed To get drunk To distract myself Other	Next module Next module Next module Next module Next module Next module Next module f5
	f5	Please describe why you drank alcohol?	free text	Next module
Cannabis	g1	Did you use marijuana last night / yesterday?	Yes No	g2 Next module
	g2	What was the main way you used marijuana?	Ate it Pipe Cone Joint	g3 g3 g3 g3
	g3	How many did you have?	free text	g4
	g4	Who were the MAIN people you used marijuana with?	Friends Boy/girlfriend Parents Family Coworkers Strangers Alone Other or acquaintance	g5 g5 g5 g5 g5 g5 g5 g5
	g5	What was the main reason you used marijuana?	To feel good / have fun To relax Peer pressure To escape To feel less depressed To get stoned To distract myself Other	Next module Next module Next module Next module Next module Next module Next module g6
	g6	Please describe why you used marijuana?	free text	Next module

(Table B3 continues)

(Table B3 continued)

Module	Question	Response	Next Question
Daily Stress	h1	Overall how stressful would you rate today?	Not stressful
			Kind of stressful
			Pretty stressful
		Very stressful	h2
	h2	What was the most stressful thing that happened today?	free text
Diet	i1	What meals did you eat today (including snacks)	Breakfast
			Morning tea
			Lunch
			Afternoon tea
			Dinner
			Other snacks
	i2	How many times today did you eat fast/junk food, fatty foods or sweets? eg. hamburgers, hot dogs, meat pies, potato chips or savory snacks, biscuits, doughnuts, cakes or chocolate.	None
			Once
			Twice
			3 times
			4 times
			5 times
			6 times
i3	How many times did you drink sweet drinks? eg. soft drinks, cordial, Big M, flavoured mineral water	7 times or more	
		None	
		Once	
		Twice	
		3 times	
		4 times	
		5 times	
i4	How much did you eat today?	6 times	
		7 times or more	
		Less than I needed	
		A good amount	
		More than I needed	

(Table B3 continues)

(Table B3 continued)

Module	Question	Response	Next Question	
Exercise	j1	Did you do any exercise today? Exercise includes all physical activities that increases your heart rate and makes you get out of breath some of the time.	Yes	j2
			no	Next module
	j2	What was the main exercise you did today?	Fast walking	j3
			Running / jogging	j3
			Swimming	j3
			Cycling	j3
			Skateboarding / rollerblading	j3
			Ball games	j3
			Water sports	j3
			Martial arts	j3
			Work out at the gym	j3
			PE at school	j3
	Dancing	j3		
	j3	How much exercise did you do?	Other	j3
			Less than 30 mins	j4
			30 mins to 1 hr	j4
1 hr to 1.5 hrs			j4	
1.5 to 2 hrs			j4	
2 to 2.5 hrs			j4	
2.5 to 3 hrs			j4	
3 to 4hrs			j4	
4 or more hrs	j4			
j4	How much did you enjoy exerising?	Loved it	Next module	
		Pretty alright	Next module	
		Neither fun nor bad	Next module	
		Bit of a pain	Next module	
		Hated it	Next module	
Sedentry	k1	How much time did you spend watching TV, playing video games or on the computer yesterday?	Less than 30 mins	
			30 mins to 1 hr	
			1 to 1.5 hrs	
			1.5 to 2 hrs	
			2 to 3 hrs	
			3 to 4 hrs	
			4 to 5 hrs	
			5 to 6 hrs	
	6 or more hrs			

The *mobiletype* 2.2 program

The *mobiletype* program Version 2.2 used in Chapter 7 was the same as Version 2.0 and Version 2.1 except for the following changes:

- Question a2 “Who are the MAIN people you are with?” had two extra options: “Housemates” and “With young child”.
- An extra module called Daily Positive involving the questions in Table B4.

Table B4.

The Daily Positive Module in mobiletype Version 2.2

Question	Responses	Next question
11	Overall how pleasant/positive would you rate today?	12
	Not at all positive	12
	Kind of positive	12
	Pretty positive	12
	Very positive	12
12	What was the most positive thing that happened today?	Next Module
	free text	

Appendix C

Qualitative Codebook for Thematic Analysis in Chapters 4 and 6.

Table C1.

Qualitative Codebook for The Thematic Analysis in Chapters 4 and 6.

Code	Definition	Examples and search terms
Emotional self-awareness (broad theme)	An increase in awareness of emotions, ability to identify and define emotions, communication of moods, understanding the triggers and consequences of different emotions, and making decisions about how to better deal with negative mood and stressors. Anything related to awareness of emotions to be narrowed down into specific themes. This family is about an INCREASE in ESA.	Not applicable
Recognition	Recognising and becoming aware of an emotion. Refers to participant's own emotion.	Examples: "realised how I was feeling" "The program helped think about feelings" Search terms: think, notice, understand, aware, reflected and analyse
Communication	The ability to communicate an emotion to others and oneself by locating the appropriate label. Using the label to refer to the emotional state including the therapeutic benefits of communication or communicating to release negative mood or vent. This family does not include general communication of emotions. It must be a specific instance and refer to a specific emotion or difficulty in identifying the emotion felt.	Example: "talking to someone about my feelings" Search terms: SMS, talking, verbalising, sharing information with GP via the summary page

(Table C1 continues)

(Table C1 continued)

Code	Definition	Examples and search terms
Contextualisation	Understanding the associated triggers and consequences of the emotions. Identifying the preceding and proceeding events that occur to cause the feeling. Must relate the context to the emotion.	Examples: time of day, particular situation, emotional reactions Search Terms: context, caused, reaction, effect
Decision-making	Using the information gathered about the emotion such as understanding the emotions, how it affects behaviour or cognitions, and making a rational conscious decision about the best way of dealing with it. This theme is about reflecting on the information gathered about emotions to make decisions.	Examples: "I need to relax more" "Thought about the negative things I do in response to stress and change them" "think about new strategies to try" Search terms: decision, relaxation, strategies, accept, plan.
Identification	Defining an emotion and attaching it to a suitable label. Being able to distinguish the emotion attached to that label from other emotions.	Examples: "I learnt to figure out what I was feeling" "Gave me time to identify what I was feeling" "Sometimes difficult to figure out what I'm feeling" Search terms: realised, identified, distinguished.
Acknowledgement	Having an external party acknowledge the emotional experience, such as a therapist. Disclosing emotions to a therapist or the feeling that someone (or something) is listening to you and acknowledging that you have feelings. Feeling important by receiving special attention. Also, confiding how one feels to a confidential source. Not being judged.	Examples: "felt like the phone cared" Search terms: Cared for, listened, acknowledged, understood.

Appendix D

Example of the summary report accessible to doctors

Mobile TYPE Project

Intervention Group

>> Summary Report

I - Mood

mood fluctuated across the week: on some days there was little evidence of negative mood, and on others, particularly most days in week 2 she reported moderate negative mood. There were no days of very negative mood.

II - Stress & Coping

Stresses: reported three stressful occurrences in the second week, which may account for her elevated negative mood during that week. Two of these stresses were conflict with her boy/girl friend.

Coping behaviours/actions: reported crying and "didn't do anything" as her two most common coping strategies. She did report the strategies that can be helpful which are relaxing and watching TV or listening to music.

Coping thoughts/cognitions: For each stress she reported blaming herself, catastrophising, and wishing her stresses away. **Importantly, she reported two instances of thinking of hurting herself.** It is notable that there were no positive or helpful cognitive coping strategies.

III - Maintaining Well-being

Activities: appears to spend the majority of her time at home or at work. She reported being with her boy/girlfriend predominantly, followed by being alone or with coworkers. There were very few accounts of spending time with friends which is unusual for someone her age. Many of the activities she reported were watching television, relaxing/resting/sleeping, talking or working. More social activities did not seem to feature very often.

Sleep: reported having between 8-10 hours sleep each night.

Alcohol: reported one drinking occasion across the 2.5 weeks in which she consumed 6 glasses of mixed spirits (approximately 1.5 standard drinks) to feel good or have fun. This equates to approximately 9 standard drinks and falls in the moderate risk drinking for short term harms according to the NHMRC criterion.

Eating: skips breakfast often, but eats lunch and dinner every day. She reported eating snacks and consumes 1-2 serves of junk-food and 2 serves of soft each day.

Exercise: reported two occasions of exercising across the 2.5 week period, one being 1-1.5 hours at the gym and the other was not specified but was for less than 30 mins.

Television/Computer: reported watching up to 4 hours of television in a day, however she mostly appears to watch between 1.5 to 2 hours per day.

IV- Useful Resources / Recommendations

appears to have some low days, and may find it difficult to lift out of these. She has a tendency to blame herself and turn to the worst outcome when faced with stresses, in particular conflict with her partner. She also thinks of harming herself but did not report that she did so. There is a strong sense of hopelessness about her coping behaviours, as she reports crying and not doing anything most commonly. These unhelpful coping strategies may contribute to her low mood, especially in the absence of positive strategies of which she reported none. Her daily activities also seemed a little socially isolated with few reports of spending time with friends. There was little to note in particular concerning her sleeping and drinking patterns. She does not exercise often, and she skips breakfast most days.

Reviewing her coping strategies with an emphasis on helpful coping may be useful. Handouts that may be applicable are:

1. [10 questions to help think about stress?](#)
2. [Problem solving](#)
3. [Depression and thinking](#)

Navigation

Summary Report | Negative Mood | Stress & Coping | Activities | Alcohol & Cannabis | Eat | Exercise

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Mobile TYPE Project

Intervention Group

>> **Activities** Week 1 Week 2 Week 3 Week 4

week 1

%	Location	%	Company	%	Activity
40.91	At home	33.33	Boy/girlfriend	31.58	TV / Movies
22.73	In a car	33.33	Alone	21.05	Other
18.18	At work	19.05	Co-workers	21.05	Eating / drinking / cooking
13.64	Other place	9.52	Parents	15.79	Working
4.55	In public place	4.76	Family	10.53	Resting / sleeping

Average hours of sleep:		Average hours spending on watching TV & Video Games:	
%	Sleep	%	TV/VideoGames
100.00	8 to 10	50.00	1.5 to 2 hrs
		25.00	1 to 1.5 hrs
		12.50	3 to 4 hrs
		12.50	2 to 3 hours

Summary Report Negative Mood Stress & Coping **Activities** Alcohol & Cannabis Eat Exercise

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Mobile TYPE Project

Intervention Group

>> **Alcohol & Cannabis** Week 1 Week 2 Week 3 Week 4

week 1

Alcohol

	Drink	Kind of Alcohol	Container	Standard Drink	Reason
Sun	Drinking	Mixed spirits (eg Stolts, Barcardi B	■ [Glass (about 200ml)]	#4.7	To feel good / have fun
Mon	No drinking				
Tues	No drinking		■	■	
Wed	■	■	■	■	■
Thurs	■	■	■	■	■
Fri	No drinking				
Sat	■	■	■	■	■

Cannabis

	Use	Method	Amount	With whom	Reason
Sun	No use				
Mon	No use				
Tues	No use				
Wed	■	■	■	■	■
Thurs	■	■	■	■	■
Fri	No use				
Sat	■	■	■	■	■

Legends:
 Symbols Meaning
 ??? Missing value
 ■ No Data

Summary Report Negative Mood Stress & Coping **Alcohol & Cannabis** Eat Exercise

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Mobile TYPE Project

Intervention Group

Week 1
Week 2
Week 3
Week 4

week 1

	Breakfast	Lunch	Dinner
Sun		yes	yes
Mon	yes	yes	yes
Tues		yes	yes
Wed	yes	yes	yes
Thurs	yes	yes	yes
Fri	■	■	■
Sat		yes	yes

	Morning Tea	Afternoon Tea	Other Snacks	Junk Food	Soft Drink
Sun			yes	Twice	Twice
Mon			yes	Twice	Twice
Tues	yes		yes	3 times	Twice
Wed	yes		yes	Once	Twice
Thurs	yes		yes	Twice	Twice
Fri	■	■	■	■	■
Sat	yes	yes		Twice	Twice

Legends:
[Symbols](#) [Meaning](#)
??? Missing value
yes Taken
■ No Data

Summary Report
Negative Mood
Stress & Coping
Activities
Alcohol & Cannabis
Eat
Exercise

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Mobile TYPE Project

Intervention Group

Week 1
Week 2
Week 3
Week 4

week 1

	Did you exercise?	Exercise	Amount	Enjoyment
Sun	No			
Mon	No			
Tues	No			
Wed	No			
Thurs	No			
Fri	■	■	■	■
Sat	Yes	Other	Less than 30 mins	Neither fun nor bad

Legends:
[Symbols](#) [Meaning](#)
??? Missing value
■ No Data

Summary Report
Negative Mood
Stress & Coping
Activities
Alcohol & Cannabis
Eat
Exercise

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Appendix E

Quantitative analysis of the Depression, Anxiety and Stress Scale and the Adolescent Coping Scale from Chapter 5

Hypothesis

The hypotheses for these analyses was that higher levels of ESA would be associated with (a) a decrease in mental health outcomes from pretest to posttest, (b) an increase in productive coping from pretest to posttest, and (c) participants would have better mental health outcomes from pretest to posttest.

Results

The means and standard deviations of pretest and posttest mental health symptoms and coping styles are presented in Table E1.

Table E1

Descriptive Statistics of the Depression, Anxiety and Stress Scale and Adolescent Coping Scale Subscales Pretest and Posttest

	Time 1		Time 2	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
DASS				
Depression	12.0	9.68	12.5	8.92
Anxiety	11.3	8.67	10.0	7.85
Stress	15.6	9.64	15.2	7.46
ACS				
Problem-solving	44.0	10.84	40.6	11.46
Reference to Others	32.4	11.01	26.4	13.47
Nonproductive	31.6	10.37	28.3	10.53

Compared with the general population, participants were classed in the 'normal' range for the stress subscale. For the anxiety and depression subscales, participants were

in the ‘mild’ range suggesting that participants were slightly above the population mean but were nevertheless well below a diagnosable disorder. For each subscale of the DASS, two regression analyses were conducted: Model 1 using the pretest DASS score to predict the posttest DASS score and Model 2 adding the ESA scale to predict the posttest scores of depression, anxiety and stress. These results are presented in Table E2.

Table E2

Multiple Regression Analysis Predicting Posttest Stress Depression, Anxiety and Stress from Pretest Scores with ESA Count Included in Model 2

Test	Predictors	Model 1			Model 2		
		Beta	SE	t-score	Beta	SE	t-score
Time 2 Depression							
	Constant	4.93	1.72	5.64*	-.98	2.32	-0.42
	T1 DEP	.64	.11	2.86*	.61	.10	6.12*
	ESA				2.35	.70	3.37*
	R^2		.48*			.61*	
	F		31.77*			26.23*	
Time 2 Anxiety							
	Constant	2.43	1.46	1.67	-0.97	2.12	-0.46
	T1 ANX	.67	.10	6.51*	0.66	.10	6.75*
	ESA				1.32	.62	2.14*
	R^2		.55			.60	
	F		42.36*			25.62*	
Time 2 Stress							
	Constant	9.37	2.09	4.48*	4.12	2.65	1.55
	T1 STR	.38	.11	3.29*	.36	.10	3.44*
	ESA				2.08	.73	2.85*
	R^2		.24			.38	
	F		10.82*			10.58*	

Note. T1 = pretest assessment; Time 2 = posttest assessment; DEP = DASS depression subscale; ANX = DASS anxiety subscale; STR = DASS stress subscale.

* $p < .05$.

As shown in Table E2, the pretest DASS score significantly predicted the posttest DASS score for depression, anxiety and stress for Model 1. Adding the ESA count in Model 2 increased the amount of variance accounted for by the model by 13%, 5% and 14% for each of the depression, anxiety and stress subscales respectively.

As with the DASS, two regression analyses were conducted for each subscale of the ACS. Model 1 using pretest scores to predict posttest scores and Model 2 included the ESA measure to predict posttest ACS scores. The results for these regression analyses are presented in Table E3.

Table E3

Multiple Regression Analysis Predicting Posttest Stress Adolescent Coping Scale from Pretest Scores with ESA Count Included in Model 2

Test	Predictors	Model 1			Model 2		
		Beta	SE	t-score	Beta	SE	t-score
Time 2 Problem-Solving							
	Constant	7.5	5.67	1.33	8.0	5.94	1.34
	T1 PS	.75	.12	6.00*	.76	.13	5.92*
	ESA				-0.11	.39	-.28
	R^2		.51			.51	
	F		36.04*			17.58*	
Time 2 Reference to Others							
	Constant	3.64	5.74	.63	-.27	6.16	-.04
	T1 REF	.70	.17	4.18*	.69	.16	4.17*
	ESA				.79	.51	1.55
	R^2		.33			.38	
	F		17.45*			10.28*	
Time 2 Nonproductive coping							
	Constant	7.64	4.36	1.75	6.90	4.69	1.47
	T1 NON	.65	.13	4.98*	.65	.13	4.82*
	ESA				.18	.39	.47
	R^2		.41			.42	
	F		24.78*			12.23*	

Note. PS = Problem-solving; REF = Reference to Others; NON = Nonproductive coping.

* $p < .05$.

Adding ESA into the regression analyses presented in Table E3 increased the variance accounted for by 5% and 1% for the reference to others and nonproductive coping subscales. There was no difference in the variance accounted for in the problem-solving subscale. In both Model 1 and 2 for each subscale, pretest scores significantly predicted posttest scores. ESA did not significantly predict posttest scores for any ACS subscales.

Discussion of Quantitative Results

The hypotheses were that higher levels of ESA would be associated with: (a) a decrease in mental health outcomes from pretest to posttest, (b) an increase in productive coping from pretest to posttest, and (c) participants would have improved mental health outcomes pretest to posttest were not supported. Regression analysis demonstrated significant increases in the symptoms of depression, anxiety and stress from pretest to posttest. ESA was also significantly associated with the increase in depression, anxiety and stress. Both productive and nonproductive coping strategies significantly decreased over time but were not significantly associated with ESA. Although these results suggest that self-monitoring and higher ESA is associated with a decrease in coping skills and an increase in mental health symptomology, there are several ways to interpret these results. First, as young people become more aware of their emotional experiences it is natural that they would more accurately and more frequently report their emotions than previously. Second, most young people in this study had either no or mild symptoms of depression, anxiety and stress, and the increase in these symptoms, although statistically significant, was not of clinical importance as they remained in the 'normal' category or slightly increased into the 'mild' category. The decrease in both productive and nonproductive coping strategies supports this interpretation, as it is likely that young people had so few stressful experiences that they had less opportunity to use either productive or nonproductive coping strategies. Third, it is possible that increasing awareness of emotions may have a delayed effect on symptomatology, beginning with an increase in awareness without an increase in strategies to cope with emotional experiences and then, with trial and error, an increase in coping strategies resulting in a decrease of mental health symptoms.

Appendix F

Interrater Discrepancies in Chapter 5

This appendix lists the discrepancies between the two coders when coding the qualitative interviews in Chapter 5. There were eight discrepancies out of 40 between the two coders. This list below details the data extract in question, the decisions made by each coder, the resolution and the change made to the codebook.

Data extract 1

“You probably learnt because when you try to explain or tell something or someone how you're feeling, you kind of either exaggerate or understate, so you probably say, “nah, I'm fine” or say you're a lot worse than you probably actually would be. So for me I probably understated a lot of stuff.”

Coder 1: Coded this extract as *recognition* and *communication*.

Coder 2: Coded this extract as *recognition*.

Resolution: This extract was coded as *recognition* category.

Change to Codebook: Communication does not include general communication of emotions. Must be a specific instance and refer to a specific emotion or difficulty in identifying the emotion felt.

Data extract 2

“I was able to realise how stressed I feel.”

Coder 1: Did not code this extract.

Coder 2: Coded this extract as *identification*.

Resolution: This extract was coded as *identification* only.

Change to Codebook: When you realise what your feeling (i.e., stress) was added to identification category.

Data extract 3

“You have a better understanding of your own moods.”

Coder 1: Coded this extract as *decision-making*.

Coder 2: Coded this extract as *contextualisation*.

Resolution: This extract was coded as decision-making only.

Change to Codebook: No change.

Data extract 4

“Mostly it made me aware of the difficulties I was having with my family.”

Coder 1: Coded this extract as *contextualization*.

Coder 2: Coded this extract as *recognition*.

Resolution: This extract was coded as *recognition* only.

Change to Codebook: Context must demonstrate the knowledge of the relationship.

Data extract 5

“I guess sometimes it was hard because you'd say your feeling like this a bit, but not enough for this, but too little for this. I guess you'd have to find some balance.”

Coder 1: Coded this extract as *recognition* and *identification*.

Coder 2: Coded this extract as *recognition*.

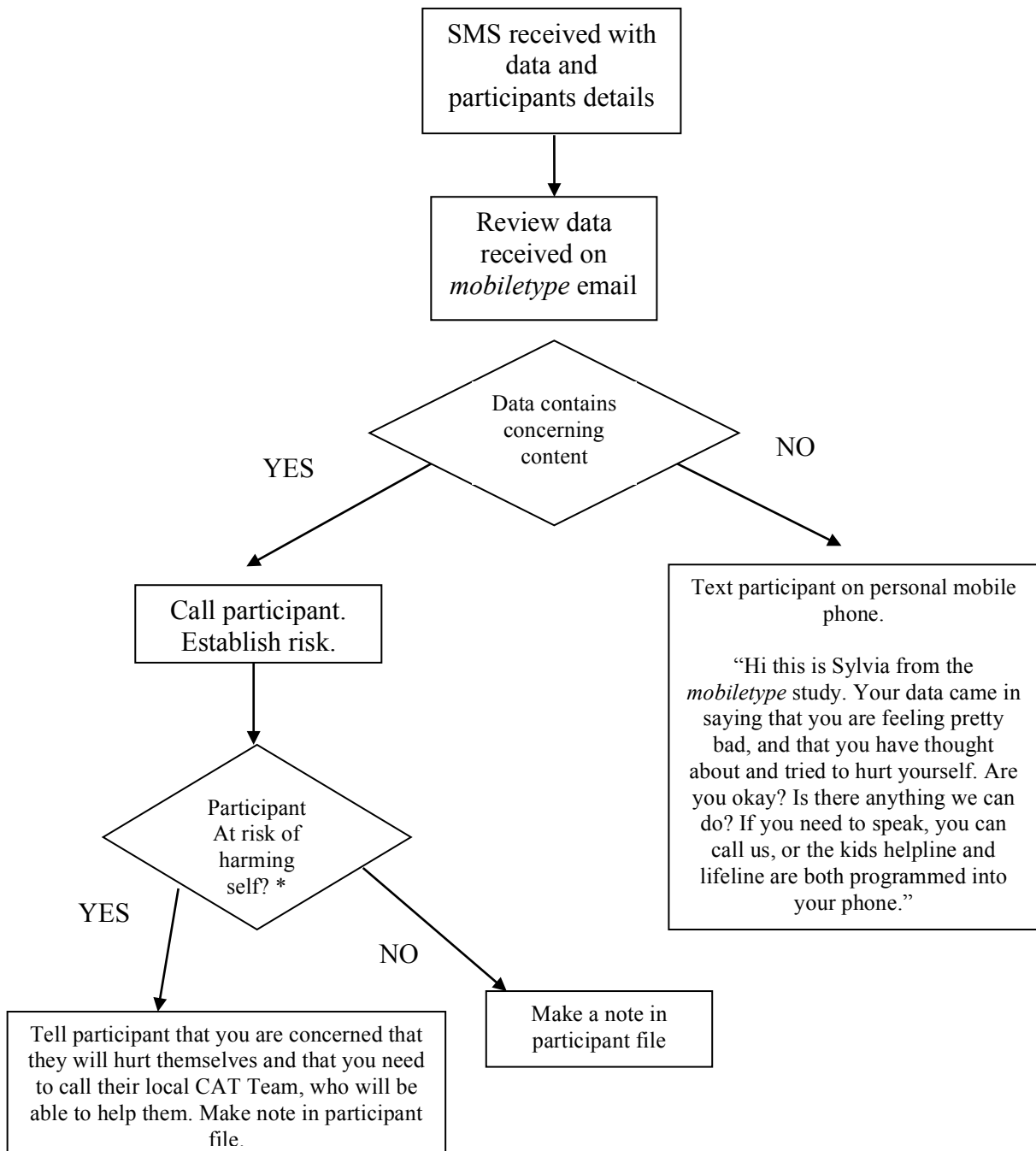
Resolution: This extract was coded as *recognition* and *identification*.

Change to Codebook: Identification includes identifying the magnitude of emotions.

Realising the difficulty of distinguishing simultaneous emotions.

Appendix G

High Risk Assessment for *mobiletype* Program



* Steps to assess risk in the *mobiletype* data entry:

- (i) The open-text response to the data include words or sentences indicating that they participant may harm themselves. Examples:
 - a. hurt or kill myself
 - b. Cut, stab, slash,
- (ii) Are you currently feeling so bad that you have had thoughts that you don't want to go on, or that you might kill yourself?

Appendix H

Publication from Chapter 7

JOURNAL OF MEDICAL INTERNET RESEARCH

Kauer et al

Original Paper

Self-monitoring Using Mobile Phones in the Early Stages of Adolescent Depression: Randomized Controlled Trial With an Attention Comparison Group to Examine the Mediating Effect of Emotional Self-awareness

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Abstract

See manuscript file.

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KEYWORDS

Mobile phone; early intervention; patient monitoring; randomized controlled trial; consciousness; depressive disorder; affect

Acknowledgments

See manuscript file.

Conflicts of Interest

See manuscript file.

Authors' Contributions

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Original Paper

Self-monitoring Using Mobile Phones in the Early Stages of Adolescent Depression: Randomized Controlled Trial With an Attention Comparison Group to Examine the Mediating Effect of Emotional Self-awareness

Abstract

Background: The stepped-care approach, where people with early symptoms of depression are stepped up from low-intensity interventions to higher-level interventions as needed, has the potential to assist many people with mild depressive symptoms. Self-monitoring techniques assist people to understand their mental health symptoms by increasing their emotional self-awareness (ESA) and can be easily distributed on mobile phones at low cost. Increasing ESA is an important first step in psychotherapy and has the potential to intervene before mild depressive symptoms progress to major depressive disorder. In this secondary analysis we examined a mobile phone self-monitoring tool used by young people experiencing mild or more depressive symptoms to investigate the relationships between self-monitoring, ESA, and depression.

Objectives: We tested two main hypotheses: (1) people who monitored their mood, stress, and coping strategies would have increased ESA from pretest to 6-week posttest compared with an attention comparison group, and (2) an increase in ESA would predict a decrease in depressive symptoms.

Methods: We recruited patients aged 14 to 24 years from rural and metropolitan general practices. Eligible participants were identified as having mild or more mental health concerns by their general practitioner. Participants were randomly assigned to either the intervention group (where mood, stress, and daily activities were monitored) or the attention comparison group (where only daily activities were monitored), and both groups self-monitored for 2 to 4 weeks. Randomization was carried out electronically via random seed generation, by an in-house computer programmer; therefore, general practitioners, participants, and researchers were blinded to group allocation at randomization. Participants completed pretest, posttest, and 6-week posttest measures of the Depression Anxiety Stress Scale and the ESA Scale. We estimated a parallel process latent growth curve model (LGCM) using Mplus to test the indirect effect of the intervention on depressive symptoms via the mediator ESA, and calculated 95% bias-corrected bootstrapping confidence intervals (CIs).

Results: Of the 163 participants assessed for eligibility, 118 were randomly assigned and 114 were included in analyses (68 in the intervention group and 46 in the comparison group). A parallel process LGCM estimated the indirect effect of the intervention on depressive symptoms via ESA and was shown to be statistically significant based on the 95% bias-corrected bootstrapping CIs not containing zero (–6.366 to –0.029). The proportion of the maximum possible indirect effect estimated was $\kappa^2 = .54$ (95% CI .426–.640).

Conclusions: This study supported the hypothesis that self-monitoring increases ESA, which in turn decreases depressive symptoms for young people with mild or more depressive symptoms. Mobile phone self-monitoring programs are ideally suited to first-step intervention programs for depression in the stepped-care approach, particularly when ESA is targeted as a mediating factor.

Trial Registration: ClinicalTrials.gov NCT00794222;
<http://clinicaltrials.gov/ct2/show/NCT00794222> (Archived by WebCite at
<http://www.webcitation.org/65lldW34k>)

Introduction

Depression is a common, recurrent disorder and contributes to a substantial burden of disease [1]. Up to 25% of the population experience at least one episode of depression in their lifetime [2] with more women affected by depression than men [2,3]. First episodes of depression generally begin during adolescence [4] with up to 30% of young people experiencing mild subclinical depressive symptoms by 18 years of age [5,6] and many progressing to major depressive disorder [6]. A meta-analysis of the depressive disorder point prevalence estimates for 13- to 18-year-olds reported that 5.7% of adolescents may have a depressive disorder diagnosed at any one point in time [7]. The severity and longevity of depression are associated with substantial economic costs [8], attributed to the early onset and recurrent nature of depression. The World Health Organization predicted that depression will be the second leading cause of disease burden worldwide by 2020 [1], indicating the need for new methods to reduce the burden of depression. Current interventions are estimated to cover 66% of the burden of depression, with 33% of this burden unable to be averted by available treatments [4]. The large number of people who experience mild depressive symptoms account for more burden of depression than those with major depressive disorder [9], suggesting that new methods are needed and that they should focus on the early stages of depression.

The stepped-care approach, beginning with simple, inexpensive interventions (that are given before the onset of diagnosed major depressive disorder) with the ability to step up to higher-intensity programs as needed [9-11], has the advantage of providing a low-intensity early intervention with reduced length and cost of the treatment to young people experiencing mild mental health symptoms [12,13]. Early interventions that focus on intensive computerized or school-based cognitive behavioral therapy-based programs may be best regarded as second-step interventions, as they are time consuming and have high attrition rates [14]. Third-step interventions may include individualized face-to-face therapy, whereas a combination of face-to-face therapy and antidepressants should be considered only as a last resort for teenagers [11]. Van Straten et al [11] advocate the use of watchful waiting as a first step in the stepped-care model. The watchful waiting approach has two limitations. First, as general practitioners (GPs) are often the first point of contact for people with mild mental health symptoms, the onus of watchful waiting would be placed on GPs. GPs, however, are under pressure to treat many people within a day and to keep appointment times brief (the current average appointment time is 15 minutes) [15]. Second, a young person's lack of awareness of emotional distress may reduce the effectiveness of the watchful waiting approach, as GPs are more likely to identify mental health problems in young people who are aware of emotion distress [16]. Short programs involving the completion of homework diaries have been shown to have larger effects on depressive symptoms than longer-duration programs do and offer a potential alternative first-step approach to watchful waiting [17]. Such programs may be completed via mobile phones as a first-step early intervention with the opportunity to step up to more intensive treatment programs as needed.

Mobile Phone Self-monitoring Program

Methods for stepped-care interventions involving technology, such as computers, the Internet, or mobile phones, and simple methods such as self-monitoring techniques can engage young people and foster their involvement [18-20]. Technology is particularly important when targeting young people, dubbed early adopters, as they are familiar with and rely on technology for much of their social interactions with peers and readily engage with electronic devices [18-20]. In particular, studies conducted using electronic self-monitoring devices with young people have demonstrated that young people readily engage with the technology [21-23] and have high compliance [24].

We developed and piloted a mobile phone self-monitoring program, the *mobiletype* program (Mobile Tracking of Young People's Experiences) [21,23,25], well suited as a first step in the stepped-care approach. In our pilot studies, young people were asked to monitor their mood, stress, and daily activities on a mobile phone application 4 times a day for 1 week. Results suggested that young people complied with self-monitoring of mental health symptoms for the purpose of reviewing these data with their GP and found it a simple, easy-to-use tool to track their daily experiences. Both GPs and patients found communicating information via the *mobiletype* program to be beneficial, and the program enabled GPs to better understand the young person's mental health. The self-monitoring data can be uploaded to GPs and used to detect depressive symptoms and other mental health information to allow progression to further higher-intensity intervention if needed. Self-monitoring approaches are typically used in psychotherapy as an adjunct to cognitive behavioral therapy, with research demonstrating that self-monitoring increases the benefits of therapy more than therapy alone [26]. Research focusing on momentary sampling techniques demonstrates that self-monitoring itself can lead to a change in behavior and that changes are generally made in a favorable direction [27-29].

Mechanism Underlying Self-monitoring

The contents of early intervention programs generally target a mechanism that predicts the outcome [30]. For example, cognitive-behavioral-based universal programs focus on cognitive restructuring and problem-solving skills training [31], which are predicted to reduce depressive symptoms. In this study, the intervention was based on emotional self-awareness (ESA), which is hypothesized to predict depressive symptomatology. Increasing awareness of emotions is an important therapeutic step in most psychotherapies for depression and other mental illnesses [32] by preparing individuals for changing their cognitions, beliefs, and schemas [33]. A recent case study using mobile phones [34] showed that self-monitoring increased positive mood and coping strategies while decreasing negative mood in four adult employees with stress. Participants' ESA increased, and they were able to internalize the questions and therapies used in the mobile program on completion of the study. Self-monitoring studies are promising; however, further research is needed to explore the possible mental health benefits of self-monitoring techniques with young people who have symptoms of depression.

ESA may also provide a suitable framework for first-step intervention programs by assisting young people to become aware of their emotions in preparation for learning more adaptive coping strategies. Adolescence is an ideal target for first-step intervention of mental health problems, as young people begin to develop the ability to

independently cope with everyday stresses and negative emotions during their teen years [35]. The current study focused on examining the relationship between self-monitoring and depressive symptoms through the mechanism of ESA, specifically focusing on (1) recognizing emotions [32,36,37], (2) being able to identify emotions [38-40], (3) identifying contextual factors surrounding emotions [36,38,41], (4) communicating emotional states and associated factors to others and internally [42-44], and (5) planning and making decisions about how to cope with an emotional state [38,45,46]. Through self-monitoring, young people can learn to recognize emotional states, and to identify and differentiate various emotions within different contexts, leading to effective communication of emotions to others and productive decision making.

The overall aim of the current study was to investigate, in a randomized controlled trial, the utility of the *mobiletype* program as a first-step intervention program. The primary hypothesis was that young people who completed the *mobiletype* intervention program would have lower depressive symptoms than those who completed the attention comparison program. Using a mixed-methods model, we found that depressive symptoms significantly decreased over time for both intervention and attention comparison groups, and we found no significant difference in mental health symptoms between groups [47]. We attributed the lack of difference between groups in mental health symptoms to the unanticipated effect of the training, resources, and support given to young people and GPs over the course of the study for both the intervention and the comparison groups. Interestingly, the intervention group was found to have a significant increase in ESA compared with the comparison group. As both groups were found to have significantly decreased mental health symptoms, there was reduced power to detect a difference between groups.

The goal of this secondary analysis was to further examine the effects of a mobile phone self-monitoring program on ESA among young people with mild or more depressive symptoms as a first-step treatment of depression. Specifically, we were interested in the effects of self-monitoring on ESA and the association between ESA and depressive symptoms. We hypothesized that self-monitoring mood, stress, and coping strategies would increase young people's awareness of their emotions, which would lead to a decrease in their symptoms of depression. We tested the following hypotheses: (1) young people in the intervention group would have an increase in ESA from pretest to 6-week posttest compared with the attention comparison group, and (2) the increase in ESA would predict a decrease in depressive symptoms. We estimated a parallel process latent growth curve model (LGCM) [30,48] to investigate whether ESA would mediate the relationship between the intervention program and depressive symptoms. A secondary analysis compared the effects of the *mobiletype* intervention and comparison programs on rumination, with the hypothesis that the intervention group would have decreased rumination compared with the comparison group.

Methods

Trial Design

The data presented here were from the *mobiletype* randomized controlled trial conducted from 2009 to 2011. This was a multicenter, multiregional, stratified (according to region), single-blind, attention-controlled study with balanced (1:1) individual randomization into parallel groups. This study was conducted in Victoria,

Australia adhering to the reporting recommendations from the CONSORT statement [49] as a guide.

Participants

General Practitioners

All GPs in the Goulburn Valley Region and Albury-Wodonga Region were invited to participate in the study via the Regional Division of General Practice (support units that service clinical practices within a region). GPs in Melbourne were recruited via the local Divisions of General Practice. Clinics were targeted that listed an interest in adolescent health on the Melbourne General Practice Network (www.mgpn.com.au). Participating GPs were trained to use the *mobiletype* website and were provided with a study manual that included the study procedure, a variety of clinical supports (including referral details of adolescent-friendly allied health professionals and services), youth-friendly Internet, email, and phone support, and youth-focused psychoeducation handouts on a range of mental health problems (this information was also available on the *mobiletype* website), which were available for all participating GPs and patients. Continuing professional development quality assurance points were available to GPs for their participation in the study. Of the 103 GPs who agreed to participate, 35 actively participated in the study with at least one young person. These contributing GPs were from 26 different practices in the three recruitment areas: 12 in greater Melbourne, 7 in Albury-Wodonga, and 7 in the Goulburn Valley.

Young People

Young people meeting the following inclusion criteria were eligible to participate regardless of their reason for visiting the GPs. Participants were required to (1) be aged between 14 and 24 years, (2) speak proficient English, and (3) have a mild or more severe emotional or mental health issue as assessed by their GP or indicated by a score greater than 16 on Kessler's scale of emotional distress (Kessler Psychological Distress Scale) [50]. Participants were excluded if their psychiatric or medical condition prevented them from complying with either the requirements of informed consent or the study protocol (ie, current psychosis or imminent hospitalization).

Mobiletype Program

We used version 4 of the *mobiletype* program as the intervention and attention comparison in this study, which was created in-house using Java Platform, Micro Edition by the Murdoch Childrens Research Institute. This program was written for use with multiple models of mobile phones and firmware. For this trial, participants were lent a study mobile phone with either the *mobiletype* intervention or a comparison program uploaded onto it. Data from the program were uploaded to a secure website constructed and hosted by the Murdoch Childrens Research Institute as well as encrypted and stored on the mobile phones.

Participants were prompted to complete a *mobiletype* entry by an auditory signal (beep) emitted from the mobile phone at random intervals in the blocks outlined in Table 1. If no report was completed the phone emitted one reminder signal after 5 minutes. Entries were time coded and saved. Participants were also able to complete the program any time and were able to complete an entry between 10 PM and 8 AM,

although no trigger was sent at this time. Entries from 10 PM to 12 AM consisted of the evening questions and entries from 12 to 8 AM consisted of the same questions as the afternoon questions, as shown in Table 1. Each report took approximately 1–3 minutes to complete.

Intervention Program

The intervention group monitored themselves using the complete *mobiletype* program, which assessed 8 areas of functioning as developed in previous *mobiletype* studies [21,23], consisting of current activities, location, companions, mood, recent stressful events, responses to stressful events, alcohol use, cannabis use, quality and quantity of sleep, quantity and type of exercise, and diet. The time of day when each module assessing the eight areas was delivered varied as displayed in Table 1.

Table 1. Modules included in each block of the *mobiletype* comparison and intervention programs.

Module	Morning 8–10.59 AM	Noon 11 AM to 3.29 PM	Afternoon 3.30–7.59 PM	Evening 8–10 PM
Intervention program				
Current activity	✓	✓	✓	✓
Stress	✓	✓	✓	✓
Mood	✓	✓	✓	✓
Alcohol use		✓		
Cannabis use		✓		
Sleep	✓			
Diet				✓
Exercise				✓
Comparison program				
Current activity	✓	✓	✓	✓
Stress				
Mood				
Alcohol use				
Cannabis use				
Sleep	✓			
Diet				✓
Exercise				✓

Comparison Program

The attention comparison program was designed to provide a data collection process similar to that in the intervention group by controlling for the amount of time spent engaged in the program condition and the overall research methodology and the attention given to them by health care professionals and research staff [51]. The comparison group monitored themselves using an abbreviated version of the *mobiletype*

program, which assessed only current activities, location, companions, quality and quantity of sleep, quantity and type of exercise, and diet (meals, snacks, junk food, and soft drinks consumed). Importantly, we removed the modules pertaining to ESA and mental health as shown in Table 1 (ie, mood, stress, alcohol and cannabis use).

Summary Reports

Data collected by the *mobiletype* program (intervention and comparison groups) on the mobile phone was sent via short message service to a secure website, where it was automatically collated. Each area of assessment was displayed in graphs (eg, daily mood graphs) or in tables (eg, daily alcohol intake). An individualized summary report of the data was written following structured prescriptive guidelines by the second author (registered psychologist), or the first author under the supervision of the second author.

Outcome Measures

The pretest, posttest, and 6-week posttest questionnaire packages included the Depression Anxiety Stress Scale (DASS) [52] and the ESA Scale. The DASS is a 21-item response form with subscales of depression, anxiety, and stress with scores ranging from 0 to 42. The DASS has Australian norms and clinically validated ranges. A high DASS score indicates greater levels of depression, anxiety, or stress symptoms. The ESA Scale was adapted from the 20-item Self-reflection and Insight Scale [53], the 10-item Ruminative Response Scale [54], and the 12-item Meta-Evaluation Scale [46]. As there is no overall measure of ESA that covers the five areas of recognition, identification, communication, contextualization, and decision making, we adapted 33 items pertaining to these areas from the above scales (see Multimedia Appendix 1). These were then combined to create a total ESA scale with high internal consistency (Cronbach alpha = .83). The total ESA score ranged from 0 to 132, with higher scores indicating more ESA. Rumination was measured by the brooding subscale of the Ruminative Response Scale, which consisted of 5 items ranging from 0 to 4. A higher score indicates higher rumination.

Sample Size

We anticipated recruitment of 200 participants from 10 general practices. This sample size was based on Cohen's [55] statistical testing for multiple regression with two independent variables (accounting for the mediating variable and the outcome) to detect a medium effect with 80% power and a probability of a type I error of .05. We selected a medium effect size, as we considered this to be clinically significant. Using Fritz and MacKinnon's statistical tests [56], a sample size of 71 participants inclusive should be sufficient to detect a medium mediation effect with 80% power with bias-corrected bootstrapping (see below). The anticipated sample size of 200 was not met due to delays in recruitment during school holidays and the H1N1 influenza pandemic [57]. As a result, we set a deadline for stopping recruitment and recruited a total of 118 participants.

Randomization

Participants were randomly assigned to either (1) the *mobiletype* monitoring intervention group or (2) the *mobiletype* attention comparison group; both groups also

received medical care as usual. A database was set up by an in-house computer programmer with identification numbers for 100 Melbourne, 50 Goulburn Valley, and 50 Albury-Wodonga participants. Each number was attached to a link that downloaded either the intervention or comparison program directly to the mobile phone. This process was blinded; the intervention and comparison program could not be differentiated when downloading the program. The programmer used a random seed generator to allocate each program to the 200 identification numbers at the individual level and stratified according to area (Melbourne, Goulburn Valley, and Albury-Wodonga). This programmer was not involved in any data collection or analysis. A research assistant downloaded each program by selecting the next consecutive link for the next study mobile phone and was blinded to the allocation, as he knew only the identification number and area to load onto study mobile phones (eg, Melbourne01, Melbourne02). Mobile phones and identification numbers were allocated to consecutively recruited participants. The researchers, participants, and GPs were blinded to randomization pretest. GPs and participants became aware of the group allocation at the posttest when the summary reports were reviewed. This study had approval from the Human Research Ethics Committee of the Royal Children's Hospital, Melbourne (RCH HREC: 28113), and was registered in ClinicalTrials.gov (Reference: NCT00794222).

Procedure

Recruitment

In addition to providing treatment as usual, GPs screened their patients for eligibility to the study; organized an appointment for willing participants with a research assistant using an online booking form or a faxed referral form, or by phone; and completed a pretest questionnaire for each participant. Participants then met with a *mobiletype* research assistant, generally within 5 days of referral, to learn the study process, complete consent forms and the pretest questionnaire package, familiarize themselves with the *mobiletype* program and the other features of the phone, and complete a practice entry of the *mobiletype* program. Participants were provided with a study manual that described the research procedure and offered trouble-shooting tips.

Mobile Phone Monitoring Period

All participants borrowed a Sony Ericsson 7501i (Sony Limited Australia (Head Office), New South Wales) mobile phone containing the *mobiletype* program for the study period. Information regarding the development and testing of the *mobiletype* program has been previously published [21]. Participants were requested to complete at least two *mobiletype* entries a day until they returned for their medical review in 2 to 4 weeks. Participants and GPs were advised that 2 to 4 weeks' monitoring was the ideal monitoring period. Participants were given a subscriber identity module (SIM) card containing \$AUD30 in credit as partial reimbursement for their time and phone credit used.

Posttest Review

On completing the monitoring period, participants reviewed the self-monitoring data with their GP on the *mobiletype* website. Young people completed a posttest assessment

immediately following this appointment, and again at 6 weeks and 6 months after this review (6-month posttests not included in the current analysis). GPs completed a posttest questionnaire immediately after the appointment. Questionnaires were completed online, over the phone with a researcher, or via a mailed hardcopy questionnaire. Participants were given a \$AUD20 gift card for each posttest questionnaire completed (maximum of \$AUD60 for all questionnaires completed).

Analyses

We conducted all analyses on an intention-to-treat basis using all available data from participants included at randomization. Data were assumed to be missing at random [58], and maximum likelihood estimation was used with missing data accounted for by the missing routines in the statistical program used.

Parallel Process Latent Growth Curve Model

Recently, structural equation modeling has modernized Baron and Kenny's well-known mediation model [59,60]. LGCM is a structural equation modeling technique that allows for examination of inter- and intrapersonal changes and, importantly, parallel process LGCM accommodates longitudinal data for situations in which both the mediator and outcome change over time [61]. Baron and Kenny's requirement of a statistically significant pathway between the independent variable and the outcome [59] is no longer recommended, as detecting a total effect between the independent variable and outcome reduces power, therefore reducing the likelihood that a mediated effect can be detected [56,62]. Parallel process LGCM based on Cheong et al [30] was used to test the hypothesis that the *mobiletype* program would increase ESA and that the change in ESA over time would change (decrease) depressive symptoms, by using the software program Mplus version 6.11 (Muthén & Muthén, Los Angeles, CA, USA). The model estimates two latent variables, the intercept (estimated starting point) and the slope (estimated growth curve), using repeated measures for the mediator (ESA) and the outcome (depression) across the three time points. The latent intercept for both ESA and depression had factor loadings set to 1 to represent the starting point of the growth trajectory, and the factor loadings of the latent linear slope were fixed to 0, 3, and 9 to represent the time between tests: pretest (week 0), posttest (week 2–4), and 6-week follow-up (week 8–10), respectively. Group was defined as 0 for the comparison group and 1 for the intervention group. A combination of at least three of the following cut-off values was used to determine goodness of fit of the model as recommended [63,64]: comparative fit index > .95, Tucker-Lewis Index > .95, standardized root mean square residual < .08, and root mean square error of approximation and associated significance test (root mean square error of approximation < .05). Another statistic considered was chi-square divided by degrees of freedom, with values less than 2 indicating a good fit and values up to 3 indicating an acceptable fit [64]. When specifying the model, we allowed the variances of the observed variables to covary at each time point and calculated all regression pathways. Indirect effects of group on the slope of depression via the intercept and the slope of ESA were also specified. As recommended [56,62,65], we used bootstrapping with resampling at 5000, with bias-corrected confidence intervals reported for the indirect pathway [66]. Resampling provides more accurate results with fewer assumptions about the data (such as normal distributions) [60].

Indirect Effect Sizes

A recent development in statistical analysis has led to the capacity of estimating effect sizes for mediation models [67] using R for Mac OS X GUI 1.40-devel, an open-source language and environment for statistical analysis (<http://www.r-project.org/>). We calculated effect sizes of the indirect pathways using the mediation function in the MBESS (<http://cran.r-project.org/web/packages/mediation/mediation.pdf>) in R. Bootstrapping was used to calculate 95% confidence intervals. As recommended [60,67], both the unstandardized indirect effect size and the proportion of the maximum possible indirect effect (κ^2) are reported and described in the results. Other estimates of effect size obtained in this analysis are listed in Multimedia Appendix 2.

Rumination

We conducted a secondary analysis to determine whether the intervention group had a decrease in rumination compared with the comparison group. A mixed model analysis was conducted over time and between groups using SPSS version 17.0.0 (IBM Corporation, Somers, NY, USA) with the MIXED procedure. As with the LGCM, survey time was entered as a continuous variable in weeks (0, 3, and 9). The mixed model employed the more conservative restricted maximum likelihood estimation and unstructured covariance matrix.

Results

Recruitment

We collected data collection between April 16, 2009 and January 28, 2011. As seen in Figure 1, 137 young people accepted the invitation to join the study, of whom 118 began the recruitment process. We excluded 4 participants after randomization (2 became too unwell to participate, 1 was incarcerated, and 1 gave invalid responses to all pretest measures), resulting in a final sample of 114 young people, which was sufficient to detect the primary aim of a medium-sized indirect effect [56]. Due to a failure to recruit the expected sample of 200 participants, there is a different number of participants in the comparison and intervention groups; however, a test of the binomial distribution indicated that this difference was not significant with 69 of 118 participants randomly allocated to the intervention group ($P = .08$). The total number of participants assessed for eligibility was difficult to establish, as the GPs rarely recorded information about patients who met the inclusion criteria and were either not approached to participate or declined when invited to participate. Therefore, the number of patients assessed for eligibility presented in Figure 1 is likely to be underrepresented.

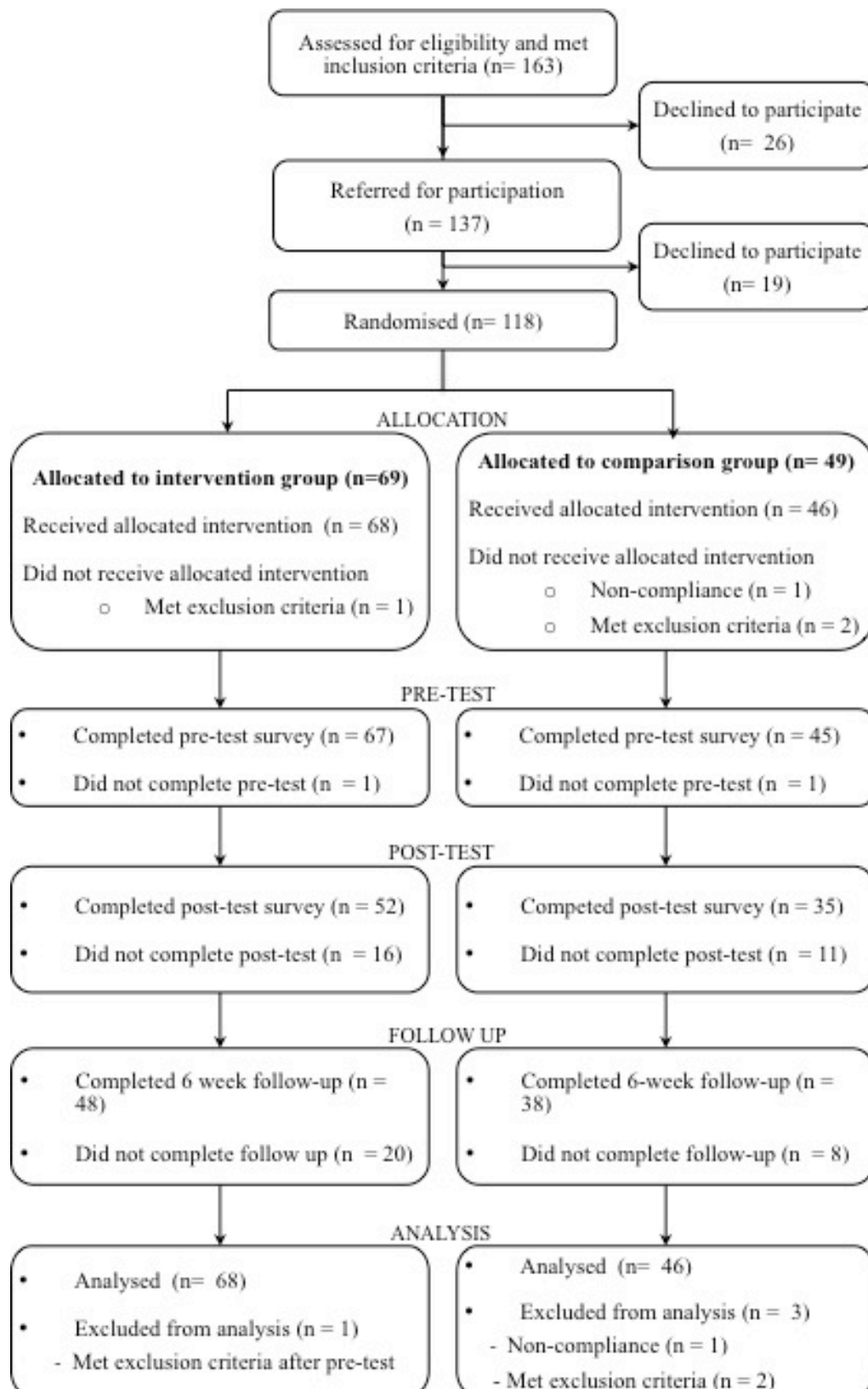


Figure 1. Flow diagram of the study process.

In total, 67% of participants (76/114) completed all questionnaires and 85% of participants (97/114) completed questionnaires at two or more time points. We

conducted t tests and chi-square tests and found no significant differences between participants who completed all questionnaires and those who missed questionnaires. Therefore, we included all 114 participants (68 in the intervention group and 46 in the comparison group) in analyses using the routines for missing data in the maximum likelihood estimation. Of 114 participants, 2 (2%) did not complete the pretest questionnaire but went on to complete the *mobiletype* entries and posttests. We could not contact 27 participants (24%) for the posttest questionnaire but they went on to complete the 6-week posttest questionnaire.

Demographics

We found no statistically significant differences in demographic characteristics between the intervention and comparison groups on any pretest measures listed in Table 2, except that the intervention group reported significantly higher stress than the comparison group with a mean difference of 3.4 ($t_{109} = 2.06, P = .04$).

Table 2. General demographics of participants in the comparison and intervention groups (n = 114).

Characteristic	Comparison group	Intervention group	<i>P</i> value
Total number ^a , n (%)	49 (41.5%)	69 (58.5.0%)	.08
14 days completed ^b , n (%)	28 (59.6%)	36 (52.9%)	.33
Area , n (%)			
Melbourne	14 (30.4%)	28 (42.6%)	.27
Goulburn Valley	21 (45.7%)	21 (29.4%)	
Albury-Wodonga	11 (23.9%)	19 (27.9%)	
Male participants, n (%)	17 (37.0%)	15 (22.1%)	.08
Age (years), mean (SD)	17.4 (3.2)	18.5 (3.2)	.06
Ethnic identification ^c , n (%)	4 (9.1%)	10 (22.7%)	.37
Employment , n (%)			
Employed	7 (15.2%)	18 (26.5%)	.21
Unemployed	4 (8.7%)	9 (13.2%)	
Student	35 (76.1%)	41 (60.3%)	
Drug-related items^c			
Ever had alcohol	38 (86.4%)	59 (88.1%)	.79
Ever been drunk	31 (70.5%)	53 (79.1%)	.30
Ever had a cigarette	25 (56.8%)	38 (56.7%)	.99
Ever tried marijuana	18 (40.9%)	33 (49.3%)	.39
Ever tried other ^d drugs	10 (22.7%)	26 (38.8%)	.08
Pretest DASS^{c,e} , mean (SD)			
Depression	19.4 (10.8)	20.4 (11.0)	.63
Anxiety	11.0 (8.0)	14.1 (9.7)	.08
Stress	16.9 (7.9)	20.3 (8.9)	.04

^a Binomial test on number at randomization (n = 118).

^b Completed *mobiletype* entries at least twice daily for 14 days.

^c Observed means (n = 111).

^d Sedatives, tranquilizers, amphetamines, analgesics, inhalants, cocaine, LSD, and heroin.

^e Depression Anxiety Stress Scale.

Participants in the intervention group completed an average of 3.3 (SD 1.42, range 1–8) *mobiletype* entries each day and completed the program from 1 to 34 days with a mean of 17.7 (SD 6.69) days completed. In the comparison group, participants completed an average of 4 (SD 1.77, range 1–12) *mobiletype* entries per day, and completed the program for 8 to 25 days with a mean of 16.8 (SD 4.03) days completed. The minimum dose of the program was completion of at least two *mobiletype* entries a day for at least 14 days. As Table 2 shows, 64 (56%) participants in intervention group and 36 (52.9%) in comparison received a minimum dose. Means, standard deviations and 95% confidence intervals are presented in Table 3 using the observed scores.

Table 3. Descriptive statistics for the intervention and comparison groups' scores^a on depression and emotional self-awareness at pretest, posttest, and 6-week posttest.

	Comparison group			Intervention group		
	n ^b	Mean (SD)	95% CI	n ^b	Mean (SD)	95% CI
Depression						
Pretest	44	19.4 (10.9)	16.1–22.7	67	20.4 (11.0)	17.8–23.1
Posttest	33	15.2 (8.9)	12.1–18.3	50	16.3 (10.8)	13.3–19.4
6-week posttest	36	12.5 (11.8)	8.5–16.5	50	13.5 (10.5)	10.5–16.5
Emotional self-awareness						
Pretest	44	61.1 (11.9)	57.4–64.7	67	61.6 (12.1)	58.7–64.6
Posttest	32	63.1 (11.1)	59.1–67.1	46	64.7 (10.9)	60.9–67.4
6-week posttest	35	62.2 (11.6)	58.2–66.1	47	68.9 (11.2)	65.5–72.1
Rumination						
Pretest	44	12.8 (3.16)	11.9–13.8	67	14.0 (3.43)	13.2–14.9
Posttest	33	12.2 (3.57)	10.9–13.4	46	12.4 (3.57)	11.3–13.4
6-week posttest	35	11.2 (3.67)	10.0–12.5	48	11.7 (3.62)	10.7–12.8

^a Observed scores.

^b Number of participants used to calculate the mean, standard deviation, and 95% confidence interval.

Parallel Process Latent Growth Curve Model

The path diagram in Figure 2 shows the parallel process LGCM used to test the indirect pathway of the *mobiletype* program used on depressive symptoms via ESA. The fit indices for Figure 2 suggest that the model is a good fit for the data ($\chi^2_6 = 11.3$, $P = .08$, comparative fit index = .958, Tucker-Lewis Index = .854, root mean square error of approximation = .088, $P = .18$, standardized root mean square residual = .040).

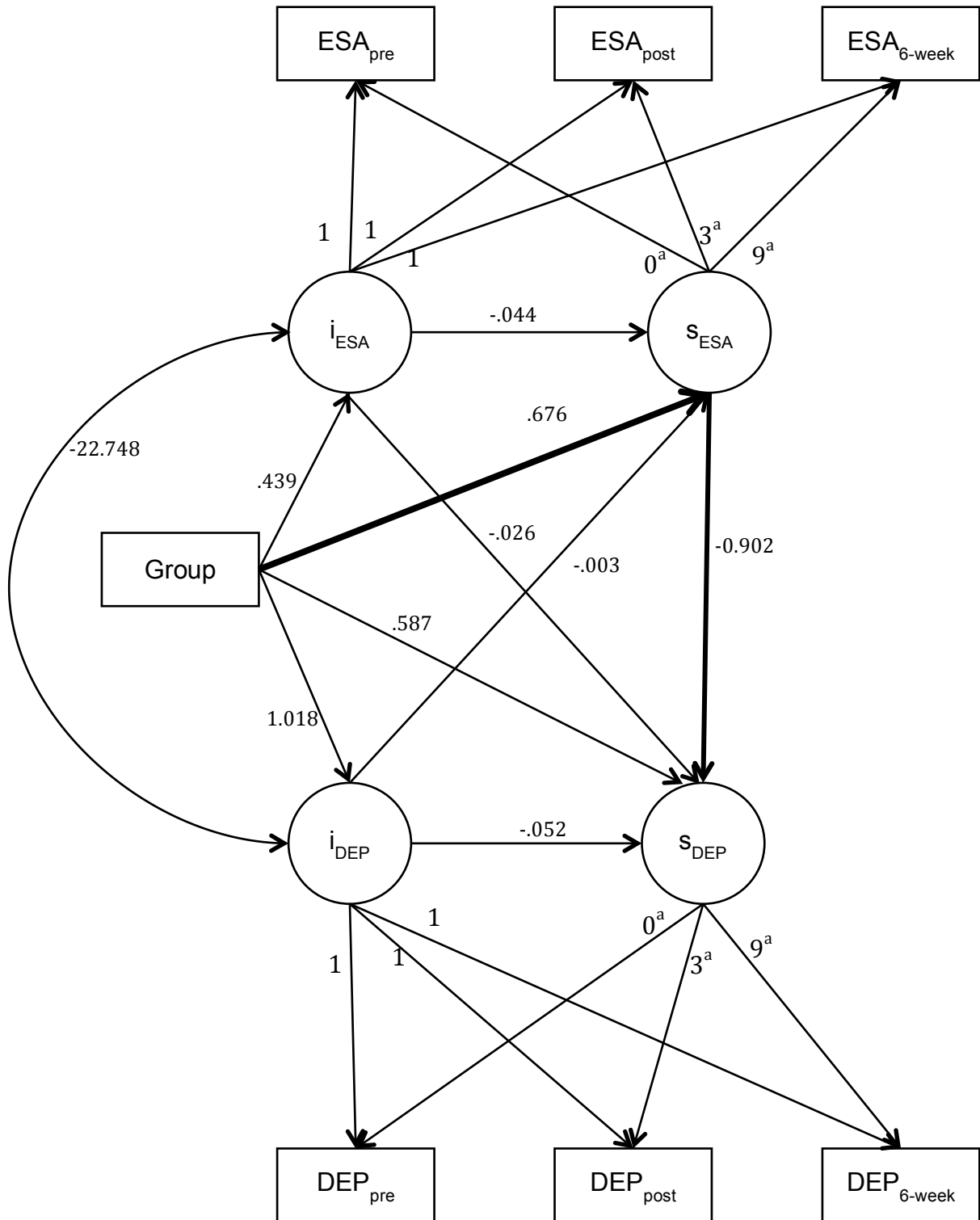


Figure 2. Parallel process latent growth curve model of the group effect on the growth of depressive symptoms via the growth of emotional self-awareness (ESA). Unstandardized estimates reported; boldface lines represent statistically significant pathways. ^a time interval from pretest by week. $DEP_{pre, post, 6-week}$, $ESA_{pre, post, 6-week}$ = the observed score of the Depression Anxiety Stress Scale depression subscale and ESA scale at pretest, posttest, and 6-week posttest, respectively; Group = intervention

program condition; iDEP = latent intercept of depression; iESA = latent intercept of ESA; sDEP = latent slope of depression; sESA = latent slope of ESA.

All possible pathways were calculated between group and the four latent variables as illustrated in Figure 2. The first step to testing mediation was conducted by regressing the slope of ESA onto group. The positive coefficient indicates that there was a greater increase in ESA across time in the intervention group than in the comparison group. This coefficient was statistically significant, as the 95% bias-corrected bootstrap CIs of group on ESA did not contain zero (see Table 4). The second step to testing mediation was conducted by regressing the slope of ESA onto the slope of depression. The negative coefficient here indicates that an increase in ESA led to a decrease in depressive symptoms. This pathway was also statistically significant as indicated by the 95% bias-corrected bootstrap CIs not containing zero (see Table 4). All other pathways illustrated in Figure 2 were tested and were not statistically significant.

Table 4. Coefficients and bias-corrected bootstrapping confidence intervals (CIs) of the parallel process latent growth curve model.

Effect	Point estimate	95% Bootstrap CI
Direct effect on the slope of depression		
Slope of ESA ^a	-0.902 ^b	-6.209 to -0.052
Intercept of depression	-0.052	-0.126 to 0.012
Intercept of ESA	-0.026	-0.315 to 0.027
Group	0.587	-0.114 to 5.072
Direct effect on the slope of ESA		
Intercept of ESA	-0.044	-0.083 to 0.162
Intercept of depression	-0.003	-0.038 to 0.063
Group	0.676 ^b	0.019 to 1.231
Direct effect of group on intercept		
ESA	0.439	-3.904 to 4.562
Depression	1.018	-2.980 to 5.208
Indirect effect of group on slope of depression		
Via the slope of ESA	-0.610 ^b	-5.596 to -0.003
Via the intercept of ESA	-0.012	-0.526 to 0.105
Total indirect effect	-0.621 ^b	-6.269 to -0.036

^a Emotional self-awareness.

^b Confidence interval does not contain zero.

The indirect effect of group on the slope of depression via the slope of ESA reported in Table 4 is statistically significant (95% bootstrap CI did not contain zero) with an unstandardized estimate of -0.608, indicating that participants in the intervention group had a decrease in depressive symptoms via the slope of ESA when compared with the comparison group. There was no significant direct effect from group to depressive symptoms based on the 95% bootstrap CI, indicating that the intervention did not directly decrease depressive symptoms.

Figure 3 presents the relationship between the change in depressive symptoms and the change in ESA for both the intervention and comparison groups.

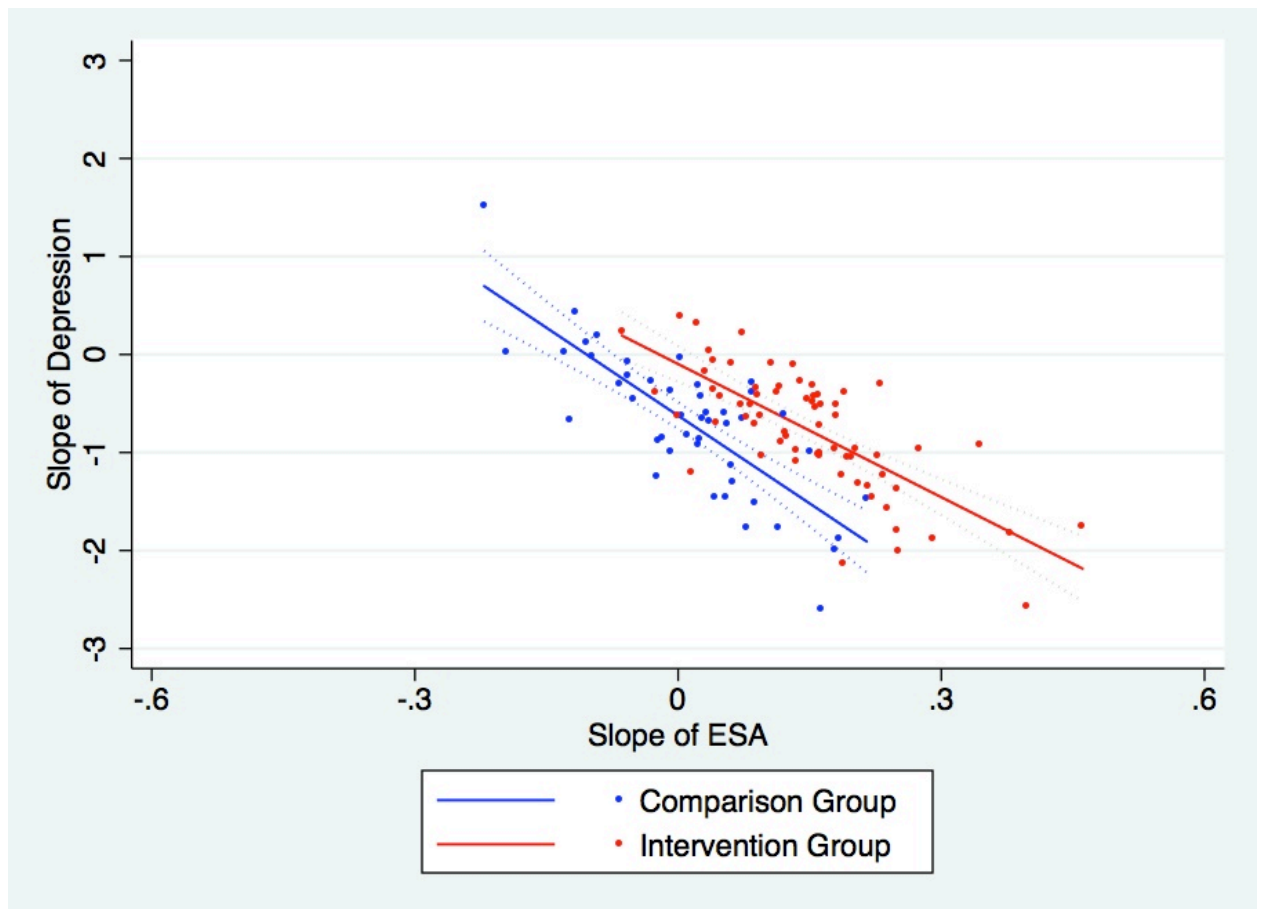


Figure 3. The relationship between self-monitoring, the slope of depressive symptoms, and the slope of emotional self-awareness (ESA). The points represent individuals' estimated slopes and the lines represent the line of best fit with 95% confidence intervals.

There was a negative relationship between changes in ESA and changes in depressive symptoms for both groups; accordingly, an increase in ESA was associated with a decrease in depressive symptoms as seen in Figure 3. The intervention group had larger increases in ESA than did the comparison group, which was associated with a greater decrease in depressive symptoms.

Indirect Effect Sizes

The unstandardized indirect effect size can be interpreted on the DASS depression subscale (on a scale from 0 to 42), indicating that the intervention group is estimated to have a linear decrease in depressive symptoms of .688 per week (95% CI $-.962$ to $-.487$) indirectly through mediation of the linear slope of ESA when compared with the comparison group. The proportion of the maximum possible indirect effect has similar properties to, and can be interpreted on a similar scale to, Cohen r^2 [67]; therefore, the estimated κ^2 of .54 (95% CI .426–.640) indicates a large size of indirect effect.

Rumination

We conducted a secondary analysis to determine whether rumination decreased over time between groups. The mixed model analysis of the Ruminative Response Scale

brooding subscale showed a significant main effect of time ($\beta = -0.16, P = .02$), indicating an overall decrease in rumination over time for both groups. There was no significant main difference between groups ($\beta = 1.01, P = .11$), nor was the interaction between group and time significant ($\beta = -0.07, P = .39$).

Discussion

The current study examined the use of a mobile phone self-monitoring program on ESA with young people who had mild or more depressive symptoms, and supported the hypothesis that self-monitoring mood, stress, and coping strategies increases awareness of emotions. The second hypothesis that an increase in ESA would predict a decrease in depressive symptoms was also supported. Based on Preacher and Kelley's proportion of the maximum possible indirect effect [67], there was a large effect of the intervention program on depressive symptoms indirectly via ESA.

This study supports previous research suggesting that simple self-monitoring techniques effectively increase self-awareness, in this case, awareness of one's own emotions [34,68]. Metacognitions, such as self-awareness, are developed during early adolescence [35], and interventions can be developed that target young people's ability to recognize emotions, identify emotional states, understand the contextualization of emotions, communicate this emotional knowledge, and plan and make constructive decisions about emotions. Increasing ESA is a core process in the early stages of therapy [32]. The current study demonstrates the potential for targeting ESA in first-step intervention strategies for young people with mild or more depressive symptoms. This randomized controlled trial was conducted with a view of representing a wide variety of young people who visit GPs with a range of medical and psychological problems and severity of problems. Therefore, the results of this study are applicable to this age group in general.

Self-monitoring techniques may provide an alternative to watchful waiting as a first-step intervention in the stepped-care approach. Mobile phones are ideally suited to this purpose, as the *mobiletype* program can be downloaded to patients' own mobile phones to help young people understand and manage mild depressive symptoms. Detailed information about patients' mental health in recent weeks is then uploaded to GPs in an easy-to-read format, saving time in appointments and allowing progression to more intensive second-step interventions when needed. Young people often do not recognize mental health problems [69] and instead attend GP clinics for somatic complaints rather than mental health symptoms [70]. Using self-monitoring techniques with young people who present with underlying somatic complaints may increase their ESA and help young people initiate treatment for depression.

Our secondary hypothesis that the intervention program participants would have a decrease in rumination when compared with those in the comparison program was not supported. Further research is needed to determine whether there is an inverse relationship between rumination and ESA. Nevertheless, rumination decreased over time as did depressive symptoms [47], further supporting the positive relationship between depression and rumination.

Primary care is a particularly difficult setting in which to conduct randomized controlled studies [71,72]. In this study, recruitment was delayed and ceased before the anticipated sample size was recruited due to the H1N1 influenza pandemic, first detected in Melbourne on May 9, 2009 [57], and during school holidays. These delays resulted in uneven numbers in the two groups. We strongly recommend allocating extra

time for recruitment in primary care compared with other settings, particularly in youth-focused studies. The intervention program had no direct effect on depressive symptoms. One interpretation of these results is that there was reduced power for a direct effect given that depressive symptoms decreased significantly over time in both groups. It is possible that both groups had a decrease in depressive symptoms due to the resources, training, and support given to the GPs; however, a larger sample size, or a wait-list control group, would be needed to determine whether depressive symptoms differed between the groups [56,62]. Finally, Reid et al [47] detail other limitations: a cluster randomized controlled trial, in which GPs rather than patients are randomly allocated, may have been more appropriate but was rejected during the study design due to the difficulty in blinding GPs and participants to the randomization procedure; and participant heterogeneity in illness type, severity, and familiarity with their GP due to broad inclusion criteria needed in an effectiveness trial is likely to have reduced the overall power of the study.

To our knowledge, this is the first randomized controlled trial examining the use of a mobile phone self-monitoring program as an intervention tool for young people with depressive symptoms. Self-monitoring was shown to effectively decrease depression via the mechanism of ESA, suggesting that self-monitoring programs that focus on increasing ESA may provide a useful framework for first-step care in depression. The program provided GPs with information about a young person's daily activities and can be used to detect early signs of mental health problems, such as elevated negative mood, stress and causes of stress, maladaptive coping strategies, isolation from peers, diet, and exercise, as well as other risk and protective factors. The mobile phone self-monitoring program has the advantage of being low cost, quick, and easy to use.

In summary, mobile phones are well suited to first-step interventions, providing an alternative to watchful waiting and allowing young people to provide accurate information to their GPs about their mood and stress [21], as well as shortening the length of time it would take to relay this information to GPs in a usual appointment. Mobile phone self-monitoring programs should be considered as a first-step low-cost intervention with young people who are at risk of mental health problems. Self-monitoring has the advantages of helping young people increase their ESA while gaining more information about their mental health symptoms in order to direct them to the best intervention.

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Conflicts of Interest

None declared.

Abbreviations

DASS: Depression Anxiety Stress Scale

ESA: emotional self-awareness

GP: general practitioner

LGCM: latent growth curve model

Appendix I

Emotional Self-Awareness Scale

Table I1.

Emotional Self-Awareness Scale

Item	Question
1	My moods are hard to describe (<i>reverse</i>)
2	I examined my feelings and then decided what to do
3	It's important to me to understand what my feelings mean
4	It's hard for me to tell what mood I'm in (<i>reverse</i>)
5	I analyse my personality to try to understand why I'm upset
6	I usually know why I feel the way I do
7	I often have trouble deciding what will improve my mood (<i>reverse</i>)
8	I know how I feel about most things
9	I don't know why I feel the way I feel (<i>reverse</i>)
10	I go away by myself and think about why I feel a certain way
11	I like to write down what I'm feeling and analyse it
12	I can talk about mood to others
13	I don't really think about why I behave as I do (<i>reverse</i>)
14	I often 'self-talk' to think about feelings
15	I'm often confused about how I feel about things (<i>reverse</i>)
16	I'm often aware of being emotional, but I can't describe the emotion
17	I frequently take time to reflect on how I feel
18	I often know what caused my mood
19	I'm usually aware of my emotions
20	I like to go someplace alone to think about my feelings
21	I don't often think about my feelings (<i>reverse</i>)
22	I often think about ways to make myself feel better
23	I know exactly how I'm feeling
24	Sometimes I can't figure out how to make myself feel better (<i>reverse</i>)
25	When feeling bad, I try to deal with my problems and concerns
26	I can verbalise my feelings
27	I usually have clear idea about how my feelings affects my behaviour
28	It's difficult to make sense of the way I feel about things (<i>reverse</i>)
29	I find it easy to write down how I feel
30	It's difficult to communicate what I feel (<i>reverse</i>)
31	I often think about the way I feel about things
32	I analyse recent events to try to understand why I'm upset

Note. Reverse scored items are indicated by (*reverse*)

Scoring

All items are on a 5-point Likert scale ranging from 0 (*Never*) to 5 (*A lot*). Subscales range from 0 to 20. Total scale ranges from 0 to 128.

Subscales

Recognition: Items 4, 17, 19, 20, 21, 23. Divided by 6. Multiplied by 5.

Identification: Items 1, 3, 8, 16, 28. Divided by 5. Multiplied by 5.

Communication: Items 11, 12, 14, 26, 26, 30. Divided by 6. Multiplied by 5.

Contextualisation: 5, 6, 9, 10, 13, 15, 18, 27, 31, 32. Divided by 10. Multiplied by 5.

Decision-Making: 2, 7, 22, 24, 25. Divided by 5. Multiplied by 5.

Total Scale

Total ESA score: The sum of all subscales.

Appendix J

Preliminary Confirmatory Factor Analysis of the Emotional Self-Awareness Scale

In this appendix, a preliminary examination of the psychometrics of the ESA measure was conducted using confirmatory factor analysis (CFA), however due to the small sample size, this is by no means a definitive test of the psychometrics of the ESAS.

Testing the psychometrics of the ESAS

As ESA is a relatively new concept with considerable theoretical reference (both in psychotherapy literature, past research and the current thesis), but little empirical research, many scales and questions were included to ensure adequate capturing of all the facets of the construct. Baron and Kenny (1986) suggest that when a mediating variable is an internal or latent construct, such as ESA, the most rigorous approach to capturing the construct is to include multiple indicators of the mediating construct followed by latent variable structural modelling methods. Therefore, items from the SRIS (Grant et al., 2002), the RRS (Treyner et al., 2003), the MES (Mayer & Stevens, 1994) and items developed from young people's qualitative responses were considered for inclusion in the measure of ESA and assessed by consensus between two researchers in the field of psychology with 32 items included in the ESA measure.

Confirmatory factor analysis (CFA) is a useful statistical method of assessing the 'fit' of a proposed model at explaining the observed pattern of sample correlation and covariance (Shevlin, Miles, & Lewis, 2000). To determine if the items selected for each ESA category were reflecting the same underlying construct, a confirmatory factor analysis (CFA) was conducted. CFA compared observed variables (i.e., items in the SRIS and the RRS) with latent variables (i.e., ESA categories: recognition, identification, contextualisation, communication and decision-making) using a multivariate regression model. The latent variables generated are continuous and for CFA models where the observed variables are categorical, such as in the model used in this chapter, the model is called an item response theory (IRT). Several logistic regression equations are estimated in IRT, which describe the relationship between the

latent factors, the observed variables and the relationship between the observed variables and the latent factors.

Aims

The aim of this analysis was to tentatively explore the psychometrics of the ESAS using longitudinal confirmatory factor analysis. This is the first proposed measure of ESA and, as such, there are likely to be improvements needed to the scale. Therefore only a tentative exploration of the scale was conducted here.

Method

CFA was used to validate the compatibility of the 32 items included in the ESAS with the five latent categories of ESA. The statistical package Mplus Version 6 (Muthen & Muthen, 2010) was used for the CFA with robust weighted least squares analyses to reduce the many items of ESA into a manageable scale for further analyses. All observed items were treated as categorical and measured across the three time-points according to Muthen and Muthen's Example 5.10, *Threshold Structure CFA for Categorical Factor Indicators* (Muthen & Muthen, 2010). Two models were tested; Model 1 where all items were used to measure the total ESAS and Model 2 where each subscale of the ESAS was measured by specific items with subscales correlated.

Results

Due to the small sample size, a definitive model of ESAS cannot be determined with this data. Two models (Model 1 and Model 2) were tested using the confirmatory factor analysis procedure described above. The fit of the models was tested as shown in Table J1. The latent variable covariance matrix (PSI) was not positively definite for either model. This was due to an estimated correlation between the total ESAS and one of its items greater than one ($r = 1.054$) for Model 1. For Model 2, there was an estimated correlation greater than 1 ($r = 1.056$) between the subcategory recognition and one of its items. Goodness of fit indices for the three models are presented in Table J1.

Table J1

Goodness of Fit Indices for the Proposed Model of Emotional Self-Awareness

Model	χ^2 / df	RMSEA	CFI	TLI	WRMR
<i>Good Fit Indicators</i>	< 3	< .06	> .90	> .90	< .90
Model 1	1.38	.058	.438	.438	1.92
Model 2	1.37	.057	.471	.470	1.872

For both models, only chi-square divided by the degrees of freedom and RMSEA met the goodness of fit criteria, suggesting that neither model is a good fit for the data. Failure to find a good fit for the data was likely to be due to the small sample size. Of these two models, Model 2 had the best fit indices. Further improvements to this model could be made removing items with critical ratio values (the estimate divided by the standard error) of less than 2.0, however, due to the small sample size, no improvements have been attempted. The critical ratios of each item can be found in Tables J2 for Model 1 and Table J3 for Model 2. Table J4 presents the correlation matrix for each subscale in Model 2.

Table J2
Critical ratios for Model 1

Item	<i>Est.</i>	<i>SE</i>	<i>CR</i>
I often think about the way I feel about things	0.51	0.04	12.34*
I frequently take time to reflect on my thoughts	0.54	0.04	12.25*
Analyse recent events to try to understand why you are depressed	0.59	0.05	12.12*
It's difficult to communicate what I feel	0.49	0.04	11.70*
It's hard to describe my mood at the moment	0.51	0.04	11.68*
Analyse your personality to try to understand why you are depressed	0.56	0.05	11.27*
I'm often confused about the way that I really feel about things	0.52	0.05	10.91*
Often I find it difficult to make sense of the way I feel about things	0.49	0.05	10.85*
Go away by yourself and think about why you feel this way	0.49	0.05	9.75*
It is important to me to try and understand what my feelings mean	0.44	0.05	9.62*
I often think about ways to make me feel better	0.46	0.05	8.99*
I don't know why I feel this way	0.39	0.05	8.54*
Go someplace alone to think about your feelings	0.47	0.06	8.50*
It's hard to tell what mood I'm in	0.41	0.05	8.31*
Sometimes I can't figure out how to make myself feel better	0.45	0.06	8.23*
I often 'self-talk' to think about feelings	0.50	0.06	8.15*
When feeling bad, I try to deal with problems and concerns	0.41	0.05	8.10*
I find it easy to write down how I feel	0.40	0.05	7.83*
I'm often aware that I'm having a feeling, but I often don't quite know what it is	0.41	0.05	7.68*
Write down what you are thinking and analyse it	0.27	0.06	4.42*
I don't often think about my thoughts	-0.19	0.06	-3.54*
I know why I feel this way	-0.29	0.06	-5.03*
I can verbalise my feelings	-0.33	0.06	-5.27*
I know exactly how I'm feeling	-0.29	0.05	-5.35*
I examined my feelings and decided what to do	-0.29	0.05	-5.35*
I don't really think about why I behave in the way I do	-0.28	0.05	-5.64*
I usually know why I feel the way I do	-0.26	0.05	-5.79*
My mood is clear	-0.38	0.05	-8.06*
I rarely spend time in self-reflection	-0.38	0.05	-8.29*
I can talk about moods to others	0.13	0.05	2.59*
I am usually aware of my thoughts	0.07	0.05	1.47
I often have trouble deciding what will improve my mood	0.11	0.08	1.45

Note. *Est.* = Estimate; *SE* = Standard error of the mean; *CR* = Critical ratio (estimate divided by the standard error); * $p < 0.05$.

Table J3
Critical Ratios for Model 2

Item	<i>Est.</i>	<i>SE</i>	<i>CR</i>
<i>Recognition</i>			
I don't often think about my thoughts	-0.33	0.06	-6.12*
I rarely spend time in self-reflection	-0.57	0.04	-13.1*
I frequently take time to reflect on my thoughts	0.78	0.04	20.94*
I am usually aware of my thoughts	0.20	0.06	3.56*
I know exactly how I'm feeling	-0.23	0.06	-3.65*
Go someplace alone to think about your feelings	0.58	0.06	9.36*
<i>Identification</i>			
Often I find it difficult to make sense of the way I feel about things	0.54	0.05	11.85*
It is important to me to try and understand what my feelings mean	0.50	0.05	9.91*
I'm often aware that I'm having a feeling, but I often don't quite know what it is	0.46	0.05	8.68*
My mood is clear	-0.38	0.05	-7.51*
It's hard to describe my mood at the moment	0.51	0.05	10.50*
<i>Communication</i>			
I can verbalise my feelings	-0.42	0.05	-7.77*
I often 'self-talk' to think about feelings	0.57	0.06	8.90*
I find it easy to write down how I feel	0.44	0.05	9.55*
I can talk about moods to others	0.12	0.05	2.46*
It's difficult to communicate what I feel	0.56	0.04	13.56*
Write down what you are thinking and analyse it	0.29	0.07	4.48*
<i>Contextualisation</i>			
Analyse recent events to try to understand why you are depressed	0.60	0.05	12.45*
Go away by yourself and think about why you feel this way	0.49	0.05	10.05*
Analyse your personality to try to understand why you are depressed	0.56	0.05	11.48*
I know why I feel this way	-0.24	0.06	-4.11*
I don't know why I feel this way	0.33	0.05	6.76*
I don't really think about why I behave in the way I do	-0.32	0.05	-6.71*
I often think about the way I feel about things	0.56	0.04	14.37*
I'm often confused about the way that I really feel about things	0.51	0.05	10.56*
I usually know why I feel the way I do	-0.22	0.05	-4.61*

(Table J3 continues)

(Table J3 continued)

Item	<i>Est.</i>	<i>SE</i>	<i>CR</i>
<i>Decision-making</i>			
I examined my feelings and decided what to do	-0.33	0.05	-7.22*
I often have trouble deciding what will improve my mood	0.12	0.07	1.73
I often think about ways to make me feel better	0.43	0.05	8.45*
Sometimes I can't figure out how to make myself feel better	0.45	0.05	8.72*
When feeling bad, I try to deal with problems and concerns	0.38	0.05	7.54*

Note. *Est.* = Estimate; *SE* = Standard error of the mean; *CR* = Critical ratio (estimate divided by the standard error); * $p < 0.05$.

Table J4

Correlation Matrix of the ESA categories for Model 2

	REC	ID	COM	CONT	DEC
REC	1.00				
ID	0.47*	1.00			
COM	0.49*	0.65*	1.00		
CONT	0.88*	0.98*	0.69*	1.00	
DEC	0.44*	0.90*	1.44*	0.90*	1.00

Note. Estimated correlation matrix allows for correlation greater than 1.

REC = Recognition; ID = Identification; COM = Communication; CONT = Contextualisation; DEC = Decision-making.

Discussion

The aim of this analysis was to explore the psychometrics of the ESAS using longitudinal CFA. This analysis was limited by the small sample size and the consequent lack of statistical power. Further research is needed using larger scale studies and a representative sample. From this tentative exploration, there was a marginally better fit when the categories of ESA were included when compared with the total ESAS.

Therefore, this preliminary CFA was inconclusive due to the small sample size and suggested that further refinement of the scale is necessary.

Appendix K

Additional Scales Used in Chapter 7

A list of the outcome variable and the questionnaires used to measure each outcome and information about scoring the questionnaires and the validity and reliability of each questionnaire for the randomised controlled trial presented in Chapter 7. All items used in the analyses in Chapter 7 are reported in text as well.

Table K1

All Items Used in the Randomised Controlled Trial Described in Chapter 7

Measure	Scores	How variable is calculated	Validity and Reliability
<i>Emotional Self-Awareness</i>			
Self Reflection and Insight Scale (Grant et al., 2002)	Two subscales: Self-Reflection, and Insight. Self-reflection subscale consists of 12 items and ranges from 12 to 72. The insight subscale consists of 8 items and ranges from 8 to 48.	Mean differences of subscales over time for the intervention and comparison groups. A change in the monitoring group but not in the comparison group is indicative of ESA as a mediator.	Previous research indicates that the two subscales have good internal consistency (alpha: self-reflection = .91, insight = .87); test-retest correlation was about .77 for both scales ($p < .001$).
The Ruminative Response Scale (Treyner et al., 2003)	Two subscales: The brooding subscale (to measure rumination) and the reflection subscale (to measure ESA). Each subscale consists of 5 items and ranges from 5 – 25.	The reflection subscale was used to measure ESA. The brooding subscale was used as to measure rumination.	Reliability and validity was tested in undergraduate students (Roelofs, Muris, Huilbers, Peeters, & Arntz, 2006). Internal consistency was good. Test-retest reliability was moderate.

(Table K1 continues)

(Table K1 continued)

Measure	Scores	How the variable is calculated	Validity and reliability
<i>Emotional Self-Awareness (continued)</i>			
The Meta-Experience Scale (Mayer & Stevens, 1994)	This measure includes four subscales: Clarity Acceptability Typicality Influence Each subscale consists of 6 items and ranges from 6 – 30.a	These subscales were used to measure ESA. Mean differences of the subscales over time for both the intervention and comparison groups.	No information available, however, this measure has been included as it measures important aspects of ESA that the other measures do not.
<i>Mental Health Outcomes</i>			
Depression, Anxiety and Stress Scale (Lovibond & Lovibond, 1995)	Scores range from 0 to 42 where a score of 0 – 6 is normal, 7 – 13 is mild, 14 – 20 is moderate, 21 to 27 is severe and 28 – 42 is extremely severe.	Depressive symptoms were calculated using the Depression subscale of this measure. We are interested in the mean differences between the pretest and follow-up scores and also the pretest and 6-week follow-up scores for both the monitoring and comparison groups.	This scale is an Australian scale that has been tested for reliability and validity. Compared with other scales (such as the Beck Depression Inventory and the Beck Anxiety Inventory), the DASS is able to discriminate between smaller differences between depressive, anxiety and stress symptoms.

(Table K1 continues)

(Table K1 continued)

Measure	Scores	How the variable is calculated	Validity and reliability
<i>Mental Health Outcomes (continued)</i>			
Negative Cognitive Errors Questionnaire (Leitenberg et al., 1986)	Eight scenarios assess negative cognitive errors in each of the following domains of functioning; social, academic and athletic. Each of the 24 items. Children are asked to rate how similar the thought is to what they would think in that situation, from 0 = not at all like what I would think to 4 = almost exactly like I would think.	A self-report inventory used to measure overgeneralisation, catastrophising, personalisation and selective attention. These negative cognitive errors are explicitly measured in real-time in the <i>mobiletype</i> program and form part of the content that young people increase their ESA about. Mean differences over time for the intervention and comparison groups.	The internal consistency of the NCEQ (Cronbach's alpha) has been reported to range from $\alpha = .75$ to $.91$ and it has been shown to have reasonable test-retest reliability (Leitenberg et al., 1986; Turner & Cole, 1994).
The Adolescent Coping Scale General Short Form (Frydenberg & Lewis, 1991, 1993)	There are three subscales: - Solving the problem ranges from 18 (not used at all) to 90 (used a great deal) - Reference to Others ranges from 20 (not used at all) to 100 (used a great deal) - Nonproductive coping ranges from 18 (not used at all) to 90 (used a great deal).	The 'solving the problem' subscale and the 'reference to others' subscale are considered productive coping. The mean differences over time for both the monitoring and comparison groups.	This is an Australian scale that has been tested for reliability and validity in Australian secondary schools and other adolescent populations.

(Table K1 continues)

(Table K1 continued)

Measure	Scores	How the variable is calculated	Validity and reliability
<i>Evaluation in Primary Care</i>			
Short-Form 12 Health Survey (Ware et al., 1996)	The SF12 generates two scores: a mental health and a physical health component score. In a general population the mean score on each component is around 50, with scores of 40-49 indicating mild disability, scores of 30-39 indicating moderate disability and scores below 30 indicating severe disability. The response to each item is tagged with weights that are different for mental and physical components. These weights are added to a constant to give the final scores.	This measure will assess physical and mental health outcomes. The mean differences over time for both the intervention and comparison groups in order to determine whether young people that complete the monitoring group have improved physical and mental health outcomes.	This measure has been tested for validity and reliability in a number of different populations (Ware et al., 1996).
Questions 10 and 11 from the General Practice Assessment Questionnaire (from the National Primary Care research and Development Centre, 2007)	Communication subscale (Question 10) ranges from 8 – 56. The Enablement Subscale (Question 11) ranges from 3 – 13.	This measure will be used to assess communication and enablement. We predict that the monitoring group will have an increase in these subscales.	This is a widely used instrument in Australia to evaluate GP and GP practices. It is an acceptable, reliable and valid instrument in evaluating key areas of primary care activity (Ramsay, Campbell, Schroter, Green, & Roland, 2000).

(Table K1 continues)

(Table K1 continued)

Measure	Scores	How the variable is calculated	Validity and reliability
<i>Evaluation in Primary Care</i>			
The Session Rating Scale (Miller, 2002)	Each of the four items range from 0 to 10. They are added together for a total rating ranging from 0 – 100. A score below 40 indicates severe problems with the session.	This measure was used to assess whether the monitoring program increases the patient’s satisfaction with their GP sessions.	Reliability and validity were tested (Duncan et al., 2003). Cronbach’s Alpha = .83. Construct validity was supported.
Selected questions from The Party Project’s Exit Interview and the Party Project’s 3-month Follow-up Interview, Part B: Health Service Use (Sanci, 2009)	The scoring protocols are complex and will be completed using the statistical program STATA. We will follow the scoring protocols from the Party Project with guidance from Dr. Lena Sanci, chief investigator of the Party Project and collaborator on the <i>mobiletype</i> project.	This measure evaluated interpersonal and continuity aspects from the patient’s perspective of the sessions with their doctors. The scores from young people in the intervention group would increase over time when compared with the comparison group.	No information on validity or reliability is available. This instrument was developed by Dr. Lena Sanci at the University of Melbourne, who is an expert on evaluating GPs and general practice settings and has had extensive experience in this field.
A feedback questionnaire	The information here is descriptive and will be scored item by item.	This measure will be used to evaluate the <i>mobiletype</i> program.	No information is available about this measure. This was developed as part of the <i>mobiletype</i> study and has been used in previous <i>mobiletype</i> studies (HREC 26027), providing useful information.

(Table K1 continues)

(Table K1 continued)

Measure	Scores	How the variable is calculated	Validity and reliability
<i>Evaluation in Primary Care</i>			
Current diagnosis	The information is descriptive and will be used to determine the severity and type of condition the participants have.	This information will be used to determine if the <i>mobiletype</i> program is more effective with particular conditions or severity of disorders.	Not applicable.
GP questionnaire (Haller-Hester,2006)(Haller-Hester, 2006)	This measure will determine the doctor's treatment plans for each participant and is a descriptive measure.	The pretest and follow-up measures will be compared with determine if the <i>mobiletype</i> program assists doctors in developing a treatment plan	Not applicable.
SHO Appraisal Form (from the Federation of Royal Colleges of Physicians, accessed 2008)	Each item ranges from 0 to 3 and are added together to determine total confidence. A score below 6 is considered low and a score above 12 is high.	This measure is used to calculate how confident the doctor feels about their diagnosis and treatment of the patient.	There is no information available.

Appendix L

All responses from the 'High' and 'Low' ESA Groups in Chapter 5

Table L1

All responses from the 'High' ESA group

Category	Coded Response
Recognition	<p>I just found it helped me know what I was feeling.</p> <p>At times I had to stop and think about what, how I was feeling. Yeah, I did sometimes but I wouldn't say it was difficult. I had to consciously thinking about it, if that's how I was</p> <p>I suppose to a degree, they made me realise how I was feeling and I was reacting to different situations. I wouldn't say they were very useful but they were interesting to take note of where I was at</p> <p>I thought it was a very open view to help children - express their feelings everyday.</p> <p>I was already aware but now I'm just more aware</p> <p>It confirmed, it reflected quite accurately how I was feeling and how I did react to certain situations. I thought it was very accurate</p> <p>It did in the sense that you knew that you knew they'd be asking a question about all the different emotions so you paid more attention to them. Even when I wasn't filling out the diary. I did find that I was examining my emotions more. I've also been doing a thing with my doctor about it as well.</p> <p>It made you think about how I was feeling.</p> <p>Just being able to analyse the stress.</p> <p>Probably just the end result. Realising what I'm feeling and how I'm doing.</p> <p>Reflective. It was just a good way to think about what I had been feeling.</p> <p>Sometimes I had to think about it and I was like I don't even know how I feel really.</p> <p>They gave me a couple of moments to myself and they made me examine how I was feeling in a degree that I usually wouldn't.</p> <p>They were actually helping me with my feelings and all that.</p>

(Table L1 continues)

(Table L1 continued)

Category	Coded Response
Identification	<p>I was doing it, I was for a few weeks before and the mobiletype program actually made it a lot easier in the sense that because I was already examining what was going on several times a day, at the end of the day when I had to write up my little diary it was a lot easier. Instead of sitting there at the end of the day going 'hum, how was I feeling today' It was already there.</p> <p>It sometimes can be quite difficult, caz you have to examine emotions that you're not normally thinking about. Exactly what I was feeling - that was the difficult part. Usually you think that would be easy and youknow what your feeling, should be obvious oh I'm a bit anxious. But it's just are you a bit anxious? how anxious are you? are you also sad? Are you happy? It was</p> <p>It was hard sometimes to pinpoint how I felt. I just. I suppose too that a few times I had to come back to it and by the time I was feeling different. So that threw me out a bit too.</p> <p>Some of them for me were a bit difficult because it was sort of 'how am I, how anxious am I right now?' How sad am I right now. Things that you generally don't stop and ask yourself. It was more useful for me, just bymyself to say 'well, I am feeling a bit anxious let's go and do something that I'm not going to feel anxious about.'</p> <p>Trying to think about where I was. Trying to gauge my level of mood. Sometimes I didn't know which ones to answer so I had to stop and think how am I really was feeling, if I wasn't paying much attention to my thoughts and feelings.</p>

(Table L1 continues)

(Table L1 continued)

Category	Coded Response
Communication	<p>I think I found that talking to people helped. I don't think I was as aware.</p> <p>I was a lot calmer just able to express myself.</p> <p>Just being able to express yourself.</p> <p>Just being able to talk really. Like if you want to speak in just a general, normal time, you are less likely to express your feelings when I was asked.</p> <p>Just that I think it's a really good thing for the user and that if any child thinks that they have any type of stress problem of emotional problem, that it's a great way of expressing yourself and dealing with it without thinking that it's an over the top thing.</p> <p>The different ways of expressing it.</p> <p>The responses that they had for you were actually quite open so it was easy enough to express.</p> <p>my mum spoke to the doctor about that as well that she feels that I was a lot more open and loving and stuff because I was not bottling anything up at all.</p> <p>that I was open and more fun and stuff because I wasn't bottling everything up</p>

(Table L1 continues)

(Table L1 continued)

Category	Coded Response
Contextualisation	<p>It makes you sit down and actually examine how your feeling on things you normally wouldn't ask yourself</p> <p>It's good to think about when your stressed what you think would make you feel better and if it actually did.</p> <p>finding out what I need to do and that like 5 weeks went by and I just didn't have much happiness. Like I just did the same shit - oops sorry I just did the same things and I didn't really hang around friends I just kind of did the same things.</p> <p>Caz it made me look at exactly what was stressing me, more so than usual. Sometimes you know you are stressed and you don't bother to look into it. Often you know the main cause of why your stressed but don't know the bits that set you off. made me realise exactly what was annoying or stressing or making me anxious</p> <p>I suppose I have an interest in my health and mental wellbeing and think that we should be aware of how we react to different situations and be aware of what is going on in our heads</p> <p>I tried to think about why I feel a certain way more. Try to look back and think about what had happened leading up to my mood.</p> <p>It asked what you were doing and how you were feeling about the situation ≥ So it changed throughout the day again</p> <p>Just again to see what ticked me off and how I dealt with it. Like when my daughter needs to be picked up that's usually when I was feeling upset. I kind of already knew that but it was kind of interesting to see that on the first week that you got all this information, that it went up and down.</p> <p>Just being aware of how you are reacting to things caz sometimes you might not pay attention to how you reacted and it just, I suppose is a reflection of how you are acting and feeling</p> <p>One thing I did discover that I feel very anxious about, which would explain a lot of things, was with the shopping, it was generally household grocery shopping and that. That was always sort of a very anxious experience and usually because I'd go with my mother and that would involve leaving my daughter. So whenever my daughter is at daycare or something, I discovered I'm very anxious. So, even though she's always been going to daycare and they are qualified and all that, when she's not with me I'm very anxious about i</p> <p>What had actually made me stressed and how stressed, the level it actually was.</p>

(Table L1 continues)

(Table L1 continued)

Category	Coded Response
Contextualisation <i>(continues)</i>	<p>It had a lot of questions and it varied a bit. Like it asked you at different times of the day how you were feeling and it changed throughout the day and your mood and everything. it was good that it went off a few times caz your mood does change throughout the day.</p> <p>when my daughter gets picked up by her father that was when I started getting a bit stressed and started freaking out a bit. Just having to interact with my ex</p>
Decision-Making	<p>At the end really, caz during it I just kept doing what I was doing. I did go to Queensland though, but apart from that I'm just doing the same things and the same routine and I'm bored and I realised it after. And I have changed a bit as a result to it. Hanging around my friends more and making more of an effort and making sure everyday that I text message people throughout the day. I'm a lot more positive and with that little sheet that the doctor gave me if somethings stressing me out or whatever I'm just like thinking about it and forget about it if it's nothing big. And it's like there are bigger things to worry about.</p> <p>It was really helpful to read how to cope with the stress and which one I had chosen and which other ones there were</p> <p>Like if something was stressful I was like this isn't a big deal and then I stopped worrying.</p> <p>Probably coping mechanisms and like that.</p> <p>Probably the coping mechanisms of stress and now thinking about to express things that I might think are minor, but it still helps to express them</p> <p>The different ways of expressing it. like not just talking but also going for a walk and stuff like that.</p> <p>Yeah, a lot of dealing with it later doesn't help.</p> <p>Yeah. a lot of doing nothing doesn't help</p> <p>Yes, they made me think about how I was feeling and more likely to try and do something about it.</p> <p>being able to learn how to cope with stress and stuff.</p> <p>to realise that you overcome it throughout the day without really realising it.</p>

Table L1

All responses from the 'Low' ESA group

Categories	Coded Responses
Recognition	<p>Again because it made me think about how I felt</p> <p>Caz I was made to think about it. Well - not made but yeah.</p> <p>Helps think about what feelings and emotions are there. I would never have noticed/realised before.</p> <p>I guess it just made me aware of them. Whereas I used to feel down but it kind of, because I felt down a lot it felt normal but when I was filling out the diary it made me aware that it wasn't normal and that I had to do something about it I guess. Or sometimes I would be so confused that I didn't know if I was down or depressed or not. So filling out the diaries helped me be aware of it</p> <p>It helped me realise ow I was really feeling all that kind of stuff.</p> <p>It just helped me work out how I was actually feeling and that kind of stuff.</p> <p>It made me think more about what I thought and felt and sort of be able to understand that I actually do have those feelings.</p> <p>That it gave me an opportunity to reflect on my thoughts even when I know that I normally wouldn't have</p> <p>Yes I did. It just helped me realise, getting through it and answering them, made it a bit easier</p> <p>it brought things out that I wouldn't never have paid attention to before.</p> <p>it was interesting to have to think about what I was feeling at that time.</p>
Identification	<p>Because then instead of like just wondering why you're feeling it you actually sort of know.</p> <p>I guess it was that I'm often feeling more than one set emotion.</p> <p>I never noticed before that I have an underlying angry mad upset thing constantly. I noticed that, so it was helpful to see that it was actually there. Caz I wouldn't have notcied otherwise.</p> <p>It got better as I was going along. It just came to me after a little bit</p> <p>It got easier as I did it a bit more. I couldn't tell if I was stressed out or stuff.</p> <p>But I can sort of tell now.</p> <p>It was easy most of the time. It was confusing that a lot of the time I'd be a little bit angry, a little bit sad and happy at the same time. That was strange.</p> <p>Probably that I was a bit more down or depressed than I initially thought I was.</p> <p>because I was more aware of how I was feeling, it was easier to decipher how I was feeling and how to deal with things.</p> <p>Finding out, that I'm not really feeling mixed emotions most of the time.</p>

(Table L2 continues)

(Table L2 continued)

Category	Coded Response
Communication	<p>It actually made me feel better to get things of my chest but not have to talk to anyone. If I didn't want to answer it, to fill it out I didn't have too.</p> <p>It was helpful to fill out something, to get a little bit of your chest.</p> <p>The diaries were really good because it helps you to get things of your chest while it's happening and the feedback's really good, because then you've got something to work towards.</p> <p>Yep, when I went back to the doctor, it made it easier to show her how I was and that</p> <p>and then I felt better caz I felt like I'd sort of spoken to someone even though I hadn't.</p> <p>being able to tell other people that I don't know what I feel like</p>
Contextualisation	<p>it just helped me realise how I was acting.</p> <p>things that trigger negative thoughts and how to turn negative thoughts into positive thoughts.</p> <p>I guess it gave having... myself... To see my eating habits and drinking habits and how both of those affected my mood and that probably helped her a bit which helps me in turn.</p> <p>I had the chance to fill in the diary, which sort of helped me think about why I was feeling down.</p> <p>I realised maybe I don't spend a whole lot of time around friends and things but I try and make myself think that I do but then it really reflected that myself, for my age, I don't spend enough time around friends, beign social or leisure things.</p> <p>It depends on what situation I'm in. Like at work if I'm stressed I know I'm stressed. Whereas if I'm home if I'm stressed, I may not know. It depends on what environment I'm in</p> <p>It just helped me, showed me the way I was reacting and I kind of stopped and thought about how I was reacting</p> <p>It made you analyse your behaviour.</p> <p>Just by having to put stuff in you have to think about it, therefore you think about why it happened.</p> <p>Just my reaction to things. How I behaved, that kind of stuff</p> <p>Yeah, it makes you think more about how you feel and why you feel it.</p>

(Table L2 continues)

(Table L2 continued)

Category	Coded Response
Decision-Making	<p>Definitely yes. The way I choose to to spend my time. to see what I spend my time doing and that I could do more with myself.</p> <p>I did, but I didn't want to accept it. Sort of accepted it.</p> <p>I guess because I realised that there was something wrong that I was like 'I've got to work on fixing it'</p> <p>I remember at times being surprised about my answers. Seeing that I consistently have an angry and things like that</p> <p>Just because like I said before admitting to myself that there is something wrong and then because I've sort of filled the survey in I'm like 'oh wow, I am feeling a bit down, maybe I should talk to someone or change my thinking and habits'</p> <p>That it's ok to feel down about things. That I do need help in some areas in changing the way I think and behave and stuff when I'm down.</p> <p>To be able to look at how I behaved and I've been feeling over the past few weeks. It helped you to work out strategies about how to be more positive or how to deal with whatever the problem is. And also it helps to indicate which areas are worse.</p> <p>because filling it out makes you realise how you used to do things as opposed to how you should do things. It's good for reflecting ways to figure things out I guess.</p> <p>that there were ways that I can achieve that by doing small things like exercise and making new friends and things like that</p>