Investigating teachers’ knowledge, practice and change following an oral language professional learning program

Hannah Louise Stark
B. Speech Pathology, P.G.Dip. Health Research Methodology
ORCID: orcid.org/0000-0001-7755-8190
Student ID: 690908
Melbourne Graduate School of Education
University of Melbourne

Submitted in total fulfilment of the requirements
for the degree of
Doctor of Philosophy (Education)
December 2018
Abstract

Language and literacy are increasingly topics of educational and public health interest, and research suggests that these skills are significantly impacted by early educational experiences. Crucially, there is wide agreement that teaching quality is a key determinant of student achievement. In a series of three studies, the knowledge and classroom practices of early years’ teachers, and teachers’ self-perceived and measured changes that occurred during and following a sustained oral language professional learning program were explored. These investigations were informed by Desimone’s (2009) model of professional development and Hoy and Miskel’s social system model for schools (2008).

In Study 1, the knowledge of language constructs and associated self-rated ability of 78 Victorian teachers was measured. Consistent with a number of earlier Australian and international studies, teachers’ explicit and implicit knowledge of basic linguistic constructs was limited and highly variable. Despite rating their skills and knowledge as either moderate or very good, the collective knowledge of this cohort was found to be limited and variable. A statistically significant correlation was found between total self-rated ability and experience teaching the early years of primary school, but no relationship was found between self-rated ability and overall performance on knowledge items, indicating that participants’ knowledge was not well calibrated.

In Study 2, the feasibility of a novel approach to collecting teacher talk data was investigated, as was the application of an existing framework to describe talk. This approach was then applied to measure change in 12 teachers’ talk over the course of the professional learning program. Over the course of the professional learning program teachers used proportionately more talk that explained strategies that
students could use to support their language and literacy learning, and this increase was sustained 12 months later.

The aim of Study 3 was to describe the observed and self-perceived changes in knowledge, practice and beliefs of teachers who participated in the professional learning program, and whether change was adequately accounted for by current models of professional development. In three case studies it was illustrated that despite participating in the same sustained professional learning program, teachers’ growth in knowledge was variable. Change in self-rated ability was influenced by observed student outcomes (which teachers attributed to change in their practice). In one case, professional growth was restricted by factors within the school environment.

Conclusions drawn from this body of research are that (i) oral language is rarely disaggregated from early literacy and lacks visibility in the early years of primary school, (ii) teachers’ knowledge of language and literacy is variable, often limited and poorly calibrated, and (iii) the construct of teacher cognition and theoretical models of teacher practice change can and should inform the design and implementation of professional learning.
Declaration

This thesis comprises only my original work towards the Doctor of Philosophy, except where indicated in the preface. Due acknowledgement has been made in the text to the source and authorship of all other materials. This thesis is fewer than 100,000 words in length, exclusive of tables and appendices.

Hannah Louise Stark
Preface

The work contained in this thesis is submitted solely for the purposes of my PhD candidature. I did not use third-party editorial assistance in preparing the thesis. I led the writing of the publication in Chapter 6 that has been published in the journal *Annals of Dyslexia*. Similarly, I led the writing of the manuscript in Chapter 8 that has been accepted for publication in *Professional Development in Education*. The co-authors, who were my supervisors for this doctoral research, provided intellectual input into the design, analysis, interpretation and writing. I was responsible for addressing all feedback and revising both manuscripts, with advice from my co-authors as needed. No work within this thesis has been submitted for other qualifications. No work in this thesis was carried out prior to enrolment in this degree. All content has been attributed to the original source, and permission for reproduction has been sought where appropriate (as detailed on page xvi).

Publications during candidature.

Two manuscripts were published during my PhD candidature. The citations for these publications are:


Presentations during candidature.

During my candidature, I delivered two peer-reviewed oral presentations of work from this PhD:


In addition, I have had two peer reviewed posters accepted:


I also delivered two non-peer reviewed oral presentations:


Scholarships and funding.
During my PhD candidature I was supported by a number of scholarships which I gratefully acknowledge here.

- An Australian Research Council stipend (Linkage Grant LP 130100308): 2014-2015
- An Australian Government Research Training Program Scholarship (formerly the Melbourne Research Scholarship): 2015-2018
- The Melbourne Graduate School of Education Jack Keating Education Policy Scholarship: 2017
- The University of Melbourne Department of Paediatrics Vera Scantlebury Brown Child Welfare Memorial Trust Scholarship: 2015
- The Victorian Department of Education and Training Dr Lawrie Shears Doctoral Scholarship: 2015
Acknowledgements

The opportunity to undertake a PhD has been a privilege and an honour. I would not have been able to complete this work without the support, guidance and generosity of many people. Most importantly, I acknowledge and thank the teachers who participated in this research. I am particularly grateful for their willingness to share their knowledge and practice throughout the CPO trial. I especially thank “Karen”, “Elizabeth” and “Stacey”, who were so generous in sharing their stories and reflections on professional learning. I similarly thank the schools, school leadership, and the Victorian Department of Education and Training and the Catholic Education Commission of Victoria for allowing this research to be conducted.

I feel incredibly fortunate to have had the opportunity to learn and grow as a researcher under the supervision of three inspiring and generous women. I have appreciated your patience and guidance, especially in this final year of my candidature. To Associate Professor Tricia Eadie, I have valued the opportunity to work and learn under your guidance. Your passion and dedication to quality in early childhood education is unwavering and I thank you for showing me what can be achieved through collaboration. To Professor Pamela Snow, thank you for teaching me how to develop well-considered arguments. I am grateful for everything have taught about writing, style and communication. To Professor Sharon Goldfeld, thank you for always reminding me to take a wider view and to think about the implications and impact of research.

I am similarly grateful to my advisory committee, Professor Janet Clinton and Dr Liza Hopkins, for their interest, encouragement and guidance. I have valued your advice and input at various points in my candidature. I would also like to acknowledge Emeritus Professor Collette Tayler, who was the chair of my advisory committee in the first year of my candidature. Collette was never too busy to stop and ask me how my reading and thinking was progressing.
I offer special thanks to the CPOL team, especially Beth Shingles and Dr. Amy Watts who have both played an important part in the execution and completion of my research. Thankyou also to Francesca Orsini for her guidance and assistance with data analysis. I also thank Lia, Nicole, Jaclyn, Josephine, and Christina for the many hours they spent coding transcripts.

Throughout my candidature I have been surrounded by many teachers, fellow PhD students, researchers and academics in my various workplaces, including the Early Childhood Education and Care team at MGSE, the Centre for Community Child Health, the Baltara School and the University of Melbourne Department of Audiology and Speech Pathology. Your friendship and collegiality has been incredibly important.

To my parents, Adrienne and Phil, thankyou for your unwavering support. You have both always worked so hard in your careers and in turn have created countless opportunities for me. You have instilled in me a belief that with persistence and determination I can achieve whatever I set my mind to. I also thank my brother Peter, my sister Julia and my wonderful circle of friends who have all supported me and distracted me in equal measure.

Finally, I thank my husband Peter. We met just as I began my PhD journey and you have been by my side through all of the wonderful highs and the testing lows. Your love, encouragement and belief in me has kept me going. Thankyou for helping me to find ‘the story’ and reminding me that this research matters.
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An unsuccessful attempt was made to establish the copyright holder of Goe’s (2002) Teacher Quality Framework (Figure 3-1; pp. 36).
## Abbreviations

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<td>ABS</td>
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<td>ACARA</td>
<td>Australian Curriculum, Assessment and Reporting Authority</td>
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<td>ACER</td>
<td>Australian Council for Educational Research</td>
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<td>AEDC</td>
<td>Australian Early Development Census</td>
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<td>AITSL</td>
<td>Australian Institute for Teaching and School Leadership</td>
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<td>ARC</td>
<td>Australian Research Council</td>
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<td>AusVELS</td>
<td>Australian Victorian Essential Learning Standards</td>
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<td>CECV</td>
<td>Catholic Education Commission of Victoria</td>
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<td>CPOL</td>
<td>Classroom Promotion of Oral Language</td>
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<tr>
<td>DEECD</td>
<td>Department of Education and Early Childhood Development</td>
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<tr>
<td>DET</td>
<td>Department of Education and Training</td>
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<tr>
<td>ICPALER</td>
<td>Ideas, Conventions, Purposes, Ability to Learn, Expressive &amp; Receptive</td>
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<td>LANTITE</td>
<td>Literacy and Numeracy Test for Initial Teacher Education</td>
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<td>MUHREC</td>
<td>Monash University Human Research Ethics Committee</td>
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<td>NAPLAN</td>
<td>National Assessment Program – Literacy and Numeracy</td>
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<tr>
<td>NHMRC</td>
<td>National Health and Medical Research Council</td>
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<td>NITL</td>
<td>National Inquiry into the Teaching of Literacy</td>
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<tr>
<td>NRP</td>
<td>National Reading Panel</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development,</td>
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<tr>
<td>OLSEL</td>
<td>Oral Language Supports Early Literacy</td>
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<tr>
<td>PIRLS</td>
<td>Progress in International Reading Literacy Study</td>
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<td>PISA</td>
<td>Program for International Student Assessment</td>
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<td>PL</td>
<td>Professional learning</td>
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<td>PLS</td>
<td>Plain Language Statement</td>
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<td>RCT</td>
<td>Randomised Controlled Trial</td>
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<td>VIT</td>
<td>Victorian Institute of Teaching</td>
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A Note on Terminology and Style

Australian English spelling conventions are used throughout this thesis, with the exception of the manuscript in Chapters 6. There is purposeful variation in the terminology that is used throughout this thesis. A rationale for the language that is used (or where two or more terms interchangeably) is provided below.

**Oral and spoken language:** oral language will be used throughout this thesis to refer to non-literate communication and is used in preference to spoken language. The array of skills that constitute oral language is defined and described in detail in Chapter 2.

**Literacy:** the meaning and use of the word *literacy* has evolved in recent times and is increasingly applied to a broad range of skill areas beyond reading and writing, for example, computer literacy and health literacy. A narrow definition of literacy will be used in this thesis. As will be reiterated throughout, my research is concerned with the transition children make in the early years of school from understanding and using oral language only to being able to also read and write. As such, early literacy skills (the gradual acquisition of the skills needed to read fluently and for comprehension) are discussed.

**Professional learning and professional development:** these terms are used somewhat interchangeably throughout the literature, in practice, and in policy. Professional learning is used predominantly in this thesis, as it implies a greater level of teacher agency and engagement, than professional development or training.

**Teacher and educator:** throughout this thesis, reference will be made to Victorian teachers, as the sample of teachers in this study were all employed within the state of Victoria and were guided by the curriculum and policies of this state. The manuscripts in Chapters 6 and 8 were submitted to international journals, and as such, participants are
described as Australian teachers. It should also be noted that there is variability between Australian states and territories, and internationally, in the age at which children commence formal education. The scope, structure and curriculum of early childhood education (incorporating kindergarten and preschool) and the early years of formal education also vary considerably. As a result, there are a number of instances in this thesis where it is appropriate that the early childhood education literature is considered. Accordingly, the term educator is used, although teacher is predominantly used, and refers to the adult who is employed by a school and is responsible for providing instruction and care to students. Throughout this thesis teachers are differentiated from other educators and school staff, including teachers’ aides, teaching assistants, school principals, speech-language pathologists, and school counsellors.

**Teacher and teaching quality:** The terms teaching quality and teacher quality are both used in the literature. In this thesis, the term teaching quality will be preferred. The critical issues associated with the teaching workforce that will be discussed in this thesis are largely systemic, and as such, the issue of quality does not primarily lie with the individual (as implied by teacher quality), but instead with the system that trains, supports and regulates the teaching workforce.

**Student and child:** both student and child are used in this thesis, and in some instances these terms are used to refer to people of the same age. Child is the preferred term when issues associated with early childhood (prior to the commencement of formal education) are being discussed, or contexts that are not overtly or exclusively associated with the classroom and school. Student is used to refer to the child in the context of the school and classroom.

**Primary and elementary school:** in Australia, primary schools cater for students between approximately five and 12 years of age and are equivalent to elementary schools
in the United States, and primary schools in the United Kingdom. Some independent Victorian schools that cater for primary and secondary students refer to their primary school as a junior school.

**Early years’ classrooms, and the Foundation or Preparatory year:** the first year of school was previously called the Preparatory or “Prep” year in Victoria. In 2016 a move was instigated to transition to call the first year of school the Foundation year. This year is approximately equivalent with Kindergarten in the United States, and Reception in the United Kingdom.

**Speech pathology and speech-language pathology:** these two terms and the British *speech therapy* are commonly used interchangeably in practice and in the research literature. While the national body for this profession in Australia is Speech Pathology Australia, I have chosen to use *speech-language pathologist* as I believe this more adequately reflects the scope of practice of this profession.
Chapter 1  Introduction

Expressive and receptive oral language proficiency is essential for participation in the classroom, the workforce, and society. The early years of primary school are a critical period; children who successfully master oral language skills unlock their potential to succeed academically, socially, vocationally and economically. Those who begin school without established oral language proficiency and do not catch up in the first years may struggle to understand classroom expectations, form friendships, and participate fully at school, both in the classroom and the playground (Mok, Pickles, Durkin & Conti-Ramsden, 2014; Yew & O’Kearney, 2013). For some children, difficulty with oral language may be associated with a developmental delay or disorder, or a linguistic difference (Norbury & Sparks, 2013). For many others, compromised oral language development is associated with socio-economic disadvantage (for example, a home environment that did not foster early language learning).

Many factors determine children’s oral language competency and their transition to becoming literate, but it is well established that teachers exert an important and powerful influence (Borg, 2015; Hattie, 2009, 2012; Ingvarson & Rowe, 2008; McCutchen, Abbott et al., 2002). In recent years literacy standards in Australia have plateaued (Thomson, Hillman, Schmid, Rodrigues, & Fullarton, 2017) and there has been accompanying lively discussion and commentary in the Australian media and political arenas about the standards of literacy instruction and achievement in Australian schools. Nearly all children attend school and it can be argued that improving the effectiveness of the oral language and early literacy instruction provided by teachers in Australia will have long-lasting and broad-ranging implications for all Australian children. Those in the tail of the achievement curve stand to benefit most from high quality instruction (Hempenstall, 2005; Masters, 2016). This argument is
particularly timely and salient in a society in which there is growing inequity and a job market that is increasingly inaccessible to those who do not have adequate language and literacy skills. Ensuring all Australian children are provided with opportunities to develop the necessary oral language and literacy skills could serve to reduce the academic achievement and subsequent economic gap between the most and least advantaged members of society.

Teaching is a complex cognitive task and improving teachers’ instructional practices is neither a simple or straight-forward task. Teachers must integrate their knowledge of content and pedagogy and use this knowledge to inform their instruction. Classrooms are multifaceted and diverse environments and if all children are to reliably access the curriculum, teachers must tailor their instruction to meet the needs of all learners in a classroom. To do so, teachers need to align their knowledge of content and pedagogy with the requirements of the curriculum, and their underlying philosophical beliefs and understandings of how children learn.

In recognising the substantial influence that teachers have upon their students, professional learning programs are widely implemented as a means of supporting and improving the quality and effectiveness of instruction, typically with the ultimate goal of improving student outcomes. This process of delivering training to teachers and expecting a resultant change in the performance of their students has been likened to a “black box” (Mendive, Weiland, Yoshikawa, & Snow, 2016; Timperley, Wilson, Barrar, & Fung, 2007). This analogy highlights limited visibility of how professional learning leads to change first in teachers, and consequently in students. This hypothesised sequence of change is often only implicitly communicated in policy, practice and the research literature. Professional learning programs have variable degrees of impact, but it has become increasingly evident that professional learning that is sustained, informed by research evidence, embedded within the school context, and involves
coaching, is more likely to be impactful (Desimone, 2009; Ingersoll & Kralik, 2004; Wasik & Hindman, 2011).

Participation in professional learning activities is widely mandated for teachers by registration boards, however these activities and provisions vary greatly in content and rigour, especially in the field of oral language and early literacy. An often-untested assumption is made that professional learning leads directly to improved instructional quality, by increasing, improving or changing what teachers know, do or believe. There is variability in the association between teachers’ professional learning activities and a resultant change in student outcomes in early language and literacy instruction, especially when the interaction between teachers’ knowledge and practice and how this is mediated by their beliefs and attitudes is considered. In this thesis I explore the interaction between what teachers know, do and believe with respect to early oral language and its implications for the transition to literacy.

1.1 Objective

The overarching objective of this doctoral research was to describe the nature, degree, and sequence of change in early years’ teachers’ knowledge, practice and beliefs during and following participation in an oral language professional learning program. It is not well understood how well Victorian (and more generally, Australian) teachers are equipped to provide evidence-informed oral language instruction. In addition, it is not understood if (and how) teachers’ knowledge, practice and beliefs change as a result of participation in professional learning.

In this thesis I explore the complex and contested constructs of teaching quality in relation to language and literacy instruction in the early years of primary school. I describe a series of studies in which I investigated teachers’ knowledge, how this knowledge is shared with students through classroom talk, and subsequent changes in
teachers’ talk during and following professional learning. I also investigated teachers’ experiences and reflections on participating in a professional learning program focussing on oral language.

1.2 Research Context

This research was embedded within the Australian Research Council (ARC) funded Classroom Promotion of Oral Language (CPOL) study (LP130100308), a large cluster randomised controlled trial (RCT) that sought to determine whether a sustained oral language professional learning program would result in improved language and literacy outcomes for students (Goldfeld et al., 2017). CPOL built upon a rigorous pilot study, the Oral Language Supports Early Literacy (OLSEL) trial, which demonstrated that gains can be made in the oral language and reading skills of students in disadvantaged schools in the early years following a teacher led oral language intervention (P. Snow et al., 2014).

1.3 Thesis Overview

In addition to this introductory chapter, this thesis contains eight chapters. Each chapter is briefly summarised below.

In Chapter 2, I present the first part of my literature review and describe the background and contextual issues that influence oral language instruction in the early years of primary school in Australia. This chapter includes definitions and descriptions of the skills that constitute oral language and provides the reader with background information and conceptual and theoretical frameworks to navigate the content-specific discussion in the remainder of this thesis. This chapter also orientates the reader to the complexities and contextual issues that underpin the teaching of oral language and literacy in Victorian (and Australian) early years’ classrooms.
In Chapter 3, I continue my review of the literature and address the theoretical frameworks that conceptualise teacher professionalism, teaching quality, and teacher practice change associated with professional learning. Teacher-mediated factors that influence oral language and literacy skill acquisition are then described, with a systematic review of the literature documenting teacher change as a result of professional learning in oral language is then presented. This is then complimented by a review of the extant literature about teacher knowledge and talk associated with language and literacy instruction.

In Chapter 4, the theoretical framework that underpins this thesis is described, and the research questions arising from the literature review are stated, alongside a rationale for the focus of this thesis. The research methods of the embedded doctoral studies are then provided in Chapter 5, as well as an overview of the CPOL trial. The protocol paper for the CPOL trial (Goldfeld et al., 2017) is included in Appendix A.

This thesis contains three distinct but related studies and these are presented in Chapters 6 to 8. This is a thesis with publications and as such, one manuscript from this thesis has been published, and a second has been submitted for review. The first manuscript (presented in Chapter 6) describes Study 1. In this study I examined the knowledge, self-rated abilities and beliefs associated with language and literacy instruction of Australian early years’ teachers (Stark, Snow, Eadie & Goldfeld, 2016). The results from Study 2 are presented in Chapter 7. In this study I investigated the feasibility of an approach to collecting teacher talk data, and the application of an existing framework to describe such talk, and measure change in teachers’ talk over the course of a professional learning intervention. Study 3 (Chapter 8) is presented as a manuscript which has been accepted for publication by the journal Professional Development in Education. In this study I integrated the quantitative data collection methods described in the preceding chapters, and qualitative data from semi structured
interviews to produce a series of three mixed methods case studies describing teachers’ experiences and change during and following professional learning. This thesis concludes with a discussion of the findings and implications of the three studies (Chapter 9).
Oral Language

Oral language competency is a fundamental set of skills that underpins interactions in all facets of human life (Owens, 2012). The ability to ask and answer questions, make requests, state a point of view, and negotiate relationships all depend upon the ability to use and understand oral language. In turn, these skills enable participation, engagement and a sense of belonging within a community. In primary school classrooms, oral language is often viewed as literacy's "handmaiden"; a background skill that supports a task often seen as being of greater importance (P. Snow, 2016). While oral language provides a critical foundation for reading and writing, it also permeates teaching, learning and students’ social and academic participation more broadly in its own right. As will be discussed in this chapter, students’ oral language proficiency in the early years of primary school has substantial life-long implications.

2.1 Chapter Overview

In this chapter I provide a background to oral language development. In doing so, I establish a context for this thesis and a rationale for why oral language instruction is of critical importance in the early years of primary school. This chapter is in the form of a narrative review through which I address four topics. Firstly, the skills that constitute oral language and communicative competence for the school-age child will be conceptualised. Secondly, biological and environmental factors that influence oral language development will be described. Thirdly, the literature that identifies outcomes associated with oral language proficiency, including the symbiotic relationship between language and literacy will be explored. Finally, language (and associated literacy)
standards within the Australian population and the historical and contemporary factors that have influenced oral language and early literacy instruction will be described. This chapter provides a foundation for a review of the literature concerning teachers’ professional learning in oral language presented in Chapter 3.

2.2 Oral Language Development

The ability to communicate orally is nearly universal and, as a result, the complexity of oral communication can be overlooked due to the automaticity with which it is often executed. Oral language encapsulates a broad set of integrated sub-skills that are both sequentially and simultaneously developed and strengthened throughout childhood, adolescence and into adulthood (Halliday, 1975; Nippold, 2016; Owens, 2012). While children’s first words are typically spoken close to their first birthday, their ability to recognise their mother’s voice and attend to auditory stimuli emerge much earlier: from as early as 28 weeks’ gestation (Saffran, Werker, & Werner, 2006). In the first year of life, children master a range of pre-linguistic skills, including eye gaze and joint attention (Reilly et al., 2006). During the toddler and preschool years, children’s receptive (comprehension) and expressive (production) vocabularies grow at an exponential rate, as they simultaneously master the sounds, meaning and grammatical structures of the language being learned, and the often-implicit rules that guide the social use of human communication (Huttenlocher, Waterfall, Vasilyeva, Vevea, & Hedges, 2010). By school entry, the typical monolingual child has a vocabulary larger than 2000 words and is able to construct simple narratives and participate in conversation (Paul & Norbury, 2012).

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1 Oral language is not the only non-literate form of communication; visual-manual signed languages, including Auslan, are used by the Deaf community as a primary communication modality.

2 Children who develop language in a multilingual context acquire language skills in the same or similar pattern as their monolingual peers, although their acquisition of language may initially be at a slower rate (Nicholls, Eadie, & Reilly, 2011)
Language is both multidimensional and multimodal (Fromkin et al., 2012). Bloom described the receptive and expressive modalities of language in children in 1974, and then in conjunction with Lahey developed a taxonomy of language that presents intersecting aspects of language content, form and use[^3] (Bloom & Lahey, 1978). The Bloom and Lahey taxonomy extended the earlier work of Charles Pierce (1834–1914), Charles Morris (1901–1979), and Rudolf Carnap (1891–1970) who, within the field of semiotics, differentiated the components of language into semantics, syntactics[^4], and pragmatics (Crystal, 2008).

Empirical research has subsequently built upon these early theoretical descriptions of language development. Notably, Tomblin and colleagues examined language development in a population sample of 7218 children. Employing confirmatory factor analysis, Tomblin & Zhang (2006) found that in middle childhood, grammatical and vocabulary abilities are more clearly differentiated in children than the ability to understand and use language (receptive and expressive modalities). Lonigan and Milburn (2017) have similarly identified a two-factor model of language, composed of vocabulary and syntax. Their two-factor model is also derived from a confirmatory factor analysis of language that used factors derived from standardised testing of 1895 preschool and primary school-age children. Lonigan and Milburn concluded that oral language is multidimensional both in early childhood and into the primary school years. These two-factor models contribute to an ongoing discussion about how both typical and atypical language development can be conceptualised.

**Linguistic domains.**

Our knowledge of language is underpinned by the study of linguistics, a complex and diverse field of study characterised by differing views, approaches and

[^3]: Alternatively, meaning, form and function (McAllister & Miller, 2013).
[^4]: Syntactics is used interchangeably in the literature with the modern term syntax.
schools of thought on how the structure and meaning of language is best conceptualised. Functionally, and in the context of typical development (as described in this thesis), five separate domains of language can be considered (Berko Gleason, 2005). These discrete yet integrated linguistic domains include syntax, semantics and pragmatics, and the associated domains of phonology (including phonological and phonemic awareness) and morphology. In Berko Gleason’s conceptualisation of language, discourse is described alongside pragmatics. The definitions below are provided to outline the scope and detail of information necessary to consider the interface between practice in an educational context and cognitive psychological research in language and literacy.

**Phonology and phonological awareness.**

Phonology is the study of “the range and function of sounds in specific languages and the rules which can show the types of phonetic relationships that relate and contrast words and other linguistic units” (Crystal, 2008, p.365). Phonological awareness is the conscious knowledge and mindfulness of the sounds within language including rhyming, syllable identification, segmentation, blending, phoneme identification and deletion. Phonological awareness includes the ability to detect rhyme, alliteration and syllable boundaries (Berninger, Abbott, Nagy, & Carlisle, 2010; Gillon, 2018; Moats, 2000; Stahl & Murray, 1994). A further subskill of phonological awareness is phonemic awareness, the perception or manipulation of individual sounds within words (McLeod & McCormack, 2015). Phonology and phonological awareness are differentiated from phonics⁵ (the knowledge of letter-sound correspondences) and phonetics (the study of sounds). Phonological and phonemic awareness are important

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⁵ The term phonics is also applied to a method of reading instruction in which phoneme-grapheme correspondences are emphasised.
foundations for later literacy development (Bus & Van Ijzendoorn, 1999; Stahl & Murray, 1994).

**Semantics.**

Semantics is one of three aspects of language described within the Bloom and Lahey (1978) taxonomy and is the study of meaning in language, and is commonly equated to vocabulary (Crystal, 2008). Semantic knowledge is, however, more than knowledge of word definitions and is supported by the systemic classification of word types by grammatical function, including nouns, adjectives, and verbs. Children develop detailed semantic representations that extend to include the relationships between different words (Vance, 2011). Semantic knowledge is applied to enable comprehension and production of language and rely on contextual information to support growth in their semantic knowledge (Horan & Hersi, 2011).

**Syntax.**

Syntax is “the study of the rules governing the way words are combined to form sentences in a language” (Crystal, 2008, p.471) and along with morphology, forms the basis of grammar. The English language utilises a subject-verb-object word order (Nelson & Greenbaum, 2016). Syntax is not concerned with the logic or meaning of language, but adherence to the rules and conventions that underpin sentence structure (Fromkin et al., 2012). Native speakers of a language can typically identify a sentence that is syntactically correct, and one that is not, regardless of their explicit knowledge of syntactic rules or word types.

**Morphology.**

Morphology is the study of morphemes, the smallest meaningful units of language. A morpheme may be free (and as such constitute a single word, for example *man, car, tree*) or bound: affixes, including suffixes and prefixes, that act only as parts
of other words, for example -s, un-, -ing, -est (Fromkin et al., 2012). The ability to use
and comprehend language at a morphemic level emerges throughout early childhood⁶,
and alongside syntax constitutes grammar. The identification of the average number of
morphemes within children’s utterances is one way to calculate a mean length of
utterance (MLU), an indicator of linguistic complexity in young children (McLeod &
McCormack, 2015). In addition to the ability to use morphemes, morphemic awareness
is increasingly recognised as an important skill set that supports reading and spelling
(Apel, 2017; Moats, 2010).

**Pragmatics, discourse & metalinguistics.**

Halliday (1975) described seven functions for which young children use
language. The first four address different personal and social requirements: to express
needs (instrumental), to instruct others (regulatory), to form relationships (interactional),
and to express feelings, emotions and identity (personal). The remaining three
functions assist children in the interactions with their environment: to gain knowledge
(heuristic), to share stories and jokes (imaginative), and to convey facts and
information (representational). The functional use of language is supported by the use
of pragmatic and supra-linguistic skills, which are influenced by social, cultural and
cognitive norms (Ninio & Snow, 1996; O’Neill, 2012). Pragmatics is “the study of
language from the point of view of the user, especially of the choices they make, the
constraints they encounter in using language in social interaction, and the effects their
use of language has on the other participants in an act of communication” (Crystal,

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⁶ The development of morphemes in children’s language was described by Brown
(1973), as the sequential acquisition of the present progressive (ie. “car going”) and regular
plurals, followed by irregular and regular past tense, and contractible copulas and auxiliary
verbs in three children. His contemporaries, De Villiers and De Villiers (1973), described the
same pattern of acquisition in a study of 21 children between the ages of 16 and 40 months.
Pragmatic features of language include proxemics, intonation, turn-taking and topic maintenance. In typical development, knowledge about the use of language is not explicitly taught to children, although parents, caregivers and teachers may provide feedback on the appropriateness of different communication styles. Impaired pragmatic skills relative to other language skills is a defining feature of autism spectrum disorder (American Psychiatric Association, 2013), and other forms of neurodisability (P. Snow & Douglas, 2017).

Discourse is commonly aligned with the pragmatic use language and can be defined as "a continuous stretch of language larger than a sentence" (Crystal, 2008, p. 148). Discourse relies on the integration of cognitive and linguistic skills. Forms of discourse include conversation, procedural, exposition, and narrative, as well as poetic and argumentative discourse (Gee, 2014; Nippold, Hesketh, Duthie, & Mansfield, 2005). Children’s ability to participate in conversational discourse emerges early and is underpinned by the pre-linguistic skill of turn taking. The earliest forms of narrative discourse typically emerge at the age of two years and narratives become increasingly complex and refined throughout the preschool and school years, as children develop both the linguistic and cognitive skills to tell integrated and succinct stories (Boudreau, 2008; Nippold, 2016). Discourse and social and emotional functioning are closely associated, and it is increasingly understood that discourse-level linguistic skills are integral to social and academic participation (Boudreau, 2008; Fiorentino & Howe, 2004; Westerveld & Vidler, 2016).

In addition to the ability to understand the supralinguistic features of oral language, children must also develop the capacity to use their oral language skills to talk about language. This is the development of metalinguistic awareness. In becoming metalinguistically aware, children are able to define words, recognise synonyms and antonyms, and recognise and describe syntactic and semantic features
(and errors) within language (Paul & Norbury, 2012; Westby, 2005). Metalinguistic skills support the transition from oral language to literacy in the early years of primary school.

**Communicative competence.**

In typical contexts, proficiency develops in each linguistic domain synchronously, and the integration of these skills results in overall communicative competency. The concept of *communicative competency* was first introduced by Hymes (1972), and has more recently been defined by P. Snow (2009) as:

The ability to engage successfully with a range of communication partners via the spoken word, in order to conduct a wide variety of personal, social, educational, commercial and professional relationships. Such engagement should be reciprocal at the level appropriate to the nature of the interpersonal relationship and should conform to a range of developmental, cultural, and socio-linguistic norms. Oral language competence also confers the ability to progress to reading and writing at an educationally and developmentally timely juncture, provided adequate and appropriate instruction is provided (p.102).

As such, the ability to engage in oral communication relies on both expressive and receptive language skills and speakers need to understand both what is being said, as well as what is meant (Nippold, 2016), as these are not always one and the same. It is expected that there is variation in communicative competency within the population that can be typified against a normal distribution. There is a large body of research that describes delays and disorders of oral language\(^7\), which are beyond the

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\(^7\) Delayed or disordered language development is characterised by weakness in one or more domains and may be associated with a cognitive impairment or a neurodevelopmental disorder. When language is disordered in the absence of an underlying neurodevelopmental, cognitive or genetic disorder, a diagnosis of Developmental Language Disorder may be appropriate (Bishop, Snowling, Thompson, Greenhalgh, & Catalise-2 Consortium, 2017).
scope of this thesis. Instead, this research is concerned with patterns of underachievement associated with reduced oral language competence in the Australian primary school-age population, and how this might be addressed within the classroom.

2.3 Factors that Influence Oral Language Development

Historically, there have been two dominant views about the nature of oral language acquisition: the nativist view that oral language is “inbuilt” (Chomsky, 1986), and an empiricist view that purports that oral language development is determined by interactions with others (Skinner, 1957). The dominant contemporary understanding of language development is that it is dependent upon the interaction of complex biological and behavioural systems within a stimulating and responsive environment (R. Chapman, 2000; Mueller et al., 2016).

Biological factors.

Humans have a biological predisposition to learn and use language, and it is understood that the integrity of the neural system is a determinant of language outcomes (Morgan & Liègeois, 2015). Male gender, low birthweight and prematurity (Linsell, Malouf, Morris, Kurinczuk, & Marlow, 2017), and comorbidities including hearing impairment (Wake, Poulakis, Hughes, Carey-Sargeant, & Rickards, 2005), autism spectrum disorder (Pickles, Anderson, & Lord, 2014) and intellectual impairment (Houwen, Visser, van der Putten, & Vlaskamp, 2016) have all been associated with increased risk of poor language and communication outcomes. Additionally, it has been established that genetic factors can determine susceptibility for speech and/or language difficulties⁸ (Newbury & Monaco, 2010), and the genetic basis of some forms

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⁸ The FOXP2 gene was the first to be implicated in spoken communication in the study of the KE family, of whom 15 members had either developmental verbal dyspraxia or childhood apraxia of speech (Lai, Fisher, Hurst, Vargha-Khadem, & Monaco, 2001)
of dyslexia and developmental language disorder have been identified\(^9\) (Graham & Fisher, 2013; Mozzi et al., 2016). Twin studies have also contributed to this field of research (Bishop, North, & Donlan, 1996; Lewis & Thompson, 1992; Trouton, Spinath, & Plomin, 2002).

**Environmental factors.**

It is indisputable that the psychosocial environment within which children grow and live exerts influence over their development and has an impact that lasts into adulthood (Conti & Heckman, 2010), and is cumulative over time (Evans, Li, & Whipple, 2013). When compared to biological investigations, more investigations have been conducted into the environmental factors that influence language development, (Rogers, Nulty, Betancourt, & DeThorne, 2015). In particular, longitudinal studies such as the Longitudinal Study of Australian Children (LSAC) (Zubrick, Taylor, & Christensen, 2015) and the Early Language in Victoria study (ELVS)\(^10\) (Reilly et al., 2006, 2010) have identified factors that influence early cognitive, social, emotional, linguistic, literacy and academic outcomes. It is now understood factors including socio-economic status, aspects of the home learning environment, and a number of maternal factors influence early language, including mother’s education, age, and mental health (Law, Levickis, McKean, Nolan, & Goldfeld, 2017).

The home learning environment influences children’s early language skills (Sénéchal, Lefevre, Thomas, & Daley, 1998). For example, shared reading between children and mothers (Deckner, Adamson, & Bakeman, 2006; Whitehurst et al., 1988)

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\(^{9}\) Dyslexia is underpinned by at least nine genomic loci (DYXI-9), and developmental language disorder is associated with three chromosomal loci: 16q24 (SLI1); 19q13 (SLI2); 13 (SLI3).

\(^{10}\) Notable international longitudinal studies of child language development include the Millennium Cohort Study (Connelly & Platt, 2014), the British National Child Development Study (Power & Elliott, 2005), the Ottawa Language Study (Beitchman, Nair, Clegg, & Patel, 1986), The Dunedin study (Silva, 1990), longitudinal research in the United States by Tomblin and colleagues (Catts, Fey, Tomblin, & Zhang, 2002), and the Avon Longitudinal Study of Parents and Children (Golding, 2004).
and fathers (Quach et al., 2017) has been found to influence later language skills. In their study of 63 first-born and later-born children, Hoff-Ginsberg (1998) found relatively higher lexical input from mothers for first born children resulted in stronger early language skills, relative to later-born children. This study also identified a difference between the language that occurred between mothers and children who had an average socio-economic status, and dyads from more affluent backgrounds.

The above findings are consistent with the highly influential work of Hart and Risley (1995), who found a large difference in both the quantity and quality of child-directed language in homes where parents received welfare benefits, compared to homes in which parents were described as working class or professional. Hart and Risley (2003) later described this social gradient as a “social catastrophe”, highlighting that a child of professional parents may hear 30 million more words than their most disadvantaged peers by the age of three. Indeed, this variation is played out consistently in early language research (Law, McBean & Rush; 2011; Roy & Chiat, 2013), and differences between advantaged and disadvantaged children’s oral language skills emerge as early as 18 months of age (Fernald, Marchman, & Weisleder, 2013).

This social gradient can be either exacerbated or mitigated by the quality of early childhood education and care (Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002). Exposure to high quality care and education in early childhood acts as a protective factor, and the impact is increased with the child’s level of vulnerability (Guss, Jones-Harden, Stein, Yazejian, & Forestieri, 2016). In the absence of both universal 3-year-old kindergarten and compulsory 4-year-old kindergarten in Australia, it can be argued that the first year of formal education is the first opportunity to implement an intervention that will reliably reach all members of the population. Once children begin school, positive educational experiences, including a warm relationship
with a classroom teacher, are known to be a protective factor against academic disengagement (Spilt, Koomen, & Harrison, 2015).

Importantly, early relationships and participation in the classroom are mediated by oral language proficiency. The long-term academic, social and vocational implications of achieving oral language and literacy proficiency are significant, and for this reason, the delivery of high-quality oral language and early literacy instruction in schools is paramount (P. Snow, 2016).

2.4 Outcomes Associated with Oral Language Proficiency

Early oral language skills are strongly associated with school readiness (Britto, 2010; Prior, Bavin, & Ong, 2011), behaviour (Law & Elliott, 2009), social and emotional wellbeing (Conti-Ramsden, Mok, Pickles, & Durkin, 2013), and academic achievement (C. Johnson, Beitchman, & Brownlie, 2010). Children who begin school with adequate oral language skills possess the academic capital needed to meet the demands and expectations of the school environment. For those who do not, the transition to school may be problematic (P. Snow, 2014). Mercer (2015) argues that schools should continue to focus on ‘oracy’ throughout the school years as the ability to confidently articulate ideas and perspectives is fundamental to success in the classroom and later in life.

Social and emotional wellbeing.

In the classroom, oral language is the medium through which learning occurs in the early years, both before and after the transition to literacy has taken place (Law et al., 2017). Children use oral language skills to navigate the social expectations of the school environment, and behavioural expectations are shared with children through

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11 School readiness has been conceptualised across three dimensions: children’s readiness for school, schools’ readiness for children, and families’ and communities’ readiness for school (Britto, 2010).
spoken language (Armstrong, Elliott, Hallett, & Hallett, 2016; Gallagher, 1993; Myhill, 2006). Young children who persistently struggle to realise these expectations in the classroom and playground have been found to have underlying language difficulties that have been concealed by emotional and behavioural disorders (Hollo, Wehby, & Oliver, 2014; Yew & O’Kearney, 2015). Oral language skills underpin not only relationships and interactions with others, but also the way children process, label and comprehend their thoughts, feelings and emotions (Brinton, Fujiki, Brinton & Hart, 2004; Cross, 2011; Hart, Fujiki, Brinton & Hart, 2004).

**Oral language and early literacy skills.**

In the scheme of human evolution, the ability to decode and encode written language is a relatively new human skill (Seidenberg, 2017; P. Snow, 2016; Wolf, 2008). Further, neuroimaging studies have confirmed that there is not one single region of the brain that is exclusively utilised for the task of reading or writing (Seidenberg, 2017). Reading and writing are not universal skills, and the Western notion that learning to read and write is achievable by all members of the population only became commonplace in the mid twentieth century (Wolf, 2008).

Upon the commencement of formal education, usually between the ages of four and six years, children typically begin to formally learn how to read and write. For some children, a natural propensity for literacy is demonstrated earlier, but for the clear majority, the emergence of literacy skills occurs with the provision of specific instruction (National Reading Panel, 2000). Oral language skills continue to strengthen and develop alongside literacy into adolescence (Nippold, 2000), and language skills underpin later reading comprehension (Snowling & Hulme, 2011).

The transition to literacy can be problematic for children who do not possess adequate oral language skills (Muter, Hulme, Snowling, & Stevenson, 2004; C. Snow & Matthews, 2016). Children who have difficulty learning to read often have concomitant
oral language difficulties, and these two areas of impairment can be described as homo-typically comorbid (Caron & Rutter, 1991; Snowling & Hulme, 2011). Children who do not acquire the necessary level of skills to read fluently and with comprehension can experience ongoing difficulties throughout their school years.

Learning to read is a complex task, and oral language skills provide the foundation for early literacy (Castles, Rastle & Nation, 2018; Ehri, 2005; Taylor, Davis & Rastle, 2017; Scarborough, 2001). The relationship between oral language and literacy is not a neat hierarchical step-by-step process (Hill & Launder, 2010).

Reading and writing are skills that must be taught and are not acquired in the absence of exposure to text and some form of instruction (Castles, Rastle & Nation, 2018; Hempenstall, 1997, 2005, 2016; Seidenberg, 2017; P. Snow, 2016). As with oral language, literacy is multidimensional and multimodal. Children utilise decoding skills to read new or unfamiliar words, and their encoding skills to spell and subsequently write (Moats, 2010). The five key skills required to become a fluent reader (phonemic and phonological awareness12, phonics13, vocabulary14, fluency15 and comprehension) were described as the “Big Five” by the US National Reading Panel (National Reading Panel, 2000). These five skills have since become the focus of the Centre for Independent Studies Five from Five campaign for effective early literacy instruction in Australia (Buckingham, 2018). Importantly, Konza (2014, 2016) argues that in addition to the five skills specified by the National Reading Panel (2000), oral language should

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12 Phonological awareness is the explicit knowledge of the sound structure of language, and includes the skills of rhyming, syllable identification, segmentation, blending, phoneme identification and deletion (Fromkin et al., 2012; McLeod & McCormack, 2015).

13 Phonics is knowledge of the association between the phonemes of spoken language, and letters of written language. Children learning to read and write English need to understand the association between 44 phonemes and the 26 letters of the alphabet, including knowledge of consonant blends, digraphs (two letters associated with one sound) and vowel sounds.

14 Vocabulary, or semantic knowledge, is a component of both oral language (as described in the semantic section above) and literacy.

15 The achievement of reading fluency signals students’ transition from learning to read, to reading to learn (Fuchs, Fuchs, Hosp, & Jenkins, 2001), and is measured by three components: accuracy, rate and prosody (Hasbrouck & Tindal, 2006).
be included as a sixth key skill area. As described by Scarborough, the integration of these skills is akin to the weaving of a rope (2001). Children who are learning to read must integrate language comprehension skills (including background knowledge, vocabulary, semantics, syntax, verbal reasoning and literacy knowledge) with word recognition skills (phonological awareness, decoding and sight recognition). With increasing practice, automaticity, and strategy, children become skilled readers. The integration of these two componential skills: decoding and linguistic comprehension, are conceptualised in the “Simple View of Reading” (Gough & Tunmer, 1986; Hoover & Gough, 1990). Skilled reading requires proficiency in both linguistic comprehension and decoding, and a weakness in either or both skills will limit success.\[^{16}\]

Given its broad-ranging academic, social and economic implications, the transition from communicating using only oral language, to being able to read and write proficiently is a critical journey. However, oral language continues to become increasingly complex in the school years, and as described by Moats (2010), there are direct associations between oral language skills and reading and writing. For example, the language domain of morphology is essential for the comprehension and production of compounds, prefixes, suffixes, roots, which are necessary for word recognition and spelling. Similarly, discourse skills underpin paragraph structure, narratives, and other text organisations, enabling reading comprehension and written expression, and pragmatic skills support students’ awareness of the author in their reading and writing.

A number of authors have sought to conceptualise the foundational role that oral language plays in early literacy. Building upon an understanding of comorbidities in child development (Caron & Rutter, 1991), literacy has been described as being parasitic upon language (Snowling & Hulme, 2012). Beyond a parasitic relationship,\[^{16}\]

\[^{16}\] Various iterations of this model and others that explain the transition from novice to proficient reader have since been proposed. This subject is beyond the scope of this thesis.
whereby literacy draws upon language, literate language feeds back into oral language, indicating a relationship that is perhaps better described as symbiotic. As children mature, the content, form and style of their written and oral language becomes increasingly differentiated, with the diversity and complexity of language encountered in text exceeding that of spoken language (Moats, 2010; Nippold, 2016).

2.5 Oral Language and Literacy in Australia

The importance of nurturing oral language skills as a foundation for later literacy and more general academic achievement and social and emotional wellbeing has been established. As highlighted in Chapter 1, the focus of this thesis is on the early years of formal education, which is a time when children are transitioning from communicating using only oral language, to being able to also read and write competently. The oral language and literacy skills of Australian children, and the literacy skills of adolescents and adults will now be characterised, by drawing upon cross-sectional and longitudinal data and internationally comparative studies. Building upon the previous discussion of factors associated with language and literacy, historical and contemporary issues that have influenced instruction in Australian schools will be discussed, and comparisons will be made with other English-speaking countries, including the United States, the United Kingdom and New Zealand. The alignment of instructional practice, policy and research evidence will also be explored.

Australia has a national identity strongly connected to ideals of prosperity, equity and equality (Moran, 2017; Purdie & Wilss, 2007). This narrative has been perpetuated over a number of decades, and education policy has aspired to these standards. In their 2005 book, *Children of the Lucky Country?*\(^\text{17}\), Stanley, Richardson

\(^{17}\) The phrase “Lucky Country” was first coined in text by Horne (1964), who attributed Australia’s economic and social prosperity in the early 20\(^{th}\) century to capitalisation upon resources and good fortune (luck), rather than careful and purposeful political strategy, economic investment or technology. The author did not apply the term lucky in a favourable
and Prior drew attention to the fact that, at the time, while more Australian children were surviving and reaching adulthood, the rates of behavioural disorders, substance abuse, and suicide were increasing. Furthermore, the differences between the most and least affluent members of Australian society have grown. In their concluding chapter, a series of recommendations were made by the authors to improve experiences of childhood in Australia and reduce inequities. These included, but were not limited to, providing accessible, high quality childcare and improving the school system.

In 1997 Australian commonwealth, state and territory education ministers made a collective commitment that every child leaving primary school should be numerate, and able to write and spell at an appropriate level, an outcome that was not being universally achieved at the time. A decade later, the Melbourne Declaration on Educational Goals for Young Australians was made. As signatories to this document, all Australian states aspired to promote equity and excellence, and to create an education system in which all young Australians become successful learners, confident and creative individuals and active and informed citizens (MCEETYA, 2008). Progress towards these aspirational, but arguably not unduly ambitious standards, has been slow in the decade since, as evidenced from population level studies (Buchanan & Chapman, 2011) and data collection (Australian Curriculum, Assessment and Reporting Authority [ACARA], 2018a).

**Population measures of children's oral language in Australia.**

There are few reliable indicators of oral language proficiency in the Australian population. The ELVS study found nearly 18% of four-year-old children had a communication difficulty (Reilly et al., 2010). Equivalent levels of vulnerability have way, yet the phrase has since been misappropriated, and the description of Australia as a “lucky country” has been used largely as a positive and endearing expression over the past 50 years. Not all children proceed to develop a clinically significant language disorder. 

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18 Not all children proceed to develop a clinically significant language disorder.
also been reported in the Australian Early Development Census\textsuperscript{19} (AEDC). The AEDC is a national data collection of child development that occurs during the first year of school, and has been completed in 2009, 2012 and 2015 (Australian Government, 2013; Brinkman, Sayers, Goldfeld, & Kline, 2009). Data are collected from teacher assessments across five domains: (i) physical health and well-being, (ii) social competence, (iii) emotional maturity, (iv) language and cognitive skills, and (v) communication skills and general knowledge, and the proportion of children who are judged as ‘on track\textsuperscript{20}’, ‘at risk\textsuperscript{21}’ and ‘developmentally vulnerable\textsuperscript{22}’ are reported. The 2015 census found that nearly 20\% of Victorian children were considered by their teacher to be vulnerable in one domain, and nearly 10\% were reported to be vulnerable in two or more domains. Of particular relevance to this review is the finding that 7.6\% of Victorian children were vulnerable within the communication skill and general knowledge domain, and a further 8.9\% were at risk. Similarly, 6.3\% were vulnerable within the language and cognition domain, and 8.9\% were at risk. Fewer Victorian children were found to be at risk or vulnerable when compared to the national average. However, consistent with findings in the 2009 and 2012 data, boys, Aboriginal and Torres Strait Islander children, and children from families with a lower socio-economic status are more likely to be vulnerable or at risk (Australian Government, 2013; Brinkman et al., 2009).

Beyond the measures reported above, relatively little is known about oral language competency in Australian children, adolescents or adults. As Hill (2016) has

\textsuperscript{19} Previously the Australian Early Development Index (AEDI).
\textsuperscript{20} Scores above the 25\textsuperscript{th} percentile (in the top 75 per cent) of the national AEDC population.
\textsuperscript{21} Scores between the 10\textsuperscript{th} and 25\textsuperscript{th} percentile of the national AEDC population.
\textsuperscript{22} Scores below the 10\textsuperscript{th} percentile (in the lowest 10 per cent) of the national AEDC population.
observed, oral language becomes marginalised as later assessment of literacy in schools focuses on literacy.

**Oral language instruction.**

The Australian and Victorian English curricula specify that students should be able to appreciate, enjoy and use spoken and written language (ACARA, 2014a). The Australian English curriculum aims to ensure that students:

(i) learn to listen to, read, view, speak, write, create and reflect on increasingly complex and sophisticated spoken, written and multimodal texts across a growing range of contexts with accuracy, fluency and purpose,

(ii) appreciate, enjoy and use the English language in all its variations and develop a sense of its richness and power to evoke feelings, convey information, form ideas, facilitate interaction with others, entertain, persuade and argue,

(iii) understand how Standard Australian English works in its spoken and written forms and in combination with non-linguistic forms of communication to create meaning, and;

(iv) develop interest and skills in inquiring into the aesthetic aspects of texts and develop an informed appreciation of literature (ACARA, 2014a).

The Australian Curriculum and Victorian Essential Learning Standards (AusVELs), which preceded the Victorian curriculum, similarly specified that it was within the remit of Australian early years’ teachers to provide instruction in oral language. This includes developing students’ sound awareness, vocabulary and other linguistic skills. It would appear however that children’s functional use of language is
the primary focus of many Australian curricular documents (rather than their development of explicit knowledge about language).

In reference to structural aspects of language, Christie (2010) described the tension in different approaches and views of the place of grammar within the Australian classroom and charted the introduction of systemic functional linguistics into Australian classrooms in the late 1960s, as influenced by the work of Halliday (1964). Teachers were encouraged to focus on the use and meaning of language, rather than its grammar and syntactic structure. This shift in focus has continued to the present day, and in her discussion about the role of language within the Australian curriculum, Derewianka (2012) called for the ongoing prioritisation of functional approaches to language instruction across the school years, as opposed to “traditional” instruction in grammar. This is in keeping with the dominance of Whole-Language based instruction in Australian schools in recent decades (P. Snow, 2016).

From a contrasting perspective, both locally and internationally there have been calls to support teachers’ knowledge of oral language constructs. Nearly two decades ago, Fillmore and Snow (2003) specified the knowledge that teachers required in order to teach oracy and literacy effectively and called for them to act as “educational linguists”. This is a discussion that has been recurrent in the literature since the 1990s and continues today (Arrow, McLachlan, & Greaney, 2015; Callahan, Benson-Griffo, & Pearson, 2009; Cunningham & O’Donnell, 2015; Moats & Lyon, 1996; Washburn, Mulcahy, Joshi, & Binks-Cantrell, 2016). This ongoing debate will be discussed in detail later in Chapter 3. Despite the empirical evidence and theoretical rationale that underpin the opportunity to influence oral language outcomes in the first year of school, skills or knowledge specifically in oral language are not incorporated into the Australian Institute for Teaching and School Leadership (AITSL) Australian Professional
Standards for Teachers document, and language is only discussed in relation to linguistically and culturally diverse students (AITSL, 2011).

**Population measures of literacy in Australia.**

Data that illustrate literacy standards are much more readily available than those for oracy in Australia for school-age children and adults. Australian primary and secondary schools participate in a number of standardised assessments that measure literacy skills, including the National Assessment Program – Literacy and Numeracy (NAPLAN; ACARA, 2008), the Programme for International Student Assessment (PISA; Organisation for Economic Co-operation and Development, 2017), and the Progress in International Reading Literacy Study (PIRLS; Thomson et al., 2017).

NAPLAN has been completed by Australian students enrolled in Years 3, 5, 7, and 9 annually since 2008. This national assessment program is overseen by the ACARA, an independent statutory authority. The NAPLAN assessment consists of four domains: reading, writing, language conventions (spelling, grammar and punctuation) and numeracy. In the decade since this assessment program was introduced there have been no significant changes in the national average reading and writing skills, or the proportion of underachieving students who do not meet the defined national minimum standards at each grade level (ACARA, 2008, 2009, 2010, 2011, 2012, 2013, 2014b, 2015, 2016, 2017).

PISA and PIRLS testing differ from NAPLAN in that they permit comparisons in the standards being achieved by students on measures of literacy to be made with their international counterparts. PIRLS, managed in Australia by the Australian Council for Educational Research (ACER) and internationally by the Lynch School of Education at Boston College, collects comparative data on children in the equivalent of the United States fourth grade. This time-point is chosen because it is identified as a point at which school students are transitioning from learning to read, to reading to learn. The
PIRLS aims to “inform policies and practice while there still is an opportunity to improve students’ performance in reading” (Thomson et al., 2017, p. 1). The 2016 PIRLS data indicate that Australian students performed marginally better than when PIRLS was last completed in 2011, however they were out-performed by students in Singapore, Hong Kong, Ireland, Northern Ireland and England (Thomson et al., 2017). PISA is overseen by the OECD and is completed every three years by a stratified sample of 15-year-old students. The 2015 PISA results demonstrated that Australian students’ reading standards have continued to fall, both relative to students in other countries, and to earlier administrations of the measure, and Australia is currently positioned 12th internationally. A substantial difference in the performance of indigenous and non-indigenous students, and a strong social gradient has persisted.

The projection of this trend of relatively low and declining literacy competencies across the population is further illustrated in the Australian Programme for the International Assessment of Adult Competencies (PIAAC) data collected and published by the Australian Bureau of Statistics. The most recent round of data collection found that 44% of Australian adults lack the literacy skills required to cope with the complex demands of modern life (Australian Bureau of Statistics [ABS], 2013). Low literacy is known to impact upon productivity and efficiency within the Australian workforce (Australian Industry Group, 2010; Industry Skills Council of Australia, 2011).

When these longitudinal studies and large-scale population measures are considered collectively, a picture emerges of Australia as a nation that is increasingly characterised by inequity in educational attainment, with a persistent social gradient and pattern of overall underachievement (Industry Skills Council of Australia, 2011). This is at odds with the intention that underpinned the Melbourne Declaration on the Educational Goals for Young Australians that was signed by all state education ministers a decade ago (MCEETYA, 2008). While literacy difficulties are more easily
recognised in adults, oral language difficulties are less evident, and often hidden. Language difficulties are often described as ‘invisible disorders’, and are commonly under-identified by parents, teachers and specialists (Dockrell & Hurry, 2018). There is evidence to show that oral language difficulties are often not recognised by classroom teachers (Antoniazzi, Snow, & Dickson-Swift, 2010) and are under-identified in children with social, emotional and/or behavioural difficulties (Hollo, Wehby, & Oliver, 2014; Stringer & Lozano, 2007).

**Literacy instruction.**

Literacy instruction has consistently garnered much more attention than oral language and has been a focus of intense and unresolved discussion and debate amongst teachers, researchers, the media and politicians for several decades. Throughout the twentieth century, literacy instruction in Western Anglophone cultures has been dominated by tensions between two distinct approaches: a systematic approach to literacy that includes explicit phonics instruction, Whole Language approaches, and so-called “Balanced Literacy” (Buckingham, Wheldall, & Beaman-Wheldall, 2013; Scarparolo, 2014).

**National reviews of literacy instruction.**

In Australia, the report of the National Inquiry into the Teaching of Literacy (NITL), was published in 2005 (Rowe, 2005). This inquiry was guided by two key propositions: (i) that skilled and knowledgeable young people are the nation’s most valuable resource, and (ii) teachers are the most valuable resource available to school. It highlighted the expectation shared by students and their parents that all children will learn to read, write and communicate, regardless of gender, socioeconomic status, location, or cultural background. While there were some differences in the scope and the findings when compared to the Rose Report (Rose, 2006) and the National Reading Panel (2000), there was consensus that a clear and strong base of evidence
exists to support the teaching of literacy. The NITL committee discussed the dichotomous tension between phonics-centred and Whole Language approaches to literacy instruction. The committee found that systematic instruction in phonics was an essential element in the teaching of reading, and that teachers should be able to draw on the approaches and techniques needed to ensure all students were able to learn to read. The committee also described the effective teaching of reading as a highly professional skill and found that most teachers were not adequately prepared in their initial teacher education for this task. In contrast to the NRP report, this Inquiry committee drew attention to the connection between literacy and oral language, and the fact that formal literacy instruction should further develop the oral language skills children acquire from birth in the context of their family and community.

A number of authors, for example Hempenstall (1997, 2006), P. Snow (2016) Buckingham and colleagues (2015), and Castles, Rastle and Nation (2018) advocate for a systematic, evidence-based approach to early reading, and have offered accounts of the cultural and sociological factors that have influenced early literacy instruction in Australia and internationally. Tensions in approaches to reading instruction have been likened by some to outright warfare (Davies, 2014; Snyder, 2008). While policy and curriculum documents may move in line with current best evidence, teachers are known to be highly influenced by their initial training (Borg, 2015). The ideological position of university academics determines the content of initial teacher education courses, and as a result exert a substantial level of influence over teachers’ classroom practice (Hempenstall, 2006). Teachers are consistently found to lack the knowledge of language and literacy constructs required to provide methodical and systematic instruction in language and literacy, and this has been attributed to inconsistent and insufficient instruction during initial teacher education (both in Australian and internationally). In recent years, the Australian federal government has sought to
regulate the literacy and numeracy standards required to undertake preservice teacher education, however, no such moves have been made to influence the curriculum and content of these programs.

2.6 Chapter Summary

In this chapter the key concepts that underpin oral language and communicative competence have been defined, as have the biological and environmental factors associated with language development. The lifelong impact of early language proficiency has been explored, and the historical and cultural factors that have influenced oral language, early literacy instruction and the particular tensions in reading instruction have been described. This chapter provides the foundation for the discussion of professional learning and oral language presented in Chapter 3.
Chapter 3  Literature Review – Part 2

Teaching, Professional Learning & Oral Language

Exposure to high quality teaching has a substantial and long-lasting influence on students, especially when it occurs in the early years of primary school (Hattie, 2009, 2012). Whether or not Australian teachers are adequately equipped to understand and evaluate children's oral language skills and to provide evidence-informed instruction remains an open question. Furthermore, it is not well established in the literature if (and how) teachers' knowledge, practice and beliefs change as a result of participation in professional learning focused on oral language. Tensions also exist between what different stakeholders believe teachers should theoretically know, and what they are commonly taught in initial teacher education (Houwen et al., 2016; Pickles et al., 2014; Zubrick, Taylor, Rice, & Slegers, 2007).

3.1 Chapter Overview

In this chapter, I first examine the constructs of teaching quality, both generally and in relation to oral language skills. Secondly, I describe and critique models of professional learning and teacher change. Following the exploration of models of teacher change, a systematic review of studies of professional learning for teachers in oral language is presented. Finally, a complimentary body of literature that describes teachers’ knowledge and practice in relation to oral language is described.

3.2 Teachers and Teaching Quality

The United Nations’ Universal Declaration on Human Rights recognises the right of every child to receive an education (UN General Assembly, 1948). While there are varying definitions of what constitutes an education, it is generally agreed that it is a process that equips children with the necessary skills and knowledge to lead active,
fulfilling lives and to participate in society (MCEETYA, 2008). Primary and secondary school education is universally accessible in Australia, yet as illustrated in Chapter 2, there is great variability in the skills that Australian children take to and acquire through their time at school. While variability is expected in any human skill, there is growing concern about the increasing proportion of the Australian population who leave school without adequate language, literacy and numeracy skills to participate fully in the workforce (Australian Industry Group, 2010).

A key determinant of the effectiveness of education (and student outcomes) is the quality of teaching. Students’ achievement is determined (in part) by what their teachers know, do, believe and say (Borg, 2015; Hattie, 2009, 2012; McCutchen, Abbott et al., 2002). Accordingly, it has been argued that teachers are the most valuable resource in education systems, that ongoing investment in teachers and teaching quality is vital (Ingvarson & Rowe, 2008), and schools can ultimately be no better than the teachers who work within them (Guskey, 2002). Hattie’s large-scale synthesis of meta-analyses measured factors that influence student outcomes, and lists those that are attributable to students, their home environment, the school environment, and to teachers (2009). It was reported that teacher-determined factors (for example, instructional approaches, relationships with students, and professional learning) account for approximately 35% of variance in student outcomes, and this influence surpasses the individual impact of home, student, school and curriculum variables in school-aged children. Consequently, Hattie has argued that teacher-determined factors (rather than home or individual factors) are most readily influenced by policy makers and education systems.

Prior to Hattie’s meta-analysis (2009), earlier attempts were made to synthesise the education research literature and determine the influences on students’ outcomes. This includes the work of Darling-Hammond (2000; Darling-Hammond & Bransford,
who, drawing upon data from a survey of all 50 states in the United States, systematically described the impact of policies upon teachers’ general academic ability, subject matter knowledge, knowledge of teaching and learning, experience and certification status. Drawing upon student and teacher data from the School and Staffing Surveys administered to 65000 teachers by the National Assessment of Educational Progress (NEAP) in the United States, Darling-Hammond reported that teacher education (specifically being fully certified and having a relevant major) correlated strongly with students’ achievement in reading ($r = 0.75$ to $0.80$, $p = <0.01$). This study supported the notion that through policy design and implementation, teaching quality can be modified to support and enhance student achievement.

Collectively, the literature indicates variability in teaching quality that can be attributed to a suite of factors, including university entrance scores, teacher preparation and experience. “High quality teachers” is a phrase that is commonly used in policy pledges (for example, as reported by Australian Associated Press, 2018; Labone, 2018; Lang; 2018; and McGowan, 2018), but this construct is often as poorly understood and inconsistently defined in practice as it is in research. Ingvarson and Rowe (2008) addressed a series of issues associated with how teaching quality was conceptualised both in policy and the research literature. They drew attention to the use of proxy, structural measures as indicators of teaching quality, including teachers’ qualifications, and participation in professional learning and experience. Comparatively less consideration is given to what teachers should know (subject-matter knowledge) and be able to do (pedagogical skill). In the decade since this article was published, the use of proxy indicators of quality has continued in Australia, with policies proposed to increase the entry scores and exit knowledge standards for initial teacher education programs (ACER, 2015, 2017).
Alongside the construct of *teaching quality*, the term *teacher quality* is also used in the literature and is similarly inconsistently defined. In this thesis, the term *teaching quality* will be preferred, as the critical issues associated with the teaching workforce that will be discussed are largely systemic. As such, the issue of quality does not primarily lie with the individual (as implied by *teacher quality*), but instead with the system that trains, supports and regulates the teaching workforce. However, to be consistent with the literature, *teacher quality* will be discussed here in relation to a series of research syntheses in the US.

Notably, Rice (2003) outlined five key measurable characteristics that acted as indicators of teacher quality: teachers’ experience, teacher preparation programs, type of teacher certification, specific coursework taken in preparation for the profession, and teachers’ performance on tests. Teachers’ initial training and coursework contributed to positive student outcomes, as did assessments of teachers’ literacy skills. Goe and colleagues (2007; 2008) conducted further synthesis of the available literature and proposed a framework that defines and integrates four aspects of teacher quality, as illustrated in Figure 3-1.

Within Goe’s model, teacher qualifications encapsulate the standards required to enrol in initial teacher education programs, standards for certification and registration, and are regulated by governments, authorised organisations, and universities. This a highly topical issue in Australia at present with ongoing debate and discussion around the entry scores required to enrol in preservice teacher training. Beyond this initial training, performance on assessment (including the Australian Literacy and Numeracy Test for Initial Teacher Education (LANTITE)) is reflected within this construct, as are teachers’ experience and additional credentials. In recent years in Victoria, teachers have been offered incentives to undertake postgraduate study,
presumably on the assumption that this leads to improved student outcomes (Department of Education and Training [DET], 2018).

![Diagram](image)

*Figure 3-1: Goe’s graphic representation of a framework of teacher quality (2007).*

Teacher characteristics, as defined by Goe (2007), include the analysis of intrinsic, fixed characteristics (for example, gender and ethnicity), characteristics that can be acquired (for example speaking a language other than English), and teachers’ attitudes and beliefs. Teacher practices (a term akin to teaching quality) as an indicator of teacher quality is the study of the behaviour and actions of teachers both within and outside the classroom and is often linked to student outcomes. Additionally, teacher effectiveness, is determined solely by change in student achievement scores (Goe). More specifically, teacher effectiveness is calculated by determining students’ actual gains as measured by standardised assessments, compared to their predicted gains.
Attempts have also been made to synthesise the evidence about what constitutes quality teaching in language and early literacy, and to distil strategies that promote favourable student outcomes. In Australia, Louden et al. (2005) compared the literacy outcomes of students and identified three groups of teachers: those who were effective, those who were more effective and those who were less effective. Through systematic observation, this team of researchers identified the strategies and characteristics that differentiated these groups of teachers. They reported that strategies including the scaffolding of learning and differentiated levels of instruction with the purpose and use of knowledge clearly explained were associated with better students’ outcomes.

Teachers’ knowledge.

Teachers’ knowledge is often central to discussions about teaching quality. The work of Shulman has been particularly influential on this topic. In his 1986 paper, Shulman defined and differentiated types of teachers’ knowledge that continue to be frequently cited. He began by grappling with the underlying meaning and implications of George Bernard Shaw’s popularised assertion that, “Those who can, do; those who can’t, teach”\(^\text{23}\). Shulman asserted the importance of teachers’ knowledge subsequently and went on to describe three types of knowledge: content knowledge, which is the amount and organisation of knowledge of particular subject matter, pedagogical content knowledge, which is a form of content knowledge for teaching, and curricular knowledge.

While it would appear to be a reasonable postulation that teachers should have expertise in the subject or skill area that they are teaching in order to effectively impart knowledge to their students, this is not necessarily borne out by research evidence. In

\(^{23}\) Shulman later reframes this as “Those who can, do; those who understand, teach” (Shulman, 1986).
In their syntheses, Darling-Hammond (2002) and Hattie (2009) drew upon studies across a range of curriculum areas, from secondary and primary contexts. Despite evidence suggesting that (across the spectrum of school years and subjects) teachers’ content knowledge has minimal impact upon student outcomes, there is a view that language and early literacy may differ from all other areas of the curriculum, and teachers’ content knowledge is of importance in this field (Bos, Mather, Dickson, Podhajski, & Chard, 2001; McCutchen, Abbott, et al., 2002; Moats, 1994; Moats & Lyon, 1996; Spear-Swerling & Brucker, 2003).

The rationale for this stance is more developed in relation to the code-based aspects of early literacy instruction than oral language. In many instances, learning to read is the first skill children are expected to master that is not biologically innate (Gough & Hillinger, 1980). There are no other skills or subjects in which school-age students are expected to achieve a near adult level of competency, especially in the early years of primary school. For most children and adults, understanding and using written and spoken language occurs with little effort. However, some find communicating is much more effortful, and they require explicit, intentional instruction to become literate. Teachers are responsible for fostering the communication and literacy skills of all children, and as such, need to be able to provide clear and targeted instruction. It is for these reasons that it can be argued that teachers need an expert level of knowledge to provide instruction (Fillmore & Snow, 2003; Moats, 2009).
When following this line of argument, it has been argued that teachers’ knowledge of language and literacy constructs must be broad-ranging (Buckingham, 2018; Fielding-Barnsley, 2010; Moats, 2009). Their knowledge should encompass a competent understanding and ability to teach what are widely regarded as the five major components (or “big ideas”) of early literacy: phonemic awareness, phonics, vocabulary, fluency, and comprehension (Apel, Wilson-Fowler, & Masterson, 2014; Buckingham et al., 2013; Piasta, Connor, Fishman, & Morrison, 2009), in addition to a sixth skill area; oral language (Konza, 2014, 2016). Additionally, when considering the literature about teachers’ language and literacy construct knowledge, C. Snow, Griffin and Burns (2005), further suggest that knowledge may not be sufficient in isolation, and that:

what is lacking, and the task remains ahead of us as a profession, is documentation that teachers who possess this sort of knowledge actually teach better and more effectively (where more effectively means students learn more and better) than those who do not. (p.210).

Alongside the contention around the standards of knowledge that are needed in oral language and early literacy instruction, is discussion about the skills needed to deliver effective instruction. In early literacy instruction, it has been demonstrated that explicit instruction, whereby unambiguous and clear information is provided to students, is impactful. There is less evidence to demonstrate the association between instructional approaches and oral language outcomes, however explicit instruction that fosters metalinguistic and metacognitive skill development, and classroom conversations that are sustained for multiple turns are known to foster and enrich language development in early childhood (Brodie, 2014). The literature that explores teachers’ knowledge, practice, and the impact of professional learning on each of these constructs will be explored later in this chapter.
3.3 Teachers’ Professional Learning and Development

Internationally, governments invest billions of dollars in supporting teacher professional learning with the intention of improving and sustaining student outcomes by enhancing the quality of teaching (Garet et al., 2008; Guskey & Yoon, 2009; Kraft, Blazar, & Hogan, 2016). Professional learning is a core component of nearly every modern proposal to improve education systems (Borko, 2004; Guskey, 2002; Smith & Gillespie, 2007). Within the education sector, professional learning programs are more or less systematic efforts to bring about change in the classroom practices of teachers, in their attitudes and beliefs, and in the learning outcomes of students (Guskey, 2002).

Hattie (2009) has reported that teachers’ professional development has a medium to large effect size on student achievement, a finding that is consistent with that of Harris and Sass (2008). In many jurisdictions, participation in professional learning is mandated for ongoing registration, including in the state of Victoria where teachers are required to complete 20 hours of professional development annually to maintain registration (Victorian Institute of Teaching [VIT], 2018a). Data from the 2016 PIRLS study (Thomson et al., 2017) showed that Australian teachers’ participation in professional learning activities is higher than most other OECD countries.

There is evidence to suggest that professional learning is more effective when it is collaborative (rather than a traditional workshop), sustained over time (Porter, Garet, Desimone, Yoon, & Birman, 2000), connected to the teachers’ work context (Ottoson, 1997), focused on subject matter knowledge (Garet, Porter, Desimone, Birman, & Yoon, 2001), orientated towards analysis and reflection (Guskey, 1997), includes coaching (Kraft et al., 2016) and encourages colleagues to work together (Porter et al., 2000; Smith & Gillespie, 2007). It has also been recommended that professional learning should include both conceptual and procedural information about instruction
so that participants know what to do, why it should work, and how to gauge the
effectiveness of their practices (Ingersoll & Kralik, 2004; Wasik & Hindman, 2011).

These principles are reflected, in part, in the current Australian Charter for the
Professional Learning of Teachers and School Leaders (AITSL, 2012). In this
document it is specified that professional development activities should be relevant to
both context and classroom practice, collaborative and future focussed. The charter
highlights the challenges associated with changing culture and professional practices,
and states that responsibility for professional learning is shared between teachers,
school leaders, system leaders and policy makers.

*Professional development* and *professional learning* are often used
interchangeably in practice but are differentiated in the literature. These two terms, and
other iterations (including continuing professional development, training and teacher
learning), have subtly different meanings. Easton (2008) viewed the key differentiating
factor between *learning* and *development* to be agency and engagement, and likened
*development* with a maturation process, whereas *learning* is a process in which the
participants are actively engaged. In the Australian context, AITSL (n. d.) has published
*An Essential Guide to Professional Learning*, while conversely, the VIT discuss
*professional development* activities (2018a). In this thesis, the term professional
learning will be preferred, however in some instance when referring to specific work by
other researchers and authors, professional development may be used.

As with most professions, participation in professional learning activities is
commonly considered to be an essential aspect of teachers’ practice. The VIT states
that teachers may engage in professional learning activities that include attending
seminars or conferences, reading, engaging in webinars or online courses, social
media or watching movies, visiting museums or art galleries (2018b). While these
activities may offer inspiration or ideas, they do not necessarily align with the research
evidence that identifies the features of professional learning needed to improve practice, effectiveness and to create sustained change. As such, the likelihood that some of these forms of professional learning result in substantial impact upon teacher knowledge, practice or student outcomes is small. It is evident that there is little consensus around what constitutes professional learning, and as such, it is subject to interpretation by educational sectors, schools, school leadership and individuals. As described by Kennedy (2005) in her review of professional learning practices in Scotland, there is a multitude of models that can be used to conceptualise and position professional development and learning, as summarised in Table 3-1.

**Table 3-1: Models of professional learning (Kennedy, 2005)**

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<tbody>
<tr>
<td>Training</td>
<td>Generally delivered by an expert. This is a consistently popular, yet often unregulated method of professional learning. This form of professional learning commonly aligns with a standards-based approach to teacher development, which teachers undertake to meet standards set at state or national level.</td>
</tr>
<tr>
<td>Award-bearing</td>
<td>Involves undertaking a course of study to meet the requirements of a graduate certificate, diploma or degree, either through a university or other training institution.</td>
</tr>
<tr>
<td>Cascade</td>
<td>Individual teachers attend a training event, and then disseminate the information or resources to colleagues. It is likely that this model does not align with the conditions that are needed for sustained professional learning.</td>
</tr>
<tr>
<td>Standards-based</td>
<td>This model is underpinned by a desire to create a system of teaching, and teacher education, that can generate and empirically validate connections between teacher effectiveness and student learning.</td>
</tr>
<tr>
<td>Coaching/mentoring</td>
<td>While the content and structure of the model may vary, the defining characteristic is the importance of the one-to-one relationship, generally between two teachers.</td>
</tr>
<tr>
<td>Community of practice</td>
<td>Learning within a community of practice differs from coaching and mentoring and involves three essential processes: evolving forms of mutual engagement; understanding and tuning enterprise; and developing collective repertoire, styles and discourses.</td>
</tr>
</tbody>
</table>
The provision of training to teachers is a growing industry, yet in Australia this sector is largely unregulated. There is a view in some education circles that the commercialisation of programs and resource packages appears to often be prioritised by those developing programs, above ensuring a robust evidence-base or independent evaluation (Gore, Miller & Harris, 2018). Many popular resources, interventions and professional learning programs have not been subject to independent, rigorous evaluation (Bowen & Snow, 2017). In Australia, professional learning providers are only required to be accredited and provide evidence-based content in New South Wales and the Australian Capital Territory (Joseph, 2017; NSW Education Standards Authority, 2017). In a Centre for Independent Studies (CIS) report about school investment, Joseph (2017) highlights that the 2016 TIMMS and PIRLS data shows Australian teachers engage with professional learning activities at a level that exceeds that of most other countries, but contrary to expectations, Grade 4 students whose teachers participated in the most professional learning (16 hours or more) scored lower on average on the PIRLS assessments than students whose teachers had spent less than six hours on professional learning (Thomson et al., 2017). Joseph (2017) draws upon these findings, and rightly recommends that rather than targeting the quantity and frequency of professional learning, more effort should be directed towards supporting teachers to engage with high quality professional learning activities that have been subject to evaluation and scrutiny and shown to result in improved outcomes for students.

24 This was reported as a key finding in the ACER PIRLS 2016: Reporting Australia’s Results document, but it was not stated if the difference between the higher professional learning group (an average score of 544) was significantly different to the lower professional learning group (an average score of 556).
The “black box” of professional learning and teacher change.

The process by which participating in professional learning results in change in practice for teachers and outcomes for students is not well understood. In their Best Evidence Synthesis of professional learning, Timperley and colleagues have drawn an analogy of twin “black boxes” (2007), whereby the process of teachers participating in professional learning and resultant changes in student outcomes are commonly not visible or articulated in the literature. In this model, shown in Figure 3-2 below, the first “black box” is the process by which teachers interpret and use knowledge and skills acquired through professional learning, and then create learning opportunities for their students. The second “black box” is the process of student learning as a result of the learning opportunities created by their teacher or teachers following professional learning.

![Figure 3-2: The “black boxes” of teacher & student learning (Timperley et al., 2007)](image)

This analogy illustrates the problematic nature of unregulated professional learning. Professional learning may be based on a sound theoretical rationale, but without evidence of the impact upon both teachers and students, the return on investment is largely unknown.

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This analogy has also been used more recently by Mendive et al. (2016). A “black box” is an expression used to describe a complex system whose internal workings are hidden and not readily understood.
3.4 Models of Teacher Change

Several theoretical models of professional learning and teacher change that attempt to explain the process within the first “black box” described above have been proposed in recent years. These models commonly draw upon the principles of andragogy and are informed by observations of the impact of professional learning on both teachers and their students. In turn, these models should influence the design and evaluation of professional learning programs. Boylan, Coldwell, Maxwell, and Jordan (2018) have recently reviewed and critiqued five widely-cited models of teacher change: those of Guskey (2002), Desimone (2009), Clarke and Hollingsworth (2002), Opfer and Pedder (2011) and L. Evans (2014).

Guskey’s model (2002), shown in Figure 3-3, is a unidirectional linear path model that describes a “temporal sequence of events” (p. 381). In discussing an earlier version of this model, Guskey (1986) suggested that the reason many professional learning programs do not result in the desired impact is because they fail to (i) consider what motivates teachers to engage in professional learning, and (ii) to consider the process by which change in teachers typically occurs. In his 2002 model, Guskey describes a process of change that occurs following professional learning. Central to this model is the notion that teachers change their attitudes and beliefs not directly because they have participated in professional learning, but because they observe improvement in their students’ learning. The improvement in student learning is associated with teachers’ practice changes. As such, it is not the professional learning that directly leads to change in teachers’ attitudes or beliefs, or improved student outcomes, but a change in practice. The features of the professional learning that precipitate improved student outcomes are thereby valued by teachers and are

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26 It will be highlighted later in this chapter that this is done to a varying extent in studies of language and literacy professional learning
retained. Professional learning that does not result in change in practice, or in practices that do not impact upon students, are not sustained. Importantly, in the absence of evidence of improvement in students’ learning, this model suggests that significant change in the attitudes and beliefs of teachers is unlikely.

![Diagram](image)

**Figure 3-3: Guskey’s model of teacher change (2002).**

A strength of this model is that it is linear and relatively simple and incorporates measurable and visible teacher attributes. Guskey’s (2002) model has been critiqued as being limited in scope and capacity to accommodate environmental and contextual variations (Boylan et al, 2018). Guskey acknowledged that this is a relatively simple model and recognised that the process of professional learning should be seen as an ongoing activity, not a singular event. The influence of this model, whether specifically acknowledged or not, is evident in the design of many studies of professional learning in recent decades, although change in teachers’ knowledge, practices, beliefs and attitudes are not consistently measured.

Building upon Guskey’s model (2002), Desimone (2009) presents a similar pathway model (Figure 3-4), and suggests that a theory of action is enacted as follows:

1. Teachers experience effective professional development
2. Professional development increases teachers' knowledge and skills and/or changes their attitudes and beliefs,
3. Teachers use their new knowledge and skills, attitudes, and beliefs to improve the content of their instruction or their approach to pedagogy, or both, and finally

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46
The instructional changes foster increased student learning

Unlike Guskey (2002), Desimone (2009) explicitly specifies characteristics and features of professional learning that have been previously identified as being necessary in order to influence change. While describing the relationship between the different components of this theoretical model as hypothetically causal, Desimone’s model is not unidirectional, and she does not propose that the sequence of change is necessarily temporal or fixed. Another point of difference between the two models is that Desimone also incorporates contextual features (for example, teacher and student characteristics and policy environment), which are absent from Guskey’s model. Desimone again is explicit in recognising that schools are complex, dynamic environments, and teachers operate within a system.

These two pathway models described above align with the design of evaluation studies, especially those with larger sample sizes (e.g. Gersten, Dimino, Jayanthi, Kim, and Santoro, 2010, and Phelps & Schilling, 2004), but by compartmentalising aspects of change, these models may not adequately describe the complex process of change that is experienced by an individual teacher.

![Diagram](image)

**Figure 3-4: Desimone’s model of professional development (2009)**

27 These ideas have been further developed by Hoy and Miskel (2008) and Postholm (2012), amongst others.
Clarke and Hollingsworth (2002) published an interconnected, multiple pathway model, that draws upon studies of secondary mathematics teachers to detail the mechanisms by which the constructs in Guskey’s (2002) model are inter-related. This model incorporates both reflection and enactment within the professional development process and provides four domains within which growth and change can be conceptualised: personal, external, practice and consequence. Boylan et al. (2018) also include a model presented by Opfer and Pedder (2011) that further develops the complexity of professional practice change, and accounts for the interactions between systems and subsystems within educational contexts. These two models account for both formal and informal professional learning by situating learning as an ongoing and dynamic rather than static event, whereas the models of Guskey (2002), and Desimone (2009) do not.

The fifth model discussed by Boylan et al. (2018) is that by L. Evans (2014). This cognitive learning model attempts to capture the micro-level cognitive and behavioural changes that occur within an individual teacher’s process of professional growth and learning, and this model is episodic rather that progressive in nature. In her discussion of this model, Evans highlights that new practices or knowledge do not typically simply replace existing practice or knowledge, but teachers must instead integrate the old with the new, and this is a complex task that requires a deep level of willingness, reasoning and reflection.

As stated earlier, the pathway theories of change, such as those by Guskey (2002) and Desimone (2009), are potentially the most appropriate and suitable for large-scale evaluations (Blamey & Mackenzie, 2007), while more complex interactionist models may be better suited to the task of describing individual responses to a professional learning stimulus, whether it be formal or informal, within a sociological approach (Boylan et al. 2018). In light of the array of theoretical models, it becomes
evident that the process of effecting change as a result of professional learning is multifactorial and complex. Theoretical models can inform the design and interpretation of research in professional learning, explain the process by which this change occurs, and also provide an explanation when the anticipated outcomes do not eventuate. Importantly, there must be alignment between the theoretical model or framework, and the methodology and design of the study.

**Methodological issues in the evaluation of professional learning.**

As discussed in Chapter 2, there are close associations between early educational experiences and later academic, social, emotional and vocational outcomes (Law & Elliott, 2009). As this relationship has been increasingly recognised, it has been argued that it is entirely appropriate that rigorous empirical methodological approaches are incorporated into research within schools and early childhood education (Connolly, Biggart, Miller, O’Hare, & Thurston, 2017). Internationally, there has been a steady increase in the use of experimental or quasi-experimental methods to evaluate efficacy, effectiveness, and return on investment of professional learning and other classroom-based interventions, within what is commonly referred to as the “What Works” movement (Connolly, Keenan, & Urbanska, 2018). There is limited but growing recognition in the education sector of differing levels of research evidence, and education researchers are drawing upon frameworks that have been used to test medical intervention. The Australian National Health and Medical Research Council (NHMRC) Evidence Hierarchy for intervention studies is shown in Table 3-2.

While still not commonplace in education, the randomised controlled trial (RCT) design has been used within school-based evaluations and research with increased frequency over the last 15 years (Connolly et al., 2018). An RCT incorporates both random selection and a comparative control group to minimise the impact of bias in determining the impact of an intervention and optimise confidence in a result.
Torgerson and Torgerson (2001, 2008) have advocated the use of this methodology in school-based research, arguing that RCTs protect students against the potentially harmful impact of untested educational initiatives. In the United Kingdom, the Education Endowment Fund has invested and endorsed the use of RCT methodology within the education field, and Social Ventures Australia, an organisation that provides funding, investment and support to bring about social change, has similarly encouraged the use of RCTs in education (Bush, 2016).

Table 3-2: Evidence hierarchy (NHMRC, 2009).

<table>
<thead>
<tr>
<th>Level</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>A systematic review of level II studies</td>
</tr>
<tr>
<td>II</td>
<td>A randomised controlled trial</td>
</tr>
<tr>
<td>III-1</td>
<td>A pseudorandomised controlled trial (i.e., alternate allocation or some other method)</td>
</tr>
<tr>
<td>III-2</td>
<td>A comparative study with concurrent controls:</td>
</tr>
<tr>
<td></td>
<td>- Non-randomised, experimental trial</td>
</tr>
<tr>
<td></td>
<td>- Cohort study</td>
</tr>
<tr>
<td></td>
<td>- Case-control study</td>
</tr>
<tr>
<td></td>
<td>- Interrupted time series with a control group</td>
</tr>
<tr>
<td>III-3</td>
<td>A comparative study without concurrent controls:</td>
</tr>
<tr>
<td></td>
<td>- Historical control study</td>
</tr>
<tr>
<td></td>
<td>- Two or more single arm studies</td>
</tr>
<tr>
<td></td>
<td>- Interrupted time series without a parallel control group</td>
</tr>
<tr>
<td>IV</td>
<td>Case series with either post-test or pre-test/post-test outcomes</td>
</tr>
</tbody>
</table>

As argued by Hempenstall (2014), while research evidence is becoming increasingly visible in federal and state education policy documents, the translation of evidence-based practice into Australian classrooms has not occurred with the same ease. A practice of using robust research methodologies is far from wide-spread in the
education field (Bowen & Snow, 2017; Goldacre, 2013). The “What Works” movement and the use of rigorous quantitative methodologies have been the source of debate, with some critics arguing that randomisation in schools is unethical, or that schools and classrooms are not appropriate environments for experimental practices (Biesta, 2007, 2010; Cohen, Manion, & Morrison, 2018; Simpson, 2017).

A point that is often lost in this argument is that in school-based RCTs, the control children receive “business as usual” provision and are not deprived of instruction. It is apparent that in the absence of an understanding of the value and differentiation between levels of evidence, allocation of students to a control condition can be perceived to be a source of inequity, based on the assumption that an intervention makes a positive difference. The wider benefits that are derived from determining whether an intervention does in fact make a difference (and therefore warrants the time and use of resources) are often overlooked. In their text “Using Randomised Controlled Trials in Education”, Connolly et al. (2017), reflect on their experience conducting over 30 such trials in schools in the United Kingdom and the Republic of Ireland, and report that despite the controversy that has surrounded RCTs in educational discourse, they have not encountered any resistance, substantial challenges or ethical barriers in using this approach in practice. Connolly et al. argue that RCTs are appropriate for determining both the efficacy and effectiveness28 of new programs, including those that involve teacher professional learning.

Resistance within some sections of the education field to rigorous evaluation and research, and the inconsistent nature with which programs and practices are evaluated has resulted in the widespread practice of the implementation of programs and curricula without evidence of efficacy or effectiveness (Bowen & Snow, 2017). This

28 Efficacy is the performance of an intervention under ideal and controlled circumstances, while effectiveness refers to performance in ‘real-world’ conditions (Singal, Higgins & Waljee, 2014).
is problematic for many reasons. Most notably, students who are taught in ways that are not underpinned by robust evidence are at risk of not achieving to their potential.

### 3.5 Professional Learning in Oral Language for Teachers

While there is a growing literature describing oral language professional learning in early childhood education and care settings (e.g. Bleses et al., 2017; Cabell et al., 2011; Dockrell, Stuart, & King, 2006; Fricke, Bowyer-Crane, Haley, Hulme, & Snowling, 2013; Fricke et al., 2017; Johanson, Justice, & Logan, 2016; Markussen-Brown, Juhl, Piasta, Bleses, Højen & Justice, 2017; Piasta et al., 2012), evaluations of teacher professional learning that focuses on oral language in the early years of formal schooling (especially those that are both randomised and controlled) have been reported to be rare\(^{29}\) (Eadie et al., 2016). In Victoria, the Oral Language Supports Early Literacy (OLSEL) trial examined the impact of a teacher professional learning program on the language and literacy skills of young students (P. Snow et al., 2014). The professional learning program embedded within this trial aimed to improve the capacity of early years’ teachers to support students’ oral language skills, and their transition to literacy. The professional learning program focused on the links between oral language and early literacy and drew on evidence that children do not always have sufficiently well-advanced oral language skills at school entry. The intervention was based on the ICPALER model (Munro, 2011). ICPALER is an acronym for Ideas, Conventions,

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\(^{29}\) In both practice and research, targeted support for oral language skills in early childhood and school settings is commonly delivered by teaching assistants (Fricke et al., 2013), volunteers (Riley, Burrell & McCallum, 2004) and speech-language pathologists (Girolametto, Weitzman, & Greenberg, 2012; McCartney, Ellis, Boyle, Turnbull, & Kerr, 2010; van Kleeck, Gillam, & McFadden, 1998), especially for children who present with communication delays. Intervention trials often include an element of professional learning, but in many cases are manualised or delivered either by or under the direction of speech-language pathologists without incorporating additional training (Lennox, Westerveld, & Trembath, 2016; McIntosh, Crosbie, Holm, Dodd, & Thomas, 2007). For example, the *Nuffield Early Language Intervention* (Fricke et al., 2013; Fricke et al., 2017), a broad-ranging oral language program was delivered in nursery and reception classrooms by teaching assistants over the course of 30 weeks.
Purposes, Ability to Learn, Receptive & Expressive. This framework provides teachers with knowledge and strategies to support students’ vocabulary, comprehension and production of complex sentences, phonemic awareness and use of story grammar schema in narrative production.

The students who participated in the OLSEL trial (n=1254) were randomly allocated in school clusters to either the intervention (where classroom teachers participated in the professional learning), or a control condition in which standard classroom practice was delivered (P. Snow et al., 2014). Students in the intervention arm made significantly greater gains in vocabulary, syntactic understanding and some aspects of phonemic awareness. Similar gains were not seen in the length of narratives, or the production of story grammar. At pre-testing, students in the control arm were found to perform significantly better on one measure of literacy skills. At post-testing, however, students in the intervention arm demonstrated a higher rate of growth and performed significantly better than those whose teachers had not participated in the professional learning program. The OLSEL trial demonstrated that a teacher-led professional learning program that supports teachers’ knowledge and skills in language instruction can result in improved oral language and literacy skills in young primary school-age students. This study provided proof of concept for the CPOL trial, in which this doctoral research is embedded. The OLSEL trial did not directly measure the impact of professional learning on teachers.

**Systematic review of oral language professional learning literature.**

A search of the literature was conducted to determine if there were other published studies similar in scope to the OLSEL (P. Snow et al., 2014) and the current CPOL (Goldfeld et al., 2017) trials, and if so, if they had incorporated measures of teacher change. Studies of professional learning were systematically reviewed to determine the extent to which the empirical evidence aligns with theoretical models. In
conducting this review I sought to understand the impact of professional learning in oral language upon teachers by addressing three questions. Firstly, how is professional learning in oral language for early years teachers characterised in the literature? Secondly, how is teacher change following professional learning measured and reported? Finally, how does the measurement of teacher change align with key theories of teacher change? I identified studies that included (i) professional learning\textsuperscript{30} for teachers\textsuperscript{31}, (ii) targeted one or more aspects of oral language\textsuperscript{32}, and (iii) were conducted in the first three years of primary (or elementary) school. The presence or absence of measures of teacher outcomes was not an initial inclusionary or exclusionary criterion. The complete inclusionary and exclusionary criteria are detailed in Table 3-3.

**Search for published systematic reviews.**

Before searching for original studies, I first attempted to identify if a systematic reviews or meta-analyses had already been published on this topic. The What Works Clearinghouse, Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre), Cochrane and Campbell Collaboration repositories were searched, as were the EBSCO, ProQuest and JSTOR databases. No systematic reviews were identified that addressed all elements of the proposed search (teacher professional

\textsuperscript{30} For the purpose of this review, a narrow definition of professional learning was adopted: specifically, formal, systematic and structured opportunities in the form of training and/or coaching. Informal or self-directed profession learning was beyond the scope of this review.

\textsuperscript{31} Classroom teachers needed to be the participants in professional learning and positioned as the primary subject of the intervention. Alternatively, when student outcomes were the primary focus, teachers needed to be the agents of change. Studies that reported interventions delivered to students by speech-language pathologists, research assistants, teachers’ assistants or aides, or other paraeducators were excluded.

\textsuperscript{32} Oral language was defined as a broad-ranging construct that includes phonemic awareness, phonological awareness, vocabulary, syntax, morphology, and a range of discourse genres in both expressive and receptive modalities. Preliminary searches indicated that there were very few studies that were concerned exclusively with oral language in the early years of primary school. Oral language professional learning was typically included within studies that targeted early literacy. As such, literacy and reading were included as search terms, however studies were only included if they addressed an aspect of oral language.
learning, oral language and the early years of primary school). However, seven systematic reviews that shared some commonalities with this search were identified. It was determined that these reviews warranted further examination to see whether they included any relevant experimental studies.

**Table 3-3: Inclusionary and exclusionary criteria**

<table>
<thead>
<tr>
<th>Inclusionary criteria</th>
<th>Exclusionary criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early years of primary school (equivalent of Victorian Foundation to Grade 2)</td>
<td>Early childhood, upper primary or secondary setting</td>
</tr>
<tr>
<td>Studies that included a professional learning intervention that included coaching and/or training</td>
<td>Studies that do not include professional learning</td>
</tr>
<tr>
<td>Focus on oral language broadly, or a domain of oral language or linguistic (not code) aspects of literacy</td>
<td>Focus exclusively on written forms of language, phonics or decoding skills, or other academic subject (for example, mathematics or science).</td>
</tr>
<tr>
<td>Inservice classroom teachers</td>
<td>Preservice teachers, paraeducators, teachers’ assistants, speech-language pathologists, research assistants or similar</td>
</tr>
<tr>
<td>Whole class, Tier I or universal instruction, teaching or service provision</td>
<td>Tier II or Tier III instruction, including children who were learning English as a second language (English Language Learners), those with dyslexia or learning difficulties, or those deemed to be at specific risk of literacy difficulties were excluded.</td>
</tr>
<tr>
<td>Developed countries</td>
<td>Developing countries</td>
</tr>
<tr>
<td>English as the primary language of classroom instruction</td>
<td>Intervention conducted with English Language Learners, with English as an additional language, or in a language other than English</td>
</tr>
<tr>
<td>Quantitative data</td>
<td>Qualitative data only</td>
</tr>
</tbody>
</table>

Four of the seven systematic reviews considered teacher professional learning (or professional development) across a range of subject areas and year levels (Cordingley, Bell, Thomason, & Firth, 2005; Hattie, 2009; Timperley et al., 2007; Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). One review addressed student outcomes

33 Kindergarten in the United States, Reception in the United Kingdom, or Foundation or Preparatory year in Australia, and equivalent elsewhere.
following teacher professional learning in reading (Basma & Savage, 2017). Another was an evidence summary that had informed recommendations for the teaching of early literacy (Foorman et al., 2016) and included studies that involved elements of teacher professional learning. A seventh systematic review by Wilkinson and Gaffney (2016) reported on two-tiered scaffolding for learning and teaching; specifically, interventions that occurred at two levels, coaching or professional learning for an adult, and then an intervention delivered by the adult (most often a teacher, but in some instances a parent or para-professional) to a child. A systematic review of morphological interventions was also identified (Bowers et al. 2010). From the 22 studies included in the review by Bowers and colleagues, 16 were excluded because they targeted older children, four were excluded because they targeted preschool children, and the remaining two were not delivered by teachers.

From this analysis of existing systematic reviews, 14 studies that included professional learning in one or more aspects of oral language were retained for further consideration (Apthorp et al., 2012; Baker et al., 2013; Borman & Dowling, 2009; Fuchs et al., 2001; Garet et al., 2008; Gersten et al., 2010; Goodson, Wolf, Bell, Turner, & Finney, 2010; Gunn, Smolkowski, & Vadas, 2010; McCutchen, Abbott, et al., 2002; Podhajski, Mather, Nathan, & Sammons, 2009; Porche, Pallante, & Snow, 2012; Scanlon, Gelzheiser, Vellutino, Schatschneider, & Sweeney, 2008; Scanlon, Vellutino, Small, Fanuele, & Sweeney, 2005; P. Snow et al., 2014).

Search for experimental studies.

Because no systematic reviews of oral language professional learning for teachers were identified, a systematic search for experimental studies was conducted. The EBSCO, JSTOR and ERIC ProQuest databases were searched. The search terms used were (i) teacher OR educator, (ii) language OR literacy OR phon* OR vocabulary OR morph* OR narrative OR discourse OR metalinguistic*, (iii) intervention OR
"professional learning" OR "professional development" OR training OR coaching, and (iv) "primary school" OR "elementary school" OR "early years" OR kindergarten OR reception.

This search yielded 2162 articles. These results were exported to the citation management software Endnote, and the 14 studies identified via the systematic reviews listed above were added. From this yield, 690 duplicates were removed. The titles of the remaining 1486 studies were screened. Scanning of titles led to 765 studies being excluded, due to the age of the students (early childhood education, upper primary or secondary), because professional learning was not an element of an intervention, or the intervention was out of scope or conducted in a language other than English. The abstracts of the remaining 721 studies were then screened. During this phase a further 545 studies were excluded. The reasons for exclusion of studies in this stage were the targeted or specialised nature of interventions (professional learning to support teachers to work with children with dyslexia or other learning disorders, and students who are English language learners), the focus of the intervention (solely phonics, reading, spelling and/or writing without oral language) a non-experimental study design, an absence of professional learning for teachers, and/or the context of the intervention. Studies with very brief teacher training (less than two hours) were also excluded. The full texts of the remaining 176 studies were then reviewed.

Following review of the full texts, 35 studies were identified that met the criteria specified. All 35 studies reported on professional learning for teachers in one or more aspects of oral language (for example, phonological awareness or vocabulary). Non-controlled and non-randomised intervention studies were not excluded from this review because a research synthesis was not planned. These studies were categorised and coded according to the quality of evidence (as per NHMRC classification), the aspects of oral language targeted within the intervention, the teacher outcomes measured in
the evaluation, and features of the professional learning, including duration, intensity, and structure. This search is summarised in Figure 3-5. These studies are listed in Table 3-4, with further details provided in Appendix B.

Levels of evidence.

Various methodologies have been used in teacher professional learning studies, ranging from large RCTs, to case studies. Ten RCTs that incorporated an element of oral language were identified. As anticipated, because these were school-based studies, they were almost entirely cluster RCTs with randomisation occurring at the level of the school or classroom. In other studies, a comparison group was included in the design but randomisation did not occur. For example, Porche et al. (2012) conducted a non-randomised, quasi-experimental controlled study and their comparison classrooms were drawn from the same school, and as such, there may have been a contamination effect.
<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Level of Evidence</th>
<th>Model of PL &amp; content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbott, Walton &amp; Greenwood</td>
<td>2002</td>
<td>III-3</td>
<td>Professional learning in phonemic awareness</td>
</tr>
<tr>
<td>Al Otaiba, Connor, Folsom et al.</td>
<td>2011</td>
<td>II</td>
<td>Teacher professional learning in literacy, including phonological awareness and vocabulary, embedded within a RTI framework. Included training in ISI-K and A2i software</td>
</tr>
<tr>
<td>Al Otaiba, Hosp, Smartt &amp; Dole</td>
<td>2008</td>
<td>IV</td>
<td>Case study of reading first coaching within one school. Coaching included phonological awareness.</td>
</tr>
<tr>
<td>Apthorp, Randel, Cherasaro, Clark, McKeown &amp; Beck</td>
<td>2012</td>
<td>II</td>
<td>Implementation of Elements of Reading® Vocabulary (EOR:V). Reading coaches attended EOR:V training, and then delivered training in their schools.</td>
</tr>
<tr>
<td>Baker, Santoro, Chard, Fien, Park, &amp; Otterstedt</td>
<td>2013</td>
<td>II</td>
<td>Read aloud intervention. Included focus on language comprehension and vocabulary with narrative and expository texts.</td>
</tr>
<tr>
<td>Biancarosa, Bryk &amp; Dexter</td>
<td>2010</td>
<td>III-1</td>
<td>School wide coaching intervention grounded in theories of Marie Clay and Fountas &amp; Pinnell. Targeted phonics and phonological awareness, vocabulary and word structure, fluent reading, and literal, inferential, and critical thinking about texts.</td>
</tr>
<tr>
<td>Blachman, Ball, Black &amp; Tangel</td>
<td>1994</td>
<td>III-2</td>
<td>Phonological awareness &amp; phoneme awareness professional learning program, within theoretical framework.</td>
</tr>
<tr>
<td>Blachman, Tangel, Ball, Black &amp; McGraw</td>
<td>1999</td>
<td>III-1</td>
<td>Phonological awareness &amp; word recognition within general literacy professional learning intervention</td>
</tr>
<tr>
<td>Borman and Dowling</td>
<td>2009</td>
<td>III-2</td>
<td>Superkids Reading Program, including phonemic awareness; phonics; fluency; comprehension; vocabulary; listening and speaking; handwriting; spelling; expressive writing; early literacy; grammar; structural analysis; and study skills.</td>
</tr>
<tr>
<td>Bos, Mather, Narr &amp; Babur</td>
<td>1999</td>
<td>III-2</td>
<td>Professional learning in Reading Instructional Methods of Efficacy (RIME) intervention, included phonological awareness content</td>
</tr>
<tr>
<td>Brady, Gillis, Smith et al.</td>
<td>2009</td>
<td>IV</td>
<td>Professional learning in phonological awareness &amp; phonics</td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>------</td>
<td>------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Carlisle &amp; Berbitsky</td>
<td>2011</td>
<td>III-2</td>
<td>Comparison of models of professional learning: Language Essentials for Teachers of Reading and Spelling (LETRS) professional learning only and LETRS professional learning with coaching</td>
</tr>
<tr>
<td>Carlisle, Cortina &amp; Schnabel</td>
<td>2011</td>
<td>III-2</td>
<td>Comparison of three models of professional learning: LETRS professional learning, LETRS professional learning with support, and LETRS professional learning with support and coaching</td>
</tr>
<tr>
<td>Carson, Gillon &amp; Boustead</td>
<td>2013</td>
<td>III-2</td>
<td>Professional learning in Phonological Awareness Training (PAT) (modified for the classroom) delivered by teachers to students with and without specific language impairments</td>
</tr>
<tr>
<td>Fuchs, Fuchs, Thompson et al.</td>
<td>2001</td>
<td>III-1</td>
<td>Comparison between models: Ladders to Literacy, Ladders to Literacy + PALS (phonological awareness + decoding), and comparison group</td>
</tr>
<tr>
<td>Garet et al.</td>
<td>2008</td>
<td>II</td>
<td>Comparison of models of professional learning: (LETRS) professional learning only and LETRS professional learning with coaching</td>
</tr>
<tr>
<td>Gersten et al.</td>
<td>2010</td>
<td>II</td>
<td>Teacher study group (reading comprehension and vocabulary)</td>
</tr>
<tr>
<td>Gersten et al.</td>
<td>2013</td>
<td>II</td>
<td>Teacher study group (reading comprehension and vocabulary)</td>
</tr>
<tr>
<td>Goodson et al.</td>
<td>2010</td>
<td>II</td>
<td>Professional learning in Kindergarten PAVEd for Success (K-PAVE) program; vocabulary</td>
</tr>
<tr>
<td>Greenwood et al.</td>
<td>2003</td>
<td>III-2</td>
<td>Longitudinal sequential cohort design CBM model; phonemic awareness, within literacy intervention</td>
</tr>
<tr>
<td>Gunn et al.</td>
<td>2010</td>
<td>II</td>
<td>Professional learning within Read Well Kindergarten; includes vocabulary, phonological awareness, as well as alphabetic understanding and decoding</td>
</tr>
<tr>
<td>Lo &amp; Haskell</td>
<td>2009</td>
<td>III-3</td>
<td>Early reading instruction professional learning, includes phonological awareness content</td>
</tr>
<tr>
<td>O'Connor</td>
<td>1999</td>
<td>III-2</td>
<td>Professional learning in Ladders to Literacy program, includes phonological awareness</td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>------</td>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>O’Connor et al.</td>
<td>2005</td>
<td>III-3</td>
<td>Longitudinal lagged design (historical controls). Professional learning in reading (including phonological awareness) ± direct intervention to students.</td>
</tr>
<tr>
<td>Parkinson, Meakin, &amp; Salinger</td>
<td>2015</td>
<td>II</td>
<td>Children’s Literacy Initiative (CLI) program; broad ranging literacy intervention, includes vocabulary and phonological awareness</td>
</tr>
<tr>
<td>Podhajski, Mather, Nathan &amp; Sammons</td>
<td>2009</td>
<td>III-2</td>
<td>Professional learning in TIME for teachers program, includes phonemic awareness, as well as phonics, fluency</td>
</tr>
<tr>
<td>Porche, Pallante &amp; Snow</td>
<td>2012</td>
<td>III-2</td>
<td>CLLIP intervention: strategic assessment, phonemic awareness, in addition to word reading, fluency, vocabulary, comprehension, writing</td>
</tr>
<tr>
<td>Scanlon, Vellutino, Small et al.</td>
<td>2005</td>
<td>III-3</td>
<td>Professional learning in Interactive Strategies Approach (ISA) incorporated within comparison of intervention and prevention approaches. ISA includes phonological awareness component.</td>
</tr>
<tr>
<td>Scanlon, Gelzheiser, Vellutino et al.</td>
<td>2008</td>
<td>III-3</td>
<td>Professional learning in ISA. 3 arm study; PL only, student intervention only, and PL and student intervention. Coaching provided to PL and PL + intervention conditions. ISA includes phonological awareness component.</td>
</tr>
<tr>
<td>Scarparolo &amp; Hammond</td>
<td>2018</td>
<td>III-3</td>
<td>Professional learning in Let’s Decode program, includes phonological awareness and phonics</td>
</tr>
<tr>
<td>Snow, Eadie, Connell et al.</td>
<td>2014</td>
<td>II</td>
<td>Professional learning in ICPALER model; including focus on story grammar, phonological awareness, vocabulary. School leaders also completed university subject in oral language.</td>
</tr>
<tr>
<td>Stevens, Van Meter &amp; Warcholak</td>
<td>2010</td>
<td>III-2</td>
<td>Professional learning in story structure instruction.</td>
</tr>
<tr>
<td>Timperley &amp; Phillips</td>
<td>2003</td>
<td>IV</td>
<td>Broad-ranging literacy intervention, included focus on student achievement, teacher self-efficacy and new domain knowledge in literacy.</td>
</tr>
<tr>
<td>Volpe et al.</td>
<td>2012</td>
<td>III-3</td>
<td>KPALS, targeting target phonological awareness, as well as sound–symbol correspondence, decoding, and word recognition, plus an additional phase with a behaviour intervention.</td>
</tr>
</tbody>
</table>
**Programs and context of professional learning.**

Most studies (19 out of 35) evaluated the implementation of commercially available programs that include an element of professional learning, including Superkids (Borman & Dowling, 2009), Let’s Decode (Scarparolo & Hammond, 2018), Elements of Reading® (Apthorp et al., 2012;), Read Well Kindergarten (Gunn et al., 2010), Ladders into Literacy (O’Connor, Fulmer, Harty, & Bell, 2005) and Language Essentials for Teachers of Reading and Spelling (LETRS) (Carlisle & Berbitsky, 2011; Carlisle et al., 2011; Garet et al., 2008). As is evident from the titles of these programs, most had a primary focus on literacy, and incorporated a small component of language within the professional learning program. Other studies included evaluations of professional learning models that had previously been published but were not commercialised, including the Collaborative Language and Literacy instruction Project (CLLIP) (Porche et al., 2012) and the ICPALER framework in the OLSEL study (P. Snow et al., 2014). Another set of studies report the evaluation of large-scale government funded interventions in the United States, including the Children’s Literacy Initiative (CLI) in Philadelphia (Parkinson, Meakin, & Salinger, 2015), and the evaluation of the K-PAVE intervention (Goodson et al., 2010) that were instigated in response to the No Child Left Behind legislation implemented in the United States in 2001.

**Models of professional learning.**

The dominant form of professional learning reported in the literature was training (as defined by Kennedy, 2005), whereby teachers attended sessions presented by experts or research teams for one or more days (e.g. Blachman, Ball, Black & Tangel, 1999; Brady, et al., 2009; McCutchen, Abbott et al., 2002; P. Snow, et al, 2014). In line with recent trends in the US, there were also several studies that investigated coaching (Al Otaiba et al., 2008; Biancarosa, Bryk, & Dexter, 2010; Carlisle & Berebitsky, 2011; Stephens et al., 2011). Five studies compared professional
learning alone, with professional learning plus coaching (Carlisle & Berbitsky, 2011; Carlisle et al., 2011; Garet et al., 2008; O’Connor et al., 2005; Scanlon et al., 2008), all concluding that coaching resulted in greater benefit to students and/or teacher participants. Gersten et al. (2010, 2013) evaluated a Community of Practice (as described by Kennedy, 2005), in the form of teacher study groups. In their 2010 study, 81 teachers from 19 schools collaborated in a sustained professional learning program which resulted in significant improvements in teachers’ knowledge of vocabulary instruction and students’ oral vocabularies when compared to a control group.

**Targets of intervention.**

Perhaps the most notable finding in the systematic review was that oral language was infrequently the primary focus of a study. The only broad-ranging oral language professional learning studies was the Australian cluster RCT by P. Snow et al. (2014). This is contrasted with a comparatively large literature describing oral language professional learning in the early childhood education and care context (see Markussen-Brown et al., 2017 for review and synthesis). Unlike in the early childhood context, it is apparent that language is rarely disaggregated from literacy in the early years of primary school. This is not in and of itself problematic, as the need and place for professional learning in early literacy is well established. However, when the literature is considered collectively, the absence of oral language professional learning for teachers is unexpected, especially when the importance of communicative competency in the early years of primary school is unequivocal.

The remaining 34 studies targeted one or two aspects of oral language, most often alongside literacy content. The oral language skills most commonly included in professional learning was phonological awareness, which was incorporated in 29 of the 35 studies, typically alongside code-based reading instruction (for example, Al Otaiba, et al. 2011; Brady et al., 2009; O’Connor, 1999; Scarparolo & Hammond, 2018). McCutchen, Abbott, et al. (2002) followed a cohort of kindergarten (first year of school)
and first grade teachers and their students for a year following the teachers’ attendance at a two-week intensive professional learning course focused on phonological and orthographic awareness, and research about learning disabilities. McCutchen and colleagues observed instruction in the classroom, with a main focus on the use of explicit instruction. Observations were made by members of the research team who became familiar with teachers and students in the trial. It was found that teachers who had participated in the professional learning were more explicit in their instruction. This study suggests that professional development can deepen teachers’ knowledge of phonological awareness, and that this in turn can change classroom practice, resulting in improved student learning (although the sustainability of this improvement was not measured beyond the year of the intervention). The authors of this study discussed the importance of creating sustainable change. While this study did not include a follow up, the changes that occurred within the teachers’ practice appeared to become embedded to the extent that change would continue to occur.

It was noted that the details of the aspects of phonological awareness addressed in professional learning were typically limited and most studies did not provide detail about the tasks or intensity of training to allow replicability. An exception to this was Carson, Gillon & Boustead (2013) who provide a detailed description of the implementation of the Phonological Awareness Training (PAT) program in New Zealand. This program included rhyme, phoneme recognition, blending and manipulation, and involved 8 hours of professional learning and coaching for the teachers. Participants included children with Specific Language Impairment (SLI), as well as typically-developing children, who demonstrated improved phonological awareness and reduced prevalence of decoding difficulties, compared to non-treatment groups.

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Studies that evaluated commercialised programs are more readily replicable.
Professional learning in vocabulary was the focus of 15 studies. In some instances, vocabulary was the sole focus of an intervention (e.g. Apthorp et al., 2012; Goodson, et al. 2010) or was commonly incorporated within other broad-ranging literacy interventions (Porche et al., 2012; P. Snow et al., 2014). Story grammar and discourse (including narrative) were infrequently addressed. In addition to the professional learning program described by P. Snow et al.(2014), which included story grammar content, only one other study was identified that exclusively targeted narrative construction (Stevens et al., 2010). Given the centrality of discourse to academic and social participation, this was a surprising finding. No studies that addressed morphology or morphemic awareness for teachers who taught in the early years of primary school were identified\textsuperscript{35}.

**Measurement of teacher outcomes.**

When professional learning is evaluated in large-scale studies, the relationship that is most typically examined is that between professional learning and student achievement. As discussed earlier, Timperley and colleagues (2007) have likened this to a “black box”, whereby the process of transfer of benefits from professional learning to students is not illuminated or well understood. Nearly all studies reported above included measures of student outcomes, most typically proximal outcome measures, completed soon after the completion of the professional learning program.

In five studies, little or no reference was made to the impact of professional learning upon teachers. Teacher observations were conducted in 13 studies to provide an indicator of fidelity, and in seven studies this was the only teacher data collected (Abbott et al., 2002; Al Otaiba et al., 2008; Apthorp et al., 2012; Baker et al., 2013; Carson et al., 2013; Lo & Haskell, 2009; Stevens et al., 2010). These observations provide an indicator of compliance rather than measurement of teacher change. Some

\textsuperscript{35} Morphological intervention studies were found to typically target students in the middle primary school years (Bowers, Kirby, & Deacon, 2010).
authors identified that the absence of teacher measures was a limitation of their study (Apthorp et al., 2012; Porche et al., 2012; P. Snow et al., 2014; ). Beyond the use of fidelity measures, the remaining 23 studies reported at least one type of teacher outcome. Teacher outcome measures are classified into knowledge, practice, beliefs, attitudes and self-rated ability, and are described below.

**Knowledge.**

After fidelity observation, teachers' knowledge was the most commonly measured construct. Porche et al. (2012) discuss the importance of implementing professional learning programs that are evidence-based and lead to an increase in teachers' content knowledge in literacy. Their evaluation of the Collaborative Language and Literacy Instruction Project (CLLIP) report only on student outcome measures and while the authors report that the absence of measures of teachers' practice or knowledge is a limitation of their study, they state that “only student proficiency results are directly tied to state funding, and thus other measures have little significance” (p.667).

Six studies included either pre- and post- intervention measures of teacher knowledge, or a comparison between an intervention and control group. The impact of professional learning on teacher knowledge was variably reported, using F statistics, t-tests, and Cohen’s d. All effects were converted to Cohen’s d and are summarised in Table 3.5. The effect of professional learning ranged from small (d=0.33) to very large (d=3.19).

The collated effect sizes presented in Table 3-5 are consistent with previous reports in the literature about the variable impact of professional learning on teacher knowledge. Podhajski et al. (2009) also measured the outcomes for students of a small group of teachers (n=4) who participated in a professional learning program and made comparisons to a control group of teachers (n=3) and their students. While this study was limited by the small sample, they did report that professional development can
lead to gains in content knowledge and that this may contribute to student outcomes, a finding that is in line with earlier and later studies (Bos, Mather, Narr, & Babur, 1999; McCutchen, Abbott, et al., 2002; McCutchen, Harry, et al., 2002; Piasta et al., 2009; Wasik & Hindman, 2011). McCutchen and colleagues identified significant positive correlations between teachers’ literacy knowledge and students’ word reading outcomes in kindergarten, but no relation between teacher knowledge and first and second grade students’ vocabulary, reading comprehension, spelling or writing fluency skills.

Table 3-5: Professional development and teacher knowledge effect sizes

<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention</th>
<th>Teacher Knowledge measure</th>
<th>Cohen’s d</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al Otaiba et al. (2008)</td>
<td>Coaching, reading, including phonological awareness</td>
<td>Mather et al.2001</td>
<td>0.37</td>
<td>Medium</td>
</tr>
<tr>
<td>Brady et al. (2009)</td>
<td>Phonological awareness and phonics</td>
<td>Designed for study</td>
<td>2.34</td>
<td>Large</td>
</tr>
<tr>
<td>Garet et al. (2008)</td>
<td>Reading, including phonological awareness</td>
<td>Designed for study</td>
<td>0.37</td>
<td>Medium</td>
</tr>
<tr>
<td>Gersten et al. (2010)</td>
<td>Reading, including phonological awareness</td>
<td>Content Knowledge for Teaching Reading (adapted from Phelps &amp; Schilling, 2004)</td>
<td>Knowledge 0.73</td>
<td>Large</td>
</tr>
<tr>
<td>McCutchen, Abbott, et al. (2002)</td>
<td>Phonological awareness</td>
<td>Moats (1994)</td>
<td>0.60</td>
<td>Medium</td>
</tr>
</tbody>
</table>
**Practice.**

Change in practice was measured using a range of approaches. McCutchen, Abbott et al. (2002) measured teacher practice through in-person observations, using a tool developed specifically for their study, as did Carlisle and Berebitsky (2011), Carlisle, Cortina & Schnabel (2011), and Gersten et al. (2013). Other studies have measured change in teacher practice with the use of omnibus measures; for example, Goodson et al. (2010) used the Classroom Assessment Scoring System (CLASS) (Pianta, La Paro, & Hamre, 2008). These omnibus measures capture data concerning the learning environment, teacher and student behaviours and the structure and sequencing of lessons to varying degrees.

A third approach has been to record and later transcribe, code and analyse data. Authors who have used this approach include Apthorp et al. (2012), who asked both teachers participating in vocabulary focused professional learning and control teachers to audio-record lessons, which were then transcribed and coded to identify the use of different question types. In a smaller study of six teachers implementing a text comprehension program, McKeown and Beck (2004) recorded, transcribed and analysed video-taped samples of classroom talk, coding teachers’ questions, responses to student comments and the ratio of teacher to student talk.

This variability in the approaches used to measure practice makes the consolidation of this body of literature difficult. In the study reported by Apthorp and colleagues (2012), in which the impact of the vocabulary program Elements of Reading® was evaluated, teacher practice was measured through recordings that were then transcribed and coded. Teachers in the treatment condition asked proportionately more questions that required students to connect words to contexts, whereas control teachers asked more questions that required recall or repetition. Additionally, teachers who had completed the professional learning spent more time eliciting deep processing from their students, and less time on passive responses.
A similar pattern was found by Gersten and colleagues (2010), who reported that teachers who had participated in study groups showed improved practice, in addition to increased knowledge. Using the Reading Comprehension and Vocabulary (RCV) Observation tool (Gersten, Dimino, & Jayanth, 2007), they found that teachers performed an average of 0.86 standard deviations higher on the comprehension instruction measure and 0.58 standard deviations higher on the vocabulary instruction measure, compared to the control group.

McCutchen et al. (1999) reported teachers in their treatment group used a higher rate of explicit instruction, creating greater knowledge affordance for their students. They observed that kindergarten teachers offered more explicit phonological awareness instruction, whereas first grade teachers were more explicit in their comprehension instruction. They did not observe significant difference between the control and treatment groups in the orthographic instruction.

**Beliefs, attitudes, satisfaction and self-rated ability.**

It is evident that teachers’ knowledge and practice are more commonly measured in studies of professional learning, with relatively few reports of impact upon beliefs, attitudes, satisfaction or self-rated ability. Beliefs are typically measured in relation to reading instruction, commonly measuring the degree to which teachers’ beliefs fall on a continuum between Whole Language, Balance Literacy and systematic phonics instruction. While teachers’ beliefs were measured in descriptive studies discussed earlier in this chapter, beliefs were not measured in any of the 36 studies identified in this systematic review.

Carlisle and Berebitsky (2011) measured teachers’ views about professional learning and compared these views between teachers who had received coaching and those who had not. They found no significant difference between the two groups. Teachers’ satisfaction with professional learning was more typically reported (Borman & Dowling, 2009; Bos et al., 1999). Teachers’ self-rated ability to provide instruction in
language or literacy was infrequently measured. Only Timperley and Phillips (2003) measured teachers’ self-efficacy.

**Process of change.**

A process of teacher change as a result of participation in professional learning was hypothesised in only a few studies, including Bos and colleagues (1999), who stated that change in teachers’ knowledge and practice were necessary precursors to changed student outcomes. Greenwood and colleagues (2003) hypothesised that professional learning would result in a change in practice, and this would produce accelerated growth in literacy skills in students. Their evaluation of a school-wide literacy program with approximately 350 students and 16 teachers confirmed their hypothesis; professional learning did result in a change in teacher practice, and while there was a statistically significant change in student reading performance, this was mediated by factors including prior performance, and other risk factors.

Gersten and colleagues (2010) hypothesised that participation in professional learning (in this case, teacher study groups) would lead to change in teacher knowledge, followed by change in practice and resultant growth in student reading outcomes, reflecting Guskey’s Model of Teacher Change (2002). This evaluation of a teacher study group model of professional learning confirmed this hypothesis, with a statistically significant change in teacher knowledge and practice, and an effect size of $d = 0.44$ on oral vocabulary, which was marginally significant. Bos et al. (2001) also presented a theoretical model, indicating that teachers’ knowledge, attitudes and practices have an effect on study learning. In this model, interactive, collaborative professional development (typified by both course and school collaboration) influence teachers’ knowledge, attitudes and practices, which then has an effect upon student learning.
**Interactions between variables.**

Few studies consider how change within one domain affects another. This limits the extent to which the theories of teacher change described earlier in this study can be tested against the empirical evidence. The study by Gersten at al. (2010) is one the few investigations that did consider the relationship between observed teaching practices, teacher knowledge and student reading outcomes. They found higher correlations between teacher knowledge and student outcomes (range 0.22 to 0.49, median 0.31), than teaching practice and student outcomes (0.06 – 0.36, median 0.28). The authors report that a similar relationship between these two variables and student outcomes were observed in other literacy (not language) professional learning studies (Gamse, Jacob, Horst, Boulay, & Unlu, 2008; James-Burdumy et al., 2009). Gersten and colleagues reposition the way that success of professional learning should be determined, stating that “contemporary theories of teacher change suggest that professional learning interventions should first have a positive impact on proximal outcomes such as teaching practice and teacher knowledge if student achievement is to improve in the long run” (p.729).

**Summary of findings from systematic review.**

The models of teacher change described earlier in this chapter provide a theoretical explanation for what occurs within Timperley et al.’s (2007) so-called the “black box” of professional learning. On the strength of these it was posited above that teachers’ knowledge, practice, beliefs and attitudes can be influenced by professional learning. However, the preceding review of the professional learning literature highlighted that there is great variability in the scope, target, and evaluation measures, and consequently, limited evidence available illustrating the impact of professional learning upon teachers’ content knowledge and practice.
### 3.6 Teachers' Knowledge of Language and Literacy Constructs

An additional investigation was conducted to further explore the measurement and description of teachers' knowledge of language and literacy constructs. A similar inquiry into teachers' practice is presented later in this chapter.

Until the early part of the twenty-first century, relatively little research was conducted to measure teachers' content knowledge in language literacy, especially relative to other curriculum areas (Cunningham, Perry, Stanovich, & Stanovich, 2004). Early work on the subject of teacher knowledge of language and literacy constructs included one commercially available measure (Durkin, 1964) and a small number of limited scale studies conducted in the United States that largely measured phonics knowledge (Aaron, 1960; Kingston, Brosier, & Hsu, 1975; Ramsey, 1962; Schubert, 1959; Spache & Baggett, 1965). In an unpublished academic report, Narang (1977) described a trend at the time towards competency-based evaluations of teachers’ knowledge, skills and attitudes, and summarised the literature about teachers’ knowledge of phonics and other literacy skills. Without exception, the authors of these early publications concluded that although collective performance on these measures varied, many teachers did not possess a reliable knowledge of phonics. Troike (1977) and Rude (1981) both sought to develop and validate measures of teacher knowledge. The test items in both measures were developed from textbooks that were in common use in initial teacher education programs at the time, rather than considering the contemporary knowledge of scientific approaches to reading instruction. The Rude (1981) measure, titled the “Knowledge Test of Reading for Elementary School Teachers” predominantly measured pedagogical knowledge and the recall of facts, rather than the application of knowledge to literacy tasks.

Moats published an influential study in 1994, describing 89 teachers’ knowledge of basic linguistic constructs relevant to the teaching of reading. In this study she found that teachers’ knowledge of linguistic constructs (such as morphemes and phonemes)
was inconsistent, limited, and surprisingly poor. Since Moats’ original study, survey-based studies have dominated this field of research, with many utilising tools that are derived from her early work.

**Review of the literature.**

A search of the EBSCO, JSTOR and ERIC ProQuest databases was conducted. The search terms (i) teacher OR educat*, (ii) language OR literacy OR reading OR phon* OR vocabulary OR morph* OR narrative OR discourse OR metalinguistic*, and (iii) knowledge OR understanding OR cognition were used. Through this search and subsequent reference list checks, 42 studies of teachers’ knowledge of language and literacy concepts that were published between 1994 and 2018 were identified\(^\text{36}\). Studies were included if they examined knowledge in inservice and/or preservice teachers, or other education professionals, including teacher educators and speech-language pathologists. Notably, there are also a number of publications that are commonly cited that discuss teacher knowledge of language and literacy constructs but do not include original research (Arrow et al., 2015; Brady & Moats, 1997; Callahan et al., 2009; Cunningham & O’Donnell, 2015; Moats & Lyon, 1996; Washburn et al., 2016; Fillmore & Snow, 2003). A comprehensive list of the 42 studies included in this review is provided in Appendix C.

These investigations vary in scope and scale, using surveys that ranged from six or fewer items (Fielding-Barnsley, 2010), to extensive piloting processes with 261 items (Phelps & Schilling, 2004). Many studies use surveys that are derived from those originally published by Moats (1994), Bos et al., (2001) or Brady et al., (2009). Sample sizes ranged from seven teachers (Podhajski et al., 2009) to over 1500 (Phelps & Schilling, 2004). Studies of preservice, novice and inservice teachers have been conducted, as well as teacher educators (e.g. Joshi, Binks, Houghen, Dahlgren, Ocker-

\(^{36}\) This search parameter was set to capture studies conducted since Moats’ 1994 paper on this subject.
Dean & Smith, 2009) and other professionals (including speech-language pathologists) (e.g. Spencer, Schuele, Guillot & Lee, 2008).

The Journal of Learning Disabilities (2009) and the Annals of Dyslexia (2016) have both published special editions on the topic of teacher knowledge. In these issues, the guest authors of the editorial (Joshi, Washburn, & Kahn-Horwitz, 2016; Moats, 2009) and discussion (Reid Lyon & Weiser, 2009) highlight disconnect between the scientific evidence that underpins language and reading, and the content of initial teacher education courses. As such, teachers’ beliefs and practices, and contemporary best evidence for reading instruction are seen to be poorly aligned (Reid Lyon & Weiser, 2009).

Study designs include both descriptive studies in which knowledge is measured at a single time-point in a defined population, studies in which comparisons are made between two or more groups, for example between inservice and preservice teachers (Aro & Bjorn, 2015; Bos et al, 2001; Carroll, Gillon & McNeill, 2012; Fielding-Barnsley & Purdie, 2005; Mahar & Richdale, 2008), professional learning treatment and comparison groups and as pre- and post-professional learning measures (as described on page 66). There does not appear to be a difference in performance when surveys are completed remotely, vs in the presence of investigators. This was reported by Mahar and Richdale (2008), who compared the performance of participants in these two conditions and found no significant difference ($t(118) = -1.36, p=0.17$), despite the possibility that respondents could access information from other sources. Surveys are increasingly being distributed and completed online, and McNeill and Kirk (2014) report a higher rate of return occurs when participants respond in this way, compared to paper-based surveys.

Studies vary in length and, depth and breadth, and little is reported about the psychometric properties of most tools, aside from face validity. There have been few attempts to validate tools that measure this knowledge. Three exceptions are studies
by Phelps and Schilling (2004), Binks-Cantrell, Joshi, and Washburn (2012), and Duguay, Kenyon, Haynes, August, & Yanosky (2016).

**International research.**

Research on teachers’ knowledge of language and literacy constructs has been conducted predominantly in the United States, although there has been recent growth in studies from other countries, including Australia and New Zealand. Moats’ 1994 study found that teachers displayed weaknesses in the areas of terminology, phonics knowledge and phonemic and morphemic awareness, and her original survey has been replicated and modified in the subsequent two decades, e.g. by Joshi, Washburn, Binks-Cantrell and colleagues (2012). This group of researchers has measured the knowledge of language and literacy constructs of preservice and inservice teachers, as well as university academics in the United States (Binks-Cantrell, Washburn, Joshi, & Hougen, 2012; Binks-Cantrell, Joshi, et al., 2012; Joshi et al., 2009; Washburn, Joshi, & Binks-Cantrell, 2011; Washburn & Mulcahy, 2014). Differentiation is made in this research between the *explicit* knowledge of constructs and conventions (i.e., defining the term *morpheme* or *phoneme*), and the *implicit* knowledge or ability to apply it (i.e., syllable or phoneme counting, or identifying syntactic errors) (Binks-Cantrell, Washburn, Joshi, & Hougen, 2012). An *implicit* knowledge of how language works, or a sense of what is and is not “correct” English, does not necessarily translate to an ability to *explicitly* teach children about the rules and idiosyncrasies of the English language (McCutchen, Harry, et al., 2002). McCutchen and colleagues’ findings indicate that preservice teachers are typically able to display *implicit* skills related to some basic language constructs, but fail to demonstrate *explicit* knowledge (Washburn, Joshi, & Binks-Cantrell, 2010), and that many university academics who deliver courses in reading and literacy also have limited explicit knowledge of basic language constructs (Joshi et al., 2009).
In the United States a recurrent finding, that has remained largely unchanged since Moats’ (1994) original paper, is that teacher knowledge is variable, but largely insufficient for the task of oral language and early literacy instruction. Over the past two decades, studies of preservice and inservice teachers, and other education professionals have repeatedly demonstrated that teachers exhibit low levels of knowledge of language and literacy constructs, and the processes that promote language, reading and broader literacy development (Bos et al., 2001; Mather, Bos, & Babur, 2001; Moats, 1994; Moats & Lyon, 1996; Piasta et al., 2009; Spencer, Schuele, Guillot, & Lee, 2008, Stephenson, 2018).

International comparative research by Washburn, Binks-Cantrell, Joshi, Martin-Chang, and Arrow (2015) found relative strengths in preservice teachers’ knowledge that aligned with national initiatives in their international comparative study, and Washburn et al. (2015) found that Canadian preservice teachers outperformed their peers from New Zealand, the United States and United Kingdom, but still achieved below 70% accuracy on a measure of phonemic, phonological and morphological knowledge. In New Zealand, McNeill, Gillon and colleagues have interrogated the knowledge of inservice and preservice teachers, teachers’ aides and speech-language pathologists, concluding that further education for both preservice and inservice education professionals is needed (Carroll, Gillon, & McNeill, 2012; McNeill & Kirk, 2014; Wilson, McNeill, & Gillon, 2015). A similar conclusion has also been recently reached by Chapman Greaney, Arrow & Tunmer (2018) in regard to phonics in New Zealand.

Australian research.

There are five known published studies of inservice and preservice Australian primary teachers’ knowledge of language and literacy constructs (Fielding-Barnsley, 2010; Fielding-Barnsley & Purdie, 2005; Mahar & Richdale, 2008; Scarparolo & Hammond, 2018; Tetley & Jones, 2014). These studies show Australian teachers’
knowledge of language and literacy constructs to be limited and highly variable, especially in regard to phoneme awareness. Fielding-Barnsley and Purdie (2005) tested preservice, inservice and special education teachers and found that while most teachers held a positive attitude towards teaching language and early literacy, many had poor knowledge of language constructs. The exception to this was special education teachers, who achieved significantly better results on both belief and knowledge measures. Mahar and Richdale utilised the same 10-item questionnaire as used by Fielding-Barnsley and Purdie and confirmed that both inservice and preservice teachers had poor linguistic knowledge, with few for example, able to correctly define a schwa vowel or a diphthong. The preservice teachers in the study by Tetley and Jones (2014) performed better overall than Australian teachers in earlier studies, especially in skill-based items, but their knowledge was still variable. The preservice teachers’ phonological knowledge was related to their reported confidence, but not to the amount of experience they had received in teaching in the early years. Exposure to commercial phonics programs was associated with higher knowledge, whereas exposure to Reading Recovery (Clay, 1985) was not.

**Experience and qualifications.**

The relationship between teachers’ levels of experience and qualifications and knowledge does not appear to be linear. When a dichotomous comparison is made between preservice and inservice teachers, inservice teachers are generally found to have a higher level of knowledge than preservice teachers (Carreker, Joshi, & Boulware-Gooden, 2010).

Tetley and Jones (2014) reported preservice teachers’ experiences were positively associated with their knowledge. Carreker et al. (2010) found that hours of professional learning was positively correlated with knowledge and instructional decision making in inservice teachers. However, as teachers progress through their careers, experience does not always provide a strong predictor of expertise or
specialised knowledge (Cunningham et al., 2004; Mahar & Richdale, 2008; Piasta et al., 2009). When a positive relationship is observed between experience and knowledge, it is reported that even the most experienced teachers rarely approach a ceiling level of measures of language and literacy constructs (Spear-Swerling, Brucker & Alfano, 2005). This is similarly observed in studies that involve teacher educators in universities (Binks-Cantrell, Joshi et al., 2012; Joshi et al., 2009). Special education qualifications appear to be associated with higher levels of knowledge (Moats, 1994, Fielding-Barnsley & Purdie, 2005). In their study of teachers who were undertaking a special education qualification, Spear-Swerling and Brucker (2003) found that teachers who had previously completed courses or had experience in teaching reading outperformed their peers who did not have prior experience on measures of recognising syllable types and irregular words, but not grapho-phonemic segmentation (although neither group demonstrated a high level of proficiency prior to an intervention).

**Assessment of specific knowledge types.**

As is frequently discussed in the literature, while teachers may be competent communicators, and have experience and education in language and literacy instruction, they are often found to lack explicit essential knowledge of basic language constructs and structure (Cunningham et al., 2004; Joshi et al., 2009; Moats, 1994). Given the complexities and irregularities of English etymology and spelling, there is a strong body of opinion that a deeper knowledge of the English language is necessary to teach reading, and that knowledge of language structure must be explicit in order to teach reading effectively to students (C. Snow, Griffin, & Burns, 2005; Tetley & Jones, 2014).

Phonemic knowledge is commonly measured in these studies of teacher knowledge, with respondents typically asked to identify (from options provided) the definition of a phoneme (Binks-Cantrell, Joshi, et al., 2012; Fielding-Barnsley, 2010;
Moats, 1994), with studies reporting that most, but by no means all, respondents are able to identify the correct response. Many studies then ask respondents to identify the number of phonemes within words. Success with this task varies and is largely determined by the associations between graphemes and phonemes. Where there are direct correspondences (i.e., the phoneme /m/ and the letter ‘m’), there is a much higher level of accuracy, where-as when there are two letters associated with one sound (a digraph), teachers are less likely to be able to identify the correct number of phonemes (e.g., chip). This task appears to be most difficult when there is more than one phoneme associated with a single letter. The most common measure of this is counting phonemes in words such as box, ox, or fox, with most studies finding that fewer than 10% of respondents are able to correctly identify that the letter x represents the phonemes /k/ and /s/ (Parker, 2018). Moats (1994) found that knowledge of phonics was surprisingly weak, and while participants could often answer some items correctly, only 10% to 20% could consistently identify consonant blends. Furthermore, even when they were able to correctly identify blends, they incorrectly identified other co-located consonants as blends, where one consonant was in fact silent (for example, the bt in doubt). Many teachers believe that the digraph of the letter ‘n’ and ‘g’ in a word produce an amalgam of the /n/ and /g/ phonemes, not the distinct /ŋ/ phoneme, just as the digraph /θ/ was an amalgam of the phonemes /t/ and /h/, not the distinct voiceless /θ/ (or voiced /ð/) phoneme. This is likely to be a result of low orthographic knowledge impeding phonemic awareness.

Australian teachers have been found to have highly variable phonological knowledge by Mahar and Richdale (2008) and Fielding-Barnsley and Purdie (2005). Carroll et al. (2012) reached the same conclusion in their study of education professionals in New Zealand, in which teachers achieved a mean of 74% accuracy on an assessment of phonological awareness, with specialist literacy teachers achieving a mean of 89%. Teachers’ aides, early childhood educators and preservice educators
demonstrated lower proficiency, scoring, on average, between 55% and 68%. It is reported in this literature that teachers are uncertain when it comes to differentiating between phonetics, phonology, phonological and phonemic awareness and phonics (Moats, 1994; Washburn & Mulcahy, 2014).

Knowledge of morphology is less commonly assessed in this body of literature. English is widely described as a *morpho-phonemic* language, meaning that spelling and structure is guided both by phonemic and morphemic conventions. Morphology has been largely overlooked until recent times (Apel, 2017; Berninger et al., 2009). Moats (1994) found that terminology associated with morphology was 'foreign' to her participants, and that many had never been asked to consider words at a morphemic level before. Binks-Cantrell, Joshi, et al. (2012) asked respondents to identify the correct definition of a morpheme, and then count morphemes in a range of words, including those with inflectional endings, derivational endings, prefixes, a combination of morpheme types, or only one morpheme. In their psychometric analysis, they found that the ability to count morphemes was much better at discriminating between teachers who had an overall high level of knowledge of language and literacy constructs than those who did not. In their factor analysis, these researchers found moderate to large rotated factor loadings for the items that dealt with morphology (identifying the correct definition of a morpheme and counting morphemes in words).

Almost without exception, researchers in this field conclude that initial teacher education should include a greater depth and breadth of content about oral language and literacy, both in Australia (Fielding-Barnsley, 2010; Mahar & Richdale, 2008) and internationally (Moats, 1994, 2009; Spear-Swerling & Brucker, 2003; Washburn et al., 2015). Nearly all researchers in this field emphatically highlight disconnect between the theory and empirical research that underpins oral language and literacy, and the knowledge of both inservice and preservice teachers.
In addition to the description of teachers’ knowledge of language and literacy constructs, a number of issues have been described. While the recommendation to increase and improve instruction in this area in preservice teacher education would appear reasonable, Binks-Cantrell, Washburn, et al. (2012) report a barrier in enacting this recommendation. In their study of teacher educators and their preservice teachers at universities in the United States, they describe an instance of the so-called Peter Effect. This effect, first reported by Applegate and Applegate (2004) in their study of preservice teachers, alludes to the New Testament story of the Apostle Peter, who when asked for money replied that he could not give what he himself did not possess. Binks-Cantrell, Washburn, et al. (2012) found that teacher educators’ knowledge of language and literacy constructs was in many cases limited, and that not surprisingly, the students of teacher educators who did not possess an adequate level knowledge, in turn, performed poorly on a knowledge measure.

**Knowledge calibration.**

Cunningham et al. (2004) described issues with teacher knowledge calibration, whereby teachers are often found to have difficulty aligning perceptions of their own knowledge, and their demonstrated knowledge. Al-Hazza, Fleener, and Hager (2008) further investigated the issue of knowledge calibration. In a study of 141 primary school teachers in the United States, they found that teachers over-estimated their knowledge of phonological awareness and phonics, and there were no significant differences between those who rated their knowledge as high as compared to those who rated their knowledge as low. This phenomenon can be likened to the Dunning-Kruger effect (Kruger & Dunning, 1999). This effect described a cognitive bias in which relatively unskilled individuals experience an illusory superiority, mistakenly rating their ability as much higher than is accurate. Similarly, those with a relatively high skill or knowledge level are inclined to underestimate their own ability.
Teachers’ beliefs about language and literacy instruction.

An area of research that is commonly conducted alongside studies into teachers’ knowledge is the study of associated beliefs concerning language and literacy instruction. McNeill and Kirk (2014) and McCutchen, Harry, et al. (2002) found disconnect between teachers’ self-reported beliefs about spelling instruction, and their self-reported practices. More than 90% of the teachers in this study reported that they believed teaching phonological awareness, and letter sound knowledge was important, but fewer than half of these teachers reported that they regularly incorporated these fundamental skills into their classroom practice. Teachers are commonly found to have positive perceptions about the importance of early literacy instruction (Mather et al., 2001). McNeill and Kirk (2014) found large variability in New Zealand teachers’ beliefs and practices associated with spelling instruction, and a disassociation between reported beliefs and implementation of instructional practices.

Joshi et al. (2009) hypothesised that an underlying contributing issue to elementary teachers’ limited knowledge and awareness of the structural aspects of language and literacy may be the beliefs and knowledge of teacher educators and staff within university education faculties. Their 2009 study of 78 university staff identified limited phonemic and morphemic knowledge, and further interviews with participants found poor alignment with beliefs about instruction, and the scientific evidence that underpins early literacy instruction. Most notably, synthetic phonics was not regarded by the teacher educators as a desirable method for initial literacy instruction, especially for students who were at risk of literacy difficulties, despite evidence to the contrary (Castles, Rastle & Nation, 2018; Ellis, 2007; Johnston & Watson, 2005).

3.7 Teachers’ Practice and Classroom Talk

A core component of both models of change (Desimone, 2009; Guskey, 2002) and the “black box” analogy (Mendive et al., 2016; Timperley et al., 2007) is teachers’ practice. Within the construct of teacher practice, the use of talk in the classroom can
be considered. It is widely recognised that throughout the school years, knowledge is shared between teachers and their students through spoken language, a notion embodied in the idea that “learning floats on a sea of talk” (Britton, 1970, p.164). Clear communication is critical to ensure successful teacher-student interactions for all students (Hollo & Wehby, 2017). Students and teachers utilise oral language to share perspectives, expectations, and questions and answers back and forth in conversation (Myhill, Jones & Hopper, 2005). While developing, strengthening and refining their oral language skills, students need to simultaneously develop their ability to think about language (metalinguistic skills) (Nippold & Berman, 2004). This is done while also using their oral language skills as a modality for learning (Myhill et al., 2005).

As discussed in Chapter 2, it is well understood that oral language skills (including phonological awareness) are important precursors to literacy, with the interrelationship between oral language and literacy emphasised both theoretically and empirically (Scarborough, 2001; C. Snow, 1991; P. Snow et al., 2014; Tomblin, Zhang, Buckwalter, & Catts, 2000). Oral language is the primary tool by which learning takes place, making “verbal abilities... the currency of education” (National Institute of Child Health and Development, 2005). It is for this reason that talk between teachers and students in early years’ classrooms has been a topic of interest in education research. Classroom talk is a well-established field of research, especially in English-speaking countries (Jones & Hammond, 2016). Key findings have included that teachers’ talk typically dominates in the classroom (Alexander, 2002), often within an Initiation-Response-Evaluation pattern (Howe & Abedin, 2013).

**Classroom practice measures.**

There are a number of existing tools and frameworks that measure teacher and educator practice and instruction, including the Classroom Assessment Scoring System (CLASS) (Hamre, Pianta, Mashburn, & Downer, 2007), the Early Childhood Environmental Rating Scale (the ECERS) (Perlman, Zellman, & Le, 2004), the Early
Language and Literacy Classroom Observation (ELLCO) (M. W. Smith & Dickinson, 2002), and the Communication Supporting Classroom (CSC) Observation Tool (Dockrell, Bakopoulou, Law, Spencer, & Lindsay, 2012), amongst others. These measures capture data across the multiple aspects of teacher practice and the learning environment, and can reflect teacher and student behaviours, and the structure and sequencing of lessons (to varying degrees). It is possible that the methods by which they evaluate teacher talk may not be sufficiently sensitive to capture and quantify fine-grained change following professional learning. For the purposes of quantifying impact and change, teacher talk can be considered in isolation, specifically in the context of evaluating interventions that seek to improve teacher knowledge in specific content areas and change student outcomes.

**Classroom talk systematic reviews.**

Recent reviews on the topic of classroom talk by Howe and Abedin (2013) and Mercer and Dawes (2014) described variation in both theoretical and methodological approaches to studying this topic. Howe and Abedin (2013) identified studies of teacher talk served one of two key functions: describing talk within the classroom or evaluating the dialogue between students and teachers. Both qualitative and quantitative methodologies have been utilised in this field of research. While value has been attributed by many authors to the authenticity, richness and depth of studies that take a qualitative approach to describing teacher talk, research utilising quantitative methodologies has provided an alternative analytical approach and quantifiable evidence of the student outcomes associated with different types and ratios of classroom talk. Advances in software, transcription, and other technologies have simplified the process and improved accessibility of classroom talk data for educational researchers in recent years. Borg (2015) discussed the dimensions of observational research that may influence data collection in the study of teacher talk, cognition and practice. In his review of the literature, he identified the trend towards non-participant,
in-person observations, which have presented challenges for researchers. This has meant that observers who are not participating in the lesson or discussion are present in person to collect data. The presence of an observer who is not involved may influence the behaviour and actions of both students and teachers. Furthermore, as highlighted by Meyer, Cash, and Mashburn (2011), classroom interactions vary both throughout the day and over the course of the school year, and there is scope for measurement error when assessing and analysing classroom talk.

Key influential descriptive studies have included the work by Alexander (2006), who conducted an international comparative study of classroom talk, identifying the ongoing preponderance of the teacher-dominant Initiation-Response-Evaluation (IRE)\(^{37}\) pattern in classroom talk internationally. In this pattern of discussion, the teacher provides an initiating statement or question, to which the student responds. This response is then evaluated by the teacher, before the next cycle begins (Alexander, 2006; Cazden, 1988). When this type of talk is the dominant pattern within the classroom, children are expected to respond to questions, yet there are limited extensions made to their responses.

Rymes (2009) drew attention to three dimensions of language within the classroom: (a) the social and institutional context, specifically the conventions that determine language use within the classroom context, (b) the unpredictable nature of interaction and conversation, and (c) individual agency in using language and discourse in any given interaction or context. While these dimensions are theoretical, they align closely with what is known about pragmatic and discourse skills (for example, topic maintenance, recognition of speakers’ roles and turn-taking) that are needed to participate in the classroom (Ripich and Spinelli, 1985).

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\(^{37}\) The Initiation-Response-Feedback (IRF) pattern was first identified by Sinclair and Coulthard (1975) and was further developed as Initiation-Response-Evaluation (IRE) by Mehan (1979), and then Cazden (2001), who analysed the third turn in these interactions.
Anstey (1991) analysed samples of teacher talk in primary school classrooms and developed a framework that conceptualises the function of such talk. The framework identifies three broad functions of teacher talk: Organisation, Doing Literacy and Learning about Literacy, and further sub-classification of the function of talk as follows: classroom management, literacy management, within Organisation; Reconstruction or restatement, Elaboration or projection, and Informative, within Doing Literacy; and Process and Utility within Learning about Literacy.

The application of Anstey’s (1991) framework to samples of teacher talk across primary school classrooms has shown that talk is predominantly orientated around organising and doing literacy tasks, with little talk dedicated to the cognitive aspects of literacy, including explicit recognition and discussion of literacy skills, or the transference of skills between contexts (Anstey, 2003). In a more recent study of 25 primary classrooms, Edwards-Groves, Anstey and Bull (2014) reported that a quarter of the talk that occurred had the function of organisation, 69% was directed towards doing literacy (either reconstructing statements, elaborating students’ statements, or providing useful information), with the remaining 6% orientated towards the cognitive aspects of literacy learning. They noted that while the observations in this study were taken across the primary school years, there was limited variation between the early and later years of primary school.

Other researchers to consider the distribution of types of teacher talk within classroom discourse include Michaels and O’Connor (2015), who conceptualise teachers’ responsive utterances or ‘moves’ as ‘talk tools’. These authors take an approach to studying classroom discourse that they describe as qualitative micro-analysis (Michaels, O’Connor, & Resnick, 2008; O’Connor & Michaels, 1993; Resnick, Michaels, & O’Connor, 2015). In their research they have identified four types of ‘academically productive talk’, and as a result, have encouraged four different goals in the use of teacher talk that align with their notion of ‘talk tools’. These are (i) to help
students share their thoughts, (ii) to help students orient to and listen to one another, (iii) to help students deepen their reasoning, and (iv) to help students engage with others’ reasoning. In their 2015 study, Michaels & O’Connor compared the percentage of total teacher turns that were classified as “academically productive talk” before and after a professional learning intervention in nine teachers. They found that teachers were more likely to adopt some “tools” or talk types than others; statistically significant growth was observed in talk that promoted reasoning ($t(8) = 3.80, p = .0005, 2$-tailed), and engagement with others’ reasoning ($t(8) = 2.73, p = .025, 2$-tailed). Michaels and O’Connor found that many teachers already used talk “tools” that supported students to share their thoughts, and there was limited scope for growth in this behaviour.

In early childhood contexts, teacher talk has been examined in studies that have sought to measure the impact of knowledge-driven professional learning (for example the work of Hammond, 2015, and Wasik and Hindman, 2011). Relatively few studies measuring the impact of professional learning upon teacher talk have been conducted in the primary classroom setting. Two key studies have examined teacher talk as a link between teacher knowledge and student outcomes in language and early literacy in a school setting (McCutchen, Abbott et al., 2002; Piasta et al., 2009). Both studies sought to determine whether specialised knowledge about language and literacy concepts was related to teachers’ practice, and whether this in turn influenced students’ literacy outcomes. McCutchen, Abbott et al. (2002) followed a cohort of kindergarten (first year of school) and first grade teachers ($n=44$) and their students ($n=492$) for a year following an intensive professional development course focused on the importance of explicit instruction in phonological and orthographic awareness, and research about learning disabilities. Explicit instruction\(^{38}\) involves clear explanations, modelling or demonstrating, and guided practice (Geoghegan, O’Neill, & Petersen, 87).
In this approach, the teacher decides the learning intention(s) and success criteria, makes them transparent to the students, demonstrates them by modelling, evaluates whether they understand what they have been told by checking for understanding, and re-telling them what they have already told by summarising for closure (Hattie, 2009; Rupley, Blair, & Nichols, 2009). McCutchen and colleagues found that teachers who had participated in the professional learning deepened their knowledge of phonological constructs, and spent more time providing explicit instruction in phonological awareness (in kindergarten classrooms) and comprehension (in Grade 1 classrooms). This finding suggests that professional learning can deepen teachers’ knowledge of phonological awareness, and that this in turn can change their classroom practice (i.e., instructional talk). These improvements resulted in significant improvements in students’ skill growth in phonological awareness and reading comprehension, amongst other skills.

### 3.8 Chapter Summary

A series of issues emerge from the review of the literature. Firstly, it is evident that oral language has limited visibility in the primary and elementary school literature and is rarely disaggregated from literacy, especially in professional learning for teachers. Comparatively, code-related aspects of oral language are much more dominant in the research literature. Encouragingly, the scope, depth and size of evaluations of professional learning appear to be growing in recent years, especially in the United States.

Teachers have been found to have limited knowledge of language and literacy constructs, and this is complicated by an inconsistent relationship between demonstrated and perceived knowledge. Teachers’ knowledge has rightly been positioned as a systemic issue, rather than ashortcoming of individual teachers. Encouragingly, participation in professional learning can improve teacher knowledge, although the degree of change achieved is variable. Professional learning that is
sustained and includes coaching appears to have greater impact upon students and teachers, although most evidence is needed in regard to oral language interventions.

The literature that describes the impact of professional learning in language (and literacy) upon primary school teachers is equivocal: there is substantial inconsistency in the constructs, methods and models that underpin investigations of teacher change and this limits the scope for synthesis. Furthermore, there is disconnect between the theoretical literature that is concerned with explaining the process of teacher change, and the construction of experimental studies in this field. The documentation of the process of change that results from professional learning eases the translation of this research into practice in the school environment. Finally, experimental professional learning studies are the epitome of ‘real world research’, and as Desimone (2009) and others highlight, teacher change is influenced by an array of factors, many of which are external to the individual teacher.
Chapter 4  Theoretical Framework, Methodology & Research Questions

In this chapter, I describe the theoretical concepts that underpin the research reported in this thesis and the ways in which they are related. A rationale and explanation for the use of a postpositivist paradigm is then provided, before the three studies within this thesis and the research questions are introduced.

4.1 Theoretical Framework

Regardless of researchers’ perspectives or methodologies, inquiries should be designed and conducted in the context of a sound theoretical framework (Yilmaz, 2013). Theories are drawn upon to provide general explanations and to guide research (Hoy & Miskel, 2008; Moore, 2012). Research in the field of education has been described as a “deliberative, complex, subtle, challenging, and thoughtful activity” (L. Cohen et al., 2018, p.3), and investigations have been conducted within a variety of paradigms.

As stated in Chapter 1, the overarching objective of this research was to describe the nature, degree, and sequence of change in early years’ teachers’ knowledge, practice and beliefs during and following an oral language professional learning program. As such, theoretical models of teacher change are at the core of this objective. The thesis objectives sit within a two-armed framework that incorporates theories of (i) ecological and social systems and (ii) teacher cognition, professional development and change. These theoretical concepts are summarised in Table 4-1 and described in detail below.
Table 4-1: Theoretical concepts

<table>
<thead>
<tr>
<th>Tenet</th>
<th>Concept</th>
<th>Theorist(s)</th>
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<tbody>
<tr>
<td>1.</td>
<td>Ecological and social systems theories</td>
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<tr>
<td></td>
<td>Children’s development is influenced by both biological and environmental factors, including the school environment</td>
<td>Bronfenbrenner (1979)</td>
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<td></td>
<td>Schools are complex, open social systems, and teaching and learning is subject to the influence of individual, structural, political and cultural systems.</td>
<td>Hoy &amp; Miskel (2008)</td>
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<tr>
<td>2.</td>
<td>Teacher cognition, knowledge, professional development and change theories</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teachers’ cognition is influenced by a series of factors, including their own schooling, training, experience, and their working environment</td>
<td>Borg (2015)</td>
</tr>
<tr>
<td></td>
<td>Teaching is a complex cognitive activity, and teachers require multiple forms of knowledge, including content knowledge and pedagogical content knowledge.</td>
<td>Shulman (1986, 1987)</td>
</tr>
<tr>
<td></td>
<td>Professional development may lead to change in teachers’ knowledge, practice, attitudes and beliefs, and student achievement</td>
<td>Guskey (1986, 2002) Desimone (2009)</td>
</tr>
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</table>

Ecological and social systems theories.

In conceptualising a child’s environment, I draw upon Bronfenbrenner’s Ecology of Human Development and Socialisation Model (1979), which addresses the complex multidirectional interactions between the developing child, (who is recognised as a dynamic entity), and the various environments that exert influence. These include the home and school (within the meso-system), extended family and the local community (within the exo-system), the laws, values and customs of Victoria and Australia (the macro-system), and the continuous influences of history and passing time (the chronosystem). I integrate this model into the theoretical framework for this thesis to identify that schools (and the teachers within them) are a part of the child’s environment and operate within a complex ecology. It is recognised that teachers exert influence upon their students, but their impact is mediated by other environmental factors.
The school environment itself is dynamic and complex, and this is reflected in the Social System Model for Schools\(^39\) (Hoy & Miskel, 2008; Figure 4-1). Hoy and Miskel drew upon work of earlier theorists in the development of this comprehensive model, and emphasised that it is an open model, accounting for the continuous external influences (including politics, policy and regulations and other environmental forces) upon schools. It is beyond the scope of this thesis to provide an in-depth exploration and account of all aspects of this model, however its key features are summarised below.

Teaching and learning are positioned as the technical core of Hoy and Miskel’s (2008) model. They argue that theoretical perspectives on learning (for example, behavioural, cognitive or constructivist) influence how decisions related to teaching and learning are made. Teaching and learning are also influenced by the interaction of four systems: political, structural, cultural and individual. As an open system, this environment is also subject to the influence of external inputs and can be measured by a series of outcomes and outputs, as per Figure 4-1.

The structural system is described by Hoy and Miskel (2008) as the expectations of the school administration (or bureaucracy) which are implemented to meet the goals of the organisation. Bureaucratic structure can be either enabling or hindering to progress and change. Structural effectiveness is dependent on aligning the structure of the organisation with the goals, environment, technology, people and strategy of the organisation. This highlights the impact of school leadership upon the efficacy of the school organisation.

The political system is concerned with power and politics, which Hoy and Miskel (2008) describe as a reality of organisations. This component of the model highlights the array of relationships in which there are power differentials within school

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\(^{39}\) This book was first published in 1978. The 8th edition (2008) is described here.
environments. Four types of relationships are described: legitimate power, which can be formal\textsuperscript{40} or informal\textsuperscript{41}, and illegitimate power, which may be coercive\textsuperscript{42} or political\textsuperscript{43}. Hoy and Miskel (2008) state that politics is a fact of organisational life, and internal politics is illegitimate because by function it stands to benefit an individual or group at the expense of an organisation. Despite illegitimacy, politics is not necessarily always negative and can bring to light organisational problems and leads to solutions, however political systems typically ensure that the strongest members of organisations are also the most powerful.

\textbf{Figure 4-1: Hoy \\& Miskel’s social system model for schools (2008).}

\textsuperscript{40} Formal authority is legally established within positions, rules and regulations. In joining an organisation, teachers are required to accept the formal authority that is embedded within the school organisation (for example, the power differential between a school principal and a teacher).

\textsuperscript{41} Informal authority can be legitimate. This type of relationship stems from the personal behaviour or attributes of individuals, and with the establishment of norms of allegiance between colleagues, power differentials can be established (for example, between long-serving, experienced staff members, and recent graduates).

\textsuperscript{42} Coercive power is the ability of an administrator to influence those who are less powerful by administering punishments for undesired behaviour. These may be in the form of reprimands, closer supervision or termination.
Within Hoy and Miskel’s (2008) model, the cultural system is defined by a school’s norms, shared values and basic assumptions. Culture is closely aligned with a school’s climate. School climate refers to:

The heart and soul of a school, psychological and institutional attributes that give a school its personality, a relatively enduring quality of the entire school experienced by members, which describes their collective perceptions of routine behaviour, and affects their attitudes and behaviour in the school (p. 28).

Norms may include the implicit expectations that guide actions and behaviour, including supporting and not criticising colleagues. Tacit assumptions about decision making and teachers’ autonomy are also embedded within school climate.

Hoy and Miskel’s (2008) individual system, within the school environment, is central to this thesis. These authors explain that despite a formally established social system, the activities and actions of members within the system do not necessarily strictly adhere to the structural requirements. Individuals are motivated by their needs (as defined in Maslow’s 1943 hierarchy of needs), beliefs and goals. Teachers’ beliefs include those that guide their expectations of students, and those associated with their own self-efficacy. Within this individual system, Hoy and Miskel also address the construct of teachers’ cognition\textsuperscript{44}, which they define as the individual’s use of mental representations to understand the job in terms of perception, knowledge and expected behaviour.

**Teacher cognition.**

Teacher cognition is a component of Hoy and Miskel’s (2008) model described above. Borg (2003; 2015) has also developed the construct of teacher cognition

\textsuperscript{44} This is differentiated from the use of the term cognition in psychology, which typically refers to the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses.
specifically associated with language teaching. He defined teacher cognition as “an often tacit, personally-held, practical system of mental constructs held by teachers and which are dynamic – that is defined and refined on the basis of educational and professional experiences through teachers’ lives” (p.40). Borg highlighted the key contributing factors to cognition as being teachers’ own experiences of school, their professional coursework, contextual factors, and their classroom practices. This is shown in Figure 4-2.

Borg (2015) purported that teachers’ own school experiences are a strong and often overlooked influence on their beliefs and attitudes, and these cognitions that are formed early in life, can mitigate engagement and acceptance of later evidence regarding teacher practice. According to this theory, there is a bi-directional relationship between teacher cognition and classroom practice, and both constructs are influenced by contextual factors. From this theory I draw the principle that early-formed ideas and beliefs are the most difficult to recognise and are most resistant to change.

Figure 4-2: Borg’s model of teacher cognition (2003, 2015).
Teachers’ knowledge.

Shulman’s (1986) theoretical work described and differentiated between types of teacher knowledge and is also relevant to this thesis. Teaching is a complex cognitive task, and teachers must possess a range of knowledge types, including both content knowledge and pedagogical content knowledge, in addition to knowledge of general pedagogy. Teacher knowledge is embedded within theories of teacher change associated with professional learning.

Professional learning and theories of teacher change.

The theoretical framework for this thesis also includes two path models of teacher change (Guskey, 2002; Desimone, 2009). These models were introduced in Chapter 3 and are illustrated in Figure 4-3 and Figure 4-4. Both models support the notion that the fundamental function of professional learning is to bring about change in teachers’ knowledge, practice and beliefs, in order to influence student outcomes.

![Figure 4-3: Guskey’s model of teacher change (2002)](image1)

![Figure 4-4: Desimone’s model of teacher professional development (2009)](image2)

These two models share common features and despite their similarities, are purposefully included because their contrasting features highlight the variability in the sequence and directionality of change following professional learning. Most importantly,
they illustrate multiple aspects of teacher professionalism (and associated change) within a number of domains. These domains are associated with knowledge; Guskey highlights that knowledge is gained through professional learning, while Desimone explicitly highlights knowledge (alongside beliefs and attitudes) within her model. Guskey’s model includes change in practice, while Desimone specifies change in instruction. The third teacher-determined domain is associated with attitudes and beliefs: Guskey’s model includes teachers’ beliefs and attitudes, Desimone places changes in attitudes and beliefs alongside knowledge. Both models highlight change in students’ outcomes. The key differences between the two models are the sequence and directionality of change. Desimone also specifies the characteristics of professional learning that are needed to effect change, and incorporates the contextual factors that, consistent with the Social System Model for Schools (Hoy & Miskel, 2008), affect the behaviour, actions and cognitions of individuals within the school environment.

4.2 Methodology and Research Paradigm(s)

The methodologies underpinning the research described in this thesis and related research paradigms will now be discussed. According to Lincoln, Lynham, and Guba (2011), a paradigm is a set of fundamental beliefs. By positioning research within a paradigm, the first principles that underpin an enquiry or attempt to understand a phenomenon are asserted. In their widely cited summary of paradigms and perspectives in educational research, Lincoln et al. (2011) described the positivist, post-positivist, constructivist paradigms, amongst others. Each of these paradigms is characterised by distinct ontological, epistemological, methodological, and axiological features, as outlined below.

Methodology.

In this thesis I take a predominantly, though not exclusively, postpositivist stance. Postpositivism accepts the merit of empirical research, yet also incorporates the views, perspectives and knowledge of the researcher and key stakeholders, and
explicitly considers the researchers’ biases (Lincoln et al., 2011). A fourth paradigm, pragmatism, has been described as akin to ‘methodological pluralism’, in which natural and physical realities are incorporated and triangulated with psychological and social realities, and both subjective and objective views are integrated (R. Johnson & Onwuegbuzie, 2004; R. Johnson, Onwuegbuzie, & Turner, 2007). To ensure teachers’ voices and perspectives are represented within this doctoral research, the third study in this thesis is situated within a pragmatic paradigm.

Axiology.

Axiology is the branch of philosophy that is concerned with ethics, aesthetics, and religion (Lincoln et al., 2011; Mertens, 2014). Within a research context, axiology is the study of the fundamental beliefs that underpin a researcher’s endeavours; essentially what is valued in research (Heron & Reason, 1997). Axiological considerations are pertinent to this research. As evidenced in the front matter of this thesis, I am a qualified and experienced speech-language pathologist. I do not hold a teaching or education qualification, although I have been employed in early childhood education and primary school settings in roles in which I have worked collaboratively with my teacher colleagues.

4.3 Research Questions & Studies

In constructing this thesis, I designed three studies within the theoretical framework outlined above. In each study I address a research question, as specified below.

Study 1: Teachers’ knowledge of language and literacy constructs.

The objective of the first study was to conduct a rigorous, in-depth measurement of the knowledge, confidence and self-rated abilities of Victorian early years’ teachers pertaining to key language and literacy constructs. In this study I sought to answer Research Question 1: How can the knowledge, confidence, beliefs
and self-rated abilities of teachers pertaining to key language and literacy constructs that underpin oral language and literacy instruction in the early years of primary school be characterised? In Study 1 there was an opportunity to explore the relationship between teachers’ experience, their self-rated ability to teach oral language and literacy, and their demonstrated knowledge of relevant underlying language constructs.

**Study 2: Measuring classroom talk during oral language and literacy instruction.**

In this second study I address **Research Question 2**: Does teachers’ talk during language and literacy instruction become more explicit through participation in targeted professional learning, and is this change sustained over time? I began by piloting a new procedure for collecting samples of teacher classroom talk, and then applied it in an existing framework for describing teacher talk (Anstey 1991, Edwards-Groves et al., 2014). Building upon this pilot study, the procedure was then repeated in the context of the CPOL professional learning program.

**Study 3: Exploration of teachers’ experienced and observed change during professional learning.**

In the third and final study, I took a broader perspective of the process of teacher change during and following professional learning. In this study I addressed **Research Question 3**: To what extent do existing theoretical models of teacher change account for the observed and self-perceived change in knowledge, practice, attitudes and beliefs in three early years’ teachers who participated in a sustained oral language professional learning program? In a series of three case studies, the findings from

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45 For the purpose of the manuscript presented in Chapter 8, this question was been modified slightly: To what extent do the pathway models proposed by Guskey (2002) and Desimone (2009) account for the observed and self-perceived change in three Australian early years’ teachers who participated in a sustained oral language professional learning program?
Studies 1 and 2 were triangulated with semi-structured interview data. These data were considered in the context of change theories.

### 4.4 Contextualising Studies within Theories of Teacher Change

The three studies reflect the teacher-determined components of Guskey (2002) and Desimone’s (2009) models of teacher professional development and change, i.e., teacher knowledge, practice, beliefs, and attitudes. Figures 4-5 and 4-6 illustrate how the three studies within this thesis are positioned within Guskey’s model of teacher change and Desimone’s (2009) model of professional development, respectively.

**Figure 4-5:** Studies 1, 2 and 3 in the context of Guskey’s model (2002).

**Figure 4-6:** Studies 1, 2 and 3 in the context of Desimone’s model (2009).
4.5 Chapter Summary

In this chapter I have introduced the core theoretical concepts that underpin the research within this thesis and the methodological stance that I have adopted in conducting my research. The three studies that constitute this thesis have been introduced and positioned within two theories of teacher change.
Chapter 5  Methods

5.1 Chapter Overview

In this chapter, the research methods of the studies in this thesis will be described in detail. These studies were introduced in the preceding chapter, and the overarching methodologies were also established. Pertinent details of the methods of the CPOL trial are first provided to establish context for this research, before the three doctoral studies are described in detail. There is some duplication between the content in this chapter and the manuscripts that are presented in Chapters 6 and 8.

The Classroom Promotion of Oral Language (CPOL) trial

This research was embedded within the Classroom Promotion of Oral Language (CPOL) trial (ARC LP130100308) (Goldfeld et al., 2017). CPOL was a cluster randomised controlled trial (RCT) that measured the impact of a teacher led oral language intervention on students in the early years of primary school. While there is some overlap between the methods reported in this thesis and the CPOL trial, they are two distinct bodies of work. Details of the CPOL trial that are pertinent to this doctoral research are summarised in the following sections, and the full protocol for the CPOL trial is provided in Appendix A.

Background of CPOL trial.

The CPOL trial (Goldfeld et al., 2017) was implemented in the Australian state of Victoria between 2014 and 2017. Victoria is located in the south-east of the Australian mainland. Melbourne, the capital city of Victoria, is commonly characterised as a culturally and ethnically diverse city. According to the most recent Australian census (ABS, 2016), 57% of the population of Melbourne have at least one parent who was born in another country, and 34.9% of the population speak a language other than English at home. Regional areas of Victoria are less ethnically diverse. Victoria has a relatively small Aboriginal and/or Torres Strait Islander population when compared to
other states and territories of Australia, with people who identify as Aboriginal and/or Torres Strait Islander accounting for 0.5% of the population in Melbourne, and 0.8% of the Victorian population. This is compared to the national average of 2.8%. Just over 18% of the population is under the age of 14, slightly below the national proportion of 18.7% (ABS, 2016).

This trial was instigated in response to three key issues identified in recent research: (i) that early language and literacy competence exerts influence on students’ later academic, social and vocational outcomes (Conti-Ramsden et al., 2013; Duff & Tomblin, 2018; Nippold, 2016); (ii) that improving teacher effectiveness may improve students’ oral language and literacy outcomes (Borg, 2015; Hattie, 2009, 2012; McCutchen, Abbott et al., 2002); and (iii) that an opportunity exists in the early years of formal school to influence students’ developmental trajectories (Catts et al., 2001; Siraj-Blatchford, Mayo, Melhuish, Taggart, Sammons & Sylva, 2011). The Oral Language Supports Early Literacy (OLSEL) trial (P. Snow et al., 2014), conducted in Catholic Education Commission of Victoria (CECV) schools in Victoria between 2009 and 2010, demonstrated that it was possible to improve students’ oral language and reading skills following a teacher professional learning intervention. The OLSEL trial provided ‘proof of concept’ and informed the design and development of the CPOL trial, in which investigators sought to implement and evaluate the embedded intervention at scale (Goldfeld et al., 2017).

**Recruitment.**

**Schools.**

In 2013, Victorian Department of Education and Training (DET) and CECV schools were invited to submit an Expression of Interest (EOI) to participate in the CPOL trial. Schools were required to have a minimum of 15 students enrolled in their
Foundation cohort and have ≥10% of students identified as developmentally vulnerable in the language and cognition skills domains of the 2009 and/or 2012 Australian Early Development Census (AEDC). Forty-seven DET and 25 CECV schools met the specified eligibility criteria and agreed to participate. Schools were informed that they would be allocated at random to either the intervention or control arm of the study. The study commenced at the beginning of the 2014 school year. All schools were located within a radius of approximately 150km of the Melbourne city centre.

**Teacher and student participants.**

One Foundation class in each of the 72 schools participating in the trial was selected, at random, to be an index class. Student and teacher baseline and outcome data were only collected from teachers and students in these index classes, and these students and teachers were regarded as being representative of all teachers and students who participated in the intervention. Classroom teachers from all 72 index classes received a Plain Language Statement describing the trial and subsequently provided informed, signed consent to participate. Seventy-eight teachers and 1364 students were recruited as index teachers and index students respectively. As will be described later in this chapter, all index teachers were participants in Study 1 of this doctoral research.

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46 Since 2015, the first year of formal education in Victoria has been called the Foundation Year. Prior to 2015 it was referred to as the Preparatory year.
47 The Australian Early Development Census (AEDC), was previously called the Australian Early Development Index (AEDI) and is a population measure of early childhood development that is completed for Australian children by their class teacher upon school entry.
48 The proportion of DET and CECV schools within this sample reflects the proportion of student enrolments in each sector in the Victorian school-age population.
49 In Australia, the school year aligns with the calendar year and runs from late January to December (ACARA, 2014c).
50 It was stated in the CPOL protocol paper that schools would be recruited within an 80km radius; during recruitment this was extended to 150km (Goldfeld et al, 2017).
51 There were three instances of team teaching where both teachers were recruited into the trial. During the first year of the trial (2014) three teachers resigned or took extended leave and the replacement teachers were then recruited. As a result, baseline data were collected for 78 teachers.
Randomisation.

Baseline data were collected using a range of student and teacher measures (as described in Appendix A). Following the completion of baseline data collection, schools were allocated to either the intervention or control arm of the trial using a computer-generated block randomisation process. Randomisation was stratified by school sector (DET and CECV). The chief investigators and statistician responsible for the CPOL trial were blinded to the allocation of schools. The project coordinator and I were not blinded. Teachers who were allocated to the control arm of the trial did not participate in the professional learning program and continued to implement the Australian curriculum, as per usual practice.

CPOL professional learning intervention.

Following the recruitment of schools, all teachers who taught a Foundation, Grade 1, or Grade 1 and 2 composite class in schools that had been allocated through randomisation to the intervention arm were invited to attend four days of face-to-face professional learning, spaced over 12 months. Extending the invitation to participate in the professional learning to all early years' teachers at each intervention school was done to promote collegiality and peer support throughout the intervention period, and beyond. In addition to face-to-face professional learning days, teachers received ongoing communication and school visits from CPOL support workers. There were two CPOL support workers engaged in the trial. One was an experienced speech-language pathologist who was employed by DET, and the other was an experienced teacher from CECV. Teachers participating in the professional learning were also invited and encouraged to engage in an online learning network across the duration of the intervention.

The professional learning program was delivered by experienced teachers, academics and speech-language pathologists using video and face-to-face delivery, during the four professional learning days, fitting Kennedy’s (2005) categorisation of
both training and coaching/mentoring (as summarised in Chapter 3, page 42). The professional learning program was based on the Ideas, Conventions, Purposes, Ability to Learn, Expressive and Receptive Language (ICPALER) Framework (Munro, 2011), consistent with the OLSEL trial (P. Snow et al., 2014). ICPALER provides an explicit conceptual and pedagogical framework designed to facilitate teachers’ understanding and awareness of their students’ language learning ability, the purposes for which they use language, and their underlying receptive and expressive oral language skills (Goldfeld et al., 2017; Munro, 2011). In addition, four key language domains were targeted during the professional learning program: (i) phonemic and phonological awareness, (ii) vocabulary knowledge, (iii) knowledge and application of narrative structure and (iv) comprehension of longer and more syntactically complex sentences. Teachers were provided with both theoretical content and research evidence that underpins the importance of these language domains, as well as classroom strategies to facilitate their students’ oral language learning. Teachers in the intervention arm (index and non-index) were encouraged to implement the strategies and content from the professional learning days into their day-to-day classroom practice between professional learning days.

**Student measures**

Student measures were taken at baseline (before randomisation) to allow any differences between the control and intervention arms to be identified. The primary outcome measure of the CPOL trial was the Grade 3 National Assessment Program – Literacy and Numeracy (NAPLAN) reading score. A series of secondary student outcome measures (including measures of language and literacy skills) was included when students were in Grade 1 and Grade 3.

**Teacher measures.**

The CPOL Teacher Knowledge Survey (which is described in greater detail later in this chapter), was completed by all index teachers prior to randomisation.
Measurements of teachers’ knowledge and practice were also incorporated into the design of this trial and are a focus of this thesis. The development, description and application of measures of teacher knowledge and teacher practice are described in the following chapter.

5.3 Doctoral Research

Relationship between CPOL trial and doctoral research

The three studies (summarised in Table 5-1) in this thesis were embedded within the CPOL trial (Goldfeld et al., 2017). This PhD research complements and extends the trial by situating teacher knowledge and practice data within existing theoretical frameworks of teacher change. Some data reported in this thesis were supplementary to the CPOL trial, and other data were collected within the trial.

In Study 1, I used baseline teacher survey data that were collected from index teachers from both the intervention and control arms prior to randomisation and the professional learning. In the pilot phase of Study 2, I drew upon data collected from index and non-index teachers from the intervention arm of the CPOL trial. These data were recordings of teachers’ classroom talk during the 12-month period of the professional learning program and provided pilot application (and validation) of the teacher talk framework52. In the second part of Study 2, I utilised data collected from a group of 12 index and non-index teachers from the intervention arm over the course of the professional learning program and examined change in type of classroom talk during 2014 and again 12 months later at the end of 2015. The third study consists of three case studies of index teachers from the intervention arm and draws upon both qualitative and quantitative data.

52 The procedure for measuring teacher talk described in Study 2 was also used as an outcome measure in the CPOL trial to determine whether there is a difference between index teachers in the intervention and control arms.
<table>
<thead>
<tr>
<th>Study</th>
<th>Research Questions</th>
<th>Paradigm</th>
<th>Description</th>
<th>Sample</th>
<th>Measures &amp; Time point</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>How can the knowledge, confidence, beliefs and self-rated abilities of primary school teachers pertaining to the key language and literacy constructs that underpin classroom oral language and literacy instruction in the early years of primary school be characterised?</td>
<td>Postpositivist</td>
<td>An analysis and description of teachers’ knowledge and associated self-rated ability</td>
<td>78 index teachers from both the intervention and control arm.</td>
<td>Teacher survey (baseline, before professional learning (PL) day 1)</td>
</tr>
<tr>
<td>2.1</td>
<td>Does teachers’ talk during language and literacy instruction become more explicit through participation in professional learning, and can this change be sustained over time?</td>
<td>Postpositivist</td>
<td>A feasibility study, with descriptive analysis of teacher talk.</td>
<td>21 index and non-index teachers who were in the intervention arm.</td>
<td>Teacher talk measure (between PL day 2 and 3)</td>
</tr>
<tr>
<td>2.2</td>
<td></td>
<td>Postpositivist</td>
<td>Repeated measure of teacher talk, analysis of change.</td>
<td>12 index and non-index teachers who were in the intervention arm.</td>
<td>Teacher talk measure (between PL day 1 and 2, at end of 2014 after day 3, and at end of 2015)</td>
</tr>
<tr>
<td>3</td>
<td>Do existing theoretical models of teacher professional development account for the observed and self-perceived change in knowledge, practice, attitudes and beliefs in early years’ teachers who participated in a sustained oral language professional learning program?</td>
<td>Pragmatist</td>
<td>A series of three mixed methods case studies</td>
<td>3 index teachers from the intervention arm</td>
<td>Interviews, teacher survey (baseline, end of 2014 and end of 2015), teacher talk measure (between PL day 1 and 2, at end of 2014 after day 3, and at end of 2015)</td>
</tr>
</tbody>
</table>
Ethical approval.

Ethical approval for the CPOL trial was granted initially by the Monash University Human Research Ethics Committee (MUHREC) in 2013 (#CF13/2634-2013001403) (Appendix D), and later transferred to the University of Melbourne Human Research Advisory Group (#1545540). The trial was also registered with the Victorian Department of Education and Training (DET)53, The Catholic Education Commission of Victoria, the Royal Children’s Hospital, Deakin University and La Trobe University. The International Standard Randomised Controlled Trials Number (ISRCTN) for the CPOL trial is ISRCTN77681972.

The data collection and analysis reported in Study 1 was approved by MUHREC prior to the commencement of my PhD candidature. I was added as a student investigator to the CPOL trial in May 2014 in an amendment approved by MUHREC (Appendix D). The data collection and analysis procedure reported in Part 2 of Study 2 was approved in the same amendment. Additional approval for the analysis of samples in the pilot study (Part 1) of Study 2 was granted by the University of Melbourne Human Research Advisory Group in an amendment in March 2015 (#1545540). Approval for the interview procedure reported in Study 3 was granted by the University of Melbourne Human Research Advisory Group in an additional amendment in April 2016 (#1340611).

Data management.

All data were stored securely using password-protected Microsoft Excel files on a university computer. Hard copies of consent forms were stored in a locked university filing

53 In 2014, at the commencement of the CPOL trial the Victorian authority responsible for school education was the Victorian Department of Education and Early Childhood Development (DEECD). On January 1, 2015, DEECD was renamed the Victorian Department of Education and Training (DET), as a part of changes instigated by the incoming State Labour Government. DET is used throughout this thesis for consistency. 
cabinet. Duplicate copies of all electronic data were stored on the computer of the project manager of the CPOL trial.

**Computer assisted data analysis.**

In Study 1, Research Electronic Data Capture (REDcap) and Microsoft Excel were used to manage data, and analysis was conducted using STATA software versions 14 (StataCorp, 2015). Stata version 15 (StataCorp, 2017) was used for secondary analyses. In Study 2, teacher talk samples were coded using Microsoft Excel. Analysis was conducted using IBM Statistical Pack for the Social Sciences (SPSS) version 24. The qualitative coding of the interview transcripts in Study 3 was completed using QSR International’s NVivo version 11.

### 5.4 Study 1: Teachers’ Knowledge of Language and Literacy Constructs

Study 1 was conducted in response to evidence that indicates that teachers in Australia and internationally have variable and limited knowledge of language and literacy constructs. This study has been published in the Annals of Dyslexia and is reproduced in full in Chapter 6 of this thesis.

**Participants.**

The seventy-eight (78) index teachers from both the intervention and control arms of the CPOL trial were included in this study. All teachers taught Foundation classes. Data were collected from teachers, prior to randomisation and the delivery of the professional learning program. The demographic characteristics of this sample are described in Chapter 6.

**Procedure.**

Participants completed an online questionnaire. Data were collected and managed using Research Electronic Data Capture (REDCap). REDCap is a secure, web-based
application designed to support data capture for research studies, providing 1) an interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for data downloads to common statistical packages; and 4) procedures for importing data from external sources (P. Harris, Taylor, Thielke, Payne, Gonzalez, & Conde, 2009). The questionnaire was distributed via an email containing a hyperlink to REDCap to all participants.

**Questionnaire.**

A questionnaire to measure teacher knowledge was created by the Chief Investigators for the CPOL project and included items that were drawn from previously published studies (including but not limited to Binks-Cantrell, Joshi et al., 2012), and a number of novel items. The questionnaire is described in full detail in the methods section of the publication in Chapter 6. The complete questionnaire is provided in Chapter 6, and in the format visible to participants in Appendix E\(^5^4\). The structure of the questionnaire is further illustrated in Appendix F.

**Analysis.**

The raw number and percentage of respondents who answered each knowledge item correctly was calculated, and the average performance within each aspect and domain was calculated. Mean scores for self-rated ability and belief items were reported. Correlations between experience, self-rated ability items and corresponding knowledge items were calculated using Pearson correlation coefficients (Pearson’s \(r\)).

**Further item analysis.**

Additional analysis of individual test items was conducted in response to the need for a measure of teacher knowledge of language and literacy constructs that had been

\(^{54}\) There are some inconsistencies with the item numbering between the version presented in Appendix E and the version in Chapter 6 and Appendix K.
validated on inservice Australian teachers. As stated earlier, at present, there are few psychometrically validated tools available in the literature (Binks-Cantrell, Joshi, et al., 2012; Phelps & Schilling, 2004), and none that have been validated on Australian inservice teachers. Item analysis was conducted in STATA version 15 (StataCorp, 2017) using the responses to knowledge items provided by the 78 participants in this study.

Item difficulty was measured for each knowledge item in the CPOL teacher survey. Item difficulty is an index that shows the proportion of respondents who answered an item correctly (Wiersma & Jurs, 1985), and was calculated by dividing the number of correct responses to each item, by the total number of responses, i.e.,

$$p = \frac{\text{Number of correct responses to an item}}{N}$$

The discrimination index, D, was used to measure whether a test item is effective in separating those with high scores on the total test from those with low total test scores (Wiersma & Jurs, 1985). D is the difference between the percentage of the top 27% of respondents who answered an item correctly, and the percentage of the bottom 27% of respondents, and was calculated by subtracting the number of correct responses in the lower group (NLG) from the number of correct responses in the upper group (NUG), and dividing by half of the total responses, i.e.,

$$D = \frac{\text{NUG} - \text{NLG}}{\text{Total}/2}$$

Cronbach’s alpha was also used to measure internal consistency. Internal consistency is a reflection of the correlation among items and the correlation of each individual item with the total score (Portney & Watkins, 2009).
5.5 Study 2: Measuring Classroom Talk

This study was designed in response to a need to establish a feasible approach to quantifying the type and function of teacher talk used within early years’ classrooms. This study was conducted in two parts: I first piloted an approach to collecting and analysing teacher talk, then secondly, applied this approach to investigate change in teacher talk in a professional learning context. The data in this study were collected in addition to the outcome measures that are specified in the protocol for the CPOL trial (Goldfeld et al., 2017).

Part 1: Pilot testing.

In piloting this approach, I first sought to determine whether a new procedure for collecting samples of teacher classroom talk that utilises low-cost, accessible technology was feasible from the perspective of participants, and secondly, whether an existing framework for describing type of classroom teacher talk during language and/or literacy instruction could be applied as a measurement of teacher talk.

Pilot phase participants.

Twenty-one (21) teachers participated in this pilot study. These participants were a subsample of the larger group of early years’ teachers from the intervention arm of the CPOL trial who participated in a four-day professional learning program. Of these 21 teachers, 11 were Foundation teachers, two taught Foundation and Grade 1 composite classes, five taught Grade 1 and 2 composite classes, and three were Literacy Coordinators in their school.

Collection of samples of teacher talk.

During the professional learning program all participants (index teachers and non-index teachers) were asked to make a recording of approximately 10 minutes’ duration
during a literacy lesson that focussed on phonological awareness and/or a lesson that focussed on vocabulary. These two foci were selected because they aligned with the content of the ICPALER framework of the CPOL trial. This task was a ‘Between Unit Activity’ (BUA) that all participants were asked to complete between Day 2 and 3 of the professional learning program. Participants were asked to listen to their own recordings as a reflection task, and to then share their recordings with the researchers. They were advised that their recordings may be subjected to further analysis, but details of the analysis to be conducted were not disclosed.

Recordings were made by the participants using a smart phone, tablet or electronic recording device and shared with the researchers through Dropbox™, a secure online data sharing service. Instructions were provided verbally during the second day of the professional learning, and participants were also provided with written instructions (Appendix G). Participants were asked to ensure the recording device was positioned to clearly capture their voice. They were also asked to refrain from using students’ surnames or providing any other identifying information.

A total of 74 recordings were provided by participants to the research team. The project manager of the CPOL trial selected 14 phonological awareness and 14 vocabulary recordings to be used in this pilot study using a random number generator. These 28 recordings were made by 21 different teachers.

Transcription and analysis of samples of teacher talk.

The recordings were transcribed orthographically by four postgraduate speech-language pathology students. Each student transcribed seven samples. I reviewed each transcript for accuracy and provided feedback to the postgraduate students. Transcripts were then analysed by the same four students. The samples were segmented into C-units and then transferred into Microsoft Excel. A C-unit is akin to a sentence and is defined as
an independent clause with its modifiers, and includes sentence fragments\textsuperscript{55} (Miller, Andriacchi, Nockerts, Westerveld, & Gillon, 2011). C-units include one main clause plus any subordinate clauses, and may include partial and incomplete sentences (Crookes, 1990). Using C-units ensures that all spoken utterances are included in the analysis set (which would not be the case if T-units\textsuperscript{56} were used). Using C-units aligns closely with sentences that are identified in orthographic transcriptions of teacher talk. The exception is when coordinating conjunctions (e.g., and, or, but, then, so) are present within a sentence. Sentences with coordinating conjunctions typically contain two main clauses, and as such, two C-units (Hughes et al., 1997).

In Microsoft Excel, C-units in the transcript were attributed to either the teacher or any of the students in the class, as individual students were not identified. Transcripts were treated as dyadic conversations between a teacher and a class of students. The total number of teacher and student C-units in each transcript was counted. The teachers’ talk within each transcript was then coded, with each C-unit classified by the function of talk, as per the Anstey (1991) teacher talk framework described in Chapter 3, and below. I provided the four postgraduate speech-language pathology students with training in both transcription and coding, and they received ongoing supervision and support regarding this activity.

\textsuperscript{55} An example of a grammatically complete C-unit with an independent and dependent clause is “The girl, who was reading her book, sat quietly”. An example of a grammatically incomplete C-unit is “Now I need you to...”. A sentence that includes two independent clauses joined by a coordinating conjunctions consists of two C-units. For example, “The boy read a book and the girl bounced a ball” is two C-units.

\textsuperscript{56} A T-unit is an independent clause with its modifiers and does not include sentence fragments (Hughes, McGillivray, & Schmidek, 1997).
**A measure of teacher talk.**

Anstey’s (1991) framework for describing function and type of teacher talk in Australian classrooms was originally developed through derivative coding of samples of classroom talk in Australian primary schools. The framework identifies three broad functions of teacher talk: Organisation, Doing Literacy and Learning about Literacy, and further sub-classification of the function of talk as follows: classroom management, literacy management, within Organisation; Reconstruction or restatement, Elaboration or projection, and Informative, within Doing Literacy; and Process and Utility within Learning about Literacy. A description of each type of talk is provided in Table 5-2.

This framework was selected for four reasons. Firstly, the categories and types of talk were originally developed through derivative coding of samples of classroom talk in Australian primary schools. As such, they were expected to be consistent with the type of teacher talk used by teachers participating in the professional learning program within the CPOL trial. Secondly, the categories of type and function of talk were specific to oral language and literacy instruction, without aligning only with one skill area or aspect (e.g., phonological awareness or syntactic complexity). The professional learning program within the CPOL trial was broad and sought to develop teachers’ knowledge and strategies across a number of domains, making this framework appropriate for analysis within the context of professional learning. Thirdly, Anstey’s framework offered two levels of analysis: three categories of Organisation, Doing Literacy, and Learning about Literacy, and the seven sub categories of Classroom management, Literacy management, Reconstruction or restatement, Elaboration or projection, Informative, Process and Utility. This enabled both a broad and more fine-grained analysis. Finally, the seven categories specified in Table 5-2 are associated with types of teacher talk and practice that have been linked to more effective teaching and improved student outcomes, as summarised in Chapter 3.
<table>
<thead>
<tr>
<th>Focus</th>
<th>Type of Talk</th>
<th>Description</th>
<th>Examples in Edwards-Groves, Anstey, &amp; Bull (2014)</th>
</tr>
</thead>
</table>
| Organisation           | Classroom management                  | Physical, social and organisational management, school rituals             | "Turn around XXXX", "Pens down", "Get out your...."
|                        | Literacy management                   | Management of literacy tasks and lesson, functional aspects of literacy, not teaching about literacy | "Read the first page", "Write.....", "Look at the cover" |
| Doing literacy         | Reconstruction or restatement         | Construct, reconstruct, paraphrase or rephrase text of students' answers. Confirmation of correct answers, implicit modelling. | "So Mary ran away" (paraphrasing text), "John said Mary is frightened" (repeating student answer), "Yes, well done", "I would write...." |
|                        | Elaboration or Projection             | Requires inferential thinking, or drawing on own experience or knowledge from previous lessons | "Why might he do that?", "What can you tell me about...?" |
|                        | Informative                           | Provide information or definitions about literacy, do not provide explanations about how to use the information to complete the task. | "Every sentence has a verb, usually the first sentence in the paragraph provides the main idea" |
| Learning about literacy| Process                               | Focus on cognitive aspects of task, decision making processes. Explicitly model cognitive activity and thinking processes | "What is a better strategy than guessing?", "How would you work that out?" "I am writing… because…" |
|                        | Utility                               | Explain how the strategies or process might be useful in other situations. Explain why it is useful to be able to do this. | "It is useful to do… because…", "Why do we use paragraphs" |
Data analysis.

As specified above, the first purpose of this study was to determine whether the approach to collecting samples of teacher talk was feasible for both participants and the research team. Feasibility was assessed against two criteria. Firstly, whether participants were willing and able to complete the recording, and share it with the research team, as requested, and secondly, whether the postgraduate students were able to access the recordings provided by the participants, and then successfully transcribe, code and analyse the samples using non-specialised software.

The second purpose was to determine the face validity of Anstey's framework when used as a measurement of teacher talk. The samples were described in two sets: samples of teacher talk during vocabulary instruction, and samples of teacher talk during phonological awareness instruction. To describe the function and type of teacher talk in this study, the distribution of talk between teacher and students, and across type and function of teacher talk was calculated. T-tests were used to compare the distribution of talk between the phonological awareness and vocabulary instruction samples. The outcomes of this analysis were interpreted in the context of the alignment between the type and function of talk, and types of teacher talk that have been associated with improved student outcomes (as discussed in Chapter 3). Comparisons were also made with the distribution of talk reported by Anstey (1991) and Edwards-Groves, Anstey, and Bull (2014).

Part 2: Measurement of Change in Teacher Talk

It was established in Chapter 3 that while research has documented the link between improved teacher knowledge and student outcomes, many professional learning studies do not incorporate data that measures change in teachers’ actual classroom practice. As highlighted by Piasta et al. (2009), this gap in the literature may result in the
untested assumption that changed knowledge leads directly to changed practice. In the second part of this study the piloted procedure was replicated and repeated to determine whether, in addition to being feasible and suitable, this measure of teacher talk was also sensitive to change.

It was hypothesised that teachers participating in the professional learning intervention within the CPOL trial would use an increased amount of talk that was explicit and/or supported metalinguistic knowledge, and that their talk that related to the transference of skills (informative, process and utility) would increase in relative terms.

**Recruitment.**

All principals of schools in the intervention arm of the CPOL trial were informed of this embedded doctoral research and were asked to provide consent for their staff (both index and non-index teachers) to be approached to participate in Part 2 of Study 2. With the consent of school principals, attendees at the professional learning program were approached on the first day of the program to participate in this study. The Plain Language Statement (PLS) and consent form for this study is included in Appendix H. No remuneration or incentive for participation was offered.

**Participants.**

Twelve (12) teachers provided both consent and the data required to participate. These teachers participated in the professional learning program in the CPOL trial but were a different subsample to the participants in the pilot study. Of the 12 teachers who participated in this study, six were Foundation teachers, five taught Grade 1 and 2 composite classes, and one was the Literacy Coordinator in their school.

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57 Twenty-four (24) teachers returned completed consent forms; eight did not then provide a recording at T1, and a further four provided only one recording and were excluded from analysis.
Collection of samples of teacher talk.

Consistent with the procedure that had been piloted, participants were asked to make a 10-minute recording of their classroom talk during routine literacy or language lessons each term during the professional learning program. This was later reduced to only three recordings; one in Term 2 (Time 1, following professional learning day 1), one in Term 4 2014 (Time 2), and one in Term 4 2015 (Time 3). Instructions for the task and recording process were communicated verbally at the first professional learning day (and were repeated at the second day), and in the participant information sheet, a supplementary document detailing how to use the recording application on the Apple iPhone (Appendix G). These instructions were also reiterated in follow-up emails to participants. Consistent with the procedure described in Part 1 of this study, participants were informed that these recordings were for the purpose of analysis of teacher talk, but details of the analysis to be conducted were not disclosed.

Participation and data collection.

Twelve participants provided a recording at the first time point (T1) and the second time point (T2) at the end of 2014, and eight (8) of these twelve (12) participants provided an additional recording at the third time point (T3) at the end of 2015.

Transcription of samples of teacher talk.

The audio files were transcribed by using a secure online transcription service (www.rev.com), using orthographic transcription. All samples were then checked for accuracy and segmented into C-units by a research assistant who was a speech-language pathologist. As described above, C-units, like T-units, include one main clause plus any subordinate clauses that happen to be attached or embedded within it.
**Analysis of samples of teacher talk.**

I completed the analysis of the transcripts using the procedure and framework described in Part 1 of this study. The proportion of total C-units that met the pre-specified criteria for each category was treated as a continuous variable. A series of paired-sample t-tests was conducted to evaluate the impact of the intervention on teachers’ talk, with comparisons made between (i) Time 1 and Time 2, and (ii) Time 1 and Time 3. The pre- and post-effect size (Cohen’s $d$) of the professional learning intervention on each type of talk was also calculated. Bonferroni adjustments were made to account for multiple comparisons and reduce the likelihood of Type I errors.

5.6 Study 3: Teachers’ experienced and observed changes

There are a number of theories that explain the multi-faceted process of teacher change as a result of professional learning. These theories draw upon models of teacher professionalism and describe multiple aspects of teacher cognition and associated change.

**Research question.**

In the third and final study I sought to integrate frameworks described in Studies 1 and 2, and theories of teacher change, as described in Chapter 2. This study was designed to address the Research Question 3:

58 In my initial analysis protocol for this study I proposed a complex approach to analysis, incorporating both Anstey’s (1991) framework, and a detailed framework derived from Munro’s ICPALER model. During early piloting of this original approach it became apparent that the framework resulted in a deep descriptive analysis but was not suitable as an outcome measure, or measurement of change.

59 As stated in Chapter 4, for the purpose of the manuscript presented in Chapter 8, this question was been modified slightly: To what extent do the pathway models proposed by Guskey (2002) and Desimone (2009) account for the observed and self-perceived change in three Australian early years’ teachers who participated in a sustained oral language professional learning program?
knowledge, practice, attitudes and beliefs in three early years’ teachers who participated in a sustained oral language professional learning program.

A mixed-methods, explanatory sequential design was utilised in this study to obtain two views on the process of teacher change during a professional development program, as illustrated in Figure 5.1.

An explanatory sequential design is one in which qualitative data are presented after quantitative data, to explain the results in more detail (Creswell, 2014). The approaches described above were used to measure the knowledge, self-rated ability and practice components before, during and after the professional learning program. Qualitative data taken from semi-structured interviews illustrated the participants’ perspectives. The integration of qualitative and quantitative data offers the opportunity for illustration, convergent validation and analytic density (Fielding, 2012).

Participants.
Three self-nominated female early years teachers participated in this series of embedded case studies. Index teachers who were participants in Study 2 were approached on Day 3 of the professional learning program and asked if they would like to consider participating in a semi-structured interview. Potential participants were provided with a PLS and a consent form (Appendix I) to read and consider, before they agreed to
participate. Three participants were recruited and given the pseudonyms Karen, Elizabeth and Stacey. All three attended the four days of face-to-face professional learning, completed three recordings within Study 2, and as index teachers, had also participated in Study 1.

**Procedure.**

**Measures.**

In this study, I incorporated the measures described in Studies 1, 2, and 3, with semi-structured interviews. The structure, administration and analysis of the CPOL teacher survey and teacher talk measures in this study are consistent with the procedures described in Studies 1 and 2. It should be noted that a single administration of the teacher survey is described in Study 1. In this study, the three participants completed the CPOL Teacher Survey on three occasions: at baseline, at the end of the first year of the professional learning program (2014), and again one year later\(^6^0\). Please refer to Study 1 (Chapter 6) for the complete survey.

**Semi-structured interviews.**

I conducted semi-structured telephone interviews with the three participants following completion of the professional learning program. In these interviews I sought to elicit participants’ perspectives about the role of oral language within the early years’ classroom, and to explore their perceptions of participation in the professional learning, their change in knowledge, practice, and beliefs, and their perceived influence upon their students and their school community. The protocol and question prompts (designed to elicit reflections in line with the domains of teachers change) for these interviews are provided in Appendix J. The participants’ observations of environmental and contextual

\(^6^0\) The results of the second and third administrations of the CPOL Teacher Survey for all index teachers are reported in Goldfeld et al, (2018).
factors that may have contributed to their participation, change, and the sustainability of change were also explored. The interviews were audio-recorded and later transcribed using orthographic transcription by the same online transcription service that was used in Study 2 (www.rev.com). The transcriptions were reviewed to ensure accuracy, before being coded thematically using NVivo.

**Data analysis.**

The quantitative data collected for each participant were analysed using the procedures described in Studies 1 and 2 to determine the extent to which their knowledge, practice and self-rated ability had changed following the professional learning. The qualitative data taken from the semi-structured interviews were then considered alongside the quantitative data. The demonstrated and perceived process of change were then interpreted in the context of models of professional development and teacher change (Desimone, 2009; Guskey, 2002).

### 5.7 Chapter Summary

In this chapter I have provided a detailed description of the methods for the three studies reported in this thesis. The methods of the CPOL trial have also been reported to provide context for this research. The results of Studies 1, 2 and 3 are reported in Chapters 6, 7 and 8.
Chapter 6  Teachers’ Knowledge of Language and Literacy Constructs

6.1  Chapter Overview

The results of Study 1 are reported in this chapter in the form of a manuscript. This study was published in the journal “Annals of Dyslexia” as a part of a special edition on the topic of teacher knowledge from an international perspective. This chapter also includes supplementary results that were not included in the publication.
Language and reading instruction in early years’ classrooms: the knowledge and self-rated ability of Australian teachers

Hannah L. Stark1,2 · Pamela C. Snow3 · Patricia A. Fadie1 · Sharon R. Goldfield1,4,5

Received: 25 March 2015 / Accepted: 21 July 2015 / Published online: 23 September 2015 © The International Dyslexia Association 2016

Abstract This study sought to investigate the level of knowledge of language constructs in a cohort of Australian teachers and to examine their self-rated ability and confidence in that knowledge. Seventy-eight teachers from schools across the Australian state of Victoria completed a questionnaire which included items from existing measures, as well as newly developed items. Consistent with a number of earlier Australian and international studies, teachers’ explicit and implicit knowledge of basic linguistic constructs was limited and highly variable. A statistically significant correlation was found between (1) total self-rated ability and (2) years since qualification and experience teaching the early years of primary school; however, no relationship was found between self-rated ability and overall performance on knowledge items. Self-rated ability to teach phonemic awareness and phonics had no relationship with demonstrated knowledge in these areas. Teachers were most likely to rate their ability to teach skills including spelling, phonics, comprehension or vocabulary as either moderate or very good. This was despite most respondents demonstrating limited knowledge and stating that they did not feel confident answering questions about their knowledge in these areas. The findings from this study confirm that in the field of language and literacy instruction, there is a gap between the knowledge that is theoretically requisite, and therefore expected, and the actual knowledge of many teachers. This finding challenges current pre-service teacher education and in-service professional learning.

Pamela C. Snow
p.snow@latrobe.edu.au

1 Melbourne Graduate School of Education, University of Melbourne, Melbourne, Australia
2 Murdoch Childrens Research Institute, Parkville, Australia
3 College of Science, Health and Engineering, La Trobe Rural Health School, La Trobe University, PO Box 199, Bendigo 3552, Australia
4 Department of Paediatrics, University of Melbourne, Melbourne, Australia
5 Centre for Community Child Health, Royal Children’s Hospital, Parkville, Australia
Keywords  Literacy · Oral language · Reading instruction · Teacher education · Teacher knowledge

Introduction

The early years of school are a crucial period in children’s lives when their acquisition of language and literacy skills can strengthen or limit their lifelong capacity for academic, vocational and economic success, as well as social-emotional participation (Law, Rush, Schoon, & Parsons, 2009). Genetic, biological and environmental factors in early childhood largely influence the initial acquisition of language (Reilly et al., 2010). Beyond this, the importance of teacher instruction in influencing the acquisition of reading and broader literacy skills in the first years of formal schooling is well documented (Goe, 2007; Hutchinson & Clegg, 2011; Reid Lyon & Weiser, 2009). The task of teaching children to read, write and spell has been, and remains, the major focus of teachers in these early years of formal education (Donnelly & Wilsheire, 2014). In Australia, the ability of educators to teach language and literacy is under constant scrutiny; the topic receiving a high level of attention in the media, in addition to the academic, education and political arenas (Buckingham, Wheldall, & Beaman-Wheldall, 2013). Australia’s relatively low rankings in the 2011 Progress in International Reading Literacy Study (PIRLS) have sparked discussion and concern around current approaches to reading and literacy education (Thomson et al., 2012), and more recently, the Federal Government has responded to concerns about teachers’ personal literacy levels, with a plan to implement literacy and numeracy benchmarking for all graduates from tertiary education courses from 2016 (Department of Education, 2015; Craven et al., 2014).

In preschool and during the early years of formal education, children move beyond being solely oral communicators and, with instruction, begin to acquire the skills to decode, comprehend and produce literate language (Tomblin, 2005). The ability to understand and use oral language is biologically innate, while in contrast, reading and writing are socially constructed skills, and are not instinctive (Gough & Tunmer, 1986). The relationship between early oral language skills, reading and writing development, and later academic success is now well established (Muter, Hulme, Snowling, & Stevenson, 2004; Snowling, 2005; Snowling & Hulme, 2012; Tomblin, 2005), with preliterate phonemic awareness and vocabulary playing a significant role in the development of word recognition and reading comprehension (Muter et al., 2004). Indeed, oral language competence in the early years of school is recognised as a protective factor with respect to the later development of literacy and academic and social success (Snow & Powell, 2008).

Consequently, instructional proficiency in oral language is an important foundation component of teacher knowledge. While much has been written on the importance of utilising evidence-based instruction in the teaching of reading and literacy (Buckingham et al., 2013; Mather, Bos, & Babur, 2001), it is well known that the delivery of such instruction is dependent upon teacher content knowledge and the application of this knowledge in classroom practices (McCutchen, Harry, et al., 2002). There is a distinction to be made between the terms reading and literacy, with reading referring to the ability to decode, recognise and draw meaning from the printed word, and the associated higher level skills of sentence and text comprehension, while literacy encapsulates a broader set of skills, including listening to, reading, speaking, writing and creating both oral and visual language (Buckingham et al., 2013). We discuss approaches to the teaching of reading, which in turn has implications for the acquisition of broader literacy skills.
In Australia, the delivery of a consistent interpretation and approach to best practice in the teaching of reading has been complicated by the shift in recent decades from teacher-centred, direct instruction approaches to a constructivist, student-centred learning model (Bowey, 2006; Buckingham et al., 2013). These apparently opposing frameworks have polarised teacher educators, policy makers, clinicians and teachers themselves. This can be seen in the delivery of reading education within Australian classrooms variably utilising a constructivist Whole Language approach (or its key derivative, ‘Balanced Literacy’) or (much less commonly) a direct instruction, decoding-based, synthetic phonics approach (Coltheart & Prior, 2006; Hempenstall, 1997). The 2005 National Inquiry into the Teaching of Literacy (Rowe, 2005) concluded that direct instruction in synthetic phonics during the early years of schooling is an essential foundation for teaching children to read. Furthermore, this document concluded that all students learn best when teachers adopt an integrated approach to reading that explicitly teaches phonemic awareness, phonics, fluency, vocabulary knowledge and comprehension. These findings were in line with the outcomes of the Rose Report in the UK (Rose, 2006) and the National Reading Panel in the USA (NRP, 2000). While many schools seek to deliver so-called ‘Balanced Literacy’ in early years’ classrooms, this apparent compromise approach is difficult to operationally define but is known to draw heavily on Whole Language practices (Moats, 2000) and, as such, is unlikely to translate into the types of teaching practices recommended by the three inquiry reports mentioned above.

The quality of classroom reading instruction is often attributed at least in part to the level of teachers’ basic understanding of the concepts related to the English language (Bos, Mather, Dickson, Podhajski, & Chard, 2001; McCutchen, Abbott, et al., 2002; Moats, 1994; Moats & Lyon, 1996; Spear-Swerling & Brucker, 2003), and while teachers may possess a high level of experience and education, they are often found to lack explicit essential knowledge of basic language constructs and structure (Cunningham, Perry, Stanovich, & Stanovich, 2004; Joshi et al., 2009; Moats, 1994). Indeed, an implicit knowledge of how language works does not necessarily translate into an ability to teach children about the rules and idiosyncrasies of the English language (McCutchen, Harry, et al., 2002). Given the complexities and irregularities of the English language, there is a strong body of opinion that a deeper knowledge of the English language is necessary for teaching reading and that knowledge of language structure must be explicit in order to teach reading effectively to all students (Moats, 1994, 2009; Snow, Griffin, & Burns, 2005; Tetley & Jones, 2014). Teachers’ knowledge of language constructs must be broad-ranging and a competent understanding and ability to teach the five major components of early literacy: phonemic awareness, phonics, word identification, fluency, vocabulary and comprehension (Apel, Wilson-Fowler, & Masterson, 2014; Buckingham et al., 2013; Piasta, Connor, Fishman, & Morrison, 2009). Furthermore, differentiation must be made between the explicit knowledge of constructs and conventions (i.e. defining the term morpheme or phoneme), and implicit ability to apply this knowledge (i.e. morpheme or phoneme counting) (Binks-Cantrell, Joshi, & Washburn, 2012). Over the past two decades, studies of pre-service and in-service teachers and other educational professionals have repeatedly demonstrated that teachers exhibit low levels of knowledge of language and literacy constructs and the processes that promote language, reading and broader literacy development (Bos et al., 2001; Mather et al., 2001; Moats, 1994; Moats & Lyon, 1996; Piasta et al., 2009; Spencer, Schueler, Guillot, & Lee, 2008; Tetley & Jones, 2014).

In the USA, a seminal study by Moats (1994) found that teachers displayed weaknesses in the areas of terminology, phonics knowledge and phonemic and morphemic awareness. These findings have been replicated by Joshi, Washburn, Binks-Cantrell and colleagues, who have
published a number of studies in the last decade, measuring language and literacy conceptual knowledge in pre-service and in-service teachers, as well as in university academics in the USA (Binks-Cantrell, Joshi et al., 2012; Binks-Cantrell, Washburn, Joshi, & Hougen, 2012; Joshi et al., 2009; Washburn, Joshi, & Cantrell, 2011; Washburn & Mulcahy, 2014). Their findings indicate that pre-service teachers are typically able to display implicit skills related to some basic language constructs, but fail to demonstrate explicit knowledge (Washburn et al., 2011), and that many university academics who deliver courses in reading and literacy also have limited explicit knowledge of basic language constructs (Joshi et al., 2009).

There are four known published studies of Australian teachers’ linguistic conceptual knowledge (Fielding-Barnsley, 2010; Fielding-Barnsley & Purdie, 2005; Mahar & Richdale, 2008; Tetley & Jones, 2014). These studies show Australian teachers’ explicit instructional linguistic, or metalinguistic, knowledge to be limited and highly variable. In their 2005 paper, Fielding-Barnsley and Purdie define metalinguistics as an acquired awareness of language structure and function that allows one to reflect on and consciously manipulate the language. Fielding-Barnsley and Purdie (2005) tested pre-service, in-service and special education teachers and found that while most teachers held a positive attitude towards metalinguistics, and teaching early literacy, many had poor levels of knowledge. The exception to this was special education teachers, who achieved significantly better results on both belief and knowledge measures. Mahar and Richdale utilised the same 10-item questionnaire as used by Fielding-Barnsley and Purdie (2005), and again found that both in-service and pre-service teachers had poor knowledge of language structure and function, with few able to correctly define a schwa or a diphthong. The pre-service teachers in the study by Tetley and Jones (2014) performed better than teachers in earlier studies, but their knowledge was still highly variable. They speculated that most Australian pre-service teachers and recent graduates are themselves a product of Whole Language approaches to reading, and received limited exposure to the teaching of language concepts during their own primary and secondary education.

Complementing what is known about teacher knowledge is the research exploring the beliefs and views of teachers regarding early language and literacy. Fielding-Barnsley (2010) found that an overwhelming majority of Australian pre-service teachers agree that phonics is ‘important’ in the teaching of reading; however, these pre-service teachers also report that they do not feel adequately prepared to use phonics in the classroom due to an insufficient understanding of how to do so. The Teacher Perception towards Early Reading and Spelling Survey (TPERS) (Mather et al., 2001) was adapted by Mahar and Richdale (2008) in a study of Australian teachers, who found that years of teaching experience was significantly negatively correlated with positive perceptions of code-based (phonics) instruction, while years of teaching experience positively correlated with positive perceptions of meaning (Whole Language)-based instruction. The Dyslexia Belief Index (Waddington & Waddington, 2005) has been used to measure the beliefs of educators regarding dyslexia. This US study found that most teachers held a significant number of misconceptions about dyslexia. Washburn et al. (2011) adapted this validated tool to measure pre-service teachers’ knowledge and perception about dyslexia, in conjunction with knowledge of basic language constructs. They found that pre-service teachers held many misconceptions about the underlying cause, nature and best teaching practices for students with dyslexia.

Teachers’ beliefs also extend into their self-perceptions, with teachers inclined to believe that they are more knowledgeable and prepared for teaching reading than they are (Podhajski, Mather, Nathan, & Sammons, 2009; Washburn et al., 2011). Cunningham et al. (2004)
reported that even though teachers may rate their knowledge of children's literature, phonemic awareness and phonics as 'high', the majority demonstrate limited knowledge about phonemic awareness and phonics. In fact, they found that teachers who reported that they were 'experts' in phonological awareness had more difficulty counting the number of phonemes in words than the teachers who indicated that they had minimal skill. As with self-reported ability, teachers' confidence in their knowledge of language constructs and concepts and their demonstrated knowledge does not appear to be significantly related (Fielding-Barnsley & Purdie, 2005). Teachers are often unable to accurately measure or calibrate their knowledge and typically overestimate their own knowledge base with respect to language (Cunningham et al., 2004).

The current literature presents a matrix of information on (i) pre-service and in-service teachers' knowledge, (ii) beliefs and (ii) self-perceptions across constructs broadly defined as language and literacy. Despite a growing body of research in Australia and a number of international papers exploring teacher knowledge and beliefs across the constructs of language and literacy, there remains limited evidence about the knowledge of teachers in these foundation areas of oral language, reading and literacy, and in particular their application of knowledge in the classroom. In this study, we measured the knowledge, beliefs and confidence of a sample of in-service Australian early years' teachers in reading instruction ability and reading-related language constructs.

Method

Participants

Seventy-eight teachers of Prep classes in Victoria, Australia, were included in this study ('Prep' or the preparatory year is the first year of formal schooling in the state of Victoria, Australia). These teachers were from 72 schools participating in a cluster randomised controlled trial (RCT) investigating the efficacy of a teacher-led oral language intervention designed to improve both oral language and literacy outcomes in children. All schools participating in this trial met the criterion of having greater than 10% of children developmentally vulnerable in the language and cognitive domains on the 2009 and/or the 2012 Australian Early Development Index (now the Australian Early Development Census; Brinkman, Gregory, Goldfeld, Lynch, & Hardy, 2014). The Australian Early Development Census (AEDC) is a population measure of child development across five domains, taken in the first year of full-time school. Schools submitted an expression of interest, indicating a willingness to participate in the trial. Study data were collected from teachers as a baseline measure, prior to randomisation and the delivery of the intervention. The teacher sample was predominantly female (94.9%) and participants were employed by the Victorian Government (n = 53) or the Catholic Education Office of Victoria1 (n = 25).

1 The Victorian Government Department of Education and the Catholic Education Commission of Victoria are two of the three education sectors in the state of Victoria. In 2014, the distribution of enrolment for primary school age children in Victoria was as follows: 67% in Victorian Government schools, 22.2% in Catholic schools and 10.8% in Independent schools.
Procedure

Participants completed an online questionnaire. Study data were collected and managed using Research Electronic Data Capture (REDCap) electronic data capture tools hosted at the Murdoch Children’s Research Institute. REDCap is a secure, web-based application designed to support data capture for research studies, providing (1) an interface for validated data entry, (2) audit trails for tracking data manipulation and export procedures, (3) automated export procedures for data downloads to common statistical packages and (4) procedures for importing data from external sources (Harris et al., 2009). The questionnaire was distributed via an email containing a hyperlink to REDCap to all participants. The time it took participants to complete the survey was not recorded.

Questionnaire

The questionnaire contained 51 multiple-choice items across four areas: background; self-rated ability to teach language, reading and literacy; associated beliefs and confidence; and teacher content knowledge (refer to the Appendix for the complete questionnaire). The 11 background items included demographic information, educational sector (State Government or Catholic), teachers’ educational background, time since qualification and years of experience teaching in the early years of primary school. Teachers were asked to rate their own ability across 10 teaching areas related to language, reading and literacy, including teaching phonics, comprehension and teaching children with reading disabilities. This self-assessment item required respondents to rate their ability as either minimal, moderate, very good or expert. A measurement of teachers’ views and beliefs associated with reading disabilities was adapted from earlier publications by Wadlington and Wadlington (2005) and Washburn et al. (2011). Teachers were asked to respond to a series of eight statements by indicating whether they strongly agree, somewhat agree, somewhat disagree or strongly disagree. Statements included Children with learning difficulties have lower IQs than typical learners, and Children with reading difficulties can be helped by using coloured lenses/coloured overlays. Some items were altered slightly to capture beliefs about children who are struggling with reading, without a diagnosis of dyslexia.

Thirty-seven items were concerned with teacher content knowledge of basic language constructs. Two items have 7 and 14 components, respectively, creating a total of 56 items in the area of teacher knowledge. Forty-three of the 56 knowledge items were derived from Washburn et al. (2011), Binks-Cantrell, Joshi, et al. (2012) or Fielding-Barnsley and Purdie (2005). Many of these items were, in turn, adapted from earlier studies including those by Bos et al. (2001), Cunningham et al. (2004), McCutchen,Harry, et al. (2002) and Moats (1994). Thirteen items, predominantly those specific to knowledge of sentence and discourse level language, were developed specifically for this study.

Each item was categorised within a domain and an aspect (Binks-Cantrell and colleagues, 2012, refer to these as skill and type, respectively). Consistent with earlier studies (Binks-Cantrell, Joshi, et al., 2012; Bos, Mathur, Narr, & Bahur, 1999; Mahar & Richdale, 2008; Moats, 1994; Piasa et al., 2009), in the category of aspect, we measured phonemic awareness, phonological awareness, phonics and morphology. Novel items measuring knowledge of sentence and discourse level language were also incorporated. As with previously published assessment tools by Joshi et al. (2009) and Binks-Cantrell, Joshi, et al. (2012), items measuring phonemic awareness dealt specifically with perceiving or manipulating individual sounds,
while phonological awareness items are concerned with perceiving and manipulating sounds at the larger level (e.g. syllables). Phonics items measured the use of letter-sound correspondences, generalisations, rules and patterns of the written language to decode a word; morphology items deal with the use of units of meaning within a word to decode and/or comprehend; and sentence or discourse level items investigate meaning, syntax and structure to identify or comprehend language beyond the level of single words or phrases in either spoken or written modalities. Two items were deemed to not fit with any one aspect and so were categorised as 'other'.

Items were also classified by the domain measured: knowledge, skill or pedagogy. Consistent with Binks-Cantrell, Joshi, et al. (2012), knowledge items measure the explicit knowledge of a term or concept. Skill items measure an implicit ability to perform a task. Our introduction of a third domain, pedagogy, captures items that measure the practice associated with teaching a construct or concept. This is consistent with the assertion by Piasta et al. (2009) and McCutchen, Abbott, et al. (2002) that teachers must not only understand that explicit instruction is important, but must also understand the concepts to be taught and possess the specialised knowledge to teach these concepts.

Twenty-five knowledge items that were not previously published were categorised to fit within an extended and adapted version of their framework. The first three authors allocated each item an aspect and domain. All authors were blinded to the allocations made by others. Upon comparison, any disagreements were discussed with consensus being reached. Key points that resolved disagreements included the following: clarification between the explicit or implicit nature of a task, the fact that phonics items measured the links between phonemic and graphemic knowledge, and that although a pronoun is a single morpheme, item 48 was allocated to the sentence/discourse aspect because it measures the application of knowledge in the context of a sentence. One item was reclassified from phonics knowledge (Binks-Cantrell, Joshi, et al. 2012) to phonics skill for consistency (item 19).

The questionnaire included proportionately more skill items than knowledge or pedagogical items. This was to allow the application of knowledge to be measured across a number of contexts (for example, phonemic skill items included counting phonemes in words that contain direct phoneme-grapheme links, digraphs and trigraphs). An exception was in the area of phonics, in which explicit knowledge presents a greater challenge than the application of this knowledge. Table 1 displays a breakdown of the items across aspects and domains. For most items, respondents had the opportunity to select ‘Don’t know’ as a response and were explicitly encouraged to do so, rather than guessing.

The work by Binks-Cantrell, Joshi, et al. (2012) is the only known tool in this field that has been tested for validity and reliability, on a sample of pre-service teachers and teacher

<table>
<thead>
<tr>
<th>Domain</th>
<th>Aspect</th>
<th>Phonetic</th>
<th>Phonological</th>
<th>Phonics</th>
<th>Morphological</th>
<th>Sentence/discourse</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>3 (14, 26, 29)</td>
<td>1 (28)</td>
<td>2 (16, 19)</td>
<td>2 (30, 37)</td>
<td>4 (32, 33, 38, 47)</td>
<td>1 (31)</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Skill</td>
<td>12 (17 a-g, 20-22, 24, 27)</td>
<td>7 (23 a-g)</td>
<td>2 (15, 25)</td>
<td>7 (23 a-g)</td>
<td>11 (39-46, 48-50)</td>
<td>0</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Pedagogical</td>
<td>1 (34)</td>
<td>1 (18)</td>
<td>1 (36)</td>
<td>0</td>
<td>0</td>
<td>1 (35)</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>9</td>
<td>5</td>
<td>9</td>
<td>15</td>
<td>2</td>
<td>56</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 Breakdown of teacher content knowledge items across aspects and domains
educators in the USA. Their validation process, including measuring each item for difficulty and discriminability, as well as validity, has been repeated using this Australian in-service teacher population and will be available in a future publication.

Results

Teachers’ total knowledge scores ranged between 14 and 45 out of a possible 56. The mean score was 31.17 (SD = 7.6) or 55% (SD = 13%), with performance across domains comparable. The mean score was 7.4 (56%) from a possible 13 in the domain of knowledge (SD = 2.17), 21.6 (55%) out of 39 in the domain of skill (SD = 5.92) and 2.16 (54%) out of a possible 4 in the domain of pedagogy (SD = 0.93). Table 2 displays the mean percentages and standard deviations across domains and aspects of knowledge. A mean score of 9.14 (57%) out of the possible 16 phonemic items (SD = 3.02) was achieved, 7.41 (79%) out of the 9 phonological items (SD = 1.21) and 3.15 (63%) out of the possible 5 phonics items (SD = 1.14). A mean of 3.9 (43%) out of the possible 9 morphological items (SD = 2.77) was achieved and 6.7 (44%) out of the possible 15 sentence and discourse items (SD = 2.82).

A statistically significant positive correlation was not found between overall performance and time since qualification (r = 0.1, p = 0.33) or years of experience teaching in the early years of primary school (r = 0.15, p = 0.16). Similarly, there was no significant difference in overall performance on knowledge items between teachers who had completed a postgraduate qualification and those who had not (r = 0.14, p = 0.21).

Phonemic knowledge, skill and pedagogy

While 79% of teachers could identify the correct definition for *phoneme*, the definition of *phonemic awareness* was correctly identified by only 38%. Items that measured deeper phonemic knowledge were even more challenging, with fewer respondents able to identify a schwa (26%) or diphthong (13%). On average, respondents performed better on phonemic knowledge items (66%, SD = 24%) than phonemic skill items (55%, SD = 22%), but responses were highly variable, best demonstrated by the ability to correctly identify and count phonemes, which ranged from 5% (*box*) to 87% (*knee*) (refer to Table 3). Eighty-two percent

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Number of items, difficulty index (% correct) and standard deviation, (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain</td>
<td>Aspect</td>
</tr>
<tr>
<td></td>
<td>Phonemic</td>
</tr>
<tr>
<td>Knowledge</td>
<td>n = 3</td>
</tr>
<tr>
<td></td>
<td>66 (26)</td>
</tr>
<tr>
<td>Skill</td>
<td>n = 12</td>
</tr>
<tr>
<td></td>
<td>55 (22)</td>
</tr>
<tr>
<td>Pedagogical</td>
<td>n = 1</td>
</tr>
<tr>
<td></td>
<td>47 (50)</td>
</tr>
<tr>
<td>Total</td>
<td>n = 16</td>
</tr>
<tr>
<td></td>
<td>57 (19)</td>
</tr>
</tbody>
</table>
Table 3 Response to item 19: How many speech sounds are there in the following words? n (%)  

<table>
<thead>
<tr>
<th>Word</th>
<th>Number of phonemes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Skip</td>
<td>1 (1.3)</td>
</tr>
<tr>
<td>Grass</td>
<td>1 (1.3)</td>
</tr>
<tr>
<td>Box</td>
<td>1 (1.3)</td>
</tr>
<tr>
<td>Moon</td>
<td>1 (1.3)</td>
</tr>
<tr>
<td>Brush</td>
<td>1 (1.3)</td>
</tr>
<tr>
<td>Knee</td>
<td>8 (10.3)</td>
</tr>
<tr>
<td>Through</td>
<td>3 (3.8)</td>
</tr>
</tbody>
</table>

Note: The correct response is indicated in italics.

of respondents were able to correctly identify the reason why students might confuse the sounds /b/ and /p/ or /f/ and /v/.

A relationship was not found between overall performance on phonemic items and experience in the early years (r = 0.05, p = 0.61) or time since qualification (r = 0.1, p = 0.35). There was a weak positive correlation between performance on phonemic knowledge items and phonemic skill (r = 0.22, p = 0.04), but no relationship between performance on the pedagogical item and skill (r = 0.13, p = 0.26) or knowledge items (r = -0.01, p = 0.54).

Phonological knowledge, skill and pedagogy

Implicit phonological awareness (skill) was measured by a syllable identification task. Performance on this task was strong. Phonological awareness was not measured extensively, with one item asking respondents to identify the definition of phonological awareness. This proved to be difficult, with only 47% of respondents identifying the correct definition, with more respondents (48.7%) selecting The ability to use letter-sound correspondences to decode, which is a definition of phonics, not phonological awareness. On the whole, respondents were able to identify and count syllables accurately (93%, SD = 14%), although frogs proved challenging to some. The pedagogical item requiring teachers to complete a deletion task: “Say the word ‘cat’. Now say the word without the /k/ sound” was similarly difficult (40% correct). Teachers who were new to teaching in the early primary years demonstrated better than average phonological awareness scores. However, the relatively few items in this area require this finding to be interpreted with caution.

Phonics knowledge, skill and pedagogy

Phonics knowledge was measured using one item, which asked respondents to recognise that A combination of two or three consonants pronounced so that each letter keeps its own identity is called a consonant blend. This was a difficult item, with only 41% responding correctly. Performance on phonics skill items was variable; 88% could identify a word that contained the same vowel sound as the non-word tide, and 71% could identify a word that contained a soft c sound, compared to 22% who could identify a word with a voiced consonant diagraph. Performance on phonics pedagogical knowledge was much stronger (94%; SD = 25%).
Morphological knowledge, skill and pedagogy

Performance was consistent across the explicit morphological knowledge and morphemic skill domains, and these two knowledge domains significantly correlated ($r = 0.39$, $p = 0.0003$). There was, however, variation within the two domains. Fifty-three percent of the teachers were able to identify the correct definition of a morpheme, compared to 55% who could identify the correct definition of morphemic analysis. The application of this knowledge to the task of counting morphemes varied, as shown in Table 4, ranging from a 26% correct response rate for bookkeeper, to 54% for disassemble, heaven and teacher. Experience in teaching in the early years of primary school and morphological skill have a moderate strong positive relationship ($r = 0.31$, $p = 0.005$).

Sentence/discourse knowledge, skill and pedagogy

Most teachers were able to recognise literal (95% correct) and inferential (91% correct) comprehension tasks, but other higher level linguistic items proved more difficult, with relatively few teachers identifying the correct definition of story grammar (28% correct). Teachers' ability to recognise different clause types and forms was variable, but on the whole poor, ranging from 5% able to identify a dependent clause, to 68% able to identify an interrogative form. A mean of 38% (SD = 22%) of respondents answered correctly across these sentence or discourse level skill items. Most items proved to be difficult, with the exceptions of items that required the respondent to identify the following clause types: interrogative (68% correct) and independent (59% correct) and sentences that contain an adjective (55% correct) and have correct grammar (56% correct).

Self-rated ability and reported confidence

Respondents rated their own teaching ability using a Likert-type scale: 1 = minimal, 2 = moderate, 3 = very good, and 4 = expert. Descriptive data pertaining to each self-rated measure of ability are presented in Table 5. As may be seen in this table, the median response for all items was Very good, with the exception of the ability to Teach literacy skills to English as a second language learners (median = 2) and Teach children with reading disabilities (median = 2).

Table 4 Response to item 25b: For each of the words below, determine the number of morphemes; n (%)  

<table>
<thead>
<tr>
<th>Word</th>
<th>Number of morphemes</th>
<th>Don't know</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disassemble</td>
<td>16 (20.8)</td>
<td>6 (7.7)</td>
<td>42 (53.8)</td>
<td>5 (6.4)</td>
<td>6 (7.7)</td>
<td>1 (1.3)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Heaven</td>
<td>22 (28.2)</td>
<td>42 (53.8)</td>
<td>10 (12.8)</td>
<td>2 (2.6)</td>
<td>1 (1.3)</td>
<td>1 (1.3)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Observer</td>
<td>21 (26.9)</td>
<td>13 (16.7)</td>
<td>33 (42.9)</td>
<td>7 (9)</td>
<td>2 (2.6)</td>
<td>0 (0)</td>
<td>2 (2.6)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Salamander</td>
<td>26 (33.3)</td>
<td>32 (41)</td>
<td>10 (12.8)</td>
<td>2 (2.6)</td>
<td>5 (6.4)</td>
<td>1 (1.3)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (1.3)</td>
<td>1 (1.3)</td>
<td></td>
</tr>
<tr>
<td>Bookkeeper</td>
<td>18 (23.1)</td>
<td>2 (2.6)</td>
<td>33 (42.9)</td>
<td>20 (25.6)</td>
<td>2 (2.6)</td>
<td>0 (0)</td>
<td>1 (1.3)</td>
<td>2 (2.6)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Frogs</td>
<td>22 (28.2)</td>
<td>23 (29.5)</td>
<td>29 (37.2)</td>
<td>1 (1.3)</td>
<td>1 (1.3)</td>
<td>2 (2.6)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td>17 (21.8)</td>
<td>14 (17.9)</td>
<td>42 (53.8)</td>
<td>1 (1.3)</td>
<td>3 (3.8)</td>
<td>1 (1.3)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
</tbody>
</table>
Table 5  Self-rated ability; n (%)  

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimal</th>
<th>Moderate</th>
<th>Very good</th>
<th>Expert</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teach phonemic awareness</td>
<td>3 (3.8)</td>
<td>26 (32.9)</td>
<td>41 (51.9)</td>
<td>9 (11.4)</td>
<td>3</td>
</tr>
<tr>
<td>Teach phonics</td>
<td>4 (5.1)</td>
<td>17 (21.5)</td>
<td>46 (58.2)</td>
<td>12 (15.2)</td>
<td>3</td>
</tr>
<tr>
<td>Teach fluency</td>
<td>2 (2.5)</td>
<td>33 (41.8)</td>
<td>41 (51.9)</td>
<td>3 (3.8)</td>
<td>3</td>
</tr>
<tr>
<td>Teach vocabulary</td>
<td>3 (3.8)</td>
<td>18 (22.8)</td>
<td>53 (67.1)</td>
<td>5 (6.3)</td>
<td>3</td>
</tr>
<tr>
<td>Teach comprehension</td>
<td>2 (2.5)</td>
<td>22 (27.8)</td>
<td>50 (63.3)</td>
<td>5 (6.3)</td>
<td>3</td>
</tr>
<tr>
<td>Teach spelling</td>
<td>1 (1.3)</td>
<td>37 (46.8)</td>
<td>39 (49.4)</td>
<td>2 (2.5)</td>
<td>3</td>
</tr>
<tr>
<td>Teach children's literature</td>
<td>2 (2.5)</td>
<td>28 (35.4)</td>
<td>39 (49.4)</td>
<td>10 (12.7)</td>
<td>3</td>
</tr>
<tr>
<td>Teach literacy skills to English as a second language learner</td>
<td>27 (34.2)</td>
<td>29 (36.7)</td>
<td>22 (27.8)</td>
<td>1 (1.3)</td>
<td>2</td>
</tr>
<tr>
<td>Teach children with reading disabilities</td>
<td>18 (22.8)</td>
<td>45 (57.0)</td>
<td>15 (19.0)</td>
<td>1 (1.3)</td>
<td>2</td>
</tr>
<tr>
<td>Use assessment to inform reading instruction</td>
<td>1 (1.3)</td>
<td>25 (31.6)</td>
<td>44 (55.7)</td>
<td>9 (11.4)</td>
<td>3</td>
</tr>
</tbody>
</table>

Key: 1 = minimal, 2 = moderate, 3 = very good, 4 = expert

There was a strong statistically significant correlation between total self-rated ability and both years since qualification ($r = 0.48$, $p < 0.01$) and experience teaching the early years of primary school ($r = 0.42$, $p < 0.01$); however, no relationship was found between self-rated ability and overall performance on knowledge items ($r = 0.16$, $p = 0.14$), or any individual knowledge domain. Only overall morphological knowledge correlated with total self-rated ability ($r = 0.32$, $p = 0.005$). Two specific self-rated ability items aligned with aspects of knowledge measured in the questionnaire. No relationship was found between self-rated ability to teach phonemic awareness and demonstrated phonemic knowledge ($r = -0.03$, $p = 0.76$) or self-rated ability to teach phonics and demonstrated knowledge of phonics ($r = 0.00$, $p = 1.00$).

The final item on the questionnaire asked respondents whether they felt confident responding to the language and literacy items in the questionnaire overall, and if so, where they gained most of this knowledge. The majority of teachers stated that they did not feel confident with most of their answers (59%). This reported statement of confidence was found to have a moderate relationship with the total knowledge score ($r = 0.29$, $p = 0.008$). Those who did feel confident were most likely to report that they gained their knowledge through experience in the classroom (12.8%) or professional development (15.4%). Fewer than 4% attributed their confidence to their pre-service university education; 2.6% attributed this to postgraduate study and 6.4% to their own primary or secondary education.

Beliefs and views

Results indicate that for the majority of items, teachers’ beliefs are not firmly held, sitting between somewhat agree and somewhat disagree. The majority of teachers agreed with the assertion that reading difficulties can be helped using coloured lenses or overlay (63.3%). Fifty-seven percent of teachers ‘somewhat agreed’ with the statement that seeing letters and words backwards is a characteristic of children with reading difficulties, and a further 17.7% strongly agreed with this. Nearly three quarters (72.1%) of the respondents either strongly or somewhat disagreed with the statement Children with learning difficulties have lower IQs than typical learners. There was near consensus amongst the sample regarding teacher preparation,
Discussion

From a sample of Australian early years’ teachers, this study sought to measure self-rated ability to teach reading, the knowledge of reading and literacy-related language constructs and beliefs. The results indicate that teachers’ content knowledge of basic linguistic constructs is limited and highly variable. This finding is consistent with a number of earlier Australian studies (Fielding-Barnsley, 2010; Fielding-Barnsley & Purdie, 2005; Mahar & Richdale, 2008; Tetley & Jones, 2014) and international research (Binks-Canrell, Joshi, et al., 2012; Cunningham et al., 2004; Joshi et al., 2009; Mahar & Richdale, 2008; Moats, 1994; Piasta et al., 2009; Spear-Swerling & Bruck, 2004).

There is scope for further in-depth review, analysis and validation of questionnaire items. The value of an item must be considered by the content being measured and the direct relevance to the knowledge and pedagogical requirements for teaching language and literacy in early years’ classrooms. Teachers must possess the knowledge and ability to teach across the content areas of literacy, including phonemic awareness, phonics, word identification, fluency, vocabulary and comprehension (Apel, Wilson-Fowler, & Masterson, 2014; Buckingham et al., 2013; Piasta, Connor, Fishman, & Morrison, 2009). While the overall demonstration of knowledge suggests that mastery is comparable across the domains of knowledge, skill and pedagogy, on closer inspection, there are a number of discrepancies when the aspect of linguistic or literacy knowledge is considered. This is perhaps best illustrated by the finding, consistent with Fielding-Barnsley (2010), that while over three quarters of participants could select the correct definition for *phoneme*, the application of this knowledge to counting phonemes in words proved to be difficult. Teachers were more likely to be able to correctly

Table 6  Teacher’s beliefs and views regarding children with reading difficulties

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean score (SD)</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeing letters and words backwards is a characteristic of children with reading difficulties</td>
<td>2.83 (0.82)</td>
<td>3</td>
</tr>
<tr>
<td>Children with reading difficulties can be helped by using coloured lenses/coloured overlays</td>
<td>2.55 (0.81)</td>
<td>3</td>
</tr>
<tr>
<td>Children with reading difficulties have problems in decoding and spelling but not in listening comprehension</td>
<td>2.31 (0.91)</td>
<td>2</td>
</tr>
<tr>
<td>Children with learning difficulties have lower IQs than typical learners</td>
<td>1.92 (0.79)</td>
<td>2</td>
</tr>
<tr>
<td>Most teachers receive intensive training to work with children with reading difficulties</td>
<td>1.50 (0.73)</td>
<td>1</td>
</tr>
<tr>
<td>Children with reading difficulties need a particular type of remedial instruction which is different from that given to typically developing readers</td>
<td>2.78 (0.81)</td>
<td>3</td>
</tr>
<tr>
<td>Children with reading difficulties are naturally compensated for their literacy difficulties by particular strengths in artistic/visuospatial domains</td>
<td>1.84 (0.73)</td>
<td>2</td>
</tr>
<tr>
<td>Children with reading difficulties often have associated difficulties such as clumsiness, poor short-term memory and concentration problems</td>
<td>2.55 (0.74)</td>
<td>3</td>
</tr>
</tbody>
</table>

Key: 1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree.
identify phonemes in words when two graphemes produced one phoneme (e.g. sh in ship, br in brue, or oo in moon). Teachers identified the consonant cluster thr as a single phoneme, in the word through, as well as the br in brush and gr in grass. A common feature of measures of teacher language is to ask the number of phonemes in a word that features the grapheme x, be it ox, fox or box. In our sample of in-service Australian teachers, only 1 in 20 could correctly identify that the grapheme /x/ corresponds with two phonemes. This is lower than other studies of in-service teachers, where (still low) success rates of 19% (Mather et al., 2001) and 25% (Moats, 1994) have been reported.

As explained by Fielding-Barnsley (2010), children who have difficulty learning to read usually have problems in perceiving the speech sounds, as well as difficulty matching these phonemes with the letters of the alphabet. Teachers need a well-developed knowledge of phonemic awareness to support children to become aware of the phonemic structure of speech, prior to commencing phonics instruction, and need to be able to dissociate sounds from spellings (Mather et al., 2001; McCutchen, Abbott, et al., 2002). Described the Peter Effect (a new testament reference), one cannot give something that one does not possess; teachers cannot teach content that they themselves have not yet understood (Applegate & Applegate, 2004; Binks-Cantrell, Washburn, et al., 2012; Buckingham et al., 2013).

Phonological awareness appeared to be an area of relative strength for these Australian teachers; however, this must be interpreted with some caution, as the skills measured were limited to syllable counting. The knowledge and pedagogy domains in phonological awareness highlighted limited knowledge. It is concerning to note that fewer than half of the respondents correctly identified the definition of phonological awareness, with slightly more respondents selecting an incorrect definition of The ability to use letter-sound correspondences to decode. This apparent confusion between phonics and phonological awareness, which likely extends to phonemic knowledge, may be attributable to confusion with terminology. Indeed, it is a commonly encountered confusion to see errors in the differentiation of phonemic and phonological awareness and phonics (Moats & Lyon, 1996). Given the increasing frequency with which this terminology is used in educational literature and literacy programmes, it is concerning that graduates are not equipped with this knowledge during their pre-service studies.

Teachers who were new to teaching in the early primary years demonstrated better phonological awareness scores than their more experienced counterparts. This resonates with the work of Tetley and Jones (2014), who showed that Australian pre-service teachers had better overall knowledge than had been described in some earlier studies of both in-service and pre-service teachers. In our sample, teachers did not appear to be strengthening their linguistic knowledge through experience in the classroom. Consideration must therefore be given to how content knowledge is being delivered to in-service teachers and how language and literacy knowledge acquisition is prioritised and delivered in line with current evidence and best practice. The outcomes of the current study suggest that in the decade since the National Inquiry into the Teaching of Literacy (2005), the requisite knowledge to deliver a direct instruction, decoding-based, synthetic phonics approach has not been disseminated effectively to practising teachers, as demonstrated by those participating in this research.

Performance on explicit morphological knowledge and implicit morphemic knowledge (skill) items was significantly correlated; however, their association accounts for only a little over 15% of the variance in scores. The application of this knowledge to the counting of morphemes was variable. Over 40% of respondents incorrectly said that there were two morphemes in bookkeeper, suggesting that the term morpheme may be mistaken to mean a
component word, not a unit of meaning. One in four teachers said that they did not know how
many morphemes were in each item. Teachers with more experience teaching in the early
years of primary school were better at identifying morphemes, but their explicit morphological
knowledge was not stronger. Most teachers were able to recognise literal and inferential
comprehension tasks, and it would be expected that this has carry over into the tasks presented
within the classroom. Many items in this aspect proved to be difficult, especially the identi-
fication of a dependent clause, with only 5% correctly identifying this. While many of these
items are novel and may benefit from further refinement, it can be concluded that on the whole,
teachers’ linguistic knowledge pertaining to early year’s instruction is low.

While the subtleties of the aspects and domains of teacher knowledge warrant attention and
discussion, it is the interrelationship between knowledge, experience (measured by time since
qualification and experience in early years) and self-rated ability that is perhaps of greater
interest in our data. It was expected that knowledge and skills would increase with experience
across all areas, but the only area in which this was observed was implicit morphemic
knowledge (skill). This increase possibly reflects relatively greater familiarity with the concept
of morphemes and opportunities to apply this knowledge through classroom experience and/or
professional learning opportunities. It is not immediately evident why this effect was observed
only in implicit morphemic knowledge (skill), and not other areas of language and literacy
knowledge. This will require further examination in future studies. Teachers in this study
report that their ability to teach across a range of areas increases as their career progresses,
declining their level of knowledge not improving. Our finding that self-rated ability to teach
phonemic awareness and phonics had no relationship with demonstrated knowledge in these
areas was in line with the studies by Fielding-Barnsley and Purdie (2005) and Cunningham
et al. (2004).

The finding that teachers overestimate their reading and literacy related knowledge has a
number of implications. Firstly, it is very likely that teachers who have limited or inaccurate
knowledge are not able to equip students, especially those who are struggling to acquire
decoding skills, with the necessary skills to progress. Secondly, teachers who are not aware of
the gaps or shortcomings of their knowledge, or do not know what they do not know, are less
likely to be inclined to seek professional learning or development in this area of content
knowledge, and furthermore, those who do access or receive professional learning opportuni-
ties may not be receptive to new ideas or content if they believe their existing level of
knowledge is high. Confidence, which was measured at the completion of the questionnaire,
was related to overall knowledge, suggesting that immediate reflection on capacity to answer
the questions in the questionnaire was a more accurate measure than perceived knowledge and
ability at the outset. Very few teachers indicated that their confidence was derived from their
own school or tertiary education, consistent with the observations that Australian pre-service
teacher education has not prioritised the explicit teaching of language, reading and literacy in
recent decades (Buckingham et al., 2013; Coltheart & Prior, 2006).

Evidence-based practice regarding reading instruction for students of all abilities is con-
stantly challenged by many long-standing ‘myths’ which continue to influence beliefs and
views within the teaching profession. Our measure of teachers’ views indicates that Australian
teachers appear to be uncertain and lack conviction in their knowledge regarding reading
difficulties, with the median response to most statements posed being either somewhat agree
and somewhat disagree. The findings from our measure of teachers’ beliefs and views align
with those of Washburn et al. (2011), who similarly found that responses to statements Seeing
letters and words backwards is a characteristic of children with reading difficulties and
Children with reading difficulties can be helped by using coloured lenses/coloured overlays indicate that many teachers continue to view reading difficulties as originating from visual perceptual difficulties, despite the long-standing consensus that most reading disabilities originate from a specific impairment of language processing (Moats, 1994). Also consistent with the findings of Washburn et al., responses regarding IQ, compensatory strengths and listening comprehension in children with reading difficulties suggest that the beliefs and understanding of teachers in this sample are tending towards the current evidence; however, the influence of myths associated with reading difficulties or dyslexia prevails.

Previously documented low levels of linguistic knowledge (Fielding-Barnsley & Purdie, 2005; Mahar & Richdale, 2008) in Australian teachers have led to calls for improved professional development and training, both prior to qualification, and for practising teachers. Tetley and Jones (2014) note that teacher education programmes are beginning to respond to reviews of reading research, including the National Inquiry into the Teaching of Literacy (2005) and Learning to Read in Australia (Coltheart & Prior, 2006). However, a recent audit of the literacy content of tertiary education courses conducted by the New South Wales Board of Studies, Training and Education Standards (2014) has highlighted variability in content and scope, and concluded that many teaching graduates were not adequately prepared to deliver a direct instruction, synthetic phonics approach to reading. There is a push to closely measure and address the literacy levels of pre-service teachers, with the Federal Government endeavouring to implement a test for all pre-service teachers by 2016, consistent with current practice in the UK. Indeed, it makes sense that reform of the current literacy practices and outcomes of Australian students should begin with pre-service teacher education in universities.

There is increasing evidence to support the notion that practising teachers can deepen their knowledge of phonological awareness and can use that knowledge to change classroom practice, and these changes in knowledge and classroom practice can improve student learning (Bos et al., 1999; Driver, Pullen, Kennedy, Williams, & Ely, 2014; McCutchen, Abbott, et al., 2002; Snow, 2014). Complementing this evidence, there is a growing research base suggesting that in order for professional development programmes to be effective, they must be ongoing and incorporate support structures including follow-up and mentoring to effect long-lasting change. Understanding the current areas of strength and the limitations in the knowledge of Australian teachers will assist in the development of future professional learning programmes, target teachers who would most benefit from professional learning and identify content to be embedded within pre-service education.

In this sample of Prep teachers from both the Government and Catholic education sectors, all schools met the inclusion criterion of having greater than 10% of children developmentally vulnerable in the language and cognitive domains on the 2009 and/or the 2012 Australian Early Development Index (Census). This criterion carries a potential for confounding within the sample, with eligible schools more likely to come from lower socio-economic status (SES) communities. Mahar and Richdale (2008) found that teachers in independent (or private) schools had higher levels of knowledge than the Government or Catholic sector counterparts. This would suggest that the sample of teachers from Government and Catholic schools in lower socio-economic status communities in the current study may not be representative of the full teacher population. Furthermore, this was not a random sample from within the population, as schools were required to indicate interest in this study. However, this interest in
participation was at the discretion of the school principal, not the teachers, who were randomly selected from within their school. The questionnaire used in this research has, in part, been validated on a US pre-service teacher population. Our finding that Australian teachers’ knowledge of language and literacy constructs is highly variable does warrant further analysis and refinement of test items. This work will be further strengthened by a full psychometric analysis using an Australian population. Furthermore, this will allow this tool to be utilised in future studies of Australian teachers. Indeed, findings need to be replicated using a representative sample of teachers and sectors (including the private sector).

Conclusions

Given the high level of political and media interest in reading and literacy education and teacher knowledge, this study addresses the need for up-to-date measurement of practising teachers’ knowledge of language and literacy concepts and constructs. This study, in line with a number of both Australian and international studies, has demonstrated that teacher knowledge of language and literacy concepts is both limited and highly variable. Self-rated ability does not equate to levels of explicit or implicit knowledge across a range of language aspects. Teachers also lack confidence in their beliefs and views associated with teaching children with reading difficulties. Most teachers are not confident in their knowledge, and those who do express confidence do not report having acquired their knowledge through education, be it primary, secondary or university.

There is a gap between the research findings on effective reading instruction and teacher preparation (Moats & Fournier, 2003; Tetley & Jones, 2014). A strong and explicit knowledge of the constructs and concepts underlying language is essential and forms the foundation upon which literacy knowledge and skills are built for children in the early years (Mather et al., 2001). Teachers need to be equipped with explicit knowledge of child development, language and literacy and the skills to effectively teach these to all children, regardless of their developmental levels on school entry (Podhajski et al., 2009), as the achievement gap in schools cannot be eliminated without closing the knowledge gap within the teaching profession (Snow et al., 2005). The persistence of myths around the origin, nature and management of reading difficulties needs to be addressed systemically throughout the teaching profession. In line with the recommendations made nearly a decade ago (Louden & Rohl, 2006; Rowe, 2005; Torgerson et al., 2006), there is need for an increased focus on the teaching of decoding skills and knowledge of learning difficulties in literacy education for teachers, in addition to specialist reading courses. Teachers need to be reliably equipped with knowledge and prepared to deliver instruction across oral language, phonemic awareness, phonics, word identification, fluency, vocabulary, comprehension and the assessment management of all aspects of literacy learning, but as Fielding-Barnsley (2010) also concluded, there is still much progress to be made across the education sector in Australia.

Acknowledgments The Classroom Promotion of Oral Language Project is funded by grants from the Australian Research Council Linkage Grant (LP13011308) and the Ian Potter Foundation. Sharon Goldfeld is supported by an Australian National Health and Medical Research Council (NHMRC) Career Development Fellowship 1082922. We acknowledge and thank all of the teachers for their contributions to this study. We also acknowledge and thank Francesca Orsini from the Clinical Epidemiology and Biostatistics Unit, Murdoch Childrens Research Institute for her assistance with this project.
### Appendix: Questionnaire

<table>
<thead>
<tr>
<th>Domain</th>
<th>Knowledge</th>
<th>Skill</th>
<th>Pedagogical</th>
<th>Aspect</th>
<th>Phonemic</th>
<th>Phono logical</th>
<th>Phonics</th>
<th>Morphological</th>
<th>Sentence/discourse</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Explicit knowledge of a term or concept</td>
<td>Implicit ability to perform task utilising knowledge</td>
<td>Practice or process associated with teaching a term or concept</td>
<td></td>
<td>Deals specifically with perceiving or manipulating individual sounds</td>
<td>Deals with perceiving and manipulating sounds at the larger level (e.g., syllables)</td>
<td>The use of letter-sound correspondences, generalisations, rules and patterns of the written language to decode a word</td>
<td>The use of units of meaning within a word to decode and/or comprehend</td>
<td>The use of sentence or discourse level meaning, syntax and structure to identify, or comprehend</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Category</th>
<th>Domain</th>
<th>Aspect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have read and understood the information about this survey and any queries I had have been addressed to my satisfaction.</td>
<td>Background</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>◦ I am ready to proceed with the survey.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>◦ I require some further information (please speak with a member of the research team as outlined above) and do not proceed until your queries have been addressed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Please indicate your sex:</td>
<td>Background</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>◦ Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>◦ Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Which education sector do you work in?</td>
<td>Background</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>◦ Department of Education and Early Childhood Development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>◦ Catholic Education: Office of Victoria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Was your undergraduate qualification in education/primary teaching?</td>
<td>Background</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>5. Please enter your family name and given name.</td>
<td>Background</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>This information is needed so we know who has responded and so we can follow-up staff after the intervention.</td>
<td></td>
<td></td>
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<tr>
<td>6. Was your undergraduate qualification in education/primary teaching?</td>
<td>Background</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>7. My initial qualification was in:</td>
<td>Background</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>8. How long ago did you gain your initial teaching qualification?</td>
<td>Background</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>◦ 0–2 years</td>
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<tr>
<td>◦ 3–5 years</td>
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<tr>
<td>◦ 6–10 years</td>
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<tr>
<td>◦ 11–15 years</td>
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<td></td>
<td></td>
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<tr>
<td>◦ 16–20 years</td>
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<td></td>
<td></td>
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<tr>
<td>◦ More than 20 years</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Table 7 (continued)

| 9. | Have you completed any formal postgraduate training (via enrolment and completion of a university-based course) that had a principal focus on literacy education? |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
|    | Background | n/a  | n/a  |
|    | o Yes       |      |      |
|    | o No        |      |      |

| 10. | For how many years (in total) have you been teaching prep, grade 1, and/or grade 2? |
|     | Background | n/a  | n/a  |
|     | o 0-2 years |      |      |
|     | o 3-5 years |      |      |
|     | o 6-10 years |     |      |
|     | o 11-15 years |    |      |
|     | o 16-20 years |   |      |
|     | o More than 20 years | |      |

| 11. | Over the past 3 years, what are the main ways in which you have accessed continuing education about literacy education? |
|     | Background | n/a  | n/a  |

| 12. | Thinking about your current classroom practices, how would you rate your ability to: |
|     | Teacher self-assessment and confidence | n/a  | n/a  |
|     | o Teach phonemic awareness |
|     | o Teach phonics |
|     | o Teach fluency |
|     | o Teach vocabulary |
|     | o Teach comprehension |
|     | o Teach spelling |
|     | o Teach children's literature |
|     | o Teach literacy skills to English as a second language learners |
|     | o Teach children with reading disabilities |
|     | o Use assessment to inform reading instruction |

<p>| 15. | Please indicate your agreement with the following statements about children with reading difficulties |
|     | Teacher beliefs and views | n/a  | n/a  |
|     | o Seeing letters and words backwards is a characteristic of children with reading difficulties |
|     | o Children with reading difficulties can be helped by using coloured lenses/coloured overlays |
|     | o Children with reading difficulties have problems in decoding and spelling but not in listening comprehension |
|     | o Children with learning difficulties have lower IQs than typical learners |
|     | o Most teachers receive intensive training to work with children with reading difficulties |
|     | o Children with reading difficulties need a particular type of remedial instruction which is different from that given to typically developing readers |
|     | o Children with reading difficulties are naturally compensated for their literacy difficulties by particular strengths in artistic/visuospatial domains |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Teacher knowledge</th>
<th>Knowledge</th>
<th>Phonemic</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.</td>
<td>A phoneme refers to:</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>○ A single letter</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>○ A single speech sound</td>
<td></td>
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<tr>
<td></td>
<td>○ A single unit of meaning</td>
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<tr>
<td></td>
<td>○ A grapheme</td>
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<tr>
<td></td>
<td>○ None of the above</td>
<td></td>
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<tr>
<td></td>
<td>○ Don’t know</td>
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<tr>
<td>15.</td>
<td>If “i” is a word, the letter “i” would probably sound like “i” in:</td>
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<td></td>
<td>○ If</td>
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<tr>
<td></td>
<td>○ Beautiful</td>
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<tr>
<td></td>
<td>○ Find</td>
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<td></td>
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<tr>
<td></td>
<td>○ Ceiling</td>
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<tr>
<td></td>
<td>○ Sing</td>
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<td></td>
<td>○ None of the above</td>
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<td></td>
<td>○ Don’t know</td>
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<td>16.</td>
<td>A combination of two or three consonants pronounced so that each letter keeps its own identity is called</td>
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<tr>
<td></td>
<td>○ A silent consonant</td>
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<tr>
<td></td>
<td>○ Consonant digraph</td>
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<tr>
<td></td>
<td>○ Diphthong</td>
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<tr>
<td></td>
<td>○ Consonant blend</td>
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<td></td>
<td>○ None of the above</td>
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<td></td>
<td>○ Don’t know</td>
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<tr>
<td>17.</td>
<td>How many speech sounds are there in the following words? For example, the word “cat” has 3 speech sounds: “k”, “a”, “t”. (Speech sounds do not necessarily equal the number of letters)</td>
<td></td>
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<tr>
<td></td>
<td>a) Ship (3)</td>
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<tr>
<td></td>
<td>b) Grass (4)</td>
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<tr>
<td></td>
<td>c) Box (4)</td>
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<td></td>
<td>d) Moon (3)</td>
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<tr>
<td></td>
<td>e) Brush (4)</td>
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<tr>
<td></td>
<td>f) Knee (2)</td>
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<tr>
<td></td>
<td>g) Through (3)</td>
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<tr>
<td>18.</td>
<td>What type of task would the following be?  “Say the word ‘cat’. Now say the word without the ‘k’ sound”:</td>
<td></td>
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<tr>
<td></td>
<td>○ Blending</td>
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<tr>
<td></td>
<td>○ Rhyming</td>
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<tr>
<td></td>
<td>○ Segmentation</td>
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<tr>
<td></td>
<td>○ Deletion</td>
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<td></td>
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<tr>
<td></td>
<td>○ None of the above</td>
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<tr>
<td>Problem Description</td>
<td>Teacher Knowledge</td>
<td>Skill</td>
<td>Phonemic</td>
<td></td>
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<td>-----------------------------------------------------------------------------------</td>
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<td>19. A soft ‘c’ is in the word</td>
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<tr>
<td>○ Chicago</td>
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<tr>
<td>○ Cat</td>
<td></td>
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<tr>
<td>○ Chair</td>
<td></td>
<td></td>
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<tr>
<td>○ City</td>
<td></td>
<td></td>
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<tr>
<td>○ None of the above</td>
<td></td>
<td></td>
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<tr>
<td>○ Don’t know</td>
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<tr>
<td>20. Identify the pair of words that begins with the same sound:</td>
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<tr>
<td>○ Joke goat</td>
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<tr>
<td>○ Chef shoe</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>○ Quiet giant</td>
<td></td>
<td></td>
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<tr>
<td>○ Chip chemist</td>
<td></td>
<td></td>
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<tr>
<td>○ None of the above</td>
<td></td>
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<tr>
<td>○ Don’t know</td>
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<tr>
<td>21. If you say the word, and then reverse the order of the sounds, “ice” would be</td>
<td></td>
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<tr>
<td>○ Easy</td>
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<tr>
<td>○ Sea</td>
<td></td>
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</tr>
<tr>
<td>○ Size</td>
<td></td>
<td></td>
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<tr>
<td>○ Sigh</td>
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<tr>
<td>○ None of the above</td>
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<tr>
<td>○ Don’t know</td>
<td></td>
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<tr>
<td>22. If you say the word, and then reverse the order of the sounds, “enough” would be</td>
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<tr>
<td>○ Fun</td>
<td></td>
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<tr>
<td>○ Phone</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>○ Funny</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>○ One</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>○ None of the above</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>○ Don’t know</td>
<td></td>
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<tr>
<td>23. For each of the words on the left, determine the number of syllables</td>
<td></td>
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</tr>
<tr>
<td>Disassemble</td>
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</tr>
<tr>
<td>Heaven</td>
<td></td>
<td></td>
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<tr>
<td>Observer</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Salamander</td>
<td></td>
<td></td>
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<tr>
<td>Bookkeeper</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Frogs</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Teacher</td>
<td></td>
<td></td>
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<tr>
<td>For each of the words on the left, determine the number of morphemes</td>
<td></td>
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<tr>
<td>Disassemble</td>
<td></td>
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<tr>
<td>Heaven</td>
<td></td>
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<tr>
<td>Observer</td>
<td></td>
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<tr>
<td>Salamander</td>
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<tr>
<td>24.</td>
<td>Which of the following words contains a diphthong?</td>
<td>Teacher knowledge</td>
<td>Skill</td>
<td>Phonemic</td>
</tr>
<tr>
<td></td>
<td>- Coat</td>
<td></td>
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<tr>
<td></td>
<td>- Boy</td>
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<tr>
<td></td>
<td>- Battle</td>
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<tr>
<td></td>
<td>- Sing</td>
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<tr>
<td></td>
<td>- Been</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- None of the above</td>
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<td></td>
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<tr>
<td></td>
<td>- Don’t know</td>
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<tr>
<td>25.</td>
<td>A voiced consonant digraph is present in the word</td>
<td>Teacher knowledge</td>
<td>Skill</td>
<td>Phonics</td>
</tr>
<tr>
<td></td>
<td>- Think</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Ship</td>
<td></td>
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<tr>
<td></td>
<td>- Whip</td>
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<td></td>
<td>- The</td>
<td></td>
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<tr>
<td></td>
<td>- Photo</td>
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<tr>
<td></td>
<td>- None of the above</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Don’t know</td>
<td></td>
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<tr>
<td>26.</td>
<td>Why may students confuse the sounds /ɔ/ and /ʌ/ or /ɒ/ and /ʌ/?</td>
<td>Teacher knowledge</td>
<td>Knowledge</td>
<td>Phonemic</td>
</tr>
<tr>
<td></td>
<td>- Students are visually scanning the letters in a way that the letters are misperceived</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Students can’t remember the letter sounds so they are randomly guessing</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>- Speech sounds within each pair are produced in the same place and in the same way, but one is voiced and the other is not</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>- The speech sounds within each pair are both voiced and produced at the back of the mouth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- None of the above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Don’t know</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27.</td>
<td>A schwa (non-distinct vowel sound) is found in the word</td>
<td>Teacher knowledge</td>
<td>Skill</td>
<td>Phonemic</td>
</tr>
<tr>
<td></td>
<td>- Cotton</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Phoneme</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Stopping</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- Preview</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>- Grouping</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>- None of the above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Don’t know</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

- **Springer**
Table 7 (continued)

- A teaching method for decoding Skills
- The same as phonics
- None of the above
- Don’t know

29. **Phonemic awareness is**
   - The same as phonological awareness
   - The understanding of how letters and sounds are put together to form words
   - The ability to break down and manipulate the individual sounds in spoken language
   - The ability to use sound symbol correspondences to spell new words
   - None of the above
   - Don’t know

30. **Morphemic analysis is**
   - An instructional approach that involves evaluation of meaning based on multiple senses
   - An understanding of the meaning of letters and their sounds
   - Studying the structure and relations of meaningful linguistic units occurring in language
   - Classifying and recording of individual speech sounds
   - None of the above
   - Don’t know

31. **Rhymology is**
   - Not really connected to the development of reading skills
   - The study of the history and development of the structures and meaning of words
   - The study of the causes of disabilities
   - The study of human groups through first hand observation
   - None of the above
   - Don’t know

32. **Reading a text and answering questions based on explicit information found within the text describes:**
   - Inferential comprehension
   - **Literal comprehension**
   - Summarisation
   - Question generation
   - None of the above
   - Don’t know

33. **Questions that require the combining of background knowledge and text information to create a response describe which of the following?**
   - Inferential comprehension
   - **Literal comprehension**

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<table>
<thead>
<tr>
<th>Question</th>
<th>Knowledge</th>
<th>Pedagogical</th>
<th>Phonemic</th>
</tr>
</thead>
<tbody>
<tr>
<td>34. Which of the following is a phonemic awareness activity?</td>
<td>Teacher</td>
<td>Pedagogy</td>
<td>Other</td>
</tr>
<tr>
<td>o Having a student segment the sounds in the word “cat” orally</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>o Having a student spell the word “cat” aloud</td>
<td></td>
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<tr>
<td>o Having a student sound out the word “cat”</td>
<td></td>
<td></td>
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<tr>
<td>o Having a student recite all the words they can think of that rhyme with “cat”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o None of the above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Don’t know</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35. Which of the following is a semantic mapping activity?</td>
<td>Teacher</td>
<td>Pedagogy</td>
<td>Other</td>
</tr>
<tr>
<td>o Word webs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Word searches</td>
<td></td>
<td></td>
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<tr>
<td>o Writing a brief definition of different terms</td>
<td></td>
<td></td>
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<tr>
<td>o Predicting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o None of the above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Don’t know</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36. Which answer BEST describes the reason for an older student’s (upper primary) misspelling of the following words?</td>
<td>Teacher</td>
<td>Pedagogy</td>
<td>Phonics</td>
</tr>
<tr>
<td>o The student spelt the word phonetically</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>o The student has not been taught that English words do not end in “v”</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o The student is using invented spelling</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>o The student must memorise the spellings of these irregular words</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o None of the above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Don’t know</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37. A morpheme refers to</td>
<td>Teacher</td>
<td>Knowledge</td>
<td>Morphological</td>
</tr>
<tr>
<td>o A single letter</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o A single speech sound</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o A single unit of meaning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o A grapheme</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o None of the above</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Don’t know</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. Story grammar refers to</td>
<td>Teacher</td>
<td>Knowledge</td>
<td>Sentence/discourse</td>
</tr>
<tr>
<td>o Grammatical rules governing the number of clauses in a sentence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o The overall organisation and cohesion of a narrative</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o Syntactic rules that children acquire through their exposure to text-based stories</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The knowledge and self-rate ability of Australian teachers

<table>
<thead>
<tr>
<th>Table 7 (continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>o The more formal grammar that is used in written, vs spoken language</td>
</tr>
<tr>
<td>o None of the above</td>
</tr>
<tr>
<td>o Don’t know</td>
</tr>
<tr>
<td>The following sentences are used in questions 41–44:</td>
</tr>
<tr>
<td>A. Run under the car</td>
</tr>
<tr>
<td>B. He runs under our car</td>
</tr>
<tr>
<td>C. Does he run under our car?</td>
</tr>
<tr>
<td>D. What a happy boy he is.</td>
</tr>
<tr>
<td>39. Which: of the above sentences is an example of a declarative form? (B)</td>
</tr>
<tr>
<td>40. Which: of the above sentences is an example of the imperative form? (A)</td>
</tr>
<tr>
<td>41. Which: of the above sentences is an example of the exclamatory form? (D)</td>
</tr>
<tr>
<td>42. Which: of the above sentences is an example of the interrogative form? (C)</td>
</tr>
<tr>
<td>The following five language samples are used in questions 45–48:</td>
</tr>
<tr>
<td>A. James, who watched the dog, ate the cake.</td>
</tr>
<tr>
<td>B. Gina watched the rabbit scurry across the yard. She saw it go under the house.</td>
</tr>
<tr>
<td>C. James watched the cat.</td>
</tr>
<tr>
<td>D. Tom drank the milk and ate the apple.</td>
</tr>
<tr>
<td>43. Which: sample is an independent clause? (C)</td>
</tr>
<tr>
<td>44. Which: sample has one dependent clause? (E)</td>
</tr>
<tr>
<td>45. Which: sample is an example of a discourse meaning? (B)</td>
</tr>
<tr>
<td>46. Which: sample has two relative clauses? (D)</td>
</tr>
<tr>
<td>47. Difficulty keeping on track with the overall gist of a conversation and staying “on track” when speaking or listening is most likely to be an example of a difficulty:</td>
</tr>
<tr>
<td>o Using grammatical rules correctly</td>
</tr>
<tr>
<td>o Recalling the meanings of words</td>
</tr>
<tr>
<td>o Forming a discourse meaning</td>
</tr>
<tr>
<td>o Understanding individual sentences</td>
</tr>
<tr>
<td>o Hearing effectively</td>
</tr>
<tr>
<td>o None of the above</td>
</tr>
<tr>
<td>o Don’t know</td>
</tr>
<tr>
<td>The following sentences are used in questions 51–53:</td>
</tr>
<tr>
<td>A. Racing to board the launch the captain slipped on the damp pier and broke its knee.</td>
</tr>
<tr>
<td>B. The witness’s voice trembled then fell quiet, causes the judge to call an adjournment.</td>
</tr>
<tr>
<td>C. Con pulled the fish off the hook too quick and incurred a cut deep to his hand.</td>
</tr>
<tr>
<td>D. The guard what is sleeping made it will be easier for burglars to get in the building undetected.</td>
</tr>
<tr>
<td>E. The work place had been stressful and unpredictable over the duration so that by his birthday his blood pressure had reached a critical level.</td>
</tr>
<tr>
<td>48. Which: one shows incorrect use of a relative pronoun? (D)</td>
</tr>
<tr>
<td>49. Which: one is correct grammatically? (E)</td>
</tr>
</tbody>
</table>
### Table 7 (continued)

<table>
<thead>
<tr>
<th>50.</th>
<th>Which one misuses an adjective? (C)</th>
<th>Teacher knowledge</th>
<th>Sentence/discourse</th>
</tr>
</thead>
<tbody>
<tr>
<td>51.</td>
<td>If you felt confident responding to the language and literacy items in this survey, please tell us where you gained most of your knowledge</td>
<td>Teacher knowledge</td>
<td>Skill</td>
</tr>
<tr>
<td>a) I did not feel confident with most of my answers</td>
<td>Teacher self-assessment and confidence</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>b) University study—pre-service</td>
<td></td>
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<tr>
<td>c) University study—postgraduate</td>
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<tr>
<td>d) Experience in the classroom</td>
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<tr>
<td>e) Professional development</td>
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</tr>
<tr>
<td>f) My own primary or secondary education</td>
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</tr>
</tbody>
</table>

### References


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6.2 Addendum

In addition to the results reported in the published Annals of Dyslexia paper, further psychometric analysis of the survey was completed. Additionally, respondents were asked to report their participation in professional learning. These findings are reported and discussed here.

Item difficulty, discriminability and reliability.

The reliability for the knowledge items in this survey using Cronbach’s alpha was 0.84, with an average inter-item correlation of 0.015. Item difficulty ranged from 0.05 (for the identification of a dependent clause and counting phonemes in the word “box”) to 0.99 (counting syllables in the word “heaven”). As suggested by Binks-Cantrell, Joshi, et al. (2012), the ideal difficulty for most items is approximately 0.65 – 0.67. The mean difficulty of the items in the present survey that were derived from the Binks-Cantrell et al. validation study was 0.64, which was within 0.01 of the original study. The mean difficulty for all 56 knowledge items in the present survey was 0.55. The mean difficulty for the new, previously unpublished items was 0.44, suggesting these questions were more difficult. The item difficulty and discriminability for each item is detailed in Appendix K.

Eight items had very good discriminability indices (above 0.4). Six items in this range were morphological skill items, which required respondents to identify the number of morphemes in a word. Other items with high discriminability were item 17b, which asked the respondent to count the number of speech sounds in grass, and item 42 which required respondents to identify an interrogative form. Eleven items had discriminability indices between 0.31 and 0.38, indicating reasonably good discriminability, and a further 11 items were marginal (discriminability indices between 0.22 and 0.28) and 26 were poor (between -0.03 and 0.19). The items that asked respondents to define or count morphemes seem to be the best at discriminating between high and low performing
teachers, followed by phonemic skill and knowledge questions, and the item that asked teachers to identify the interrogative form. Two items with very low difficulty had discriminability indices of 0, meaning they did not discriminate between high and low performing respondents. One item had a negative discriminability index.

**Psychometric issues.**

As established in Chapter 3, despite recurrent calls for psychometrically valid tools for assessing teachers' knowledge of language and literacy constructs, the psychometric evaluation of surveys has been limited (Binks-Cantrell, Joshi, et al., 2012; Phelps & Schilling, 2004). There is scope for further validation and psychometric analysis of the assessment tool used in this study, including application of item response testing and factor analysis.

Consideration should also be given to how a survey tool can be deemed to be valid when there were limited opportunities for teachers to acquire the knowledge that is being tested. This type of survey differs to measures of intelligence, aptitude, or strength. Knowledge of language and literacy constructs must be explicitly taught. While many argue that this is content that teachers *should* know (Fillmore & Snow, 2003), there is evidence that many (if not most) teachers have not had an opportunity to learn this knowledge. It is possible that this invalidates the psychometric properties of some test items. Some items are psychometrically poor yet measure knowledge that is theoretically crucial from a linguistic perspective. The existing “rules” that determine the value of a question state that the item should have strong face validity, be neither too easy nor too difficult (as indicated by a difficulty index), and therefore discriminate between respondents who perform well overall, and those who do not. It can be argued that some questions should remain in future iterations of this assessment, even if they do not have these psychometric properties.
**Reported professional learning activities.**

The teachers who completed the survey were also asked to report the main ways in which they had accessed continuing education about literacy in the previous three years. They were asked to identify the four methods they had used the most, ranking the method most used as 1, followed by 2, 3 and 4. They were asked to mark the remaining three options with 0. The responses are reported in Table 6-1 below. Responses were grouped into three categories: the primary methods or activities (rated 1), secondary methods or activities (rated 2, 3 or 4), and lesser methods or activities (rated 0).

<table>
<thead>
<tr>
<th>Professional learning activity</th>
<th>Primary</th>
<th>Secondary</th>
<th>Less</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher professional development days organised by my employer</td>
<td>45</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>Reading magazine-style publications that are accessible to me in my workplace</td>
<td>3</td>
<td>47</td>
<td>28</td>
</tr>
<tr>
<td>Websites</td>
<td>11</td>
<td>26</td>
<td>41</td>
</tr>
<tr>
<td>Reading papers in academic journals</td>
<td>7</td>
<td>26</td>
<td>45</td>
</tr>
<tr>
<td>Education conferences</td>
<td>7</td>
<td>38</td>
<td>33</td>
</tr>
<tr>
<td>Online discussion forums</td>
<td>1</td>
<td>17</td>
<td>60</td>
</tr>
<tr>
<td>Participation in Professional Learning days related to the Oral Language Supports Early Literacy (OLSEL) project</td>
<td>3</td>
<td>12</td>
<td>63</td>
</tr>
<tr>
<td>Participation in the University of Melbourne Unit: Oral Language Learning: the primary years</td>
<td>0</td>
<td>3</td>
<td>75</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>28</td>
<td>43</td>
</tr>
</tbody>
</table>

Preferred=rated 1, Secondary source=rated 2, 3, or 4, less common source=0

More than half of the respondents (57%) reported that “Teacher professional development days organised by my employer” was the primary way in which they accessed professional learning. The 33 respondents who did not report that this was their primary way of accessing professional learning listed this as a secondary method.
Following employer-organised professional development days, reading magazine articles, journals and websites were the next most common category of professional learning activities. Respondents were asked to specify which websites they regularly accessed. As is evidenced in Table 6-2, the websites that were regularly accessed ranged from resource sharing websites, to commercial literacy or oral language programs, and websites provided by the education sectors in the study. Some respondents were non-specific in their responses, reporting that they accessed blogs or search engines.

Table 6-2: Reported professional learning websites

<table>
<thead>
<tr>
<th>Website type</th>
<th>Example (URL)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education sector website (Victorian)</td>
<td><a href="http://www.olsel.catholic.edu.au">www.olsel.catholic.edu.au</a></td>
<td>27</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.ausvels.vcaa.vic.edu.au">www.ausvels.vcaa.vic.edu.au</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.education.vic.gov.au">www.education.vic.gov.au</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="https://fuse.education.vic.gov.au/Primary">https://fuse.education.vic.gov.au/Primary</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.acara.edu.au">www.acara.edu.au</a></td>
<td></td>
</tr>
<tr>
<td>Commercial language or literacy programs</td>
<td><a href="http://www.soundsforliteracy.com.au">www.soundsforliteracy.com.au</a></td>
<td>21</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.readingeggs.com.au">www.readingeggs.com.au</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.fountasandpinnellleveledbooks.com">www.fountasandpinnellleveledbooks.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.earlylearningfoundation.com">www.earlylearningfoundation.com</a></td>
<td></td>
</tr>
<tr>
<td>Resource sharing website</td>
<td><a href="http://www.pintrest.com">www.pintrest.com</a></td>
<td>13</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.readwritethink.org">www.readwritethink.org</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.superteacherworksheets.com">www.superteacherworksheets.com</a></td>
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<tr>
<td></td>
<td><a href="http://www.teacherspayteachers.com">www.teacherspayteachers.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.teachertube.com">www.teachertube.com</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="http://www.tes.com/en-au/teaching-resources">www.tes.com/en-au/teaching-resources</a></td>
<td></td>
</tr>
<tr>
<td>Generic search engine</td>
<td><a href="http://www.google.com">www.google.com</a></td>
<td>9</td>
</tr>
<tr>
<td>Other education sector website</td>
<td><a href="http://det.wa.edu.au/stepsresources/">http://det.wa.edu.au/stepsresources/</a></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.education.sa.gov.au">www.education.sa.gov.au</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td><a href="https://newteachercenter.org/">https://newteachercenter.org/</a></td>
<td></td>
</tr>
</tbody>
</table>
More than half of the respondents (57%) reported that they accessed professional learning in ways other than the options listed in the survey. As shown in Table 6-3, the most common method reported was through informal discussions with colleagues, Professional Learning Teams, and consulting books.

**Table 6-3: Other reported professional learning activities**

<table>
<thead>
<tr>
<th>Reported professional learning activity</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal discussions with colleagues</td>
<td>17</td>
</tr>
<tr>
<td>Professional Learning Teams</td>
<td>11</td>
</tr>
<tr>
<td>Books</td>
<td>11</td>
</tr>
<tr>
<td>Coaching or mentoring</td>
<td>7</td>
</tr>
<tr>
<td>Moderating or looking at data</td>
<td>3</td>
</tr>
<tr>
<td>Networks</td>
<td>2</td>
</tr>
<tr>
<td>PL outside school hours</td>
<td>2</td>
</tr>
<tr>
<td>Other teachers reporting on PL</td>
<td>1</td>
</tr>
</tbody>
</table>

Respondents specified a range of authors, including “Where Thinking and Learning Meet” (Lane Clark, 2008), “Phonemic Awareness in Young Children: A Classroom Curriculum” (Adams, Foorman, Lundberg, & Beeler, 1998), “Teaching Oral Language” (Munro, 2011), “Spelling: Approaches to Teaching and Assessment” (Westwood, 2005), “Engaging Young Writers” (Glover, 2009), “Spelling K-8” (Snowball & Bolton, 1999) and texts by the late Dame Marie Clay (who developed the Reading Recovery program). Few (8%) reported that coaching or mentoring was one of their main ways of accessing professional learning.

Respondents reported that they commonly seek out other colleagues as a source of professional learning, although few reported participating in structured coaching or mentoring. Another finding was that some respondents did not discriminate between
sourcing materials and ideas (i.e., through websites like Pinterest or Teachers Pay Teachers) and professional learning. While there has been a recent proliferation of websites that provide lesson plans and classroom activity ideas, if these are misconstrued as professional learning, teachers may then forgo higher quality opportunities that have a higher probability of resulting in improved student outcomes, incurring an opportunity cost.
Chapter 7  Measuring Classroom Talk

7.1 Chapter Overview

The results of Study 2 are reported in this chapter. The pilot testing (Part 1) of the approach to measuring teacher talk will first be reported, followed by Part 2 of this study, in which this procedure was used in the context of a professional learning program.

7.2 Part 1: Pilot study

I first sought to determine whether a participant-directed procedure that used low-cost, accessible technology for collecting and transcribing research samples of teacher talk was feasible, and secondly, if Anstey’s (1991) framework could be applied as a measurement of the type of teacher talk in early years’ classrooms during oral language and/or literacy instruction. In addressing these objectives, the distribution of types of teacher talk during instruction (as per Anstey’s framework) was also described.

Following the instructions provided (Appendix G), the participants shared recordings made on their smart phones during language and/or literacy instruction through Dropbox™. The recordings (n=28) selected by the CPOL project manager using a random number generator from a larger pool of 74 recordings for the purpose of piloting an analysis approach. The recordings commenced at the beginning of a lesson and ended at the completion of a distinct phase of instruction (i.e., when a task or topic of discussion was completed), rather than after precisely 10 minutes. They ranged from 5:19 to 20:20 minutes in duration (M=10:45; SD=3:19) and followed the course of a lesson or period of instruction. The conclusion of a period of instruction was signified by a transition to another task, or a statement of completion by the teacher.
In all 28 instances, the quality of the recordings was adequate for transcription, and the recordings were all shared either through file sharing or by providing the researchers with the audio-file on a Universal Serial Bus (USB) flash drive. Transcription and analysis were completed by research assistants using widely available, non-specialised software (Microsoft Word). Research assistants were able to discern all teacher and most child utterances. The recordings contained between 77 and 363 teacher C-units (M=105.3; SD=37.21), and teacher talk accounted for a mean of 72.19% (SD 9.15%) of talk in the classroom.

**Face validity of the measure of teacher talk.**

The C-units were coded using the framework described in Table 5-2 (page 117). Less than 1% of teacher C-units were not able to be coded within the framework due to not meeting the specified criteria for one of the seven types of talk. These uncodable utterances were typically ‘filler’ language and/or incomplete utterances. While the average distribution of talk aligned closely with the proportions reported in Edwards-Groves et al. (2014), the distribution of type of talk was variable within the sample, as indicated by the relatively large standard deviations (Table 7-1).

*Organisational talk* accounted for 35.99% (SD 13.25%) of teacher talk, with subcategories *classroom management* and *literacy management* accounting for an average of 14.13% (SD 13.84%) and 21.86% (SD 9.19%) of teacher talk respectively. Utterances that were coded as Organisational typically occurred within a prolonged sequence, in which the teacher was providing instructions and expectations about classroom behaviour or the task. In other instances, an extended series of classroom management utterances occurred in response to undesired behaviour by one or more children. For example:
Teacher: *I'm sorry, I'm finding this very unfair,*
Teacher: *lots of other children have their hands up to share,*
Teacher: *and you are not being fair to others*
Teacher: *Sit on your bottom, cross your legs, put your hands on your lap.*
Teacher: *If you want to share your learning, you need to put your hand up*

An example of literacy management talk is:

Teacher: *You're going to turn to your partner.*
Teacher: *Someone behind you or next to you.*
Teacher: *And tell them what words you heard that sound the same.*
Teacher: *Ok, off you go!*

**Table 7-1: Proportion of type of talk (%)**

<table>
<thead>
<tr>
<th>Type</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom management</td>
<td>14.13</td>
<td>13.84</td>
</tr>
<tr>
<td>Literacy management</td>
<td>21.86</td>
<td>9.19</td>
</tr>
<tr>
<td>Doing literacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reconstruction or restatement</td>
<td>30.09</td>
<td>9.24</td>
</tr>
<tr>
<td>Elaboration or projection</td>
<td>22.11</td>
<td>8.91</td>
</tr>
<tr>
<td>Informative</td>
<td>7.79</td>
<td>4.75</td>
</tr>
<tr>
<td>Learning about literacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>3.34</td>
<td>3.49</td>
</tr>
<tr>
<td>Utility</td>
<td>0.02</td>
<td>0.63</td>
</tr>
</tbody>
</table>

The dominant type of talk was *Doing Literacy*, which accounted for a mean of 59.99% (SD 12.5%) of teacher utterances. The subtypes within this function were *Reconstruction or restatement* (30.09%, SD 9.24%), *Elaboration or projection* (22.11%, SD 8.91%), and *Informative* talk (7.79%, SD 4.75%). Student responses to questions were
typically followed by a teacher *Reconstruction or restatement* utterance, and then an *Elaboration or projection* utterance. For example:

Teacher: *So if he's the grandpa, who do you think this little boy is, um, Anthony?* [elaboration or projection]

Student: *This is like a little boy*

Teacher: *A little boy.* [reconstruction or restatement]

Teacher: *So, can anyone think of a word that might describe if this is the grandpa?* [elaboration or projection]

Talk that met criteria for the function of *Learning About Literacy* accounted for 3.54% of teacher utterances across the 28 samples. *Process* teacher talk, in which teachers spoke about strategies that students could use, accounted for an average of 3.34% (SD 3.49%). Examples of this type of talk include:

Teacher: *Well, we need to look at the word and at the end there isn't an "s" at the end.*

Teacher: *So we need to make sure we're reading exactly what's on the page, don't we?*

Utterances that were coded as *Utility* were rare and accounted for 0.2% (SD 0.63%) of total teacher utterances. An example of an utterance coded as Utility was:

Teacher: *Now you can make a picture in your mind of what she's going to do next.*

When the two types of lessons were compared, more *Process* talk was used in vocabulary instruction (5.17%, SD 3.98%) than phonological awareness instruction (1.5%, SD 1.47%), and this difference was statistically significant (*t*(16.51) = 3.23, *p*=0.005) (equal variances were not assumed). There were no other significant differences between vocabulary and phonological awareness instruction. The key findings from this pilot testing were that (i) collecting teacher talk data remotely was feasible, (ii) Anstey’s (1991) framework was suitable for categorising the type of talk and has an acceptable level face
validity, and (iii) the distribution of teacher talk types is consistent with previously published data (Edwards-Groves et al., 2014).

### 7.3 Part 2: Measurement of Change in Teacher Talk

The procedure described in Part 1 was replicated to determine whether, in addition to being feasible and suitable, this measure of teacher talk was also sensitive to change. It was hypothesised that teachers who were participating in the professional learning intervention within the CPOL trial would use an increased amount of talk that was explicit and/or supported metalinguistic knowledge, and that related to the transference of skills (informative, process and utility).

The recordings provided were predominantly whole class reading activities, with a focus on reading comprehension, vocabulary and/or decoding. In four instances, participants provided recordings of whole class phonological awareness activities. Data were available for 12 teachers at both Time 1 and Time 2. Four teachers were not able to provide a recording at Time 3 due to a change in employment (n=3) or because they were taking maternity leave (n=1). The distribution of the types of talk at Times 1 and 2 (n=12), and Times 1 and 3 (n=8) are summarised in Table 7-2.

A series of paired-sample t-tests was conducted to compare the types of talk at Times 1 and 2 (n=12), and Times 1 and 3 (n=8). There was a statistically significant increase in the proportion of talk classified as Process (M=3.28%, SD 4.75%, p=0.035) between Time 1 and Time 2, with a large effect size of 0.94. A non-significant improvement was also evident between Time 1 and Time 3 in the smaller sample of 8 teachers (M=2.22%, SD 4.5%, p=0.211), with a Cohen’s d of 0.71 indicating a medium to large effect size.
### Table 7-2: Proportion of type of talk at times 1, 2 and 3 (%)

<table>
<thead>
<tr>
<th>Type of talk</th>
<th>n</th>
<th>Time 1 M</th>
<th>SD</th>
<th>Time 2 M</th>
<th>SD</th>
<th>Time 3 M</th>
<th>SD</th>
<th>T1-T2</th>
<th>T1-T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom management</td>
<td>12</td>
<td>16.73</td>
<td>7.14</td>
<td>20.00</td>
<td>15.74</td>
<td></td>
<td></td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>15.43</td>
<td>4.85</td>
<td>18.7</td>
<td>2.89</td>
<td>18.7</td>
<td>8.18</td>
<td>0.49</td>
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</tr>
<tr>
<td>Literacy management</td>
<td>12</td>
<td>16.76</td>
<td>12.56</td>
<td>13.83</td>
<td>8.49</td>
<td></td>
<td></td>
<td>0.36</td>
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<tr>
<td></td>
<td>8</td>
<td>14.78</td>
<td>9.00</td>
<td>10.82</td>
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<td>12.33</td>
<td>9.78</td>
<td>0.25</td>
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<tr>
<td>Doing literacy</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reconstruction or restatement</td>
<td>12</td>
<td>36.8</td>
<td>11.44</td>
<td>31.93</td>
<td>9.38</td>
<td></td>
<td></td>
<td>0.47</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>39.21</td>
<td>12.43</td>
<td>32.55</td>
<td>6.04</td>
<td>35.9</td>
<td>7.84</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>Elaboration or projection</td>
<td>12</td>
<td>23.59</td>
<td>9.52</td>
<td>23.18</td>
<td>9.6</td>
<td></td>
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<td>0.04</td>
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<tr>
<td></td>
<td>8</td>
<td>25.09</td>
<td>8.64</td>
<td>24.61</td>
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<td>24.00</td>
<td>7.21</td>
<td>0.07</td>
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</tr>
<tr>
<td>Informative</td>
<td>12</td>
<td>3.61</td>
<td>2.31</td>
<td>4.86</td>
<td>4.27</td>
<td></td>
<td></td>
<td>0.34</td>
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<tr>
<td></td>
<td>8</td>
<td>3.31</td>
<td>2.36</td>
<td>5.22</td>
<td>5.07</td>
<td>4.43</td>
<td>3.5</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td>Learning about literacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>12</td>
<td>2.29</td>
<td>2.68</td>
<td>5.58*</td>
<td>4.16</td>
<td></td>
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<td>0.94</td>
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</tr>
<tr>
<td></td>
<td>8</td>
<td>2.16</td>
<td>2.74</td>
<td>6.65</td>
<td>3.97</td>
<td>4.38</td>
<td>3.43</td>
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</tr>
<tr>
<td>Utility</td>
<td>12</td>
<td>0.19</td>
<td>5.60</td>
<td>0.60</td>
<td>0.81</td>
<td></td>
<td></td>
<td>0.58</td>
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</tr>
<tr>
<td></td>
<td>8</td>
<td>0.00</td>
<td>0.00</td>
<td>0.06</td>
<td>0.91</td>
<td>0.21</td>
<td>0.29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < 0.05
No significant differences in other types of talk occurred between Time 1 and Time 2. Medium effect sizes were observed in *Informative* ($d=0.34$) and *Utility* ($d=0.58$) types of talk, but these increases were not significant. The teachers used proportionately less *Literacy Management* ($t(11) = -0.682, p=0.51$) *Reconstruction or restatement* ($t(11) = -1.32, p=0.21$) and *Elaboration or projection* talk ($t(11) = -0.124, p=0.903$) at Time 2, and proportionately more classroom management talk ($t(11) = 0.875, p=0.4$).

At Time 3, a year later, the remaining eight teachers continued to use more Process talk than at Time 1, with a medium to large effect size evident ($d=0.71$), although this increase was not statistically significant ($p=0.21$). Proportionately more *informative* and *utility* talk was also used at Time 3, but these differences were much smaller and not significant.

### 7.4 Discussion

This study built upon the notion that while professional learning can improve teachers’ knowledge of language and literacy constructs, this may not be sufficient to result in improved student outcomes. When theories of teacher change are considered, altering practice is a crucial aspect in improving student outcomes (Desimone, 2009; Guskey, 2002). In addition to answering the research question above, this study was designed to complement the CPOL trial through piloting and testing a procedure for measuring and categorising teacher talk. Talk was measured as an indicator of practice, although it is recognised that instructional practice includes a broader range of behaviours and skills. This procedure generated a quantitative indicator of the distribution of types of talk and has potential application as a teacher outcome measure. The small sample size must be considered in the interpretation of these results, and in the absence of control comparisons, a causal relationship between participation in professional learning and change in teacher talk cannot be reported.
Feasibility.

The ubiquitous nature of smart phone technology meant that this approach to the collection of samples of talk was feasible in a way that may have not been possible even a decade ago. Much of the existing research in this field has used data that have been collected using non-participant, in-person observations by researchers. In the present study, however, data about teacher practice was collected through audio recordings made by the participants themselves. Using an approach that did not require a research assistant to be present in the classroom meant that data could be collected in a number of rooms at approximately the same time.

Neither a research assistant nor unfamiliar equipment were present in the classroom, optimising the extent to which an authentic, naturally occurring interaction could occur. While the impact of introducing an observer into the classroom environment was removed, other forms of bias were introduced. Namely, this process was instead dependent on participant engagement and compliance. Teachers also chose the time and lesson that was recorded. In the piloting phase of this study, transcription was completed by university students who were already skilled in transcription and were familiar with listening to children’s language. No problems were encountered in this process.

Two key limitations were identified during this study. The first limitation of this approach was the lack of visual data in the recordings. Verbal communication is complemented by visual communication such as gestures, shared eye-contact, and pointing. Not being able to see the teachers and children meant that there were occasions of ambiguity when non-specific language was used, but this may have occurred in the context of nonverbal cues that made meaning clear in context.

Secondly, compared to much of the existing literature that describes discourse within the classroom, this approach has a relatively narrow focus. Michaels and
O’Connor (2015) similarly commented that their micro-analysis of talk may appear to be a *blunt instrument*. While this method lacked the depth and detail of descriptive studies of classroom discourse (that used conversational analysis), it does appear to be suitable for quantifying the distribution of types of talk. As such, it was used to measure change in the second part of this study.

The limitations of the approach used to measure teacher talk have been described above. The second part of this study was limited by a relatively small sample size, and the absence of a control group. It is likely that only teachers who were relatively experienced, confident in their own abilities, and/or intrinsically interested in the discourse within their classroom volunteered to participate. In future applications of this procedure, it is recommended that inter-rater reliability is measured. Further development and testing are needed to determine the predictive and concurrent validity of this framework as a measure of teacher talk. It would be of interest to determine whether teachers’ increased use of a specific type of talk (relative to other types) predicts student achievement.

**Part 1: Pilot testing.**

The key findings from the pilot phase of this study reported above were that (i) collecting teacher talk data remotely using smart phones was feasible, (ii) Anstey’s (1991) framework was suitable for categorising the type of talk and has an acceptable level of face validity, and (iii) the distribution of teacher talk types is consistent with previously published data (Edwards-Groves et al., 2014).

Through the process of applying the categories and subcategories of the function of teacher talk to the samples of classroom talk, the framework was determined to have sound face validity. Nearly all teacher C-units were attributed to an existing function of talk, across two different types of literacy lessons (vocabulary and
phonological awareness). Most talk was orientated towards doing tasks associated with literacy. Consistent with remarks made by Gillies (2016) and Howe and Abedin (2013), despite a growing body of evidence that demonstrate the impact of dialogic talk, Initiation-Response-Evaluation (IRE) style interactions appear to be the default mode of operation in many classrooms.

The very limited presence of informative, process or utility talk suggests that teachers in this pilot study were not consistently and reliably sharing information about language and literacy explicitly with their students. When this is considered alongside the findings from Study 1 in this thesis, it is possible that the limited knowledge of some teachers restricted their ability to provide information to their students. There was little explicit instruction, provision of metacognitive information, or language that supported the transfer of knowledge to other contexts (for example, “That's why [key words] are really important because we can use those to retell the whole story”).

The variability of the function of talk between samples (for example, Learning About Literacy accounted for an average of 3.54% of classroom talk, with a range between 0.0% and 14.81%) suggesting that this framework may differentiate between classrooms where certain types of talk are used with greater frequency than others. The distribution of the type of talk aligned closely with the findings of Anstey’s 1991 study of Australian teachers, suggesting both that the results are replicable, and based on this small pilot study that very little has changed in classroom talk in nearly 3 decades.

**Part 2: Measurement of change in teacher talk.**

When this procedure was used to measure change over time in 12 teachers who participated in professional learning, no statistically significant changes were
found. It was, however, evident that teachers used proportionately more talk that supported students' focus on cognitive aspects of task and decision-making processes (coded as process). The CPOL professional learning program appears to have had a small to medium positive effect on teachers' provision of information or definitions about literacy (informative talk) and explanations about how the strategies or process might be useful in other situations (utility talk). A year later, these three types of talk were still used proportionately more than they were at the first measurement (close to baseline), but not to the same extent that they were immediately following the professional learning program.

There is a clear link between the type of talk coded as process, informative and utility, and the explicit instruction that was found to be of benefit to students in earlier descriptive (Geoghegan, O'Neill, & Petersen, 2013; Gillies, 2016; van der Veen, de Mey, van Kruistum, & van Oers, 2017) and experimental studies (Apthorp et al., 2012; McCutchen, Abbott, et al., 2002). As such, these results are somewhat promising. When considered alongside the findings that (i) the OLSEL intervention resulted in improved student outcomes, and (ii) the CPOL intervention resulted in improved teacher knowledge, it is plausible that this intervention has changed teachers' talk. It appears that the intervention had an effect on the types of talk teachers used. Of course, this should be interpreted with caution due to a small sample size and a novel assessment measure. Furthermore, the teachers who participated in this study volunteered, and as such, may have different characteristics to the larger CPOL sample, and teachers generally.

The second part of this study was limited by a relatively small sample size, and the absence of a comparison group. It is likely that only teachers who were relatively

\[61\] Change in process talk was significant prior to adjustment for multiple comparisons.
experienced, confident in their own abilities, and/or intrinsically interested in understanding their discourse use within their classroom volunteered to participate. In future applications of this procedure, it is recommended that inter-rater reliability is measured. Further development and testing are needed to determine the predictive and concurrent validity of this framework as a measure of teacher talk. It would also be of interest to determine whether teachers’ increased use of a specific type of talk (relative to other types) predicts student achievement.
Chapter 8  The Impact of an Oral Language Professional Learning Program on Australian Early Years’ Teachers’ Knowledge, Practice and Beliefs

8.1 Chapter Overview

In this chapter, a series of three case studies is reported. This manuscript has been accepted by the journal *Professional Development in Education*. The interview protocol for this study is included in Appendix J. This manuscript has been modified to meet APA 6th guidelines and subheadings have been formatted to align with the style in this thesis.
The impact of a sustained oral language professional learning program on Australian early years’ teachers’ knowledge, practice and beliefs: a mixed-methods exploration

Hannah L. Stark\textsuperscript{a,c}, Patricia A. Eadie\textsuperscript{a,*}, Pamela C. Snow\textsuperscript{b} and Sharon R. Goldfeld\textsuperscript{c, d}

\textsuperscript{a}Melbourne Graduate School of Education, The University of Melbourne, Parkville, Australia; \textsuperscript{b}La Trobe Rural Health School, College of Science, Health and Engineering, La Trobe University, Bendigo, Australia; \textsuperscript{c}Murdoch Children’s Research Institute, Parkville, Australia; \textsuperscript{d}Department of Paediatrics, The University of Melbourne, Parkville, Australia

*Level 4, 100 Leicester Street, Parkville, Victoria, 3121, AUSTRALIA, Ph: +61 3 9035 4503, Email: peadie@unimelb.edu.au

Biographical notes:

Hannah Stark is a PhD candidate in Early Childhood Education and Care in the Melbourne Graduate School of Education, University of Melbourne and an honorary research associate at the Murdoch Children's Research Institute.

Patricia Eadie is Associate Professor of Early Childhood Education and Care in the Melbourne Graduate School of Education, University of Melbourne.

Pamela Snow is a Professor and Head of the La Trobe Rural Health School, La Trobe University.

Sharon Goldfeld is a Professor in the Department of Paediatrics, University of Melbourne and Co-Group Leader of Child Health Policy, Equity and Translation at the Murdoch Children’s Research Institute.

Acknowledgements: This project was funded by an Australian Research Council Linkage Grant (LP13011308) and the Ian Potter Foundation. Hannah Stark received support through an Australian Government Research Training Program Scholarship. Sharon Goldfeld is supported by an Australian National Health and Medical Research Council (NHMRC) Career Development Fellowship 1082922. We acknowledge and thank the teachers for their contributions to this study.
The impact of a sustained oral language professional learning program on Australian early years’ teachers’ knowledge, practice and beliefs: a mixed-methods exploration

8.2 Abstract

Teachers in the early years of primary school can play an important role in supporting students’ oral language skills, however there is evidence to suggest many Australian teachers are not adequately prepared to provide systematic, evidence-based instruction in oral language and/or early literacy. The aim of this study was to describe the observed and self-perceived changes in knowledge, practice and beliefs of teachers who participated in a sustained oral language professional learning program. A second aim was to determine whether this development was adequately accounted for by current models of professionalism and professional development. Three case studies are presented, using data taken from a survey of teacher knowledge and the analysis of samples of classroom talk at three time points, and semi-structured interviews. These case studies illustrate that despite participating in the same sustained professional learning program, there was inconsistency in teachers’ outcomes. Growth in knowledge was variable; and change in self-rated ability to provide instruction was influenced by observed student outcomes (which teachers attributed to change in their practice). In one case, professional growth was restricted by factors within the school environment.

Keywords: Professional learning, oral language, literacy, teacher knowledge.
8.3 Introduction

Oral language proficiency is of vital importance in the early years of primary school (Law, Rush, Schoon, & Parsons, 2009, P. Snow, 2016). Children who do not begin school with sufficient oral language are at risk of not developing the skills needed to access the curriculum (Roulstone, Law, Rush, Clegg, & Peters, 2011), and are more likely to struggle socially and emotionally (Schoon, Parsons, Rush & Law, 2010). A symbiotic relationship exists between oral language and literacy (Snowling & Hulme, 2012) and there is a strong and persistent social gradient in both language and literacy achievement, with children from more advantaged backgrounds commonly outperforming their less advantaged peers (P. Snow, 2014). In Australia there is a proliferation of students who do not have the skills required to participate in school and the workforce and this has been described as “the long tail of under achievement” (Masters, 2016). While a multitude of genetic and environmental factors influence children’s oral language and later literacy development, mounting pressure from politicians, commentators and parents is placed upon Australian teachers to better support the language and literacy skills of their most vulnerable students.

It is within the remit of Australian teachers to support their students’ oral language skills (Australian Curriculum Assessment Reporting Authority, 2014). Furthermore, the long-lasting risks associated with poor oral language and literacy skills can be mitigated if teachers provide opportunities for students to strengthen their foundation of oral language in the early years of school and provide systematic, methodical early literacy instruction (Buckingham, Wheldall, & Beaman-Wheldall., 2013). This is further supported by findings from large scale meta-analyses that teacher-mediated factors account for approximately 30% of variance in student outcomes (Hattie, 2009).
There is growing evidence that many Australian teachers are not adequately equipped by their initial teacher education to deliver language and literacy instruction to all students and as a result are not able to provide all students with the requisite knowledge and skills to successfully make the transition to literacy (Fielding-Barnsley, 2010; Meeks, Stephenson, Kemp, & Madelaine 2017; Stark, Snow, Eadie & Goldfeld, 2016). The knowledge and skill base that teachers need to reliably support all students within an early years’ classroom to become competent in both oral and written communication is wide ranging (Moats, 1994). The broad knowledge underpinning ‘oral language’ includes a specific understanding of both the comprehension and production of language and the sounds, syntax and morphological development, as well as narratives and other forms of discourse (Roulstone et al., 2011). In both the United States and Australia, the Peter Effect has been described; a biblical reference to the notion that just as one cannot give something they do not possess, teachers cannot teach what they themselves do not know (Applegate & Applegate, 2004; Binks-Cantrell, Washburn, Joshi, & Houghen, 2012; Stark et al., 2016).

It has been argued that systematic efforts to improve educational standards should include rigorous and sustained professional learning for teachers (Sykes, 1996, Desimone, 2009, Joseph, 2017). Accordingly, there has been a recent increase in research publications pertaining to the efficacy of professional development in early language and literacy (McCutchen, Abbott et al., 2002; P. Snow, Eadie, Connell, Dalheim, McCusker, & Munro., 2014; Washburn & Mulcahy, 2014), yet findings from this body of research remain equivocal. Studies have demonstrated that it is possible to deepen teachers’ knowledge (e.g., McCutchen, Abbott et al, 2002), but there is still a degree of uncertainty about the way in which teachers’ knowledge is enacted in classroom practice, and in turn, influences students’ outcomes. Research examining professional development in language and literacy instruction is often orientated
towards evaluating the content of programs and resultant change in student outcomes (Desimone, 2009). While this is an important and necessary line of enquiry, there is also a need to address the many complex factors that influence how language and literacy are taught and supported in the early years’ classroom.

**Theoretical models of professional learning and teacher change**

Understanding the process of how knowledge is transferred (as a result of professional learning) between teacher and student provides policy makers, politicians, researchers, and, importantly, teachers with insight into not only if, but how improvements are made and sustained. In participating in professional learning, teachers’ existing knowledge is not simply replaced with new knowledge, but instead teachers must decide which new information to integrate with their existing knowledge and understanding, and the way and extent to which this is done (Evans, 2014; Tillema and Imants, 1995). A broader line of enquiry around the process of professional learning and development ultimately ensures professional learning is delivered in a systematic, purposeful way. Resultantly, there can be greater confidence that investment in professional development results in improved teacher quality and student outcomes.

Two widely cited models of teacher change are those by Guskey (2002) and Desimone (2009). These two models are similar in their components but differ in their sequence, directionality and specificity. Guskey’s model is based on the premise there is a close association between teachers’ perception of their own success and their students’ successes. When delivering professional learning, rather than initially seeking to change teachers’ beliefs and/or attitudes, he suggested that training should provide teachers with information and skills to create change in practice. It is a shift in instructional practice that in turn influences students’ outcomes, and it is a shift in student performance that leads teachers to adjust previously held beliefs and attitudes.
In the absence of evidence of positive change in students’ learning, it is suggested that significant change in the attitudes and beliefs of teachers is unlikely.

A more recent path model of professional learning by Desimone (2009) which is similarly sequential (but not unidirectional) has built upon the core features of Guskey’s model. The components of knowledge, practice, attitudes and student achievement are still present but are presented in a different sequence. Desimone proposes that professional development results in increased teacher knowledge and skills and changes attitudes and beliefs, which in turn creates a change in instruction and subsequent improved student learning. As highlighted by Boylan, Coldwell, Maxwell, & Jordan (2018), Desimone has explicitly described the features of professional development needed to effect change, namely a content focus, active learning, coherence, duration and collective participation. Desimone also considers contextual factors that may influence change, including teacher and student characteristics, curriculum, school leadership, policy environment. This model of change that results from professional learning has “nonrecursive, interactive pathways”. This description of growth within one component of the professional learning model is not necessarily dependent on growth other components, and there may be variability in the sequence and directionality of change.

The influence of these path models can be seen in the design of evaluative studies of professional learning in language and literacy, in which programs have sought to change teachers’ practices, resulting in change in students’ outcomes, including the work of McCutchen, Abbott et al. (2002), Piasta, Connor, Fishman, & Morrison. (2009), and P. Snow et al. (2014). The intervention component of these studies has sought to improve student outcomes by influencing teachers’ knowledge and practice, rather than directly targeting attitudes or beliefs. Just as these two models of professional development and teacher change have influenced researchers and
academics in this field, many have also been critical of these linear models, and have described the process-product conceptualisation of professional development as too simplistic.

**The present study.**

This study was designed to investigate the process of professional learning within the Classroom Promotion of Oral Language (CPO) cluster randomised controlled trial. The CPO trial sought to determine if student outcomes in oral language and literacy were improved as a result of their teacher’s participation in an oral language professional learning intervention (Goldfeld et al., 2017). This embedded study was guided by an overarching question: To what extent do the pathway models proposed by Guskey (2002) and Desimone (2009) account for the observed and self-perceived change in knowledge, practice, attitudes and beliefs in three Australian early years’ teachers who participated in a sustained teacher led oral language professional learning program? In line with these models and previous research by McCutchen, Abbott et al. (2002), it was hypothesised that the following changes would be observed:

1. Participation in professional learning would result in an increase in teachers’ knowledge of language and literacy constructs;
2. Self-rated ability to teach a range of topics associated with oral language (and early literacy) instruction would rise as a result of increased knowledge of language and literacy constructs and experience implementing evidence based instructional strategies;
3. High quality, evidence-based instruction with explicit teaching by teachers with improved knowledge of oral language constructs would result in improved student outcomes (as perceived by their teachers);
4. Improved student outcomes would be associated with changed teacher beliefs about oral language and pre-literacy skills.
These hypotheses were tested using a series of three case studies. It was anticipated that one or both of these models may not be sufficient for explaining the complexities of teacher change. For this reason, in addition to data and methodological triangulation, theoretical triangulation was also used. Additional contextual and historical factors that may influence teacher knowledge, practice, attitudes and beliefs were also considered.

**Research paradigm.**

To determine if the hypothesised observable and self-reported changes described above occurred as a result of professional learning, this study was conducted within a pragmatic paradigm. Pragmatism refers to the connection between knowledge and methods by which this knowledge is gained and posits that knowledge of the world can be obtained by observation, experience and experimentation (Liamputtong, 2010). Pragmatism permits a connection between the nature of knowledge and the methods used to gain knowledge (Johnson, Onwuegbuzie, & Turner, 2007; Teddlie & Tashakkori, 2003). This approach has been used previously in the field of teacher professional learning (Kim, Capotosto, Hartry, & Fitzgerald, 2011; Neuman & Wright, 2010,).

**Study design.**

A mixed-methods, explanatory sequential design was used in this study to obtain two perspectives on the process of teacher change during a professional development program. Quantitative data was used to measure the knowledge, self-rated ability and practice components before, during and after the intervention, aligning with the linear theories proposed by Guskey (2002) and Desimone (2009). Qualitative data taken from semi-structured interviews was used comparatively to illustrate the participants’ perspectives of their experiences of the professional learning and their
perceptions of change. The integration and comparison of qualitative and quantitative data offered the opportunity for illustration and analytic density (Fielding, 2012).

8.4 Methods

Participants.

Three self-nominated female teachers participated in this study. The participants (who were given the pseudonyms Karen, Elizabeth and Stacey) taught in Foundation classrooms at schools that participated in the CPOL trial (Goldfeld et al., 2017). This large-scale trial sought to determine the effectiveness of a teacher led oral language intervention in the Australian state of Victoria between 2014 and 2017.

Details of the CPOL trial have previously been published (Goldfeld et al., 2017) and are described only in brief here. In 2013, Victorian Government and Catholic schools were invited to submit an expression of interest (EOI) to participate in this trial if they had greater than 10% of children that were developmentally vulnerable in the language and cognitive domains on the 2009 and/or the 2012 Australian Early Development Index (now the Australian Early Development Census; Brinkman, Gregory, Goldfeld, Lynch, & Hardy, 2014) and had not previously participated in a similar intervention. Following this EOI process, schools that met the specified criteria were selected to participate and baseline student and teacher data was collected. Schools were then randomly allocated into the control or intervention arm of the trial. Karen, Elizabeth and Stacey were employed by schools allocated to the intervention arm of the trial. They each attended four days of face-to-face professional learning that were spaced over 12 months. All three participants were recruited into this embedded study on the first day of the program.

62 Foundation is the first year of formal school in education. It is also referred to as the preparatory, or “prep” year. Grade one is the second year of formal schooling, and grade two is the third year.
Intervention.

All early years’ teachers from each intervention school were invited to attend a four-day program of professional learning, based on the Ideas, Conventions, Purposes, Ability to Learn, Expressive and Receptive Language (ICPALER) Framework (Munro, 2011). ICPALER provides an explicit conceptual and pedagogical framework that teachers can draw upon to promote a range of expressive and receptive language skills in their classroom. It considers the underlying expressive and receptive language skills (e.g., phonological, morphological, semantic, syntactic, and discourse), supporting teachers to develop teaching strategies that facilitate students to develop more sophisticated language skills. Within the overarching ICPALER Framework, the CPOL professional learning program incorporated four language domains: phonemic and phonological awareness, vocabulary knowledge, awareness and application of story grammar, and comprehension and use of longer and more complex sentences. This intervention framework was previously utilised in the Oral Language Supports Early Literacy (OLSEL) trial (Snow et al., 2014), a successful pilot study that informed the design of the CPOL trial (Goldfeld et al., 2017).

As described in Goldfeld et al. (2017), the first three professional learning days were held 6-8 weeks apart. The Victorian school year runs from January to December and the first professional learning day took place in May of the Foundation year. The final day was held in February of the following year (when students were in Grade 1, their second year of formal schooling). In addition to the face to face training days, participants had access to a self-directed online learning network of teachers and had the opportunity to liaise with specialist support workers via intermittent face-to-face, telephone, and online communications throughout the intervention. An overview of the professional learning content is shown in Table 8-1. The professional learning program met the core features of a high-quality professional program, including a content focus,
active learning, coherence, substantial duration and collective participation, as specified by Desimone (2009).

Table 8-1. Overview of the CPOL intervention (Goldfeld et al., 2017)

<table>
<thead>
<tr>
<th>Session</th>
<th>Content summary</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>Introduction to the need for oral language promotion in the early years’ classroom.</td>
<td>Facilitated discussion</td>
</tr>
<tr>
<td></td>
<td>Detailed overview of the ICPALER Framework for describing and teaching language</td>
<td>Video footage including teaching examples</td>
</tr>
<tr>
<td></td>
<td>Discussion of the material provided</td>
<td>Table and whole group discussion</td>
</tr>
<tr>
<td>Day 2</td>
<td>Day 1 refresher</td>
<td>Facilitated discussion/activities</td>
</tr>
<tr>
<td></td>
<td>Assessing and profiling for oral language</td>
<td>Modelled use of two assessment tools</td>
</tr>
<tr>
<td></td>
<td>Using ICPALER to plan and implement classroom-based speaking and listening teaching</td>
<td>Practice use of a screening tool</td>
</tr>
<tr>
<td></td>
<td>School planning for implementation</td>
<td>Facilitated activities</td>
</tr>
<tr>
<td>Day 3</td>
<td>Day 2 refresher</td>
<td>Small group planning</td>
</tr>
<tr>
<td></td>
<td>Assessing and teaching the ‘four language elements’: Phonological and phonemic awareness, vocabulary development, developing and using complex sentences and story grammar.</td>
<td>Facilitated discussion and activities</td>
</tr>
<tr>
<td></td>
<td>School planning for implementation</td>
<td>Small group planning</td>
</tr>
<tr>
<td>Day 4</td>
<td>School presentations of implementation</td>
<td>Peer to peer learning</td>
</tr>
<tr>
<td></td>
<td>School planning for sustained implementation</td>
<td>Small group planning</td>
</tr>
</tbody>
</table>

Measures.

Teacher survey.

The three participants completed the CPOL Teacher Survey (described below) on three separate occasions; at baseline (T1), at the end of the first year of the intervention (T2), and again one year later (T3). The survey was distributed via REDCap, a secure web application for building and managing online surveys and databases (Harris, Taylor, Thielke, Payne, Gonzalez & Conde., 2009). This survey was used to measure teacher knowledge of language and literacy constructs. The survey
Knowledge. As described in Stark et al. (2016), there were 37 items in the CPOL Teacher Survey pertaining to teacher content knowledge of basic language constructs. Two of these items comprised several component parts, resulting in a total of 56 items. Forty-three of these knowledge items were drawn from Binks-Cantrell, Joshi and Washburn (2012), and/or Fielding-Barnsley and Purdie (2005), and had, in turn, originated from earlier studies, including Moats (1994). The other 13 items, most of which related to knowledge of sentence and discourse level language, were developed specifically for the CPOL study (Goldfeld et al., 2017).

Teacher knowledge items were categorised to create a series of outcome measures: domains and aspects. The category of domain measured knowledge, skill or pedagogy. Knowledge items measure the explicit knowledge of a term or concept. Skill items measures an implicit ability to perform a task. Pedagogy items measure the practice associated with teaching a construct or concept (see Stark et al., 2016 for a more detailed description of these classifications). Survey items were also classified by the aspect, which incorporated measurement of phonemic awareness, phonological awareness, phonics, and morphology, as well as novel items measuring knowledge of sentence and discourse level language.

Self-rated ability. Within the same survey, Karen, Elizabeth and Stacey were asked to rate their own ability (as either minimal, moderate, very good, or expert) to teach across 10 areas related to language, reading and literacy, including teaching phonics, comprehension, and teaching children with reading disabilities. These responses were given a score (minimal = 1, moderate = 2, very good = 3 and expert =
4), and an average score across the 10 areas was calculated. The total possible scores ranged between 1 and 4.

**Teacher talk.**

On three occasions during the professional learning program Karen, Elizabeth and Stacey were asked to make a 10-minute classroom recording of literacy or oral language instruction. These recordings were made following the first day of intervention, at the end of the first school year, and again 12 months later. The participants were informed that these recordings were for the purpose of analysing their talk. Recordings were made using a smart phone, tablet or electronic recording device. Audio recordings were shared with the researchers through a secure online data sharing service.

**Transcription and analysis of samples of teacher talk.** The recordings were transcribed using an online transcription service. Transcripts were checked by the first author for accuracy, who then segmented the transcripts into C-units and transferred the text into Microsoft Excel. A C-unit is akin to a sentence and is defined as an independent clause with its modifiers, and includes sentence fragments (Miller, Andriacchi, Nockerts, Westerveld, & Gillon, 2011). C-units in the transcript were attributed to either the teacher or the students in the class. Individual student identities were not recorded in the samples; transcripts were treated as dyadic conversations between the teacher and a class of students. The transcripts were then analysed by the first author as per the Anstey (1991) teacher talk framework described below, and in greater detail elsewhere (Edwards-Groves, Anstey & Bull, 2014, Eadie et al., in preparation).

**Measure of teacher talk.** Anstey’s (1991) framework (most recently published in Edwards-Groves et al. (2014)) for describing function and type of teacher talk in Australian classrooms was originally developed through coding of samples of
classroom talk in Australian primary schools. This framework and application within the CPOL trial is described in detail elsewhere (Eadie et al., in preparation). A brief overview is provided below.

This framework identifies three broad functions of teacher talk (Organisation, Doing Literacy or Learning about Literacy). This framework was chosen for the following reasons: firstly it was expected to be consistent with the type of teacher talk that was expected by teachers participating in the CPOL trial. Secondly, the categories of type and function of talk were specific to oral language and literacy instruction, without aligning only with one skill area or aspect (e.g., phonological awareness or syntactic complexity). The intervention within the CPOL trial was broad and sought to develop teachers’ knowledge and strategies across a number of domains, making this framework appropriate for analysis within the context of professional learning. Thirdly, Anstey’s framework offered two levels of analysis: three categories of Organisation, Doing Literacy, and Learning about Literacy, and the seven sub categories. This enable a broad level analysis, and more fine-grained analysis. The percentage of C-units within each sample of teacher talk attributable to each function and sub-classification of talk was calculated. It was expected that, following participation in the professional learning program, teachers’ use of language that supported students’ Learning about Literacy would increase. This type of talk supports students’ metalinguistic and metacognitive knowledge and skills.

**Semi-structured interviews.**

Semi structured telephone interviews were conducted by the first author with the three participants following their participation in the intervention. In these interviews, participants’ perspectives about the role of oral language within the early years’ classroom were elicited, and their perceptions of the process of participation in the professional learning, their change in knowledge, practice, attitudes and beliefs,
and their influence upon their students were discussed. Their observations of environmental and contextual factors that may have contributed to their participation, change, and the sustainability of change were also explored. The interviews were audio-recorded and later transcribed. They were coded deductively and inductively using NVivo, to identify themes related to the professional learning process, using the components of Desimone (2009) and Guskey’s (2002) models of teacher change, as described above.

### 8.5 Results

Karen, Elizabeth and Stacey’s cases are presented below. As per the explanatory design of this study, the data from the quantitative measures described above are summarised in Table 8.2 and were subsequently integrated with the qualitative data from the semi-structured interviews. Results are presented in relation to the components of Guskey (2002) and Desimone’s (2009) models, specifically knowledge, practice, beliefs and attitudes, and perceptions of students’ outcomes.

#### Karen.

**Training and career pathway.**

Karen is aged in her 50s and completed her initial three-year teacher training in Australia in the late 1970s. She described her initial teacher training as being focused on the creation of language and literacy experiences for students and reported that in the early years of her career she believed children learnt to read almost "by osmosis". Karen had a career interruption of approximately 15 years while raising a family and returned to classroom teaching in the late 1990s as an emergency teacher. In the mid-2000s she undertook the fourth year of initial teacher training at a university. During this year she elected to enrol in as many literacy subjects as possible. After this year of study, she returned to full time teaching and, prior to the professional learning program
reported in this paper, had been teaching in the Foundation year consistently for six
years. She continued to teach in Foundation for the duration of the intervention.

Change in knowledge.
Karen reported feeling that she did not know a lot about oral language before the
professional learning program. She spoke about her confusion understanding the
difference between phonics, and phonemic and phonological awareness. As shown in
Table 8-2, Karen's total knowledge score did not change substantially between
baseline (66%) and immediately following the professional learning (67%) and was
lower at follow up a year later (57%). At follow up she responded to all morphemic skill
items with “I don't know”, where she had previously answered many of these items
correctly.

Karen initially reported that the professional learning content around vocabulary
instruction was particularly valuable for her, and later spoke about the importance of
learning about sentence structure and semantics. She thought learning about the
ICPALER model had helped structure her knowledge but reported she was not highly
motivated to learn the specifics of language and literacy constructs. She believed
building her knowledge around promoting children's knowledge was much more
important. She commented that if she taught a higher grade, she might have felt it was
more important to know the correct terminology. Karen reported that she found the
surveys frustrating and sometimes guessed when answering items at follow up.
<table>
<thead>
<tr>
<th>CPOL Teacher survey</th>
<th>Knowledge domain</th>
<th>Skills domain</th>
<th>Pedagogy domain</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>knowledge items</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(number of items and % correct)</td>
<td>Karen</td>
<td>Elizabeth</td>
<td>Stacey</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td>T2</td>
<td>T3</td>
<td>T1</td>
</tr>
<tr>
<td>Knowledge domain</td>
<td>7 (53.85%)</td>
<td>8 (61.54%)</td>
<td>7 (53.85%)</td>
<td>8 (61.54%)</td>
</tr>
<tr>
<td>Skills domain</td>
<td>29 (74.36%)</td>
<td>30 (76.92%)</td>
<td>23 (58.97%)</td>
<td>32 (82.05%)</td>
</tr>
<tr>
<td>Pedagogy domain</td>
<td>1 (25.00%)</td>
<td>0 (0.00%)</td>
<td>2 (50.00%)</td>
<td>1 (25.00%)</td>
</tr>
<tr>
<td>Total</td>
<td>37 (66.07%)</td>
<td>38 (67.86%)</td>
<td>32 (57.14%)</td>
<td>41 (73.21%)</td>
</tr>
<tr>
<td>CPOL Teacher survey</td>
<td>Self-rated ability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>self-rated ability</td>
<td>3.2</td>
<td>2.5</td>
<td>3.3</td>
<td>2.5</td>
</tr>
<tr>
<td>Type of talk (% C-Units)</td>
<td>Organising Literacy</td>
<td>38.89%</td>
<td>32.35%</td>
<td>20.39%</td>
</tr>
<tr>
<td>Doiing Literacy</td>
<td>60.61%</td>
<td>55.88%</td>
<td>69.74%</td>
<td>77.78%</td>
</tr>
<tr>
<td>Learning About Literacy</td>
<td>0.51%</td>
<td>11.76%</td>
<td>9.87%</td>
<td>4.83%</td>
</tr>
</tbody>
</table>
Change in practice.

The proportion of Karen’s talk that was explicit to learning about language and literacy increased between baseline (0.51%) and the end of the professional learning program (11.76%) and was sustained a year later (9.87%). Karen described her new process of explicitly teaching the vocabulary that was going to be encountered by her students in a new book, or before an inquiry topic. She reported that she had a much stronger focus on phonological awareness, before phonics. She also spoke about being more purposeful in differentiating her teaching for the different abilities in her class.

In describing her practice change, Karen recounted her previous practice, and made a series of comparisons. She felt her expectations of students during language and literacy tasks had changed. In the past, she reflected, children would be expected to be engaged with a lot more reading and writing tasks each day. She now sets much higher expectations around sharing activities and using oral language skills both in structured tasks, and during breaks and meal times. Karen also described a subtle change in her practice.

If somebody walked in from five years ago they probably wouldn't say that I was doing anything different because I’m using the [same] resources, but the resources that I’ve got I’m using differently. I’m using a big book much differently now than I would have.

Karen appeared to work quite independently within her school environment and did not talk about the influence of her colleagues or school leadership on her practice. Karen did not describe any barriers or challenges to implementation, but when considering the implications of participating in the intervention said “We probably haven’t spent any money and I’m able to use the same resources. It’s made me realise is that I’m the change, rather than the resources. My role is much more important than I realised".
Change in attitudes and beliefs.

Karen was a willing participant and reported feeling “enormous excitement” at the prospect of participating in the professional learning. Upon completion, she described a feeling of empowerment, saying “The fact that it had such high-quality people and theory and research behind it. It came across to me as so professional, I knew I had what I needed to help the children”.

Karen’s self-rated ability decreased between baseline (3.2) and immediately after the professional learning (2.5) and raised again a year later (3.3). Throughout the intervention she valued having access to resources but did not mention during the interview that she had found value in engaging in coaching or mentioning activities with a CPOL support worker, or collaboration with her colleagues.

Perceptions of change in student outcomes.

Karen spoke about reflecting on the research by Hart and Risley (1995), that had been discussed in the professional learning program. She reported linking this research to her own class and understanding which children had relatively higher early language input and those who had not. Karen described oral language as being vital for young children, especially those learning English as a second language:

If they don’t understand their particular vocabulary about the thing that’s being taught, they just don’t have access to it. They need to be able to express what they’re thinking. It’s something that’s gradually become apparent to me over the course of teaching.

Karen reflected on how, prior to her professional learning, she saw children who struggled with literacy in their Foundation year continue to struggle in subsequent years. She described watching children in her class during the professional learning make
relatively slow progress in Foundation but felt that they were showing accelerated growth in Grade 1 and Grade 2. She felt that oral language input they received in their first year of school was still helping them in subsequent years. Karen described her observation of students succeeding beyond her expectations.

Last year I thought I had a very mediocre group of children and I thought even some of them were very low. I was… focused on oral language and I was pleasantly surprised with the level of reading that they ended up. I’m not talking about off the chart or anything, but basic prep (Foundation) standard. But these were children that I thought “I'll never be able to get them near”.

Elizabeth.

Training and career pathway.

Elizabeth, aged in her forties, completed her initial undergraduate teacher training in the early 1990s, and did not recall being taught about oral language specifically in this training. She taught for 10 years, before taking a 10-year break from teaching and then returning full time. The first year of the intervention was her third year teaching Foundation full time. She had not undertaken any formal postgraduate training and reported that what she felt she knew about oral language development and pedagogy, she had learnt since graduating. She did however, report in the written survey that her knowledge came from her own primary or secondary education.

Change in knowledge.

Elizabeth’s knowledge was high before the intervention began (73%), increased throughout the professional learning program (80%) and remained high (78%) a year later. Her performance on the phonemic skill items remained high throughout, but her
demonstrated ability to count morphemes within words fell throughout the intervention. Elizabeth reported that some linguistic terminology was new to her and she realised during professional learning that she had gaps in her knowledge. She described the experience of realising what she did not know as being overwhelming at times. Elizabeth reported that, for her, an important outcome was being able to recognise the variability in oral language abilities in young children, saying “You just take it for granted that the kids can answer questions but their lack of comprehension or their lack of vocabulary has really surprised me when I’ve delved under the surface”.

**Change in practice.**

Elizabeth increased the proportion of explicit talk between baseline (4.83%) and the completion of the professional learning (10.9%). This wasn’t sustained at follow up (1.83%), but there was evidence she was using less organisational language and there was an increase in ‘doing’ language. Elizabeth described having a heightened awareness of oral language, “For a very long time I just thought, we do show and tell. There’s the oral language”.

Elizabeth said the most important thing she learned during the professional learning program was to have higher expectations of her students and a stronger focus on encouraging students to speak in full sentences and use interesting words. She described explicitly encouraging her students to use their oral language to support their written work:

> Before they’re doing their writing, they have to orally construct the sentence that they’re going to write so then we encourage them to put adjectives or whatever in there so that transfers over to their writing, that definitely goes hand-in-hand.
At the same time, she described feeling better-able to differentiate her teaching and to support quieter, more reticent children to attempt to answer questions. In addition to the content that came from the intervention, Elizabeth found the experience of making audio recordings of her classroom practice made her feel accountable and aware of how she was implementing the knowledge and strategies she was learning.

**Change in attitudes and beliefs.**

Elizabeth’s self-rated ability varied only marginally between the three time points. She found some parts of the intervention did not pique her interest and reported her engagement at times was low. She initially described her experience of the professional learning as a re-visit of content she already knew, then pausing before saying that she did feel she had learnt a lot along the way, stating:

> It definitely has had a positive impact on my teaching, and that's had a positive impact on the children and their learning. We are all much more aware of the importance of oral language now and it's not just left to show and tell on a Friday afternoon.

**Perceptions of change in student outcomes.**

Elizabeth confidently reported that the oral language skills of the students in her class had improved as a result of her participation in the professional learning. She described recognising her students’ metalinguistic skills, describing an example of a student who, when reading described a sentence as boring. When asked why, the student responded “because it’s only got four words in it”. Elizabeth also described a positive impact oral language development had on children’s social and emotional regulation.
Stacey.

*Training and career pathway.*

Stacey, aged in her mid-thirties, completed her initial teacher training in the mid-2000s. She began a master’s degree in education, but described “losing interest” in the course and decided to pursue a Diploma in Psychology. At the beginning of the intervention Stacey was teaching in a Foundation classroom. In the second year of the intervention her role within the school changed and she became a leading teacher. This meant she spent less time in the classroom and had responsibilities in supporting other staff and strategic planning. Stacey described being influenced by her school principal, who was a strong advocate for supporting children’s oral language within the classroom, but who she described as not being supportive of systematic approaches to teaching language and literacy, and sceptical of some content within the professional learning program.

*Change in knowledge.*

Stacey’s performance on the teacher knowledge survey was comparable between baseline (51%) and immediately after the professional learning (55%) but improved a year later (66%). Despite learning what a morpheme was, she was consistently unable to correctly count morphemes within words. She spoke about learning more about oral language over the course of the intervention but did not specify what she had learnt or how it had influenced her practice in the classroom. She did not discuss which aspects of her knowledge had changed but did specify her understanding and attitude towards oral language had changed: “I think it’s been a really big eye opener for me in knowing that oral language really is what underpins everything else.”
**Change in practice.**

At the beginning of the intervention Stacey’s classroom talk was orientated around organisation and drill style repetition activities and contained very little explicit information (0.38%). At the end of the professional learning her style of instruction had changed drastically and she explicitly shared information with her students consistently throughout the recorded sample (15.2%). This style of instruction was still present but to a lesser degree a year later (4.31%). When interviewed, Stacey did not speak about how her personal classroom practice had changed in specific detail, but did highlight the importance of the influence of her colleagues, stating:

Since getting back into the classroom and talking to my other colleagues about it I’ve been really invigorated at making oral language a priority in the classroom. I guess, if nothing else, it inspired me to think more carefully about how I delivered my lessons, how I delivered my questions.

She then commented on oral language and the implementation of the curriculum within her school, although her comments lacked specific detail, for example “Oral language is through the whole curriculum…. I think there is a lot more emphasis in the early years currently in our school.”

**Change in attitudes and beliefs.**

Stacey’s self-rated ability was high at the beginning of the study and remained so throughout. Stacey described a degree of indifference in her attitude towards participation in the professional learning intervention. She spoke of difficulty engaging in the content during the face-to-face days but found that her motivation to implement the strategies and knowledge increased once she returned to her school and began discussing her ideas with colleagues. She spoke of finding it difficult to find time to plan and enact changes within her classroom and school. She also spoke about recognising there was a degree of
tension between the content of the professional learning and the philosophical approach towards literacy within her school.

**Perceptions of change in student outcomes.**

When asked whether she had observed change in the children in her class, Stacey spoke about the low socio-economic status of the community.

I mean we have a challenging demographic of clientele who generally have a lower achievement in oral language. It's definitely a barrier when children start school. We only have one EAL child in our school. So it's not as though we've got issues with English being a second language, it's just low development of oral language skills.

Stacey spoke about measures in place to identify children who required additional support with their communication but did not describe any changes she had observed in outcomes of students at her school as a result of her participation in the professional learning program.

**8.6 Discussion**

This study was concerned with the complexities that underpin the process of professional learning and teacher change in the context of an oral language professional learning program. The program the teachers in these case studies participated in met the core features of a high-quality professional program, as specified by Desimone (2009), specifically including a content focus, active learning, coherence, substantial duration and collective participation.

The first hypothesis was that participation in a professional learning program would result in an increase in teachers’ knowledge of language and literacy constructs. As evidenced above, growth in knowledge was variable between the three cases. Despite her
reported high level of enthusiasm and motivation for participation in the professional
learning program, Karen did not value or feel motivated to develop her content knowledge
of language and literacy constructs. Her knowledge, as measured by the CPOL teachers
survey, did not improve substantially between the first and second administration, and fell
in the third administration (although she reported guessing many items during this
administration). Elizabeth similarly did not show substantial growth in her knowledge, but it
is likely that a ceiling effect was present. Like Karen, she attributed much more value to
her improved instructional practice than her knowledge. Stacey’s knowledge was lowest at
the beginning of the study and she demonstrated the most substantial growth between her
first and final attempt at the CPOL teacher survey.

In contrast with their change in knowledge, during the semi-structured interviews
Karen and Elizabeth spoke emphatically about their changed practice. All three
participants demonstrated a substantial change in their classroom talk and instructional
practice. The proportion of their talk concerned with sharing explicit knowledge and
providing students with strategies to approach oral language and literacy tasks increased.
This was sustained to varying degrees a year later. Karen appeared to be surprised by her
ability to substantially change her practice and impact her students’ achievement while still
using the same books and resources. The change that occurred as a result of her
participation in the professional learning program was processual, rather than structural
(Markussen-Brown, Juhl, Piasta, Bleses, Højen & Justice, 2017), and it would appear she
had not previously expected this type of change as a result of a professional learning
activity.

_Private epiphanies_, or personal moments of new awareness, insight or recognition
of a “better way” of knowing, believing or behaving were observed in this study. These
epiphanies may be the result of effective professional learning experiences, when the
participant is willingly, fully engaged and reflective upon their experience of change (Miller & Silvernail, 1994, Evans, 2014). Two of the participants in this study, Karen and Elizabeth, reported experiencing these realisations; Karen in her recognition of her own self efficacy, and Elizabeth in her new understanding of the scope of what oral language instruction can entail and the impact of having high expectations of her young students. When Stacey reflected upon change in her behaviour and instructional practice, she spoke about the barriers she encountered implementing change with much greater emphasis and detail than change in her attitudes, knowledge or practice.

The second hypothesis was that participants’ self-rated ability to teach a range of topics associated with early language and literacy instruction would increase both as knowledge increased, and as a result of experience delivering high quality, evidence-based instruction. The association between knowledge and self-rated ability was more complicated than hypothesised. Two effects previously described in the literature were evident in this study. The first is knowledge calibration (Cunningham, Perry, Stanovich, & Stanovich, 2004), as observed in the case of Karen. As Karen engaged in the professional learning program, she became aware of limitations in her knowledge. Although her knowledge grew, her perception of her own ability fell. Her perception of her own ability returned but did not exceed the original level a year later. Secondly, the Dunning-Kruger effect was illustrated by Stacey and Elizabeth. In Stacey’s case, this was shown in her very high estimation of her ability (in light of relatively limited demonstrated knowledge) before the intervention (Kruger & Dunning, 1999). This effect describes a cognitive bias in which relatively unskilled individuals experience an illusory superiority, mistakenly rating their ability as much higher than is accurate. Similarly, those with a relatively high skill or knowledge level are inclined to underestimate their own ability, as illustrated by the case of Elizabeth.
Teachers are rarely passive recipients of professional learning or development opportunities, and instead make choices about the degree to which they engage and participate in professional learning (Blamey & Mackenzie, 2007). Professional learning (predominantly associated with knowledge or practice) can occur when teachers attend training or undertake study they have not elected to, but in the absence of an individual’s agency, motivation and willingness to learn, development in attitudes or beliefs is unlikely (Evans, 2014). All three participants spoke about the importance of oral language for all children, and how children lacking sufficient vocabulary can struggle to access the curriculum. Guskey (2002) suggests teachers who have not been successful in helping students from disadvantaged backgrounds to succeed academically can perceive that students are not capable of learning. However, when students demonstrate gains as a result of a different approach to instruction, teachers’ perceptions of students’ abilities can change. This was evident in Karen’s reflection, when she said “I just felt empowered that I had what I needed to help the children”.

The third and fourth hypotheses were that teachers’ explicit teaching and improved knowledge of oral language constructs would result in improved student outcomes, and improved student outcomes would be associated with changed teacher beliefs about oral language and pre-literacy skills. Despite demonstrating the largest degree of measurable change in both knowledge and practice, Stacey did not remark that this change resulted in observable change in outcomes for her students. Her self-rated ability increased in line with her improved knowledge of language and literacy constructs, but she was unable to describe in specific detail what she had learnt. Stacey’s case aligns closely with the sequence of change within professional development proposed by Guskey (2002). Most notably, in not perceiving there had been substantial improvement in the outcomes of her students, and in encountering a number of barriers to implementation, Stacey did not
appear to have experienced a ‘personal epiphany’, as Karen and Elizabeth had. Stacey’s case similarly aligns with Desimone’s (2009) argument that contextual factors need to be included in theoretical models of professional development.

8.7 Conclusion

This study sought to determine if the pathway models proposed by Guskey (2002) and Desimone (2009) account for the observed and self-perceived change in knowledge, practice, beliefs and attitudes in Australian early years’ teachers, following participation in a sustained oral language professional learning program. The equivocal nature of the oral language professional learning literature attests to the complex and complicated process of creating and sustaining change (Markussen-Brown et al., 2017).

The cases presented above illustrate that change in knowledge can occur without change in practice, and vice versa. As theorised by Guskey, teachers’ perceptions of change within their students is influential and precipitates a resultant change in beliefs and attitudes. Powerful personal epiphanies can occur in teachers’ who are highly experienced. As evidenced by Karen, the realisation and actualisation of processual rather than structural change (as a result of professional learning) can greatly impact self-perception.

Theories provide a hypothetical story about why acts, events, structure and thoughts occur (Yin, 2014). Incorporating theoretical models into the interpretation of professional learning data provides two key benefits. Firstly, attention is drawn to the multi-faceted process of teachers’ professional learning and change, including knowledge, practice, attitudes and beliefs. Secondly, using theoretical models to understand professional learning outcomes can provide insight into the process that underpins change. Importantly, these theoretical models permit evaluators to recognise weaknesses
or barriers that may limit or prevent improvement in student outcomes following teachers’ professional learning.
8.8 References


Chapter 9   Discussion & Summary

My overarching objective in this thesis was to describe the process of teachers’ responsiveness (in knowledge and practice) to an oral language professional learning program. In a series of three studies I concluded that (i) oral language lacks pedagogical visibility in the early years of primary school, (ii) teachers’ knowledge of language and literacy constructs is variable, generally low, and poorly calibrated against their perception of their own knowledge, and (iii) the construct of teacher cognition and theoretical models of teacher practice change can and should inform the design and implementation of professional learning in oral language. Additionally, I investigated the feasibility of a model of characterising teacher talk during language and literacy lessons. These findings will now be discussed.

9.1 The pedagogical visibility of oral language

A core issue that arose throughout this thesis is that despite being of critical developmental importance, oral language is not given adequate emphasis or attention in early years’ research or practice. Language proficiency is driven by both biological and environmental factors, and the early years of primary school are an opportunity to positively influence and shift children’s developmental trajectories as they transition from speaking and listening to reading, writing and spelling (Siraj-Blatchford, et al., 2011).

In the review of the literature in Chapter 3 it was evident that oral language is rarely fully disaggregated from literacy in the early years of primary school. In particular, in the professional learning literature few broad-ranging oral language programs have been

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63 Teacher cognition has been defined as “an often tacit, personally-held, practical system of mental constructs held by teachers and which are dynamic that are defined and refined on the basis of educational and professional experiences through teachers’ lives” (Borg, 2015, p.40), as discussed on page 92 of this thesis.
reported, and individual domains of language are most typically targeted alongside reading and writing interventions. Oral language competency is essential for children’s transition to literacy in the early years of primary school (P. Snow, 2014), but is also a necessary proficiency in and of itself. Oral language underpins learning across the curriculum, as well as social and emotional wellbeing, and as such, should also be regarded independently as a necessary set of skills.

The pedagogical invisibility of oral language (Hill, 2016) apparent in the studies reported in this thesis was not surprising. Most prominently, the lesser position of oral language (relative to literate language) was evident in the reflections of the participants in Study 3 (Chapter 8). Following the professional learning program, the three teachers reflected upon their experiences in semi-structured interviews. Elizabeth, a teacher who was both experienced and knowledgeable, commented “For a very long time I just thought, we do show and tell. There’s the oral language”. Despite her recognition prior to the professional learning that oral language was a skill area which should be addressed in her early years’ classroom, she had not enacted this in a systematic or focussed way. Similarly, Karen’s new knowledge and skills in assessing and supporting her students’ oral language led to her students surpassing her expectations, both in language and literacy. For these experienced teachers, learning about oral language in a sustained and comprehensive way appeared to lead to private epiphanies (Evans, 2014), a new and powerful understanding of the importance of oral language.

9.2 Teachers’ linguistic knowledge and knowledge calibration

The National Inquiry into the Teaching of Literacy (Rowe, 2005) recommended that teachers be equipped with knowledge of language and literacy constructs in their preservice training. Without subsequent systematic adoption of this recommendation, there appears to have been limited progress in improving teacher knowledge in this area.
Similarly (and perhaps consequently) there has not been substantial change in the literacy standards of students in Victorian schools over the past decade, as measured by NAPLAN (Goss & Sonnemann, 2018).

As reported in Study 1 (Chapter 6), teachers’ knowledge of language and literacy constructs can be characterised as limited and highly variable. It became evident in this study that there is disconnect between the knowledge that is theoretically requisite to provide instruction in oral language and early literacy (as recently discussed by Castles, Rastle & Nation, 2018), and the demonstrated knowledge of many teachers. As noted by Moats (1995) more than twenty years ago, knowledge of language structure should be as fundamental to a teacher as anatomy is to a physician. Furthermore, being able to correctly define linguistic concepts did not ensure teachers were also able to consistently and accurately apply this knowledge to their analysis of language. Teachers’ knowledge of spelling conventions and letters overshadowed their counting of phonemes in words. This was not a novel finding (Fielding-Barnsley, 2010; Fielding-Barnsley & Purdie, 2005; Mahar & Richdale, 2008), but this study was the largest and most robust assessment of this type in Australian inservice teachers to date.

It has been suggested that the genesis of teachers’ limited knowledge lies in preservice teacher education (Moats, 2009; Hempenstall, 2016; Eadie et al., 2016). It has been posited in the literature that teachers are not able to demonstrate (and consequently teach) knowledge they themselves have not been taught. This has been referred to as the Peter Effect in the literature (Applegate & Applegate, 2004; Binks-Cantrell, Washburn, et al., 2012).

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64 For example, teachers who could identify the correct definition of a phoneme or a morpheme could not reliably and consistently identify the number of phonemes or morphemes in words.
Limitations of teachers’ knowledge in this area were also evident in Study 2 (Chapter 7), where it was found that teachers infrequently used informative, process or utility talk. These types of talk foster students’ metacognitive learning and require teachers to draw upon their own knowledge to provide explicit information. To describe and teach the phonemic or morphemic features of a word or explain why a sentence is or is not syntactically correct, teachers must understand these concepts and be able to integrate their content and pedagogical knowledge. There is strong evidence that supports the use of explicit instruction in education (Rosenshine, 2009; Hattie, 2013), however any moves towards implementing this approach to instruction should include provision to support teachers’ content and pedagogical knowledge (both through preservice training and professional learning).

Further complicating the implications of teachers’ limited collective knowledge of language and literacy constructs is the finding that knowledge is not well calibrated against self-assessment. The inverse relationship between knowledge and self-rated ability found in Study 1 replicated the findings of earlier research by Cunningham et al. (2004). In both studies, knowledge and perceptions of knowledge were found to be poorly aligned in a way that created a false sense of confidence and ability. This was recently highlighted in a piece by Exley and colleagues (2018), who refuted criticisms of the preparation of Australian teachers to teach reading by reporting graduate teachers’ high levels of satisfaction in their preservice education. They did not triangulate this data with evidence of teachers’ theoretical or conceptual knowledge. Self-rated ability and confidence should not be conflated with competence.

Poorly calibrated knowledge and self-rated ability is not a phenomenon unique to education; this has also been observed in medicine, nursing, and dentistry (Ammentorp, Sabroe, Kofoed, & Mainz, 2007; Mullan & Kothe, 2010; Oliveri, Gluud, & Wille-Jørgensen,
2004; Santiago et al., 2018). As highlighted by Cunningham et al. (2004), if knowledge is not well calibrated, teachers are unlikely to know what they do not know. This is the root of the issue: teachers are often unaware of the limitations of their own knowledge of language and literacy constructs, and this has substantial ramifications for school leadership, planning and prioritising professional learning. It has been argued that the systemic limitations in teachers’ knowledge in language and literacy are the result of the interaction of initial teacher education being underpinned by philosophical stances rather than empirical research (Meeks, Stephenson, Kemp, & Madelaine, 2017), limitations in the dissemination of knowledge about the importance of oral language in the early years of school (Hempenstall, 2016), and inefficient and unregulated professional learning in Australian schools (Joseph, 2017).

Both upstream preventative action and downstream responsive approaches are likely to be needed to increase teachers’ knowledge and understanding of oral language. Preventative measures could be instigated to mitigate or minimise negative outcomes (Williams, Costa, Odunlami, & Mohammed, 2008). In this context, the most obvious approach is to address language and literacy knowledge during initial teacher education. In a recent investigation into the preparation of Australian preservice teachers in reading instruction, Meeks and Stephenson (2018) found the most commonly used texts did not include content about systematic language or literacy instruction. Instead, these programs and resources are largely informed by philosophical or theoretical information about how children learn language and acquire literacy skills. A large emphasis is placed on knowledge of oral language “metamorphosing” into literacy skills via indirect teaching methods such as reading quality children’s literature to early years’ students (for example, as purported by Rushton, Ewing & Diamond, 2018). Meeks and Stephenson also consulted online university profiles for course instructors and found very few had a specific
focus on early reading instruction in their research. Just as an adherence to evidence-based principles compels some academics to be critical of philosophically-driven teaching practices, those with strong beliefs about how children learn to communicate (and read) are not likely to engage with empirical research derived from other paradigms, such as the cognitive sciences.

In Study 1 (Chapter 6), reference was made to the Literacy and Numeracy Testing for Initial Teacher Education (LANTITE). This testing, delivered by the Australian Council for Educational Research (ACER), was piloted in New South Wales in 2015, followed by a national pilot in 2016, and rolled out nationally in 2017. When data from the first administration were released in April 2018, it attracted largely negative media commentary (Argoon, 2018; Barnes & Cross, 2018; Cook, 2017; Knott, 2016; Marszalek, 2015). One Victorian university was reported to have a 27% fail rate (Urban, 2018), and subsequently introduced a course that prepares students for this exam. Barnes and Cross (2018) reported that passing the LANTITE test is not a requirement for admission to any course, only a condition for graduation or a mid-course milestone.

ACER (2015, 2017) states that this assessment tests preservice teachers’ ability to identify, integrate, interpret, and evaluate a range of texts. Additionally, respondents are assessed on what is described as the technical skills of writing, including grammar, spelling, word-usage and text organisation. The tests are not in the public domain, but two sets of practice questions are available (ACER, 2015, 2017). Teacher candidates need to identify whether a sentence is grammatically correct or incorrect but are not required to explain why. The LANTITE assessment ensures that teacher candidates possess foundational literacy skills but falls short of ensuring they have the knowledge and capacity to explicitly teach linguistic and literacy constructs to their students, in line with the recommendations of the three national inquiries (Rowe, 2005; Rose, 2006; NRP, 2000).
9.3 Teacher cognition, professional learning, and theories of change

It was established earlier in this thesis that professional learning is a component of nearly all downstream efforts to improve teacher knowledge and practice (as well as student outcomes) (Guskey, 2002), yet the teacher professional learning industry in Australia is largely unregulated (Joseph, 2017). Even in the research literature, the impact of professional learning upon teachers is rarely explored in detail. The application of theoretical models of teacher change (as described in Chapter 8) demonstrated that the construct of teacher cognition (as conceptualised by Borg, 2003, 2006) is useful in demystifying the ‘black box’ of professional learning. Consequently, detailed consideration should be given to how professional learning impacts upon teachers’ knowledge, beliefs, attitudes, and practice and whether such impacts are sustained over time.

In participating in professional learning, teachers do not simply replace existing knowledge with new knowledge (Evans, 2014). Participants must decide which new knowledge they will adopt, what they will reject, and how these integrate with their existing theoretical and philosophical beliefs. In Study 3 (Chapter 8) it was evident that the knowledge of two teachers became calibrated as a result of participating in a professional learning program, with their self-rated ability falling and then returning to the pre-professional learning level. Cunningham et al. (2004) highlight that knowledge calibration should be a core consideration in professional learning, as:

it has been shown that people learn information more readily when they are relatively well calibrated as to their current level of knowledge because they can focus on areas where their knowledge is uncertain and allocate less attention to areas of relative expertise. A person who is well calibrated knows what they do not know. (p. 143).
In addition to knowledge, the construct of *teacher cognition* also incorporates beliefs, practice, experience and attitudes. As explained in Chapter 4, this construct is conceptualised in Borg’s Language Teacher Cognition Model (2003, 2006), and is a component of the Social Systems Model for Schools (Hoy & Miskel, 2013). Borg purported that teachers’ cognition is influenced by their own experiences of school, professional coursework, classroom practice, experience and contextual factors. Additionally, within the Social Systems Model for Schools, teachers’ cognition is positioned within what is termed the individual system. In this system, teachers’ knowledge is enacted in the school environment alongside motivations, beliefs and self-perceptions. Within this model, Hoy and Miskel draw upon a range of theories to describe how individuals behave in the context of the school environment, including Maslow’s hierarchy of needs\(^{65}\) (1943), Herzberg's theory of motivation\(^{66}\) (1966) and attribution theory\(^{67}\) (e.g., Weiner, 2007). The knowledge, agency, beliefs and motivations of individual teachers, in combination with structural, political and cultural influences determine the core activity of teaching and learning. Furthermore, Hoy and Miskel’s model highlights the impact of power differentials between staff members. This is particularly pertinent in one of the cases in Study 3. Stacey described a willingness yet inability to effect change within her school.

Collectively, the models proposed by Borg and Hoy and Miskel support the notion that the development (and subsequent improvement) of teacher cognition is complex, multifaceted and intricate. These theories aid in the understanding of the other variables that influence how teachers’ knowledge is delivered to students and supports the case for

\(^{65}\) Humans are driven to have their needs met, and these needs can be organised in a hierarch, progressing from basic needs (e.g., food, warmth, rest, and safety) to friendships and relationships, to self-actualisation (accomplishment and creativity).

\(^{66}\) There are different factors that determine job satisfaction (e.g., growth, achievement, recognition and responsibility) and dissatisfaction (e.g., supervision, salary, security).

\(^{67}\) Attribution theory is underpinned by a three-stage process of the observation/perception of behaviour, the intentionality of behaviour and attribution to internal or external causes.
ensuring core knowledge is delivered in preservice teacher education, so it is consolidated early.

Additionally, in Study 3 (Chapter 8) theoretical models of teacher change (Guskey, 2002; Desimone, 2009) were used to explore the three teachers’ experiences of a professional learning program. These models were initially selected because their relative simplicity and structure aligned with the design of a larger trial, with connections made between the elements of the model and feasible outcome measures (Goldfeld et al., 2017). The sequence and inconsistencies of change within these case studies led to the tentative conclusion that Guskey’s unidirectional model does not account for the process and sequence of teacher change following professional learning. However, the reflections of the three participants did align with the notion that observed change in student outcomes triggers a change in beliefs and attitudes.

Desimone’s (2009) variation on the notion of a pathway model more adequately accounted for the process of change that was observed. Most importantly, Desimone also indicated that change may occur to varying degrees within each component, and the directionality and sequence may be variable. For example, if teachers already have a reasonably high level of knowledge, then substantial knowledge growth may not be necessary to facilitate change in practice. In the absence of strong foundational knowledge, there must be growth before practice change can occur. Furthermore, Desimone recognised the features of professional learning that are necessary, and the impact of the context and environment upon the process of teacher change. The complexities of the school environment are evidently accounted for by Desimone, and the position of teachers within the school environment is further contextualised in Hoy and Miskel’s Social System Model (2013). It is possible that these pathway models will have better goodness of fit when data from the larger CPOL sample are tested against them.
Similarly, analysis of data from the complete CPOL cohort of teachers will provide a clearer picture of the impact of professional learning upon a larger number of teachers’ knowledge, practice and change, both immediately following the intervention and one year later.

What may be lacking in many instances in Victoria (and Australia) is clarity at a policy and school leadership level about the purpose of teachers’ professional learning. If participation in professional learning activities is for compliance and the dissemination of information needed to meet the requirements of the curriculum, then current practices may be adequate. However, if there is an expectation that professional learning is to lead to improvements in teaching and learning, present standards may not be sufficient. Furthermore, there is a substantial cost associated with the provision of low-quality professional learning that extends beyond registration and classroom relief costs. These include the time spent implementing ineffective strategies, and opportunity costs, whereby teachers do not participate in higher quality, impactful professional learning activities (Frederick, Novemsky, Wang, Dhar, & Nowlis, 2009; Heckman, 2006).

9.4 Implications

The practical implications of this research rest largely with those who are in a position to design, deliver and determine professional learning at pre- and inservice points in teachers’ careers. Teachers with differing levels of preparation and experience engage with professional learning in different ways (as discussed by Spear-Swerling, Brucker & Alfano, 2005). Providing opportunities for knowledge to become calibrated (Scarparolo & Hammond, 2018), and recognising the influence of previous experiences and contextual factors can improve the impact and efficacy of professional learning. This may include taking measures to prepare teachers for participation in professional learning to ensure there is an optimal return on investment. The Australian education system would benefit
from regulation of professional learning in oral language and early literacy. While the establishment of regulatory processes would incur considerable cost, this expense may offset the sizeable cost currently incurred by professional learning that has not been demonstrated to lead to improved student outcomes.

Researchers similarly need to evaluate professional learning programs and continue to disseminate current best evidence about how students can be supported in the classroom to become competent communicators. Furthermore, there needs to be recognition of the importance of accounting for the complexities of teacher cognition in designing professional learning. Restraint should be exercised in judging the quality of the content of professional learning programs without “opening the black box” and considering the impact upon teachers.

9.5 Strengths and Limitations

In this thesis I have made a unique contribution to the collective knowledge and understanding of the processes and factors that influence oral language and early literacy instruction in Australia. I have drawn attention to the complexities of professional learning for Australian teachers and applied theories of teacher change to the evaluation of professional learning. This has not previously been done in the context of a study of oral language professional learning in the early years of primary school. This thesis began with a discussion of the lifelong implications of early language and literacy. Ultimately, the role of teachers and education itself is to equip students with the necessary knowledge and skills to lead fulfilling lives. There is great potential within the teaching work force to universally improve the language and ultimately literacy, social and emotional resources of Australian children.
Many of the strengths and limitations of the research reported in this thesis were identified in Chapters 6, 7 and 8. Study 1 provides strong evidence of Australian teachers’ limited knowledge of language and literacy constructs. This research has important policy implications. The publication included in Chapter 6 has been cited in discussions of teachers’ knowledge, both in the Australian (Daffern, 2017; Scarparolo & Hammond, 2018; Westerveld & Barton, 2017; Meeks & Kemp, 2017) and international (Jordan & Bratsch-Hones, 2018; Cohen, Mather, Schneider & White, 2017) literature. Notably, this study replicated earlier work by Cunningham et al. (2004) in identifying an inverse relationship between self-rated ability and knowledge. Study 3 incorporates both qualitative and quantitative data in a series of case studies, with data triangulation supporting a description of the complexities of knowledge and practice change in the context of a professional learning intervention.

The most substantial limitations are associated with the validation of both the survey and the process used to measure teacher talk. The teacher knowledge survey requires further refinements and further psychometric validation. As discussed in the addendum of Chapter 6, some items need to be revisited, with potential for further investigation of pedagogical content knowledge. Any improvements need to be balanced against increasing the length of the survey.

The method for measuring teacher talk in Study 2 (Chapter 7) may be viewed as reductionist in nature, and at odds with other approaches to describing classroom talk (as summarised in Howe & Abedin, 2014). The approach used in Studies 2 and 3 offers a limited view of teacher-student literacy-related interactions but potentially has valuable application as a quantitative measure within the context of professional learning evaluations. Both Studies 2 and 3 were limited by small sample sizes. In particular, Study 3 provides only low-level evidence, but does provide in-depth analysis of individual cases,
and importantly, incorporates teachers’ voices into this important discussion of knowledge and practice change.

It is important to acknowledge that my professional background as a speech-language pathologist (and not as a teacher) may constrain my understanding of the complexity of teaching in the early years of primary school. I also acknowledge that in this research, teachers’ knowledge and practice has been viewed through a lens of “deficit”. I have endeavoured to consider the factors that have created a situation in which the teaching workforce has not been adequately equipped with knowledge of language and linguistics, and to consider constructive responses to this issue. Pressure for reform and improvement should be directed at a systemic level; levelling criticism at individual teachers is both unfair and counterproductive.

9.6 Future directions

This body of work raises a series of questions that would benefit from further research. In regard to the measurement of teacher knowledge, there is scope to extend this field of inquiry in Australia (in line with the investigations of Washburn, Joshi, Binks-Cantrell and colleagues in the United States). There are opportunities for longitudinal studies, to investigate if there are changes in teachers’ knowledge and instructional practices both within individuals over the course of their career, and at a workforce level. There is similarly a need for comparative studies, for example between (i) preservice and inservice teachers and (ii) teachers who enter their initial teacher training with high and low entry scores. These would create an opportunity to also examine how background factors interact with the differing instructional approaches in preservice education. There is also scope to investigate the knowledge of other professionals, including speech-language pathologists, and teacher educators. The research reported in this thesis draws attention
to the value-add of incorporating measures of teachers’ knowledge, practice, attitudes and beliefs within evaluations of professional learning.

9.7 Concluding Statement

On a personal note, a particularly salient moment for me during this research was when Karen, reflecting on her professional learning experience, commented “I never realised how important my role was”. I began this thesis by considering the substantial influence that teachers have upon their students in the early years of primary school. All teachers should be equipped with the knowledge and skills that are needed to support their students to become confident and capable communicators. In doing so, not only would students reap long-lasting benefits, but teachers would be equipped with agency, self-efficacy and the satisfaction of making a powerful difference to the lives of all students.
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Appendix A: CPOL Protocol Paper (Goldfeld et al., 2017).

Open Access

BMJ Open

Classroom Promotion of Oral Language (CPOL): protocol for a cluster randomised controlled trial of a school-based intervention to improve children’s literacy outcomes at grade 3, oral language and mental health

Sharon Goldfeld,1,2,3 Pamela Snow,4 Patricia Edie,5 John Munro,5 Lisa Gold,6 Ha N D Le,6 Francesca Orsini,2 Beth Shingles,3 Katherine Lee,2,3 Judy Connell,7 Amy Watts8

ABSTRACT

Introduction Oral language and literacy competence are major influences on children’s developmental pathways and life success. Children who do not develop the necessary language and literacy skills in the early years of school then go on to face long-term difficulties. Improving teacher effectiveness may be a critical step in lifting oral language and literacy outcomes. The Classroom Promotion of Oral Language Trial aims to determine whether a specifically designed teacher professional learning programme focusing on promoting oral language can lead to improved teacher knowledge and practice, and advance outcomes in oral language and literacy for early years school children, compared with usual practice.

Methods and analysis This is a two-arm cluster randomised controlled trial conducted with Catholic and Government primary schools across Victoria, Australia. The intervention comprises 4 days of face-to-face professional learning for teachers and ongoing implementation support via a specific worker. The primary outcome is reading ability of the students at grade 3, and the secondary outcomes are teacher knowledge and practice, student mental health, reading comprehension and language ability at grade 1; and literacy, writing, and numeracy at grade 3. Economic evaluation will compare the incremental costs of the intervention to the measured primary and secondary outcomes.

Ethics and dissemination This trial was approved by the Monash University Human Research Ethics Committee #CF13/2634-2013001403 and later transferred to the University of Melbourne #1545540. The investigators (including Government and Catholic partners) will communicate trial results to stakeholders, collaborators and participating schools and teachers via appropriate presentations and publications.

Trial registration number ISRCTN77981972; Pre-results.

INTRODUCTION

The ability to use oral language to communicate effectively is a key foundation for academic success as well as social and economic participation across the life span.1 2 Receptive and expressive oral language encompasses vocabulary (ie, words), and the grammatical rules and complex pragmatic conventions that are intrinsic to the social and contextual aspects of communication.3 The ability to use language effectively impacts on children’s learning, their social behaviour in and out of the classroom and their ability to develop

Strengths and limitations of this study

► This trial addresses identified evidence gaps in the effectiveness of classroom-level oral language teaching interventions.
► This trial is one of the few methodologically rigorous studies evaluating the potential impact of teacher professional learning on student outcomes.
► The use of existing data for baseline and outcome data mixed with brief face-to-face classroom assessments presents a potentially efficient model of research in schools that can be implemented at scale.
► There is potential bias from only including schools who opted into the study and limited potential generalisability across education systems where school starting age and teacher preservice education may vary.
► The teacher and student movement in this effectiveness trial will affect the capacity to deliver the full ‘dose’ and thus may adversely and differentially affect retention rates.
► While most outcomes are objectively measured, mental health outcomes remain a subjective measure and in our study are mostly limited to teacher report and may not reflect mental health outside the school setting.


Protocol

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literacy and numeracy skills. With respect to literacy, oral language skills underpin the ability to decode and understand text, as well as writing and spelling, and the ability to engage with text across the curriculum. While learning to speak is a task for which humans are generally considered to be biologically well-prepared, reading and writing skills are not, requiring prolonged and specific instruction in order for proficiency to be achieved. Children who do not master the basics of literacy in the early years of school face long-term academic struggles, are often ambivalent towards school and may face a range of behavioural, social, vocational and social-emotional difficulties into adolescence and adulthood.

There is a clear interdependence between the transition to literacy in the early school years and oral language competence. Snowling and Hulme observed that ‘literacy is parasitic on language’ (p. 307), meaning that children’s ability to learn in the classroom and develop literacy skills is reliant on their ability to understand and use oral language effectively. Conversely, the literature examining causes of reading difficulties emphasises the influence of difficulties with oral language on literacy attainment. Given the central role that oral language competence plays in academic success, it follows that strategic efforts to improve oral language skills in the early years of school should confer gains in literacy skills, social and emotional well-being and academic trajectories taking into account the considerable impact of socioeconomic status (SES) on language.

The Australian Early Development Census (AEDC) (a population measure of early childhood development completed by teachers on all children at school entry) shows that at the start of primary school, around the age of 5 years, significant SES-based disparities in language functioning are already evident. The 2015 AEDC results show that children who live in areas characterised by the greatest socioeconomic disadvantage have the highest rates of developmental vulnerability on the language and cognitive skills (school-based) domain (17.4%), which encompasses literacy and numeracy skills such as letter and sound awareness, rhyming, ability to write own name and single words and sentences, ability to count to 20, recognise shapes and numbers and compare and sort numbers. This level of developmental vulnerability is more than four times the 3% of children living in the most advantaged areas whose language and cognitive skills are vulnerable and is consistent with the increasing evidence of relatively poorer language performance in young children from low SES backgrounds, inequities that are also reflected in later schooling.

The Industry Skills Council of Australia has identified that ‘literally millions of Australians have insufficient language, literacy and numeracy skills to benefit fully from training or to participate effectively at work’ (p. 1), indicating that such difficulties do not spontaneously resolve over time.

The early years of schooling represent an opportunity to make a substantive difference to educational and life outcomes by addressing the language abilities of whole populations of children. The reported high rates of developmental vulnerability with respect to language skills at school entry would suggest that this is both an area in need of pressing attention, and an immediate opportunity for improvement.

Evidence arising from a number of recent Australian and international studies suggests that efforts to impact student outcomes and address SES-based disparities must be centred on teaching quality. Improving language and literacy outcomes for school-aged children must therefore explicitly address teaching quality with respect to teacher knowledge and skills, effective formative assessment and instructional decisions. However, the systematic inclusion of language (eg, grammar) together with specific, phonics-based instruction has been limited in schools for decades. This presents an implementation challenge, as current teachers are often never taught these skills, either during their own schooling or in their pre-service teacher education. Teachers’ foundational knowledge, skills and attributes regarding language and literacy are critical in any effort to target classroom-based approaches to improve student outcomes.

Despite the clear importance of oral language for academic achievement, there seems to be no published, rigorous trials of oral language teacher professional learning intervention that have demonstrated a sustained change in student outcomes and/or teacher knowledge and practice. Large-scale randomised controlled trials (RCTs) in schools to test education interventions are uncommon but gaining momentum in Australia and internationally, including low-income and middle-income countries. For example, organisations such as the UK-based Education Endowment Fund and Social Ventures Australia have stimulated interest in trials by funding RCTs to test the effectiveness and cost-effectiveness of teaching and learning interventions. In Australia, the Oral Language Supporting Early Literacy (OLSEL) pilot RCT demonstrated early gains in reading and oral language outcomes in students whose teachers had been exposed to a targeted intervention designed by educators and speech-language pathologists.

OLSEL draws on the theoretical framework developed by Munro, with content broadly consistent with the so-called ‘five big ideas’ of early literacy instruction: phonics-based instruction, phonemic awareness, vocabulary development, comprehension at the sentence, paragraph and topic level and fluency, also including narrative skills and syntactic complexity.

This paper reports the research protocol for the Classroom Promotion of Oral Language (CPOI) trial. Based on OLSEL, it aims to advance the early oral language and literacy skills of students considered to be at-risk for low educational attainment, by improving teacher oral language knowledge and practice in their work with students in the first 2 years of school. The primary hypothesis is that by grade 5, students in the intervention
group will have significantly improved reading achievement, when compared with students who experienced usual teaching practice. Secondary hypotheses are that by grade 1, students in the intervention group (compared with usual practice) will have improved outcomes in (1) oral language, (2) early literacy and (3) mental health, by grade 3 they will have improved (4) numeracy, (5) literacy and (6) writing skills, and that intervention teachers will have improved knowledge and practice in classroom-based oral language teaching strategies.

This large-scale cluster RCT will help to generate an evidence-base that can inform high-quality early years teaching and learning in schools, addressing early learning inequalities that can persist across the life span.

METHODS AND ANALYSIS

Study design

CPOL is a cluster RCT of a teacher-led whole of classroom oral language promotion intervention, compared with usual teaching practice. Due to the nature of the oral language teacher professional learning intervention at the whole of class level, randomisation within CPOL is at the school level. The primary outcome is reading ability of the students at grade 3. The components of the trial are summarised in Table 1.

Ethics and trial registration

This trial was granted ethics approval by the Monash University Human Research Ethics Committee on 15 November 2013 (#CF13/2634-2013001408); this was later transferred to the University of Melbourne on 7 October 2015 (#15455-00). This trial was registered on 22 January 2014 (ISRCTN77081972).

Setting

This is a multisite trial being conducted in the state of Victoria, Australia. The Victorian school year typically runs from January to December. Participating primary schools are within a geographic radius of approximately 80 km from the centre of the state capital, Melbourne. The schools are from the Victorian Government Department of Education and Training (DET) and the Catholic Education Commission of Victoria (CECV) (22.07% and 67.62% of all primary school students in Victoria, respectively). The intervention consists of face-to-face professional learning for teachers, as well as ongoing support via trained teachers and speech-language pathologists. The face-to-face professional learning component of the intervention will be delivered from four venues across metropolitan Melbourne at each time point. The support worker element of the intervention will be delivered in the schools as well as via telephone and online support.

Participants and recruitment

Eligible schools will be those who respond positively to expression of interest invitations and meet the following eligibility criteria:

- 20% of students identified as developmentally vulnerable in the language and cognition skills domain of the 2009, and/or 2012 Australian Early Development Census;

- Minimum of 15 students in a foundation cohort in the year prior to the start of the trial.

First round expression of interest invitations will be sent to schools in each sector located within approximately 80 km of the Melbourne city centre. A second round of expression of interest invitations will follow if the required sample size is not met. If more schools respond to the expression of interest than are needed, then schools will be randomly selected to participate from each sector.

Class selection

Once a school has agreed to be in the study, one class will be randomly selected as the index class by the project coordinator. Data will only be collected from teachers and students in the index class, however every teacher responsible for a foundation, grade 1 or grade 1/2 composite class in schools randomised to the intervention arm of the study will be invited to attend the professional learning sessions and will have access to implementation support via the support workers.

Index classes will be selected using the following eligibility criteria:

- Where only one foundation class exists in the school, that class will automatically become the index class.

- Where multiple foundation classes exist, the index class will be randomly selected.

- Where only composite foundation/grade 1 classes exist in the school, the index class will be selected from the composite foundation/grade 1 classes. Two classes will be combined where necessary to ensure an adequate number of foundation students are recruited for that cluster (school).

- Where foundation classes and foundation/grade 1 composite classes exist in the school, the composite classes will be excluded and a class will be randomly selected from the foundation classes.

Student recruitment

Once the index class has been identified, informed consent will be sought from a parent/guardian of the students belonging to the index classes in the form of a hard copy letter sent home via the classroom teacher. Parent Information Statements (PIS) will be translated into relevant languages as required. PIS will include both informed passive consent (opt out) for CECV schools and a combination of informed consent.

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1 In Victoria, grade 1 is the second year of formal schooling and grade 3 is the fourth year of formal schooling.

2 The AEDC was formerly known as the Australian Early Development Index. The 2015 census and future iterations are known as the Australian Early Development Census (AEDC).
Table 1. Graphical depiction (‘Perera diagram’) of the components of the trial shared and unique to the intervention and control groups.

<table>
<thead>
<tr>
<th>Trial component</th>
<th>Intervention</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call for expressions of interest</td>
<td></td>
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<tr>
<td>Delistings</td>
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<tr>
<td>Informed consent</td>
<td>C</td>
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<tr>
<td>Enrollment and baseline data collection</td>
<td>D</td>
<td></td>
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<tr>
<td>School randomisation</td>
<td></td>
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<tr>
<td>Professional learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher data collection: time point 1—end of foundation</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>Professional learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher data collection: time point 2—end of grade 1</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Student data collection: time point 2—end of grade 1</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Final student data collection: time point 4—middle of grade 3</td>
<td>J</td>
<td>J</td>
</tr>
</tbody>
</table>

A: Schools that meet the inclusion criteria for the trial are emailed by the relevant education department inviting them to participate in the study.

B: Schools interested in participating are invited to one of two face-to-face briefings to hear more about the commitments and process of the trial.

C: One foundation class is selected from each participating school and a parent letter and consent form is sent home with the student.

D: Baseline data are collected for every consenting child and for the relevant teacher of the class.

E: Professional learning and support: all foundation, grade 1, grade 1/2 composite teachers and leadership from the intervention schools attend the face-to-face professional learning sessions (days 1, 2, 3), access the online resources forum and participate in school visits and online support from CPOL support workers.

F: A teacher survey and two teacher audio recordings are completed electronically and submitted online (secondary outcomes).

G: Professional learning and support: all foundation, grade 1, grade 1/2 composite teachers and leadership from the intervention schools attend day 4 of the face-to-face professional learning, continue to access the online resources forum and participate in school visits and smartphone support from CPOL support workers.

H: A teacher survey and two teacher audio recordings are completed electronically and submitted online.

I: Face-to-face follow-up to assess individual student early literacy and language.

J: Students complete grade-3 NAPLAN (primary and secondary outcomes).

CPOL, Classroom Promotion of Oral Language; NAPLAN, National Assessment Program Literacy and Numeracy.

Active (opt in) and passive consent in DET schools. This combination will aim to minimise recruitment bias while subscribing to the relevant consent policies for each sector.

Randomisation

Schools will be randomly assigned in a 1:1 ratio after baseline data collection to receive the intervention (teacher professional learning days, online components and implementation support) or to the control arm which carries out business as usual in the classroom. Computer-generated block-randomisation will be used, with variable block sizes, stratified by school sector (CECV and DET).

Intervention

All teachers of foundation and grade 1 classes in schools randomised to the intervention arm of the study will be
Table 2 Overview of the four face-to-face professional learning sessions

<table>
<thead>
<tr>
<th>Session</th>
<th>Content summary</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>Introduction to the need for oral language promotion in the early years’ classroom. Detailed overview of the ICPALER framework for describing and teaching language. Discussion of the material provided instructions for between-unit activities (tasks to be completed in schools before next session).</td>
<td>Facilitated discussion Video footage including teaching examples Table and whole group discussion</td>
</tr>
<tr>
<td>Day 2</td>
<td>Day 1 refresher and between-unit activity feedback Assisting and profiling for oral language Using ICPALER to plan and implement classroom-based speaking and listening teaching School planning for implementation Instructions for between-unit activities</td>
<td>Facilitated discussion/activities Modelled use of two assessment tools Practice use of a screening tool Facilitated activities Small group planning</td>
</tr>
<tr>
<td>Day 3</td>
<td>Day 2 refresher and between-unit activity feedback Assessing and teaching the four language elements: phonological and phonemic awareness, vocabulary development, developing and using complex sentences and story grammar. School planning for implementation Instructions for day 4 school presentation</td>
<td>Facilitated discussion and activities Small group planning</td>
</tr>
<tr>
<td>Day 4</td>
<td>School presentations of implementation School planning for sustained implementation</td>
<td>Peer-to-peer learning Small group planning</td>
</tr>
</tbody>
</table>

*Online professional learning.
ICPALER, Ideas, Conventions, Purposes, Ability to Learn, Expressive and Receptive Language.

invited to attend four days of face-to-face professional learning convened by the research team (Table 2). Like OLSEL, the professional learning is based on Munro’s 34 ICPALER (Ideas, Conventions, Purposes, Ability to Learn, Expressive and Receptive Language) framework. ICPALER provides an explicit conceptual and pedagogical framework that teachers can use to consider their students’ language learning ability, the purposes for language use and the underlying receptive and expressive language skills (eg, phonological, morphological, semantic and discourse levels) that a child has mastered. Teachers are then able to explore specific classroom teaching strategies to scaffold students’ acquisition of more sophisticated skills. Four language domains from ICPALER are especially targeted in the teacher professional development: phonemic and phonological awareness, vocabulary knowledge, knowledge and application of narrative structure and comprehension of longer and more syntactically complex sentences.

Supplementing the formal days of professional learning, teachers will have the opportunity to participate in a self-directed online learning network of teachers from like-schools, and they will liaise with CPOL support workers via intermittent face-to-face, telephone and online contact, in order that questions are addressed and programme fidelity is enhanced.

1. Face-to-face professional learning days

Teachers will attend four face-to-face professional learning days. Two facilitators and a support worker will deliver the professional learning content.

The first three professional learning days will be held 6-8 weeks apart beginning in May of the year the students are in foundation. The final day will be held in February of the following year when the students are in grade 1. Table 2 outlines the content of the four face-to-face sessions.

2. Online professional learning

The online component of the intervention will be available for the duration of the 2-year intervention period. It comprises a secure website which will be accessible only to intervention teachers and will include:

► Relevant documents/professional learning notes and teaching resources available for download by teachers;
► Additional video footage for use during between-unit activities;
► Simple discussion threads in relation to between-unit activities and general support for professional learning days;
► Frequently asked questions.

3. CPOL support workers

The CPOL professional learning will be reinforced by the provision of two CPOL support workers (with either an education or speech pathology professional background) each working 1 day per week for the 2-year intervention phase of the trial. The inclusion of support workers was based on feedback from the implementation of OLSEL 35 and previous work suggesting that ongoing and collaborative professional development is important for teachers implementing practice change. These workers will provide ongoing support to the participating schools including face-to-face, online and telephone
communications. Face-to-face school visits will be scheduled throughout the 2-year intervention phase with the goal that every school be visited at least once (in addition to the online and telephone support).

Support workers will adopt a responsive and flexible approach, largely driven by individual school need. They will schedule their visits according to the self-identified learning needs of the early years team, at times that are convenient to that team. It is anticipated that teachers will integrate the visits into the school’s professional learning team meetings. They will provide assistance to intervention school teachers and leaders in-between professional learning sessions and after the fourth professional learning session in making and maintaining changes to classroom practice. This may include refreshing content from the intervention, assisting with team planning, modelling the assessment or teaching strategies described in the professional learning sessions and/or addressing concerns teachers experience throughout implementation. CPOL support workers will also use a private online forum to facilitate question and answer sessions and moderate learner-generated discussion.

Control arm

The schools in the control arm will conduct teaching as usual in the classroom. After the intervention phase of the study is complete, the opportunity to participate in a 1-day workshop will be offered to control schools. The focus and content of this workshop will be carefully tailored to be distinct from the intervention professional learning days and will focus on teaching strategies for current foundation and grade 1 students, rather than targeting the age group of the CPOL study cohort who will be in grade 2 by this time.

Blinding

The research staff (project coordinator and research assistant), CPOL support workers and intervention facilitators will be aware of the allocation of participating schools. All assessments with students will be conducted by researchers blinded to the schools’ randomisation allocation. Schools will be asked not to disclose their trial arm allocation. All investigators, including the study statistician, will be blind to school allocation for the duration of the trial.

Measures

The following measures will be used. A summary of the data collection schedule is presented in table 3.

Baseline measures (completed prior to randomisation)

School demographics

A brief principal questionnaire regarding school demographics will be distributed via email to all principals at baseline. The questionnaire will ask about staff and class numbers, potential prior exposure to a number of specific oral language initiatives and the types of speech pathology services accessed by the schools.

Student demographics

The study will use schools’ routinely collected information on student demographics. Details include student date of birth, gender, family language backgrounds and Aboriginal and Torres Strait Islander (ATSI) status. Schools will also be asked to provide information about which students are receiving disability support funding during the first 2 years of school (2014 and 2015).

The School Entrance Health Questionnaire

The School Entrance Health Questionnaire (SEHQ) is a parent-report questionnaire distributed and collected by DET school nurses for all students starting school (including those in CEVC schools). It records parents’ concerns and observations about their child’s health and wellbeing. The SEHQ includes domains such as general health, medications, immunisation status, dental health, speech/language, hearing, vision, disabilities, general development, behaviour and emotional wellbeing and family stress. The SEHQ also includes maternal and paternal highest level of education. The data will be provided to the study when available as an administrative data set.

The English Online Interview

The English Online Interview (EOI) is a teacher-completed measure of language and literacy. In DET schools, the EOI is routinely administered to all students entering foundation, but this is not the case for schools in the Catholic sector. In these schools, teachers will conduct the assessment via hard copy and the data will be entered into the secure database by a CPOL research assistant. A range of printed and online materials will be provided to support teachers to become familiar with and administer the EOI including access to the EOI homepage: http://www.education.vic.gov.au/school/teachers/teachingresources/discipline/english/assessment/Pages/default.aspx.

The EOI assesses students across the three modes of English in AusVELS (the Australian Curriculum in Victoria)—reading, writing and speaking and listening. For the purposes of this study, the reading, and speaking and listening sections of the EOI (teacher assessment and/or rating of aspects such as oral language and listening comprehension, phonemic awareness and phonics and concepts of print) will be used.

Primary outcome measure

Reading level of the students in grade 3

When the study cohort is in grade 3 we will access their National Assessment Program Literacy and Numeracy (NAPLAN) results (November 2017). NAPLAN is routinely collected in all schools in Australia and is assessed independently, external to the school. NAPLAN is collected when students are in grades 3, 5, 7 and 9 and comprises tests in four areas: reading, writing, language conventions and numeracy. Each test produces a raw score and a scale score (ranging from 0 to 1000). The reading scale score has been chosen as the primary outcome because of the well-established links between oral language competence
<table>
<thead>
<tr>
<th>Measure</th>
<th>Time point</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>School demographics</td>
<td>Baseline: start of foundation</td>
<td>Principal questionnaire: developed and administered by CPOL, collected via survey link</td>
</tr>
<tr>
<td>Student demographics</td>
<td>1. End of foundation</td>
<td>School census data: routinely collected by school staff and accessed by CPOL via linkage with the education departments</td>
</tr>
<tr>
<td>Teacher evaluation of intervention (process evaluation)</td>
<td>2. End of grade 1</td>
<td>Evaluation surveys: paper-based form developed by CPOL and collected face-to-face at intervention days</td>
</tr>
<tr>
<td>Teacher, principal and literacy leader evaluation of intervention (process evaluation)</td>
<td>3. Start of grade 2</td>
<td>Semi-structured interviews and focus groups: conducted face-to-face by CPOL research assistant</td>
</tr>
<tr>
<td>Reading scale score</td>
<td>4. Middle of grade 3</td>
<td>NAPLAN: reading score: accessed via data linkage from VCAA</td>
</tr>
<tr>
<td>Secondary outcomes</td>
<td>Instrument</td>
<td></td>
</tr>
<tr>
<td>Writing, language and numeracy scale scores</td>
<td></td>
<td>NAPLAN: writing, language conventions and numeracy scores (see primary outcome above)</td>
</tr>
<tr>
<td>Mental health</td>
<td></td>
<td>The Strengths and Difficulties Questionnaire (SDQ)(^{16}), parent report collected via paper-based form and teacher report via email link to online secure survey</td>
</tr>
<tr>
<td>Reading comprehension</td>
<td></td>
<td>Reading Progress Test(^{15})</td>
</tr>
<tr>
<td>Language</td>
<td></td>
<td>CELF 4: concepts and following directions(^{17}), NIH Toolbox Picture Vocabulary Test(^{18})</td>
</tr>
<tr>
<td>Receptive language</td>
<td></td>
<td>Renfrew Language Scales (4th ed Bus Story Test(^{19}))</td>
</tr>
<tr>
<td>Receptive vocabulary</td>
<td></td>
<td>All administered by CPOL researchers, face-to-face in student's school</td>
</tr>
<tr>
<td>Expressive language</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher knowledge</td>
<td></td>
<td>Teacher survey: developed by CPOL using a number of published surveys and administered by CPOL via email link to online secure survey</td>
</tr>
<tr>
<td>Teacher practice</td>
<td></td>
<td>Teacher audio-recordings: teaching samples recorded by teacher and submitted via email and Dropbox</td>
</tr>
</tbody>
</table>

\(^{1}\): data collected by CPOL researchers; \(^{2}\): routinely collected by schools or education departments (CPOL to access via linkage or provided by project partners) |
and reading acquisition. The reading score will be used to measure the medium-term impact (>1 year post-intervention) of CPOL on students' reading ability.

Secondary outcome measures

Teachers:

Teacher knowledge

Teacher knowledge will be measured using the CPOL Teacher Survey, which will be sent to index teachers at baseline, end of foundation and at the end of grade 1. The survey collects demographic information about the teacher sample as well as containing a number of items related to teacher experience and practices, knowledge (e.g., of language and language structures) and sources of their knowledge and skill. Teachers will also be asked to self-rate their level of confidence with respect to a range of language and reading instruction parameters.

The tool has been developed specifically for CPOL and is comprised predominantly of items drawn from previously published tools. Items on constructs considered relevant to the CPOL intervention that could not be sourced from published literature (e.g., an item pertaining to teacher knowledge of narrative structure) were generated by investigators within the CPOL team. Many of these items were previously piloted in a teacher professional learning programme.

Teacher practice

Index teachers will record a 10 min audio sample of their teaching during a common whole class lesson, for example, a 'Big Book' reading. Two samples will be requested at each time point (end of foundation and end of grade 1) and one recording per time point will be randomly selected for analysis. The decision to use audio samples (as opposed to direct observation or video samples) aims to reduce participant burden (promoting better completion rates) and minimise observer bias.

Students:

A number of secondary outcome measures will be collected when the students are in grade 1 and in grade 3. These will be analysed after primary outcome data collection.

Mental health

The Strengths and Difficulties Questionnaire (SDQ) is a behavioural screening questionnaire for those aged 3–16 years with 25 questions across five scales (emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behaviour). It has been used in many cohort and intervention studies to briefly assess child mental health difficulties. The SDQ will be completed at baseline, and at the end of grade 1, by both the classroom teacher and the parent.

Reading comprehension

The Reading Progress Test will be administered as a whole of class booklet-based literacy test. It will assess prereading and early reading skills including print concepts, word knowledge and comprehension. The group test will be administered by a blinded CPOL research assistant between October and December 2015, when the students are in grade 1. This is a validated tool and has Australian norms based on a national sample of students.

Language

Expressive language (syntax and narrative)

The Renfrew Language Scales (4th ed) Bus Story Test will be used to elicit a narrative sample from the students. The assessment will be administered by a blinded CPOL research assistant between October and December 2015, when the students are in grade 1. It will be administered as per the Bus Story Test protocol, however the student narrative sample will be audio-recorded. The audio files will be transcribed verbatim and coded for narrative macrostructure (story grammar content) and microstructure (syntax) as per the OLSEL pilot RCT.

Receptive language

The Concepts and Following Directions subtest (comprehension, recall and ability to act on spoken directions) from the Clinical Evaluation of Language Fundamentals-Fourth Edition (Australian standardisation) will assess the students' receptive language. This assessment will be administered by a blinded CPOL research assistant between October and December 2015, when the students are in grade 1.

Receptive vocabulary

The National Institute of Health (NIH) Toolbox Picture Vocabulary Test (TPVT) will be used to measure receptive vocabulary. The TPVT was modified, with permission from NIH, to be delivered on an iPad in an Australian accent. This assessment will be administered by a blinded CPOL research assistant between October and December 2015, when the students are in grade 1.

Writing, language conventions and numeracy

In addition to using the students' reading score from their grade 3 NAPLAN as the primary outcome, the NAPLAN writing, language conventions and numeracy scores will be used as secondary outcome measures.

Data collection procedures

Schedule

Table 3 outlines the measures and schedule for data collection. Many of the data sources used in the CPOL RCT capitalise on routinely collected data sets. The majority of the primary data collection conducted by CPOL researchers occurs when the students are at the end of grade 1, which coincides with the end of the intervention phase. These data will be collected by teams of three to five CPOL...
research assistants blinded to the schools’ randomisation allocation from October to December 2015.

**Process evaluation**
At the conclusion of the intervention phase of the trial, a process evaluation will be conducted to evaluate the extent to which the CPOL intervention was implemented as intended. The objectives of the process evaluation will be:
1. to evaluate the degree to which teachers and school leaders engaged and complied with the CPOL professional learning intervention;
2. to identify the facilitators and barriers teachers and/or schools faced in implementation;
3. to assess the extent to which CPOL strategies are judged to have been maintained in classrooms and built into the school curriculum and wider school environment.
The fidelity of the CPOL intervention will be investigated via a mixed-methods approach, using data collected throughout the RCT pertaining to attendance, support worker notes and observations, as well as in-depth interviews and focus groups with teachers and members of school leadership teams from the intervention arm of the study (see table 9 for details of data collection).

**Economic evaluation**
A cost-consequences analysis of the intervention compared with the control arm will be conducted from the government perspective, that is, it will include costs and outcomes relevant to government (but not those relevant only to individuals, such as additional out-of-pocket expenses). The economic evaluation will compare the incremental costs of the intervention (costs accrued in the intervention compared with costs incurred in the control group) to the measured primary and secondary outcomes, which are expressed in their natural units, such as point change in NAPLAN score. Costs will include the physical resources and staff time (of training staff and participating teachers) invested in providing all aspects of the intervention, recorded prospectively by the research team. Teacher report of all professional development activities over the 2-year intervention period will be used to assess whether CPOL is associated with a reduction (cost-saving) in other professional development activities. The uncertainty of cost and outcome data will be tested in a sensitivity analysis.

**Data management and storage**
All schools, teachers and students will be assigned unique numerical identifiers (an ID code) for use throughout the study. A single electronic, password-protected, database in REDCap will record all participant details. This will be hosted on the Murdoch Children’s Research Institute server, which meets security and ethical confidentiality requirements. Members of the study team will have different levels of access depending on their role. Researchers will be able to access the details of participants where necessary but not their randomisation status unless necessary to that investigator. Participant questionnaire data will be identified by ID code only.

Written materials will be immediately scanned and saved within the study database. Paper versions of assessments or forms will be stored in a locked filing cabinet at the Royal Children’s Hospital and will be available only to the relevant research assistant. Aside from the initial consent forms (DET students), all further data collection material will be identified by unique number only, with no identifying information available.

**Sample size and power calculations**
The primary outcome of this study is the NAPLAN reading scores at grade 5.

The study is powered to identify a difference between the intervention and control groups in the reading scale score of 0.3 SD (equivalent to 22.98 points based on the mean scale score of 434.1 and a SD of 76.6) 54 Given that the average gain in NAPLAN reading score over 2 years was approximately 80 points, this would represent a meaningful difference at the population level (equivalent to a 2-month difference in progress). Randomisation of 501 students per arm is required to provide 90% power to detect a minimum difference of 0.3 SD on the NAPLAN reading scores at grade 3, allowing for an average intraclass correlation coefficient of 0.08 and an average cluster size of 17. Allowing for a potential attrition rate of 20% by the time students are in grade 3, 790 students per arm (1580 in total) will be required in the study.

**Data analysis**
Analysis will be conducted using the intention-to-treat (ITT) analysis principle, with students and teachers analysed in the study arm to which their school was randomly allocated.

As a sensitivity analysis, results will also be presented from a per-protocol (PP) analysis. The PP population will include students:

- a. who complete foundation in the first year of the intervention and grade 1 in the second year of the intervention;
- b. who have no more than 50 days of absence* in foundation;
- c. who have no more than 50 days of absence in grade 1;
- d. whose NAPLAN reading score at grade 3 is available;
- e. who have been exposed to the index teacher during foundation and to a teacher who attended the intervention during grade 1. If an index teacher leaves during foundation, his/her replacement must be an intervention teacher (intervention students only);

* In Australia, there are 200 days in a school year. Because 50 days equates to one full term of school it was agreed by consensus in the research team that this would be the operational definition of ‘significant absence’.
f. whose index teachers have been exposed to at least three of the four intervention days (intervention students only);
g. whose school has sent at least one teacher to all four intervention days, that is, school was represented at each session (intervention students only);
h. whose teachers did not work in any of the intervention schools during the 2-year intervention phase (control students only);
i. whose school has never employed a teacher who previously worked in an intervention school during the intervention phase (control students only).
All data analyses will be conducted using the Stata software package.

Statistical analysis plan
The baseline characteristics of the students, schools and the teachers will be summarised by group. Categorical variables will be presented as the number and proportion in each category. Continuous variables will be presented as means and SDs, or medians, ranges and IQRs for non-normally distributed data.

Primary outcome analysis
The primary outcome, the NAPLAN reading score at grade 3, will be summarised by study arm as a mean and SD. The mean score will be compared between the groups using a two-level random effects linear regression model. This model will include a random effect for school, a fixed effect for intervention indicator and for type of school (CECV or DET) and a random effect for the interaction between intervention and school. Results will be reported as a mean difference between groups together with a 95% CI and p value.
A secondary analysis will include fixed effects for each of the following factors: student’s gender and age; family SES; ATSI status; student’s language background other than English (LBOTE); student’s special needs (whether or not receiving disability support funding during the intervention phase of the study) and student’s mental health at baseline as potentially important confounding variables, and will again be reported as a mean difference between groups, 95% CI and p value.

Secondary outcome analyses
NAPLAN writing, language conventions and numeracy scores at grade 3 will be summarised by study arm and will be separately analysed using the same two-level random effects linear regression model as for the primary outcome. Unadjusted analyses of the outcomes NAPLAN writing, language conventions and numeracy scores as well as analyses adjusted for student’s gender and age, family SES, ATSI status, student's LBOTE, student’s special needs (whether or not receiving disability support funding during the intervention phase of the study) and student’s mental health at baseline will be reported.

Secondary outcomes at the teacher and school level will be summarised within each group, and compared between the groups using linear (continuous outcomes) and logistic (binary outcomes) regression models adjusted for type of school. All regression analyses will take account of any effects of the school (clustering), so that accurate effects of the intervention, regardless of the school, are estimated.

Handling of missing values
Prior to analysis, the available data on the primary and secondary outcomes will be explored. If there is a reasonable amount of missing data (>5%) and the summaries suggest that data may be missing depending on the characteristics of the participants, multiple imputation will be used to handle the missing data. In this case, a single imputation model will be used to impute all of the missing outcomes, using baseline characteristics as auxiliary models. Analysis will be repeated using a complete case analysis for comparison. If there is little missing data, complete case analysis will be presented as the primary analysis. The amount of missing data is not the sole criterion by which the missing data problem will be assessed; the missing data mechanisms and the missing data patterns will also be investigated and reported.

Interim analyses
At the end of the intervention phase (end of grade 1), all teacher outcome measures available will be analysed. The study statistician will remain blinded to the randomisation allocation of students by keeping links between teacher ID, school ID and student ID separate during the interim analysis. The interim analysis will include the following teacher outcome measures:
- Baseline: teacher knowledge survey
- End of grade 1: teacher knowledge survey, teacher practice recordings
- End of grade 1: teacher knowledge survey, teacher practice recordings, teacher evaluation of intervention (process evaluation)

Ethics and dissemination
This trial was approved by the Monash University Human Research Ethics Committee (#CF13/2634-2013001403) and later transferred to the University of Melbourne (#13555/0). Translation of study results will be facilitated by having CECV and DET, who are responsible for the regulation and funding of Victorian schools, as partners in this trial. Findings from this trial will be of national and international significance in health and education sectors. All investigators have extensive national and international research and policymaker networks. This will ensure academic and policy impact via national and international health, education and early childhood development conferences, academic journals, publications targeting practitioners, teachers, targeted use of social and electronic news media and inclusion in strategic policy forums such as national ministerial and senior officer councils (eg, Standing Council on School Education and Early Childhood). The findings from
this trial will be reported according to the Consolidated Standards of Reporting Trials (CONSORT) Statement guidelines.86

**DISCUSSION**

The CPOL trial is an education-based, rigorous evaluation of an oral language teacher professional learning intervention, an area of research in which there are relatively few gold standard trials. It addresses the crucial need to enhance literacy achievements in the early years of schooling by ensuring a rich oral language classroom environment. As a classroom-level, teacher-led intervention, CPOL takes a population approach to improve oral language competencies for all students. However, it targets schools where student’s oral language skills may be impoverished relative to the demands of the early years classroom. The trial’s efficiencies lie in its data collection design, capitalising on existing data sets routinely collected by schools for submission to their education departments. Partnering with CECV and DET will facilitate leveraging of these data for this intervention and tests a potentially replicable approach for future RCTs in schools.

The CPO trial responds to identified evidence gaps in classroom-level oral language interventions, and in RCTs testing the effectiveness of teacher professional learning on student outcomes over the short to medium term. This trial will therefore be proof of concept and further confirmation that large-scale RCTs evaluating pedagogy can be efficient and robust in education. If effective, the following outcomes are expected:

- The best available evidence that improving teacher knowledge and changing teacher practice regarding language and literacy can lead to student oral language development and sustained literacy improvement in the first 3 years of formal schooling.
- A cost-efficient and well-tested intervention that could be (a) delivered to students as routine high-quality teaching practice and (b) included in teacher professional development, giving some way to addressing the question of 'what works?' in early years language and literacy education.

Schools are highly susceptible to the adoption of poorly evidenced programmes.87 While a number of studies have reported the impact of teacher professional development and learning as a before and after design, this is an underdeveloped field of research.88 We will extend this research by potentially demonstrating immediate and medium-term retention of knowledge and change of practice, and by testing this impact compared with control teachers who are being exposed to regular professional development and to ad hoc access to web-based and other sources of information.

Support workers who reinforce the professional learning are included as an adjunct intervention accelerator based on feedback from the OLSEL implementation and on work which suggests that schools and teachers benefit from additional ‘hands on’ support to reinforce and adapt learnings to their actual context.89,90

It is commonly acknowledged that a nexus should exist between teacher knowledge and practice and student outcomes, potentially mediated through teacher attitudes.85,86 Given the lack of evidence in this area to date, this study will make an important contribution to the education and health literature. Indeed, there is increasing interest in rigorous testing of professional learning interventions in Australia and internationally.85,86 Education remains one of the most powerful predictors and social determinants of adult health outcomes.89 In Australia, the converging health and education policy interests in state and federal governments85,89,90 would suggest it is timely to rigorously evaluate how schools as education platforms can effectively and equitably address important child development outcomes. This is of vital importance and relevance to health and education policy makers and researchers alike.

**Author affiliations**

Centre for Community Child Health, The Royal Children’s Hospital, Parkville, Victoria, Australia

 Murdoch Children’s Research Institute, Parkville, Victoria, Australia

 Department of Paediatrics, The University of Melbourne, Parkville, Melbourne, Australia

 La Trobe Rural Health School, La Trobe University, Bendigo, Victoria, Australia

 Melbourne Graduate School of Education, The University of Melbourne, Parkville, Victoria, Australia

 Deakin University, Geelong, Victoria, Australia

 Catholic Education Melbourne, East Melbourne, Victoria, Australia

**Acknowledgements** The CPO trial is a research collaboration between the University of Melbourne, Deakin University, La Trobe University, Murdoch Children’s Research Institute (MCRI), CECV, DET and The Royal Children’s Hospital (RCH) Education Institute. The authors thank all of the students, teachers and schools who participated in the study.

**Contributors** The original study design was conceived by SG, PS, PE, LG and SG. PE, LG, BS and JC implemented the study design. JM designed the framework on which the intervention was based. FO and RL provided statistical expertise in the trial design; FO, BS and AW are conducting the data cleaning and FO and RL are conducting the statistical analysis. LG and HL provided health economics expertise in the trial design and are conducting the cost evaluation analysis. AW contributed to the development of the manuscript based on the existing protocol. All authors contributed to the refinement of the study protocol and approved the final manuscript.

**Funding** The work is supported by the Australian Research Council (linkage Project scheme grant number LP 130100330) and by the Ian Potter Foundation (reference: 130015004). The work is also supported by the CECV and DET. The RCH Education Institute and MCRI. Research at the MCRI is supported by the Victorian Government’s Operational Infrastructure Support Program. SG was supported by a NHMRC Career Development Award (1105922). LG was supported by a NHMRC Early Career Fellowship (1031506). The funding bodies had no role in relation to the design and conduct of the study, collection, management, analysis and interpretation of the data, preparation, review or approval of the manuscript, and decision to submit the manuscript for publication.

**Competing interests** None declared.

**Patient consent** Detail has been removed from this case description to ensure anonymity. The editor and reviewers have seen the detailed information available and are satisfied that the information backs up the case the authors are making.

**Ethics approval** Monash University Human Research Ethics Committee.

**Provenance and peer review** Not commissioned; externally peer reviewed.

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54. Australian Curriculum, Assessment and Reporting Authority. NAPLAN Achievement in Reading, Persuasive Writing, Language Conventions and Numeracy: National Report for 2013. Sydney, NSW.
### Appendix B: Studies of Professional Learning (PL) in Oral Language

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Level of Evidence</th>
<th>Model of PL &amp; content</th>
<th>Model of PL &amp; content</th>
<th>Provider of PL</th>
<th>Contact hours</th>
<th>Country; year level</th>
<th>Teacher (n)</th>
<th>Teacher measures</th>
<th>Student (n)</th>
<th>Additional Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbott, Walton &amp; Greenwood</td>
<td>2002</td>
<td>III-3</td>
<td>Professional learning in phonemic awareness</td>
<td>PL in phonemic awareness</td>
<td>Research team</td>
<td>Not specified</td>
<td>United States; K - Grade 1</td>
<td>2</td>
<td>Observation for fidelity</td>
<td>39</td>
<td>Teachers participated in PL and then delivered phonemic awareness program to students.</td>
</tr>
<tr>
<td>Al Otaiba, Connor, Folsom et al.</td>
<td>2011</td>
<td>II</td>
<td>Teacher professional learning in literacy, including phonological awareness and vocabulary, embedded within a RTI framework. Included training in ISI-K and A2i software</td>
<td>Teacher professional learning in content and decoding aspects of literacy, including phonological awareness and vocabulary, embedded within a RTI framework. Included training in ISI-K and A2i software</td>
<td>Research team</td>
<td>1 day training in RTI for both intervention and control, intervention also received training in ISI-K and A2i models</td>
<td>United States; K</td>
<td>44</td>
<td>Observation and video samples for fidelity</td>
<td>305 treatment, 251 control</td>
<td>Focus was on teachers learning to differentiate instruction for individual students.</td>
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<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
<td>Country; year level</td>
<td>Teacher (n)</td>
<td>Teacher measures</td>
<td>Student (n)</td>
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<tr>
<td>Apthorp, Randel, Cherasaro, Clark, McKeown &amp; Beck</td>
<td>2012</td>
<td>II</td>
<td>Implementation of Elements of Reading® Vocabulary (EOR:V). Reading coaches attended EOR:V training, and then delivered training in their schools.</td>
<td>Implementation of EOR:V. Reading coaches attended EOR:V training, and then delivered training in their schools.</td>
<td>Research team &amp; coaches</td>
<td>Not specified</td>
<td>United States; K- grade 4</td>
<td>1057</td>
<td>Baseline survey of demographics and instructional activities, recording of practice (for fidelity), logs and observations</td>
<td>16471</td>
<td>Proximal (Grade 1) and distal (Grade 2) measures – evidence of a significant effect on proximal effects but not distal effects</td>
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<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
<td>Country; year level</td>
<td>Teacher (n)</td>
<td>Teacher measures</td>
<td>Student (n)</td>
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<tr>
<td>Baker, Santoro, Chard, Fien, Park, &amp; Otterstedt</td>
<td>2013</td>
<td>II</td>
<td>Read aloud intervention. Included focus on language comprehension and vocabulary with narrative and expository texts.</td>
<td>Read aloud intervention. Included focus on language comprehension and vocabulary with narrative and expository texts.</td>
<td>Research team</td>
<td>1 day training, plus coaching for first 2 weeks of program. Half day follow-up training in week 9.</td>
<td>United States, grade 1</td>
<td>12 (6 treatment, 6 control)</td>
<td>Observations for fidelity only</td>
<td>225</td>
<td>Targeted listening comprehension, but also included reading comprehension skills. 1 teacher per school</td>
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<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
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<td>Teacher measures</td>
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<tr>
<td>Blachman, Ball, Black &amp;</td>
<td>1994</td>
<td>III-2</td>
<td>Phonological awareness &amp; phoneme awareness professional learning program, within theoretical framework.</td>
<td>Phonological awareness/phoneme awareness training program, with theoretical framework.</td>
<td>Not specified</td>
<td>7 x 2 hour workshops</td>
<td>United States; K</td>
<td>10 teachers plus their teaching assistants</td>
<td>None</td>
<td>84 treatment, 75 control</td>
<td>Teacher delivered PA intervention resulted in statistically significant difference in phoneme segmentation.</td>
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<td>Tangel</td>
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<tr>
<td>Blachman, Tangel, Ball,</td>
<td>1999</td>
<td>III-1</td>
<td>Phonological awareness &amp; word recognition within general literacy professional learning intervention</td>
<td>Phonological awareness &amp; word recognition within general literacy intervention</td>
<td>Not specified</td>
<td>13 x 2 hour workshops</td>
<td>United States, K – grade 1</td>
<td>11 teachers</td>
<td>None</td>
<td>66 treatment, 62 control</td>
<td>Students whose teachers completed PL outperformed comparison students on measures of PA and word recognition at the end of G1, and work recognition at and of G2, but not spelling.</td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
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<td>Teacher (n)</td>
<td>Teacher measures</td>
<td>Student (n)</td>
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<td>Borman and Dowling</td>
<td>2009</td>
<td>III-2</td>
<td>Superkids Reading Program, including phonemic awareness; phonics; fluency; comprehension; vocabulary; listening and speaking; handwriting; spelling; expressive writing; early literacy; grammar; structural analysis; and study skills.</td>
<td>Superkids Reading Program, including phonemic awareness; phonics; fluency; comprehension; vocabulary; listening and speaking; handwriting; spelling; expressive writing; early literacy; grammar; structural analysis; and study skills.</td>
<td>Research team</td>
<td>1-day PL followed by 3 to 5 visit and phone support</td>
<td>United States, K – grade 1</td>
<td>12 schools, with 23 treatment teachers &amp; 20 controls</td>
<td>389 treatment, 361 control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bos, Mather, Narr &amp; Babur</td>
<td>1999</td>
<td>III-2</td>
<td>Professional learning in Reading Instructional Methods of Efficacy (RIME) intervention, included phonological awareness content</td>
<td>RIME intervention, included some phonological awareness instruction</td>
<td>Trainers</td>
<td>2 ½ weeks</td>
<td>United States; K- grade 3</td>
<td>11 treatment; 17 control</td>
<td>Attitudes, knowledge, satisfaction with course, with a hypothesised process of change</td>
<td>116 treatment, 202 control</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
<td>Country; year level</td>
<td>Teacher (n)</td>
<td>Teacher measures</td>
<td>Student (n)</td>
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<td>Brady, Gillis, Smith et al.</td>
<td>2009</td>
<td>IV</td>
<td>Professional learning in phonological awareness &amp; phonics</td>
<td>Phonological awareness &amp; phonics</td>
<td>Researcher s</td>
<td>2-day summer institute, monthly workshops, coaching.</td>
<td>United States; 1st grade teachers</td>
<td>65</td>
<td>Teacher knowledge survey &amp; Teacher Attitude Survey</td>
<td>None</td>
<td>PL led to improvement in teacher knowledge</td>
</tr>
<tr>
<td>Carlisle &amp; Berbitsky</td>
<td>2011</td>
<td>III-2</td>
<td>Comparison of models of professional learning: Language Essentials for Teachers of Reading and Spelling (LETRS) professional learning only and LETRS professional learning with coaching</td>
<td>Comparison of two models of PL: LETRS PL, LETRS PL with coaching</td>
<td>Research team</td>
<td>27 hours + coaching</td>
<td>United States, grade 1 (Reading First schools)</td>
<td>76</td>
<td>Teacher survey, measuring attitudes, and support for change. TIP time sampling approach, fidelity observation</td>
<td>307</td>
<td>PL + coaching teachers' classrooms made greater improvement in decoding.</td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
<td>Country; year level</td>
<td>Teacher (n)</td>
<td>Teacher measures</td>
<td>Student (n)</td>
<td>Additional comment</td>
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<tr>
<td>Carlisle, Cortina &amp; Schnabel</td>
<td>2011</td>
<td>III-2</td>
<td>Comparison of three models of professional learning: LETRS professional learning, LETRS professional learning with support, and LETRS professional learning with support and coaching</td>
<td>Research team</td>
<td>27 hours + coaching</td>
<td>United States; grade 1 (Reading First schools)</td>
<td>111</td>
<td>Language and reading concepts survey, satisfaction with my work survey capturing information about, school climate. TIP time sampling approach</td>
<td></td>
<td>PL with support and coaching was most effective</td>
<td></td>
</tr>
<tr>
<td>Carson, Gillon &amp; Boustead.</td>
<td>2013</td>
<td>III-2</td>
<td>Professional learning in Phonological Awareness Training (PAT) (modified for the classroom) delivered by teachers to students with and without specific language impairments</td>
<td>Research team</td>
<td>8 hours (approx.)</td>
<td>New Zealand; grade 1</td>
<td>12</td>
<td>Video observations and logs for fidelity</td>
<td>129</td>
<td></td>
<td></td>
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<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
<td>Country; year level</td>
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<tr>
<td>Fuchs, Fuchs, Thompson et al.</td>
<td>2001</td>
<td>III-1</td>
<td>Comparison between models: Ladders to Literacy, Ladders to Literacy + PALS (phonological awareness + decoding), and comparison group</td>
<td>Research team</td>
<td>1 day Ladders to Literacy workshop, PALS arm attended addition ½ workshop</td>
<td>United States</td>
<td>33</td>
<td>Fidelity logs, checklists and observations, and post program survey to gauge teachers' perceptions of effectiveness</td>
<td></td>
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<tr>
<td>Garet et al.</td>
<td>2008</td>
<td>II</td>
<td>Comparison of models of professional learning: (LETRS) professional learning only and LETRS professional learning with coaching</td>
<td>LETRS developer + Research team</td>
<td>48 hours of PL (treatment groups A and B) (+60 hours coaching for arm B)</td>
<td>United States, grade 2</td>
<td>90 Schools, 270 grade 2 teachers</td>
<td>Teacher knowledge, teacher practice (logits scaled observations of explicit teaching, independent student activity and differentiation of instruction)</td>
<td></td>
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</table>


<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Level of Evidence</th>
<th>Model of PL &amp; content</th>
<th>Model of PL &amp; content</th>
<th>Provider of PL</th>
<th>Contact hours</th>
<th>Country; year level</th>
<th>Teacher (n)</th>
<th>Teacher measures</th>
<th>Student (n)</th>
<th>Additional comment</th>
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</thead>
<tbody>
<tr>
<td>Gersten et al.</td>
<td>2010</td>
<td>II</td>
<td>Teacher study group (reading comprehension and vocabulary)</td>
<td>Teacher study group (reading comprehension and vocabulary)</td>
<td>Research team</td>
<td>16 x 75 minute sessions</td>
<td>United States</td>
<td>81</td>
<td>Teacher knowledge (Content Knowledge for Teaching Reading (Phelps &amp; Schilling, 2004), teacher practice and an appraisal of program. Checklist to determine fidelity</td>
<td>468</td>
<td>Hypothesised process of change, as per Desimone (2009)</td>
</tr>
<tr>
<td>Gersten et al.</td>
<td>2013</td>
<td>II</td>
<td>Teacher study group (reading comprehension and vocabulary)</td>
<td>Teacher study group (reading comprehension and vocabulary)</td>
<td>Researchers</td>
<td>11 x 75 minutes</td>
<td>United States, grade 1</td>
<td>182 (94 treatment, 88 control)</td>
<td>Teacher Practice (OMVI) Observation Measure of Vocabulary Instruction, Teacher Knowledge – Content Knowledge for Teaching Reading</td>
<td>1811</td>
<td>Replication of Gersten et al., 2010</td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
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<tr>
<td>Goodson et al.</td>
<td>2010</td>
<td>Cluster RCT II</td>
<td>Professional learning in Kindergarten PAVEd for Success (K-PAVE) program; vocabulary</td>
<td>K-PAVE; Vocabulary</td>
<td>Research team</td>
<td></td>
<td>United States, Kindergarten classrooms</td>
<td>130</td>
<td>CLASS, and additional measure of vocabulary and comprehension support</td>
<td>1296</td>
<td>Explicitly hypothesised process of change, linking professional learning to teacher practice and student outcomes.</td>
</tr>
<tr>
<td>Greenwood et al.</td>
<td>2003</td>
<td>III-2</td>
<td>Longitudinal sequential cohort design CBM model; phonemic awareness, within literacy intervention</td>
<td>CBM model; phonemic awareness, within literacy intervention</td>
<td>Research team</td>
<td>Not specified</td>
<td>United States; K-grade 4</td>
<td>16</td>
<td>Practice, measured with MI-CISSAR</td>
<td>350</td>
<td>Approximately</td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
<td>Country; year level</td>
<td>Teacher (n)</td>
<td>Teacher measures</td>
<td>Student (n)</td>
<td>Additional comment</td>
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<tr>
<td>Gunn et al.</td>
<td>2010</td>
<td>II</td>
<td>Professional learning within Read Well Kindergarten; includes vocabulary, phonological awareness, as well as alphabetic understanding and decoding</td>
<td>Research team</td>
<td>2 days in year 1, 1 day in year 2</td>
<td>United States; K</td>
<td>54 (26 intervention, 28 control)</td>
<td>Practice (observation of instructional interactions); fidelity observation</td>
<td>1519</td>
<td></td>
<td></td>
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<tr>
<td>Lo, Wang &amp; Haskell</td>
<td>2009</td>
<td>III-3</td>
<td>Early reading instruction professional learning, includes phonological awareness content</td>
<td>Early Reading Instruction (incl PA)</td>
<td></td>
<td></td>
<td>4</td>
<td>Fidelity only</td>
<td>47</td>
<td>AT risk/targeted</td>
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<tr>
<td>McCutchen, Abbott et al.</td>
<td>2002</td>
<td>III-2</td>
<td>Professional learning for teachers in phonological and orthographic awareness</td>
<td>Research team</td>
<td>70 hours</td>
<td>United States; K &amp; grade 1</td>
<td>24 intervention; 20 control</td>
<td>Knowledge (Moats survey), practice observation</td>
<td>492 K, 287 G1</td>
<td></td>
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<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
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<tr>
<td>O'Connor et al.</td>
<td>1999</td>
<td>III-2</td>
<td>Professional learning in Ladders to Literacy program, includes phonological awareness</td>
<td>Research team</td>
<td>10 training sessions</td>
<td>United States; K</td>
<td>6 classes</td>
<td>Classroom observations (fidelity and training purposes)</td>
<td>107</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O'Connor et al.</td>
<td>2005</td>
<td>III-3</td>
<td>Longitudinal lagged design (historical controls). Professional learning in reading (including phonological awareness) ± direct intervention to students.</td>
<td>Research team</td>
<td>3 full days, plus 4 x 2 hours sessions</td>
<td>US, K – grade 3</td>
<td>22</td>
<td>Self-report of practice, observations with activity log.</td>
<td>409</td>
<td>(103 K, 103 G1031)</td>
<td></td>
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<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
<td>Country; year level</td>
<td>Teacher measures</td>
<td>Student (n)</td>
<td>Teacher (n)</td>
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<tr>
<td>Parkinson, Meakin, &amp; Salinger</td>
<td>2015</td>
<td>II</td>
<td>Children’s Literacy Initiative (CLI) program; broad ranging literacy intervention, includes vocabulary and phonological awareness</td>
<td>Children’s Literacy Initiative (CLI) program; broad ranging literacy intervention</td>
<td>3 summer institute days + 50 hours classroom embedded coaching in 1st year, 3 seminar days and 25 hours coaching in 2nd year</td>
<td>US; Grade 1</td>
<td>Practice (ELLCO)</td>
<td>4321 (K) + 3937 (1st grade)</td>
<td>218 (K) + 228 (1st grade)</td>
<td>Significant positive effect on teachers’ practices and environment</td>
<td></td>
</tr>
</tbody>
</table>
| Podhajski, Mather, Nathan & Sammons | 2009 | III-2             | Professional learning in TIME for teachers program, includes phonemic awareness, as well as phonics, fluency | TIME for teachers, includes phonemic awareness, phonics, fluency | Not stated: 35 hours + 10 mentoring visits | United States, grade 1 and 2 | 4 treatment + 3 comparison | 33 treatment + 14 comparison | Small sample of teachers showed improved knowledge following PL.
<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Level of Evidence</th>
<th>Model of PL &amp; content</th>
<th>Provider of PL</th>
<th>Contact hours</th>
<th>Country; year level</th>
<th>Teacher (n)</th>
<th>Teacher measures</th>
<th>Student (n)</th>
<th>Additional comment</th>
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</thead>
<tbody>
<tr>
<td>Porche, Pallante &amp; Snow</td>
<td>2012</td>
<td>III-2</td>
<td>CLLIP intervention: strategic assessment, phonemic awareness, in addition to word reading, fluency, vocabulary, comprehension, writing</td>
<td>CLLIP coaches</td>
<td>6</td>
<td>US, K and grade 4</td>
<td>27</td>
<td>classroom teachers, 4 Title I teachers &amp; 7 administrators</td>
<td>122 K</td>
<td>Student gains were modified by risk status; children who were benefited more from intervention than those not at risk.</td>
</tr>
<tr>
<td>Scanlon, Vellutino, Small et al.</td>
<td>2005</td>
<td>III-3</td>
<td>Professional learning in Interactive Strategies Approach (ISA) incorporated within comparison of intervention and prevention approaches. ISA includes phonological awareness component.</td>
<td>Research team</td>
<td>5 day workshop and bimonthly group meetings and supervision</td>
<td>United States, K and grade 1</td>
<td>Not stated</td>
<td>None</td>
<td>1373 screened (232 K treatment, 232 K control)</td>
<td></td>
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<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
<td>Country; year level</td>
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<td>Teacher measures</td>
<td>Student (n)</td>
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<tr>
<td>Scanlon, Gelzheiser, Vellutino et al.</td>
<td>2008</td>
<td>III-3</td>
<td>Professional learning in ISA. 3 arm study; PL only, student intervention only, and PL and student intervention. Coaching provided to PL and PL + intervention conditions. ISA includes phonological awareness component.</td>
<td>Not stated</td>
<td>3 days PL, + 5 or more coaching sessions</td>
<td>United States, K</td>
<td>28</td>
<td>CLASSIC; similar to time sampling to capture engagement and responsivene ss</td>
<td>457 (156 IO, 164 PLO) 137 (PL+)</td>
<td>PL had a significant moderate effect on the amount of time devoted to language instruction, and significant large effect on student's active engagement. No change in time allocated to comprehensio n, and small decrease in time spent on oral language.</td>
</tr>
<tr>
<td>Scarparolo &amp; Hammond</td>
<td>2018</td>
<td></td>
<td>Professional learning in Let's Decode program, includes phonological awareness and phonics</td>
<td>Research team</td>
<td>1 day PL + coaching</td>
<td>Australia, K – Year 2</td>
<td>15</td>
<td>None</td>
<td>PL resulted in significant improvement in instructional practice.</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
<td>Country; year level</td>
<td>Teacher (n)</td>
<td>Teacher measures</td>
<td>Student (n)</td>
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<tr>
<td>Snow, Eadie, Connell et al.</td>
<td>2014</td>
<td>II</td>
<td>Professional learning in ICPALER model; including focus on story grammar, phonological awareness, vocabulary. School leaders also completed university subject in oral language.</td>
<td>Teachers received training in ICPALER model; including focus on story grammar, phonological awareness, vocabulary. School leaders also completed university subject in oral language.</td>
<td>Research team</td>
<td>6 days and coaching</td>
<td>Australia; F – Grade 2</td>
<td>Teachers and principals from 14 schools (8 treatment, 6 control)</td>
<td>None</td>
<td>1254</td>
</tr>
<tr>
<td>Stevens, Van Meter &amp; Warcholak</td>
<td>2010</td>
<td>III-2</td>
<td>Professional learning in story structure instruction.</td>
<td>Story structure instruction</td>
<td>Research team</td>
<td>Summer training, hours not stated</td>
<td>United States; K-2, and special education</td>
<td>16 classes (9 treatment, 7 control)</td>
<td>Fidelity observations</td>
<td>Treatment 200, comparison 121</td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Level of Evidence</td>
<td>Model of PL &amp; content</td>
<td>Model of PL &amp; content</td>
<td>Provider of PL</td>
<td>Contact hours</td>
<td>Country; year level</td>
<td>Teacher (n)</td>
<td>Teacher measures</td>
<td>Student (n)</td>
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<tr>
<td>Timperley &amp; Phillips</td>
<td>2003</td>
<td>IV</td>
<td>Broad-ranging literacy intervention, included focus on student achievement, teacher self-efficacy and new domain knowledge in literacy.</td>
<td>Broad-ranging literacy intervention, included focus on student achievement, teacher self-efficacy and new domain knowledge in literacy.</td>
<td>Research team</td>
<td>10 x 3 hours</td>
<td>New Zealand, Year 1</td>
<td>31</td>
<td>Survey measures of teachers' expectations and self-efficacy, incorporate theory of change</td>
<td>77 treatment, 116 control students reported elsewhere (Phillips et al., 2001)</td>
</tr>
<tr>
<td>Volpe et al.</td>
<td>2012</td>
<td>III-3</td>
<td>KPALS, targeting target phonological awareness, as well as sound–symbol correspondence, decoding, and word recognition, plus an additional phase with a behaviour intervention.</td>
<td>KPALS, targeting target phonological awareness, sound–symbol correspondence, decoding, and word recognition, plus an additional phase with the addition of a behaviour intervention.</td>
<td>PALS trainers + coaching from research team</td>
<td>½ day PALS, 15 minutes behaviour training, followed by coaching</td>
<td>United States, K</td>
<td>1</td>
<td>BOSS observation, Fidelity checklists and treatment acceptability survey</td>
<td>20</td>
</tr>
</tbody>
</table>
### Appendix C: Studies of Teachers’ Knowledge of Language and Literacy Constructs

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Country</th>
<th>Population</th>
<th>Preservice teachers (n)</th>
<th>Inservice teachers (n)</th>
<th>Teacher educators (n)</th>
<th>Other professionals (n)</th>
<th>Survey description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al Otaiba, Lake, Greulich, Folsom, &amp; Guidry</td>
<td>2011</td>
<td>United States</td>
<td>Preservice teachers</td>
<td>28</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>Knowledge about teaching reading, and self-reported preparedness to teach reading</td>
</tr>
<tr>
<td>Al-Hazza, Fleener, and Hager</td>
<td>2008</td>
<td>United States</td>
<td>Inservice teachers</td>
<td>0</td>
<td>141</td>
<td>0</td>
<td>0</td>
<td>Phonological awareness and phonics knowledge, and knowledge calibration</td>
</tr>
<tr>
<td>Aro &amp; Björn</td>
<td>2015</td>
<td>Finland</td>
<td>Preservice and inservice teachers</td>
<td>150</td>
<td>74</td>
<td>0</td>
<td>0</td>
<td>Self-rated ability, knowledge of phonology, phonics &amp; morphology</td>
</tr>
<tr>
<td>Birks-Cantrell, Joshi, et al.</td>
<td>2012</td>
<td>United States</td>
<td>Teacher educators &amp; preservice teachers</td>
<td>172</td>
<td>0</td>
<td>114</td>
<td>0</td>
<td>Phonemic, phonological, phonic and morphological skill and knowledge</td>
</tr>
<tr>
<td>Bos, Mather, Dickson, Podhajski, &amp; Chard</td>
<td>2001</td>
<td>United States</td>
<td>Preservice and inservice teachers</td>
<td>252</td>
<td>286</td>
<td>0</td>
<td>0</td>
<td>Beliefs and knowledge associated with early reading (phonological awareness and phonics)</td>
</tr>
<tr>
<td>Brady, Gillis, Smith et al.</td>
<td>2009</td>
<td>United States</td>
<td>Inservice teachers</td>
<td>0</td>
<td>65</td>
<td>0</td>
<td>0</td>
<td>Phonological, phonics, fluency and vocabulary knowledge and attitudes</td>
</tr>
<tr>
<td>Carreker, Joshi &amp; Boulware-Gooden</td>
<td>2010</td>
<td>United States</td>
<td>Preservice and inservice teachers</td>
<td>36</td>
<td>38 (Study 1), 196 (Study 2)</td>
<td>0</td>
<td>0</td>
<td>Literacy-related content knowledge and ability to identify appropriate spelling activities.</td>
</tr>
<tr>
<td>Authors</td>
<td>Year</td>
<td>Country</td>
<td>Population</td>
<td>Preservice teachers (n)</td>
<td>Inservice teachers (n)</td>
<td>Teacher educators (n)</td>
<td>Other professionals (n)</td>
<td>Survey description</td>
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<tr>
<td>Carroll, Gillon &amp; McNeill</td>
<td>2012</td>
<td>New Zealand</td>
<td>Education professionals, including teachers, teaching assistants and speech-language pathologists</td>
<td>251</td>
<td>365</td>
<td>0</td>
<td>83</td>
<td>Phonological awareness knowledge</td>
</tr>
<tr>
<td>Chapman, Greaney, Arrow &amp; Tunmer</td>
<td>2018</td>
<td>New Zealand</td>
<td>Inservice teachers</td>
<td>0</td>
<td>666</td>
<td>0</td>
<td>0</td>
<td>Phonemic, phonological, phonics and morphological knowledge</td>
</tr>
<tr>
<td>Cheesman</td>
<td>2009</td>
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Appendix D: CPOL Human Ethics Certificate of Approval

This is to certify that the project below was considered by the Monash University Human Research Ethics Committee. The Committee was satisfied that the proposal meets the requirements of the National Statement on Ethical Conduct in Human Research and has granted approval.

Project Number: CF13/2634 - 2013001403

Project Title: Improving children’s language, literacy and mental health: Evaluating the impact of the classroom promotion of oral language (CPOL) approach

Chief Investigator: Assoc Prof Pamela Snow

Approved: From: 15 November 2013 To: 15 November 2018

Terms of approval - Failure to comply with the terms below is in breach of your approval and the Australian Code for the Responsible Conduct of Research.

1. The Chief investigator is responsible for ensuring that permission letters are obtained, if relevant, before any data collection can occur at the specified organization.
2. Approval is only valid whilst you hold a position at Monash University.
3. It is the responsibility of the Chief investigator to ensure that all investigators are aware of the terms of approval and to ensure the project is conducted as approved by MUHREC.
4. You should notify MUHREC immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
5. The Explanatory Statement must be on Monash University letterhead and the Monash University complaints clause must include your project number.
6. Amendments to the approved project (including changes in personnel): Require the submission of a Request for Amendment form to MUHREC and must not begin without written approval from MUHREC. Substantial variations may require a new application.
7. Future correspondence: Please quote the project number and project title above in any further correspondence.
8. Annual reports: Continued approval of this project is dependent on the submission of an Annual Report. This is determined by the date of your letter of approval.
9. Final report: A Final Report should be provided at the conclusion of the project. MUHREC should be notified if the project is discontinued before the expected date of completion.
10. Monitoring: Projects may be subject to an audit or any other form of monitoring by MUHREC at any time.
11. Retention and storage of data: The Chief Investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.

Professor Nip Thomson
Chair, MUHREC

cc: Assoc Prof Sharon Goldfield, Dr Patricia Eadie, Assoc Prof John Munro, Assoc Prof Lisa Good, Prof Frank Oberklaid, Judy Connell, Ms Brenda Dalheim, Ms Gail Inness, Mr Tony Barnett, Dr Lisa Hopkins

Postal – Monash University, Victoria 3800, Australia
Building 3E, Room 111, Clayton Campus, Wellington Road, Clayton
Telephone: +61 3 9905 5400, Facsimile: +61 3 9905 8331
Email: muhrec@monash.edu, http://www.monash.edu.research/ethics/human
ABN 12 377 674 012 OIC/C0S Provider #00008C
---------- Forwarded message ----------
From: MRO Human Ethics Team <muhrec@monash.edu>
Date: 6 May 2014 at 15:12
Subject: MUHREC Amendment CF13/2634 - 2013001403 - Improving children’s language, literacy and mental health: Evaluating the impact of the classroom promotion of oral language (CPOl) approach
To: Pamela Snow <pamela.snow@monash.edu>, Sharon Goldfield <Sharon.Goldfield@rch.org.au>, Patricia Eadie <peadie@unimelb.edu.au>, Hannah Louise Stark <hstark@student.unimelb.edu.au>

PLEASE NOTE: To ensure speedy turnaround time, this correspondence is being sent by email only. MUHREC will endeavour to copy all investigators on correspondence relating to this project, but it is the responsibility of the first-named investigator to ensure that their co-investigators are aware of the content of the correspondence.

Dear Researchers

Thank you for submitting a Request for Amendment to the above named project.

This is to advise that the following amendments have been approved:

Changes to Personnel
— Addition of Ms Hannah Stark

Changes to Procedures
— Classroom teachers participating in the CPOl project will be invited to be participants in an observational study of teacher language use and teaching practice during literacy lessons.
— Teachers will be asked to use suitable electronic device to record a 10 minute sample of their language use and teaching practice during a routine book-orientated literacy lesson. They will be asked to not use children’s full names, or provide identifying information about any children in their class during the recording.
— Teachers will email their audio recording to the project manager of CPOl, who will ensure that it is coded and de-identified before being provided to the investigator for analysis.
— Teachers will be asked to repeat this task each term during the remainder of 2014 and 2015.

Approved Documents
— Explanatory Statement - Classroom Promotion of Oral Language (CPOl) Teacher Practices Study
— Consent Form - Classroom Promotion of Oral Language (CPOl) Teacher Practices Study

Thank you for keeping the Committee informed.

Professor Nip Thomson
Chair, MUHREC
Human Ethics
Monash Research Office

Souheir Houssami, PhD - Executive Officer - Tel: +61 3 9905 2052
Coral Lindupp - Tel: +61 3 9905 5490
Alison Woods - Tel: +61 3 9905 1478
Erica MacNally - Tel: +61 3 9905 2076

Our aim is exceptional service

Monash University
Level 1, Building 3e, Clayton Campus
Wellington Rd
Clayton VIC 3800, Australia

Telephone: +61 3 9905 5490
Email: muhrec@monash.edu
Website: http://www.monash.edu.au/researchoffice/human
ABN 12 377 614 012 CRICOS Provider No 00008C

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Appendix E: Teacher Questionnaire (REDCap format)

Confidential

Teacher Survey

Hello [teacher_name]

Thank you for completing this survey - your views and experiences are very important to the research team.

We expect that this will take about 15 minutes to complete and it needs to be done in one sitting.

What is this survey about?

This survey is a part of the Classroom Promotion of Oral Language (CPOL) research project, which your school is participating in. CPOL is a statewide project, funded by the Australian Research Council, to investigate the impact of teacher-led oral language promotion on child language, literacy and mental health.

As you would know from the Project Briefing sessions that have been held recently, your school is taking part in this study, and teachers will be asked to provide data to the team at various stages of the project.

Why am I being asked to complete this survey?

Teachers are at the “front line” of literacy instruction and so we need to understand your thinking and ideas on early literacy instruction. Both your school sector (DEECD or Catholic Education Office of Victoria) and your Principal have endorsed your participation in the project.

Why is information about me needed?

In order to know who has / has not responded, in which school they work, and which part of the research study they are part of, we will need to ask you for some information about you. We also need to gather some information about your training and experience, as these are likely to influence your responses.

Please be assured that all of this information will be held securely by the research team and will not be shared with anyone outside the team, except in a deidentified and aggregated form.

What are the questions about?

Some items ask about your experience and practices, others ask about your knowledge, and where you obtained this. We do not expect that all teachers will know the “correct” response to all items (and indeed many items don’t have “right” and “wrong” answers), so we encourage you to use the “don’t know” response rather than guessing. “Don’t know” is a legitimate response option, and we expect that all respondents will use it more than once.

www.project-redcap.org
We ask you please to complete the survey on your own, without any conferring with colleagues or with Dr Google!

How will the researchers use my data?

Your responses will be entered into a database that is managed by the senior research assistant. Noone outside the research team will have access to data about you or your responses. Data will be stored on a password protected computer at the University of Melbourne. Only aggregated (grouped) responses will be reported in reports or presentations arising out of this research.

This project has been approved by the Monash University Human Research Ethics Committee (Approval No: CF13/26334 - 20130014403), and by the Department of Education and Early Childhood Development and the Catholic Education Office of Victoria.

If you have any queries about this survey, please contact the Project Manager, Ms Beth Shingles, in the first instance:

Ph: (03) 93455697
E: beth.shingles@rch.org.au

If Beth cannot assist with your query, you are welcome to contact one of the Chief Investigators:

Associate Professor Sharon Goldfeld
Ph: (03) 9345 6408
E: Sharon.Goldfeld@rch.org.au

or

Associate Professor Pamela Snow
Ph: (03) 5440 9006
E: pamela.snow@monash.edu

I have read and understood the information about this survey and any queries I had have been addressed to my satisfaction.

☐ I am ready to proceed with the survey
☐ I require some further information (please speak with a member of the research team as outlined above) and do not proceed until your queries have been addressed.
Education Conferences

Reading magazine-style publications that are accessible to me in my workplace

Reading papers in academic journals

Online discussion forums

Participation in Professional Learning days related to the Oral Language Supports Early Literacy (OLSEL) project

Participation in the University of Melbourne Unit: Oral Language Learning: the primary years

Websites

Please list the names of some of the main websites you access:

Other

Please list another way you access continual education about literacy education:

[You don't need to know the exact URLs, just the name/or]
Confidential

Some questions about you:
These questions will help us to understand the demographic makeup (sex, years experience, training etc) of teachers taking part in the study.

2 Please indicate your sex:
☐ Male  ☐ Female

3 Which education sector do you work in?
☐ Department of Education and Early Childhood Development  ☐ Catholic Education Office of Victoria

4 What is the name of the school in which you work?

5 Please enter your family name and given name. This information is needed so we know who has responded and so we can follow-up staff after the intervention.
(NOTE you will be allocated an alphanumeric code by the research team. No data that could identify you or your school will be released by the research team to any parties).

Your family name:

Your given name:

6 Was your undergraduate qualification in education/primary teaching?
☐ Yes  ☐ No

7 My initial qualification was in: (Please tell us what your initial qualification was in, even if you don’t think it was directly relevant to your current work)

8 How long ago did you gain your initial teaching qualification?
☐ 0 - 2 years  ☐ 3 - 5 years  ☐ 6 - 10 years  ☐ 11 - 15 years  ☐ 16 - 20 years  ☐ More than 20 years

9 Have you completed any formal postgraduate training (via enrolment and completion of a university-based course) that had a principal focus on literacy education?
☐ Yes  ☐ No

10 For how many years (in total) have you been teaching Prep, Grade 1, and/or Grade 2?
☐ 0 - 2 years  ☐ 3 - 5 years  ☐ 6 - 10 years  ☐ 11 - 15 years  ☐ 16 - 20 years  ☐ More than 20 years

11 Over the past 3 years, what are the main ways in which you have accessed continuing education about literacy education? Please rank your top 4 ways from 1 (the method you MOST use) to 4. Please rank all others as 0.

Teacher professional development days organised by my employer
☐ 0  ☐ 1  ☐ 2  ☐ 3  ☐ 4

www.project-redcap.org

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### Questions about your classroom practice and views

14. Thinking about your current classroom practices, how would you rate your ability to:

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<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Teach literacy skills to English as a second language learners</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Teach children with reading disabilities</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Use assessment to inform reading instruction</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
15 Please indicate your agreement with the following statements about children with reading difficulties

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Somewhat disagree</th>
<th>Somewhat agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeing letters and words backwards is a characteristic of children with reading difficulties</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Children with reading difficulties can be helped by using coloured lenses / coloured overlays</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Children with reading difficulties have problems in decoding and spelling but not in listening comprehension</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Children with learning difficulties have lower IQs than typical learners</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Most teachers receive intensive training to work with children with reading difficulties</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Children with reading difficulties need a particular type of remedial instruction which is different from that given to typically developing readers</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Children with reading difficulties are naturally compensated for their literacy difficulties by particular strengths in artistic/visuospatial domains.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Children with reading difficulties often have associated difficulties such as clumsiness, poor short term memory and concentration problems.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Questions about your knowledge

16 A phoneme refers to:
   □ A single letter
   □ A single speech sound
   □ A single unit of meaning
   □ A grapheme
   □ None of the above
   □ Don't know

17 If life is a word, the letter "i" would probably sound like "i" in:
   □ if
   □ beautiful
   □ find
   □ ceiling
   □ sing
   □ None of the above
   □ Don't know

18 A combination of two or three consonants pronounced so that each letter keeps its own identity is called:
   □ A silent consonant
   □ Consonant digraph
   □ Diphthong
   □ Consonant blend
   □ None of the above
   □ Don't know

19 How many speech sounds are there in the following words? For example, the word "cat" has 3 speech sounds: "k" "a" "t". (Speech sounds do not necessarily equal the number of letters)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>ship</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>box</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>moon</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>brush</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>knee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>through</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20 What type of task would the following be? "Say the word 'cat'. Now say the word without the /k/ sound":
   □ Blending
   □ Rhyming
   □ Segmentation
   □ Deletion
   □ None of the above
   □ Don't know

21 A soft 'c' is in the word
   □ Chicago
   □ cat
   □ chair
   □ city
   □ None of the above
   □ Don't know

22 Identify the pair of words that begins with the same sound:
   □ joke - goat
   □ chef - shoe
   □ quiet - giant
   □ chip - chemist
   □ None of the above
   □ Don't know

The following two items involve saying a word and then reversing the order of the sounds. For example, the word "back" would be "cab".
23. If you say the word, and then reverse the order of the sounds, "ice" would be:

- [ ] easy
- [ ] sea
- [ ] size
- [ ] sigh
- [ ] None of the above
- [ ] Don't know

24. If you say the word, and then reverse the order of the sounds, "enough" would be:

- [ ] fun
- [ ] phone
- [ ] funny
- [ ] one
- [ ] None of the above
- [ ] Don't know
25a For each of the words below, determine the number of syllables:

- disassemble
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10

- heaven
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10

- observer
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10

- salamander
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10

- bookkeeper
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10
25b For each of the words on the below, determine the number of morphemes (these may be the same or different to the number of syllables in the previous question).

- **disassemble**
  - Don't know
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10

- **heaven**
  - Don't know
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10

- **observer**
  - Don't know
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10
26 Which of the following words contains a diphthong?

- coat
- boy
- battle
- sing
- been
- None of the above
- Don't know

27 A voiced consonant digraph is present in the word:

- think
- ship
- whip
- the
- photo
- None of the above
- Don't know
28 Why may students confuse the sounds /bi/ and /pi/ or /fi/ and /vi/?
- Students are visually scanning the letters in a way that the letters are misperceived
- Students can't remember the letter sounds so they are randomly guessing
- Speech sounds within each pair are produced in the same place and in the same way, but one is voiced and the other is not
- The speech sounds within each pair are both voiced and produced at the back of the mouth
- None of the above
- Don't know

29 A schwa (non distinct vowel sound) is found in the word [x]
- cotton
- phoneme
- stopping
- preview
- grouping
- None of the above
- Don't know

30 Phonological awareness is
- The ability to use letter-sound correspondences to decode
- The understanding of how spoken language is broken down and manipulated
- A teaching method for decoding skills
- The same as phonics
- None of the above
- Don't know

31 Phonemic awareness is:
- The same as phonological awareness
- The understanding of how letters and sounds are put together to form words
- The ability to break down and manipulate the individual sounds in spoken language
- The ability to use sound-symbol correspondences to spell new words
- None of the above
- Don't know

32 Morphemic analysis is:
- An instructional approach that involves evaluation of meaning based on multiple senses
- An understanding of the meaning of letters and their sounds
- Studying the structure and relations of meaningful linguistic units occurring in language
- Classifying and recording of individual speech sounds
- None of the above
- Don't know

33 Etymology is:
- Not really connected to the development of reading skills
- The study of the history and development of the structures and meaning of words
- The study of the causes of disabilities
- The study of human groups through first hand observation
- None of the above
- Don't know

34 Reading a text and answering questions based on explicit information found within the text describes:
- Inferential comprehension
- Literal comprehension
- Summarisation
- Question generation
- None of the above
- Don't know
35 Questions that require the combining of background knowledge and text information to create a response describe which of the following?

- Inferential comprehension
- Literal comprehension
- Morphemic analysis
- Reciprocal teaching
- None of the above
- Don't know

36 Which of the following is a phonemic awareness activity?

- Having a student segment the sounds in the word “cat” orally
- Having a student spell the word “cat” aloud
- Having a student sound out the word “cat”
- Having a student recite all the words they can think of that rhyme with “cat”
- None of the above
- Don't know

37 Which of the following is a semantic mapping activity?

- Word webs
- Word searches
- Writing a brief definition of different terms
- Predicting
- None of the above
- Don't know

38 Which answer BEST describes the reason for an older student’s (upper primary) misspelling of the following words? hav (for “have”) and luv (for “love”)

- The student spell the word phonetically
- The student has not been taught that English words do not end in “v”
- The student is using invented spelling
- The student must memorise the spellings of these irregular words
- None of the above
- Don't know

39 A morpheme refers to:

- A single letter
- A single speech sound
- A single unit of meaning
- A grapheme
- None of the above
- Don't know

40 Story grammar refers to:

- Grammatical rules governing the number of clauses in a sentence
- The overall organisation and cohesion of a narrative
- Syntactic rules that children acquire through their exposure to text based stories
- The more formal grammar that is used in written versus spoken language
- None of the above
- Don't know
Some items about how language works

The following sentences are used in questions 41-44:

A - Run under the car.
B - He runs under our car
C - Does he run under our car?
D - What a happy boy he is.

41 Which of the above sentences is an example of a declarative form? □ A □ B □ C □ D □ None of the above □ Don’t know

42 Which of the above sentences is an example of the imperative form? □ A □ B □ C □ D □ None of the above □ Don’t know

43 Which of the above sentences is an example of the exclamatory form? □ A □ B □ C □ D □ None of the above □ Don’t know

44 Which of the above sentences is an example of the interrogative form? □ A □ B □ C □ D □ None of the above □ Don’t know

The following five language samples are used in questions 45-48:

A- James, who watched the dog, ate the cake.
B- Gina watched the rabbit scurry across the yard. She saw it go under the house.
C- James watched the cat.
D- Toni heard the parrots that were in tree and that flew away.
E- Tom drank the milk and ate the apple.

45 Which sample is an independent clause? □ A □ B □ C □ D □ E □ None of the above □ Don’t know

46 Which sample has one dependent clause? □ A □ B □ C □ D □ E □ None of the above □ Don’t know
47 Which sample is an example of a discourse meaning?

A
B
C
D
E
None of the above
Don't know

48 Which sample has two relative clauses?

A
B
C
D
E
None of the above
Don't know

49 Difficulty keeping on track with the overall gist of a conversation and staying "on track" when speaking or listening is most likely to be an example of a difficulty:

□ Using grammatical rules correctly
□ Recalling the meanings of words
□ Forming a discourse meaning
□ Understanding individual sentences
□ Hearing effectively
□ None of the above
□ Don't know

50 A five year old says: “So the little red hen eating her bread on the hammock with vegemite and oh jam, and other stuff... anyway.” This is an example of:

□ Poor understanding of word order.
□ Incorrect verb tense agreement
□ An immature understanding of grammatical categories
□ Using prepositions incorrectly
□ Poor understanding of adverbs
□ None of the above
□ Don't know

The following sentences are used in questions 51-55:

A- Racing to board the launch the captain slipped on the damp pier and broke his knee.
B- The witness' voice trembled then fell quiet, causes the judge to call an adjournment.
C- Con pulled the fish off the hook too quick and incurring a cut deep to his hand.
D- The guard who is sleeping made it will be easier for burglars to get in the building undetected.
E- The work place had been stressful and unpredictable over the duration so that by his birthday his blood pressure had reached a critical level.

51 Which one shows incorrect use of a relative pronoun?

A
B
C
D
E
None of the above
Don't know

52 Which one is correct grammatically?

A
B
C
D
E
None of the above
Don't know

53 Which one mis-uses an adjective?

A
B
C
D
E
None of the above
Don't know
Some final questions about you

54 If you felt confident responding to the language and literacy items in this survey, please tell us where you gained most of your knowledge (please select one response only):

- [ ] I did not feel confident with most of my answers
- [ ] University study: preservice
- [ ] University study: postgraduate
- [ ] Experience in the classroom
- [ ] Professional development
- [ ] My own primary or secondary education
- [ ] Other

Please list how you gained most of your knowledge:

__________________________________________

Would you like to make any other comments about children’s oral language and/or early literacy education? If so, please use the space below.

__________________________________________
Appendix F: Teacher Language Survey Structure (Study 1)

Note: This structure is adapted from Binks-Cantrell, Joshi et al., 2012. Categories described by Binks-Cantrell, Joshi et al. are shown in white. Novel categories are shown in grey.
Appendix G: Instructions for recordings (Studies 2 and 3)

### How to make an audio recording on an iPhone

<table>
<thead>
<tr>
<th>iOS 7</th>
<th>iOS 6 or earlier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tap on the Voice Memo icon, which is a picture of sound waves.</td>
<td>Tap the &quot;Voice Memo&quot; app button</td>
</tr>
<tr>
<td>Press the large red button when you would like to start recording</td>
<td>Tap the &quot;Red&quot; circle/button. This will start recording your note</td>
</tr>
<tr>
<td>When you would like to stop recording press the same button again, where there should now be a red square.</td>
<td>Speak into your device. It will record all the sounds it hears.</td>
</tr>
<tr>
<td>Press the red button again to add onto the audio clip, or click &quot;Done&quot; to finish and save the voice memo.</td>
<td>Tap the button on the right side of the volume-level area to stop your recording.</td>
</tr>
<tr>
<td>Type in a title for the voice memo and click &quot;OK&quot;</td>
<td>Tap the left-hand button (once you've started to record a note) to pause the memo</td>
</tr>
</tbody>
</table>

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To email direct from your phone:

1. From the voice memo screen click the silver button in the lower right corner. This will take you to a list of your voice memos.
2. Select the voice memo you want to share and press the large blue share button at the bottom right of the screen.
3. Select Email

Alternatively, connect your phone to your PC using the USB port, find the audio file and save. You can then send this file as an attachment.

The process will be very similar when using a Samsung Galaxy or other android phone. Please contact Hannah Stark or your CPOL Support Worker if assistance is required.

Source: http://www.wikihow.com/Record-a-Voice-Memo-on-an-iPhone
Appendix H: Plain Language Statement & Consent Form (Study 2 – Part 2)

Project: Classroom Promotion of Oral Language (CPOL)
Teacher Practices Study

Monash University Human Research Ethics Committee approval - CF13/2634 - 2013001403

<table>
<thead>
<tr>
<th>Assoc. Prof Pamela Snow</th>
<th>Assoc. Prof Sharon Goldfeld</th>
<th>Dr Patricia Eadie</th>
<th>Ms Hannah Stark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dept. Psychiatry &amp; School of Rural Health Monash University</td>
<td>Dept of Paediatrics The University of Melbourne</td>
<td>Dept. Audiology &amp; Speech Pathology University of Melbourne</td>
<td>Dept. Audiology &amp; Speech Pathology University of Melbourne</td>
</tr>
<tr>
<td>Ph: 54409006</td>
<td>Ph: 9345608</td>
<td>Ph: 9035 4503</td>
<td>Ph: 93455697</td>
</tr>
<tr>
<td><a href="mailto:pamelasnow@monash.edu">pamelasnow@monash.edu</a></td>
<td><a href="mailto:sharon.goldfield@rch.org.au">sharon.goldfield@rch.org.au</a></td>
<td><a href="mailto:peadie@unimelb.edu.au">peadie@unimelb.edu.au</a></td>
<td><a href="mailto:hstark@student.unimelb.edu.au">hstark@student.unimelb.edu.au</a></td>
</tr>
</tbody>
</table>

27/05/2014

Dear Teacher

You are invited to take part in a study on teacher practice. Please read this Explanatory Statement in full before deciding whether or not to participate in this research. If you would like further information regarding any aspect of this project, you are encouraged to contact any of the researchers via the phone numbers or email addresses listed above.

Why were you chosen for this research?
We are interested in understanding more about the everyday classroom practices of the teachers who are participating in the Classroom Promotion of Oral Language (CPOL) trial. We would like to invite you, as the classroom teacher of a Prep class that is involved in the study, to provide us with valuable information about your teaching practices.

What does the research involve?
If you agree to participate in this study, we will ask you to make a 10 minute audio recording of your language during a routine literacy lesson. This will be a lesson or activity that you would be conducting with your class, regardless of your participation in this study, and will address your class' current literacy goals. We are asking you, as the classroom teacher, to make this recording to avoid the disruption of an outside observer being in your classroom. You are able to make this recording using a tablet computer, smart phone, or digital recorder. Your CPOL support worker will be able to assist you with accessing a suitable device, or the use of a device if you are unsure.

We will ask you to make one 10 minute audio recording of your teaching each term between Term 2, 2014, and Term 4, 2015 (a total of seven recordings). You will be contacted by the student investigator of this project prior to each recording. We ask that you select a recording time when there is minimal background noise. Please refrain from using children's surnames or any other identifying information.
These recordings of your teaching practice will be transcribed and analysed. The relationship between the language conventions that you use during your literacy lessons and your responses on the Teacher Survey, (if you were asked to complete it in March 2014) will be explored.

Consenting to participate in the project and withdrawing from the research
If you agree to participate in this study, please sign and return the attached Consent Form. You are able to withdraw from this study during the four-week period after your final audio file has been submitted. There will be no penalty or adverse consequence if you decide to withdraw from this study.

Possible benefits and risks to participants
Participating in this study will not present any immediate benefits or risks to you as a participant. It is expected that the outcomes of this research project will lead to an improved understanding of teacher language and practices within Prep classroom, and may influence changes in teacher education and professional development. It is not anticipated that there will be any harm or negative side effects as a result of your participation in this project. Because you will be making your own audio recording, disruption to your class will be minimal.

Confidentiality
Please make your audio recording on a digital device which will allow the sound file to be saved to a computer and emailed. Your sound files will be coded and de-identified prior to being transcribed. No information that will identify you, your school or your students will be included in publications or presentations that result from the project. Only members of the research team will have access to this data.

Storage of data
All electronic files will be stored in password protected files on a secure University of Melbourne computer. All paper documents will be stored in a locked filing cabinet at the Department of Audiology and Speech Pathology, Melbourne University. Only the investigators and CPOL staff will have access to this data.

Results
Results of this study will be made available at the completion of the project. Findings will be disseminated through the Victorian Department of Education and Early Childhood and the Catholic Education Commission of Victoria. Findings will also be published in academic journals and presented at conferences and seminars, however no identifying information about schools, teachers, or students will be included in such publications or presentations.

Complaints
Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the

Executive Officer, Monash University Human Research Ethics (MUHREC):

Executive Officer
Monash University Human Research Ethics Committee (MUHREC)
Room 111, Building 3e
Research Office
Monash University VIC 3800

Tel: +61 3 9905 2052 Email: muhrec@monash.edu Fax: +61 3 9905 3831
Thank you for considering this request.

Assoc. Prof Pamela Snow  
Chief Investigator

Dr Patricia Eadie  
Chief Investigator

Assoc. Prof Sharon Goldfeld  
Chief Investigator

Hannah Stark  
Student Investigator
CONSENT FORM
Monash University Human Research Ethics Committee approval
CF13/2634 - 2013001403

Project: Classroom Promotion of Oral Language (CPOL)

Assoc. Prof Pamela Snow  Assoc. Prof Sharon Goldfeld  Dr Patricia Eadie  Ms Hannah Stark
Dept. Psychiatry & School of Rural Health
Monash University  The University of Melbourne  University of Melbourne  University of Melbourne
Ph: 54490006  Ph: 93456408  Ph: 9035 4503  Ph: 93455697
pamela.snow@monash.edu  sharon.goldfeld@rhh.org.au  peadie@unimelb.edu.au  hstark@student.unimelb.edu.au

I understand that I have been asked to take part in the Monash University research project specified above. I have read and understood the Explanatory Statement and I hereby consent to participate in this project.

I consent to:

provide seven (7) audio recordings of 10 minute samples of my teaching practice during a routine literacy lessons between Term 2, 2014 and Term 4, 2015 AND I provide consent for the relationship between the information from the audio recordings of my teaching practice and my responses on the teacher survey(s) (if I was asked to complete it) to be analysed.

Name of Participant ________________________ (Please print clearly)

School: __________________________

Participant Signature ______________________  Date __________________________
Appendix I: Plain Language Statement & Consent Form (Study 3)

Project: Classroom Promotion of Oral Language (CPOL)
Reflective Interviews

University of Melbourne Human Research Advisory Group approval - 1340611

Prof Pamela Snow  Prof Sharon Goldfeld  Assoc. Prof Patricia Edie  Mr Hannah Stark
Rural Health School  Dept of Paediatrics  Melbourne Graduate  School of Education
La Trobe University  University of Melbourne  University of Melbourne  University of Melbourne
Ph: 54447554  Ph: 86254746  Ph: 93854509  Ph: 93854509
p.snow@latrobe.edu.au  sharon.goldfeld@unimelb.edu.au  peade@unimelb.edu.au  hstark@student.unimelb.edu.au

19/04/2016

Dear Teacher,

You are invited to take part in an interview about your involvement in the Classroom Promotion of Oral Language trial. This interview is an additional part of Hannah Stark’s PhD research project that you have participated in. Please read this Explanatory Statement in full before deciding whether or not to participate in this additional research. If you would like further information regarding any aspect of this project, you are encouraged to contact Hannah, or her supervisors, via the phone numbers or email addresses listed above.

Why were you chosen for this research?
During 2014 and 2015 you participated in the Classroom Promotion of Oral Language (CPOL) trial. Your involvement included participation in a series of professional learning days, completing between unit activities, and working with the CPOL support workers. You also participated in an additional study that is a part of Hannah Stark’s PhD research project. This study involved completing a series of five recordings of language and/or literacy sessions. We are now interested in understanding the experiences, perspectives and reflections of teachers, following their participation in the CPOL trial.

What does the research involve?
If you agree to participate in this additional study, you will be asked to participate in an interview with Hannah Stark. This interview will take approximately 45 minutes and will be conducted at your school, or the University of Melbourne if preferred. A suitable date and time during Term 2, 2016 will be arranged.

The interview will include questions about oral language and literacy teaching within your classroom. You will also be asked about your participation in the CPOL intervention, and if you feel
this has changed your knowledge, understanding and teaching practice. If you do not feel comfortable answering any questions asked in the interview you are able to choose not to provide an answer. You will be given the opportunity to review the transcript of your interview, and you may make request that an answer or information that you provide be removed or modified prior to analysis.

Consenting to participate in the project and withdrawing from the research
If you agree to participate in this additional study, please sign and return the attached Consent Form. You are able to withdraw from this study during the four-week period after your interview. There will be no penalty or adverse consequence if you decide to withdraw from this study.

Possible benefits and risks to participants
Participating in this study will not present any immediate benefits or risks to you as a participant. It is expected that the outcomes of this research project will lead to an improved understanding of teacher language and practices within early years’ classrooms, and may influence changes in teacher education and professional development. It is not anticipated that there will be any harm or negative side effects as a result of your participation in this project.

Confidentiality
Your interview will be recorded and transcribed. Any identifying information, including your name, your colleague’s names, and the name and location of your school will not be included in the transcription of your interview.

Storage of data
All electronic files will be stored in password protected files on a secure University of Melbourne computer. All paper documents will be stored in a locked filing cabinet at the Melbourne Graduate School of Education, Melbourne University. Only the investigators and CPOL staff will have access to this data.

Results
Results of this study will be made available at the completion of the project. Findings will be disseminated through the Victorian Department of Education and Training and the Catholic Education Commission of Victoria. Findings will also be published in academic journals and presented at conferences and seminars, however no identifying information about schools, teachers, or students will be included in such publications or presentations.

Complaints
Should you have any concerns or complaints about the conduct of the project, you are welcome to contact the

Human Research Ethics Committee
Office for Research Ethics and Integrity
The University of Melbourne
Humaneethics-complaints@unimelb.edu.au
Ph. +61 3 8344 2073
Thank you for considering this request.

Ms. Hannah Stark
PhD Candidate

Assoc. Prof. Patricia Eadie
Chief Investigator

Prof. Pamela Snow
Chief Investigator

Prof. Sharon Goldfield
Chief Investigator
Consent form for persons participating in a research project

PROJECT TITLE  The Classroom Promotion of Oral Language (CPOL) <insert Themis number>

Name of participant:

Name of investigator(s): Ms Hannah Stark, A/Prof. Patricia Eadie, Prof. Pamela Srow & Prof. Sharon Goldfield

1. I consent to participate in this research, the details of which have been explained to me, and I have been provided with a written plain language statement to keep.

2. I understand that after I sign and return this consent form it will be retained by the researcher.

3. I understand that my participation will involve an interview and I agree that the researcher may use the results as described in the plain language statement.

4. I acknowledge that:
   (a) the possible effects of participating in the interview have been explained to my satisfaction;
   (b) I have been informed that I am free to withdraw from participating in the focus group/interview at any time without explanation or prejudice and to withdraw any unprocessed data I have provided;
   (c) the project is for the purpose of research;
   (d) I have been informed that the confidentiality of the information I provide will be safeguarded subject to any legal requirements;
   (e) I have been informed that with my consent the interview will be audio-taped and I understand that audio-tapes will be stored at University of Melbourne and will be destroyed after five years.
   (f) my name will be referred to by a pseudonym in any publications arising from the research;
   (g) I have been informed that a copy of the research findings will be forwarded to me, should I agree to this.

I consent to this interview being audio-taped  □ yes  □ no (please tick)

I wish to receive a copy of the summary project report on research findings  □ yes  □ no (please tick)

Participant signature: ___________________________ Date: ___________________________


Appendix J: Interview Protocol (Study 3)

Thank you for agreeing to participate in this interview. I expect we will speak for approximately 45 minutes. If you would like to end this interview at any time, please let me know. I will be recording this interview, and then transcribing it. If you would like to review the transcript before I analyse it, I am able to share it with you. Please indicate if this is the case.

1. Firstly, could you please tell me a bit about you and your teaching career?
   Prompts: Career before teaching
   - Length of time teaching
   - Length of time teaching in the early years
   - Substantial time away from career
   - Completion of Special Education qualification

I would now like to ask you about your views on the role of oral language and literacy in the early year's classroom in general, and in your classroom in particular.

1. Could you talk to me about how you see the role of language and literacy in early year's instruction in general? How do these ideas apply in your early year's classroom? I would be interested to hear your thoughts about matters including
   Prompts: What you believe influences a child's oral language and literacy skills?
   - Ways in which oral language and literacy are related?
   - Whether students' oral language skills can be improved in the classroom?
   - What teachers need to know about language and linguistics in order to promote oral language skills and manage early literacy teaching?

I would now like to ask you some questions about your participation in the Classroom Promotion of Oral Language project and get your thoughts on whether you feel this has changed your knowledge and/or teaching practice.

1. Can you tell me about your overall impression of your involvement in the CPOL project?
2. Could you tell me about your knowledge about language and literacy, and if you feel this changed during CPOL?
   Prompt: Was there any particular content that really stood out?
3. I would also be interested to know about your confidence in your language and literacy knowledge. Do you feel this changed over the course of the CPOL professional learning program?
4. I'm curious to hear your reflections about your teaching practice, and whether you feel this changed in an ongoing way as a result of your involvement in CPOL? (Probe for examples)
5. Do you feel that your students' language and literacy skills changed as a result of your participation in CPOL?
   Prompts: In measurable outcomes?
   - Behaviour? Social/emotional observations?
6. Do you have any further comments or reflections that you would like to add?

Thank you for participating in this interview.
## Appendix K: Psychometric Properties of Teacher Survey (Study 1)

<table>
<thead>
<tr>
<th>Item</th>
<th>Question</th>
<th>Domain</th>
<th>Aspect</th>
<th>Description</th>
<th>$D$</th>
<th>$p$</th>
<th>Description</th>
<th>$\alpha$</th>
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</thead>
<tbody>
<tr>
<td>14</td>
<td>A phoneme refers to:</td>
<td>Knowledge</td>
<td>Phonemic</td>
<td>0.06</td>
<td>Very poor</td>
<td>0.06</td>
<td>Easy</td>
<td>0.16</td>
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<tr>
<td></td>
<td>o A single letter</td>
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<td></td>
<td>o A single speech sound</td>
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<td>o A single unit of meaning</td>
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<tr>
<td></td>
<td>o A grapheme</td>
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<tr>
<td></td>
<td>o None of the above</td>
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<tr>
<td></td>
<td>o Don't know</td>
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<tr>
<td>15</td>
<td>If life is a word, the letter &quot;i&quot; would probably sound like &quot;i&quot; in</td>
<td>Skill</td>
<td>Phonics</td>
<td>0.19</td>
<td>Poor</td>
<td>0.19</td>
<td>Easy</td>
<td>0.10</td>
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<td></td>
<td>o if</td>
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<td>o beautiful</td>
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<td>o find</td>
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<td>o sing</td>
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<td>o None of the above</td>
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<td></td>
<td>o Don't know</td>
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<tr>
<td>16</td>
<td>A combination of two or three consonants pronounced so that each letter keeps its own identity is called</td>
<td>Knowledge</td>
<td>Phonics</td>
<td>0.31</td>
<td>Reasonably good</td>
<td>0.31</td>
<td>Difficult</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>o A silent consonant</td>
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<td></td>
<td>o Consonant digraph</td>
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<tr>
<td></td>
<td>o Diphthong</td>
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<td></td>
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<tr>
<td></td>
<td>o Consonant blend</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>o None of the above</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>o Don't know</td>
<td></td>
<td></td>
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<tr>
<td>17</td>
<td>How many speech sounds are there in the following words? For example, the word &quot;cat&quot; has 3 speech sounds: &quot;k&quot; &quot;a&quot; &quot;t&quot;. (Speech sounds do not necessarily equal the number of letters)</td>
<td>Skill</td>
<td>Phonemic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Ship (3)</td>
<td></td>
<td></td>
<td>0.31</td>
<td>Reasonably good</td>
<td>0.85</td>
<td>Easy</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>b) Grass (4)</td>
<td></td>
<td></td>
<td>0.41</td>
<td>Very good</td>
<td>0.43</td>
<td>Difficult</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>c) Box (4)</td>
<td></td>
<td></td>
<td>0.03</td>
<td>Very poor</td>
<td>0.05</td>
<td>Extremely difficult</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>d) Moon (3)</td>
<td></td>
<td></td>
<td>0.28</td>
<td>Marginal</td>
<td>0.85</td>
<td>Easy</td>
<td>0.12</td>
</tr>
</tbody>
</table>
18 What type of task would the following be? "Say the word 'cat'. Now say the word without the /k/ sound":
- Blending
- Rhyming
- Segmentation
- Deletion
- None of the above
- Don't know

19 A soft 'c' is in the word:
- Chicago
- cat
- chair
- city
- None of the above
- Don't know

20 Identify the pair of words that begins with the same sound:
- joke goat
- chef shoe
- quiet giant
- chip chemist
- None of the above
- Don't know

21 If you say the word, and then reverse the order of the sounds, "ice" would be:
- easy
- sea
- size
- sigh
- None of the above
- Don't know
<table>
<thead>
<tr>
<th>Categorisation</th>
<th>Discriminability</th>
<th>Difficulty</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 If you say the word, and then reverse the order of the sounds, &quot;enough&quot; would be</td>
<td>Skill Phonemic</td>
<td>0.34 Good</td>
<td>0.58 Ideal</td>
</tr>
<tr>
<td>o fun</td>
<td>o phone</td>
<td>o funny</td>
<td>o one</td>
</tr>
<tr>
<td>23 For each of the words on the left, determine the number of syllables</td>
<td>Skill Phonological</td>
<td>0.03 Very poor</td>
<td>0.91 Very easy</td>
</tr>
<tr>
<td>a) Disassemble</td>
<td>0.03 Very poor</td>
<td>0.99 Very easy</td>
<td>0.01</td>
</tr>
<tr>
<td>b) Heaven</td>
<td>0.00 Very poor</td>
<td>0.99 Very easy</td>
<td>0.01</td>
</tr>
<tr>
<td>c) Observer</td>
<td>0.03 Very poor</td>
<td>0.95 Very easy</td>
<td>0.03</td>
</tr>
<tr>
<td>d) Salamander</td>
<td>0.12 Poor</td>
<td>0.92 Very easy</td>
<td>0.07</td>
</tr>
<tr>
<td>e) Bookkeeper</td>
<td>0.25 Marginal</td>
<td>0.85 Easy</td>
<td>0.12</td>
</tr>
<tr>
<td>f) Frogs</td>
<td>0.15 Poor</td>
<td>0.92 Very easy</td>
<td>0.07</td>
</tr>
<tr>
<td>g) Teacher</td>
<td>0.60 Very good</td>
<td>0.54 Somewhat difficult</td>
<td>0.24</td>
</tr>
<tr>
<td>a) Disassemble</td>
<td>0.47 Very good</td>
<td>0.54 Somewhat difficult</td>
<td>0.24</td>
</tr>
<tr>
<td>b) Heaven</td>
<td>0.44 Very good</td>
<td>0.41 Difficult</td>
<td>0.24</td>
</tr>
<tr>
<td>c) Observer</td>
<td>0.41 Very good</td>
<td>0.40 Difficult</td>
<td>0.24</td>
</tr>
<tr>
<td>d) Salamander</td>
<td>0.25 Marginal</td>
<td>0.25 Very difficult</td>
<td>0.19</td>
</tr>
<tr>
<td>e) Bookkeeper</td>
<td>0.22 Marginal</td>
<td>0.37 Difficult</td>
<td>0.23</td>
</tr>
<tr>
<td>f) Frogs</td>
<td>0.41 Very good</td>
<td>0.54 Somewhat difficult</td>
<td>0.24</td>
</tr>
<tr>
<td>g) Teacher</td>
<td>0.15 Poor</td>
<td>0.12 Extremely difficult</td>
<td>0.11</td>
</tr>
<tr>
<td>24 Which of the following words contains a diphthong?</td>
<td>Skill Phonemic</td>
<td>0.15 Poor</td>
<td>0.12 Extremely difficult</td>
</tr>
<tr>
<td>o coat</td>
<td>o boy</td>
<td>o battle</td>
<td>o sing</td>
</tr>
</tbody>
</table>
25 A voiced consonant digraph is present in the word
   - think
   - ship
   - whip
   - the
   - photo
   - None of the above
   - Don't know

   Skill | Phonics | Categorisation | Discriminability | Difficulty | Variance
   ---- | -------- | --------------- | --------------- | ---------- | --------
   0.29 | Marginal | 0.22            | Very difficult  | 0.17       |

26 Why may students confuse the sounds /b/ and /p/ or /f/ and /v/?
   - Students are visually scanning the letters in a way that the letters are misperceived
   - Students can't remember the letter sounds so they are randomly guessing
   - Speech sounds within each pair are produced in the same place and in the same way, but one is voiced and the other is not
   - The speech sounds within each pair are both voiced and produced at the back of the mouth
   - None of the above
   - Don't know

   Knowledge | Phonemic | Categorisation | Discriminability | Difficulty | Variance
   0.19 | Poor | 0.82 | Easy | 0.15 |

27 A schwa (non distinct vowel sound) is found in the word
   - cotton
   - phoneme
   - stopping
   - preview
   - grouping
   - None of the above
   - Don't know

   Skill | Phonemic | Categorisation | Discriminability | Difficulty | Variance
   0.35 | Reasonably good | 0.26 | Very difficult | 0.19 |
<table>
<thead>
<tr>
<th></th>
<th>Categorisation</th>
<th>Discriminability</th>
<th>Difficulty</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td><strong>Phonological awareness is</strong>&lt;br&gt;o The ability to use letter-sound correspondences to decode&lt;br&gt;o The understanding of how spoken language is broken down and manipulated&lt;br&gt;o A teaching method for decoding Skills&lt;br&gt;o The same as phonics&lt;br&gt;o None of the above&lt;br&gt;o Don't know</td>
<td>Knowledge</td>
<td>Phonological</td>
<td>0.03</td>
</tr>
<tr>
<td>29</td>
<td><strong>Phonemic awareness is</strong>&lt;br&gt;o The same as phonological awareness&lt;br&gt;o The understanding of how letters and sounds are put together to form words&lt;br&gt;o The ability to break down and manipulate the individual sounds in spoken language&lt;br&gt;o The ability to use sound symbol correspondences to spell new words&lt;br&gt;o None of the above&lt;br&gt;o Don't know</td>
<td>Knowledge</td>
<td>Phonemic</td>
<td>-0.03</td>
</tr>
<tr>
<td>30</td>
<td><strong>Morphemic analysis is</strong>&lt;br&gt;o An instructional approach that involves evaluation of meaning based on multiple senses&lt;br&gt;o An understanding of the meaning of letters and their sounds&lt;br&gt;o Studying the structure and relations of meaningful linguistic units occurring in language&lt;br&gt;o Classifying and recording of individual speech sounds&lt;br&gt;o None of the above&lt;br&gt;o Don't know</td>
<td>Knowledge</td>
<td>Morphological</td>
<td>0.22</td>
</tr>
<tr>
<td>31</td>
<td>Etymology is</td>
<td>Categorisation</td>
<td>Discriminability</td>
<td>Difficulty</td>
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</tr>
<tr>
<td></td>
<td>o Not really connected to the development of reading Skills</td>
<td>Knowledge</td>
<td>Other</td>
<td>Reasonably good</td>
</tr>
<tr>
<td></td>
<td>o The study of the history and development of the structures and meaning of words</td>
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<tr>
<td></td>
<td>o The study of the causes of disabilities</td>
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<td>o The study of human groups through first hand observation</td>
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<tr>
<td></td>
<td>o None of the above</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Don't know</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>32</th>
<th>Reading a text and answering questions based on explicit information found within the text describes:</th>
<th>Categorisation</th>
<th>Discriminability</th>
<th>Difficulty</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>o Inferential comprehension</td>
<td>Knowledge</td>
<td>Sentence/ discourse</td>
<td>Very poor</td>
<td>Very easy</td>
</tr>
<tr>
<td></td>
<td>o Literal comprehension</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Summarisation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Question generation</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>o None of the above</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Don't know</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>33</th>
<th>Questions that require the combining of background knowledge and text information to create a response describe which of the following?</th>
<th>Categorisation</th>
<th>Discriminability</th>
<th>Difficulty</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>o Inferential comprehension</td>
<td>Knowledge</td>
<td>Sentence/ discourse</td>
<td>Very poor</td>
<td>Very easy</td>
</tr>
<tr>
<td></td>
<td>o Literal comprehension</td>
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<tr>
<td></td>
<td>o Summarisation</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>o Question generation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o None of the above</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Don't know</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Pedagogical</td>
<td>Domain</td>
<td>Discriminability</td>
<td>Difficulty</td>
<td>Variance</td>
</tr>
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<td>----------</td>
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<td>------------------</td>
<td>------------</td>
<td>----------</td>
</tr>
<tr>
<td>34</td>
<td>Pedagogical</td>
<td>Phonemic</td>
<td>0.13</td>
<td>Poor</td>
<td>0.47</td>
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<tr>
<td></td>
<td>o Having a student segment the sounds in the word “cat” orally</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>o Having a student spell the word “cat” aloud</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>o Having a student sound out the word “cat”</td>
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</tr>
<tr>
<td></td>
<td>o Having a student recite all the words they can think of that rhyme with “cat”</td>
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</tr>
<tr>
<td></td>
<td>o None of the above</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Don’t know</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Pedagogical</td>
<td>Other</td>
<td>0.32</td>
<td>Reasonably good</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td>o Word webs</td>
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<td>o Word searches</td>
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<td>o Writing a brief definition of different terms</td>
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<td>o Predicting</td>
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<td></td>
<td>o None of the above</td>
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<td>36</td>
<td>Pedagogical</td>
<td>Phonics</td>
<td>0.10</td>
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<td>0.94</td>
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<tr>
<td></td>
<td>o The student spelt the word phonetically</td>
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<td></td>
<td>o The student has not been taught that English words do not end in “v”</td>
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<td></td>
<td>o The student is using invented spelling</td>
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<td></td>
<td>o The student must memorise the spellings of these irregular words</td>
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<td></td>
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<td>o Don’t know</td>
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<tr>
<td>Question</td>
<td>Description</td>
<td>Categorisation</td>
<td>Discriminability</td>
<td>Difficulty</td>
<td>Variance</td>
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<tr>
<td>37</td>
<td>A morpheme refers to</td>
<td>Knowledge, Morphological</td>
<td>0.48, Very good</td>
<td>0.53, Somewhat difficult</td>
<td>0.25</td>
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<tr>
<td></td>
<td>o A single letter</td>
<td>Knowledge</td>
<td>Morphological</td>
<td>0.48</td>
<td>Very good</td>
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<td>o a single speech sound</td>
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<td>o A single unit of meaning</td>
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<td>o A grapheme</td>
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<td>o Don't know</td>
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<td>38</td>
<td>Story grammar refers to</td>
<td>Knowledge, Sentence/discourse</td>
<td>0.16, Poor</td>
<td>0.28, Very difficult</td>
<td>0.20</td>
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<td></td>
<td>o Grammatical rules governing the number of clauses in a sentence</td>
<td>Knowledge, Sentence/discourse</td>
<td>0.16, Poor</td>
<td>0.28, Very difficult</td>
<td>0.20</td>
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<tr>
<td></td>
<td>o The overall organisation and cohesion of a narrative</td>
<td>Knowledge, Sentence/discourse</td>
<td>0.16, Poor</td>
<td>0.28, Very difficult</td>
<td>0.20</td>
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<tr>
<td></td>
<td>o Syntactic rules that children acquire through their exposure to text-based stories</td>
<td>Knowledge, Sentence/discourse</td>
<td>0.16, Poor</td>
<td>0.28, Very difficult</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>o The more formal grammar that is used in written, Vs spoken language</td>
<td>Knowledge, Sentence/discourse</td>
<td>0.16, Poor</td>
<td>0.28, Very difficult</td>
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<td>o None of the above</td>
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<td>o Don't know</td>
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</table>

The following sentences are used in questions 39-42:
A. Run under the car.
B. He runs under our car.
C. Does he run under our car?
D. What a happy boy he is.

<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
<th>Skill, Sentence/discourse</th>
<th>0.29, Marginal</th>
<th>0.42, Difficult</th>
<th>0.24</th>
</tr>
</thead>
<tbody>
<tr>
<td>39</td>
<td>Which of the above sentences is an example of a declarative form? (B)</td>
<td>Skill, Sentence/discourse</td>
<td>0.29, Marginal</td>
<td>0.42, Difficult</td>
<td>0.24</td>
</tr>
<tr>
<td>40</td>
<td>Which of the above sentences is an example of the imperative form? (A)</td>
<td>Skill, Sentence/discourse</td>
<td>0.38, Reasonably good</td>
<td>0.44, Difficult</td>
<td>0.25</td>
</tr>
<tr>
<td>41</td>
<td>Which of the above sentences is an example of the exclamatory form? (D)</td>
<td>Skill, Sentence/discourse</td>
<td>0.32, Reasonably good</td>
<td>0.51, Somewhat difficult</td>
<td>0.25</td>
</tr>
<tr>
<td>42</td>
<td>Which of the above sentences is an example of the interrogative form? (C)</td>
<td>Skill, Sentence/discourse</td>
<td>0.41, Very good</td>
<td>0.68, Ideal</td>
<td>0.22</td>
</tr>
</tbody>
</table>
The following five language samples are used in questions 43-46:
A. James, who watched the dog, ate the cake.
B. Gina watched the rabbit scurry across the yard. She saw it go under the house.
C. James watched the cat.
D. Toni heard the parrots that were in the tree and that flew away.
E. Tom drank the milk and ate the apple.

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Skill</th>
<th>Sentence/discourse</th>
<th>Categorisation</th>
<th>Discriminability</th>
<th>Difficulty</th>
<th>Variance</th>
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<tbody>
<tr>
<td>43</td>
<td>Which sample is an independent clause?</td>
<td>(C)</td>
<td></td>
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<td>44</td>
<td>Which sample has one dependent clause?</td>
<td>(E)</td>
<td></td>
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<td>45</td>
<td>Which sample is an example of a discourse meaning?</td>
<td>(B)</td>
<td></td>
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<td>46</td>
<td>Which sample has two relative clauses?</td>
<td>(D)</td>
<td></td>
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<td>47</td>
<td>Difficulty keeping on track with the overall gist of a conversation and staying &quot;on track&quot; when speaking or listening is most likely to be an example of a difficulty:</td>
<td>Knowledge</td>
<td>Sentence/discourse</td>
<td>0.13</td>
<td>Poor</td>
<td>0.35</td>
<td>Difficult</td>
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<td></td>
<td>o Using grammatical rules correctly</td>
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<td>o Recalling the meanings of words</td>
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<td>o Forming a discourse meaning</td>
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<td>o Understanding individual sentences</td>
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<td>o Hearing effectively</td>
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<td>o Don't know</td>
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The following sentences are used in questions 48-50:

A. Racing to board the launch the captain slipped on the damp pier and broke its knee.
B. The witness’ voice trembled then fell quiet, causes the judge to call an adjournment.
C. Con pulled the fish off the hook too quick and incurring a cut deep to his hand.
D. The guard what is sleeping made it will be easier for burglars to get in the building undetected.
E. The workplace had been stressful and unpredictable over the duration so that by his birthday his blood pressure had reached a critical level.

<table>
<thead>
<tr>
<th>Skill</th>
<th>Sentence/discourse</th>
<th>Categorisation</th>
<th>Discriminability</th>
<th>Difficulty</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>Which one shows incorrect use of a relative pronoun? (D)</td>
<td>Skill</td>
<td>Sentence/discourse</td>
<td>0.10</td>
<td>Very poor</td>
</tr>
<tr>
<td>49</td>
<td>Which one is correct grammatically? (E)</td>
<td>Skill</td>
<td>Sentence/discourse</td>
<td>0.29</td>
<td>Marginal</td>
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<tr>
<td>50</td>
<td>Which one mis-uses an adjective? (C)</td>
<td>Skill</td>
<td>Sentence/discourse</td>
<td>0.32</td>
<td>Good</td>
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</tbody>
</table>
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Author/s:
Stark, Hannah Louise

Title:
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Date:
2018

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