2021

An Early Start to Self-Regulation: Investigating Educators' Beliefs and Practices for Supporting Early Self-Regulation

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An Early Start to Self-Regulation: Investigating Educators' Beliefs and Practices for Supporting Early Self-Regulation

A thesis submitted in fulfilment of the requirements for the award of the degree

Doctor of Philosophy

from the

University of Wollongong

by

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B.A. Psychology (Honours)

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October 2021

Abstract

The emerging ability to regulate one's thoughts, feelings and behaviours represents a hallmark of early childhood development. Recent findings have identified developmental trajectories for self-regulation as considerably heterogeneous, with variability in the early years a significant predictor for later educational, social, financial and health outcomes. Research suggests that targeted interventions in the early years might have the greatest potential for creating pronounced and stable change. Efforts to effect change in this early childhood period often look to Early Childhood Education and Care (ECEC) settings, given increasingly high rates of attendance by large numbers of children. Such interventions routinely use educators as the mediators for achieving child-level change, yet few studies evaluate the extent to which educator-level change has been achieved. Moreover, there is little evidence about educators' current self-regulation conceptions and practices, on which to build intervention efforts. Embedded within and expanding upon a broader study by Howard et al. (2020), this program of PhD research sought to contribute to the development, implementation and evaluation of the Preschool Situational Self-Regulation Toolkit (PRSIST) Program. Through this research, the candidate sought to: (1) explore educators' understandings and practices for supporting self-regulation development in Australian ECEC settings; (2) develop educator-focused components of the PRSIST intervention (whereas the broader project focused exclusively on the child-focused components of the PRSIST program and child outcomes as a consequence of its implementation), and engage educators in a collaborative process of intervention piloting and refinement; and, (3) evaluate the effects of the intervention on educator beliefs around self-regulation and explore perceptions of change to knowledge and practice.

To ensure program development was compatible with educators' current understanding, needs and realities in the area of self-regulation, Phase 1 of this research involved a qualitative investigation of educators' understandings of self-regulation and current practices for supporting its development among six Australian ECEC services. Findings from this study suggested educator understandings of self-regulation that where largely consistent with control-based definitions (i.e., self-regulation as the ability to supress and overcome salient maladaptive impulses), yet also revealed a tendency to focus

on manifest behaviour and emotion. Observed and self-reported practices were largely consistent with those suggested in the literature to be beneficial for children's self-regulation development (such as minimising factors that may undermine self-regulation, engaging skills central to self-regulation) yet did not reflect the adoption of a systematic or consistent approach between or within ECEC services. Intervention components were developed from these findings (as well as findings from theoretical and empirical literature) and were then piloted by a broader sample of educators from 14 ECEC services. Based on educator feedback, revisions were undertaken to several intervention components to ensure suitability, sustainability and scalability of the developed program.

Following program development and piloting, the candidate and co-authors sought to evaluate the impact of PRSIST program implementation on educators' beliefs about self-regulation, which can yield important insights into intervention efficacy and long-term sustainability of practice change. In response to a dearth of valid and reliable tools for measuring educator beliefs–including those related to self-regulation–the candidate and co-authors first undertook to develop and evaluate a quantitative measure capturing educators' perceived knowledge, attitudes and self-efficacy around self-regulation. Evaluation of the Self-Regulation Knowledge, Attitudes and Self-Efficacy (Self-Regulation KASE) scale yielded a valid and reliable 25-item scale, comprising three distinct yet related subscales: confidence in knowledge; attitudes; and, self-efficacy. To evaluate the effects of the PRSIST Program on educator beliefs, the Self-Regulation KASE scale was administered to the large and geographically dispersed sample of 152 educators, from 50 ECEC services across NSW, Australia that were recruited to participate in the broader project's cluster RCT evaluation. Findings from the educator evaluation–which was an extension to the core project as part of this PhD–revealed significant improvement to educators' confidence in their self-regulation knowledge following the 6-month intervention period. No significant changes to educators' attitudes or self-efficacy around supporting self-regulation were found. In this study, the candidate additionally sought to explore educators' perceptions of change to their knowledge and practice qualitatively, supplementing the quantitative results. Findings from these educator interviews suggested a positive perceived change to educators' knowledge of self-regulation, specifically related to its nature, development and importance. Educators and their directors also noted

a positive perceived change to educator practice for supporting self-regulation, with educators largely attributing this change to an enhanced understanding of self-regulation and its development.

This PhD research made an important contribution to the development and evaluation of this specific ECEC-embedded program for supporting early self-regulation in Australian ECEC settings, by providing key insights around the impact of the PRSIST Program on educator beliefs and educator experiences of change to knowledge and practice. This program of PhD research additionally provides broader contributions to the literature, namely novel insights into: status and importance of educators' self-regulation beliefs; susceptibility of educator beliefs to change; and educators' knowledge of self-regulation and embedded practice. These each represent important advances upon current knowledge and have likely implications for further theorising and future research.

Statement of Thesis Style

This thesis has been prepared in journal article compilation style format. A signed thesis style format agreement between the PhD candidate and supervisors can be found in Appendix A. This style was considered to be appropriate given the situation of this research within a broader project funded by a Discover Early Career Research Award grant and implications for future research in this area.

Publications Constituting this Thesis

Published Articles

Chapter 4

Vasseleu, E., Neilsen-Hewett, C., Cliff, K., & Howard, S.J. (2021). How educators in high-quality preschool services understand and support early self-regulation: A qualitative study of knowledge and practice. *The Australian Educational Researcher.* https://doi.org/10.1007/s13384-021-00466-4

Chapter 6

Vasseleu, E., Neilsen-Hewett, C., Ehrich, J., Cliff, K., & Howard, S. J. (2021). Educator beliefs around supporting early self-regulation: Development and evaluation of the Self-Regulation Knowledge, Attitudes and Self-Efficacy scale. *Frontiers in Education*, *6*, 1–13. https://doi.org/10.3389/feduc.2021.621320

Articles Under Review

Chapter 7

Vasseleu, E., Neilsen-Hewett, C., Cliff, K., & Howard, S.J. (2021). Evaluating the effects of a self-regulation intervention on educator beliefs and examining perceptions of change to knowledge and practice [Manuscript submitted for publication]. *Early Education and Development.*

The greater part of all work presented in this thesis, including published works and those submitted for publication, is attributed to me, as the PhD candidate. Supervisors and co-authors have enacted their role in the formulation of research aims and ideas and the revision of published and submitted works. All investigations, analyses and reporting have been carried out solely by me, in keeping with the requirements of my candidature. A signed statement of contribution can be found in Appendix B.

Other Publications and Contributions Related to this Thesis

As part of the broader project team, the candidate contributed to various research activities beyond those conducted in fulfilment of this PhD research. This included: an international conference presentation (ISSBD Conference); a protocol paper outlining the RCT evaluation; development and validation of a formative assessment tool of self-regulation (i.e., the PRSIST Assessment); and reporting of the RCT evaluation findings (see references below). This thesis reports on the research components that were the exclusive focus of the PhD, which supplemented what was initially planned in the core project.

Howard, S.J., Neilsen-Hewett, C., & Vasseleu, E. (2018). An Early Start to Self-Regulation: Designing and Evaluating a Low-Cost, Play-Like Intervention in ECEC. *International Society for the Study of Behavioural Development Conference,* Australia (Oral presentation)

Howard, S. J., Neilsen-Hewett, C., de Rosnay, M., Vasseleu, E., & Melhuish, E. (2019). Evaluating the viability of a structured observational approach to assessing early self-regulation. *Early Childhood Research Quarterly*, *48*, 186–197. https://doi.org/10.1016/j.ecresq.2019.03.003

Howard, S. J., Vasseleu, E., Batterham, M., & Neilsen-Hewett, C. (2020). Everyday practices and activities to improve pre-school self-regulation: Cluster RCT evaluation of the PRSIST Program. *Frontiers in Psychology*, *11*, 137. https://doi.org/10.3389/fpsyg.2020.00137

Howard, S. J., Vasseleu, E., Neilsen-Hewett, C., & Cliff, K. (2018). Evaluation of the Preschool Situational Self-Regulation Toolkit (PRSIST) program for supporting children's early self-regulation development: Study protocol for a cluster randomized controlled trial. *Trials*, 19(1). https://doi.org/10.1186/s13063-018-2455-4

Acknowledgments

To my supervisors, Steven, Cathrine and Ken, this thesis would not have been possible without the time, patience and support you have provided me. In sharing your wealth of knowledge and your passion for research, you have helped me to develop as a researcher far beyond my expectations. I feel immensely grateful to have had the opportunity to be supervised by each of you. I would also like to express thanks to my co-author Dr John Ehrich, for the important contribution you have made to this thesis.

To those who so generously participated in this research, I sincerely appreciate you sharing not only your time but your thoughts, efforts, ideas and passion for the early childhood sector. You made this research possible and I am so thankful for having been able to share in this journey with you all.

To my fellow PhD buddies, in particular Toni, Jo, Karel and Dee, it has been an absolute pleasure to share in this experience with you. Your friendships have been invaluable and I have enjoyed nothing more than celebrating all you have achieved in life and the PhD these past 4 years. A special mention to my PhD companion, Matt. You have been a constant source of support, reassurance and (at times) shared misery. You have pushed me to be a better, and more confident researcher and I cannot wait to see all that you will go on to achieve in the years to come.

To my house-mates, work-mates and real-life best-mates Bec and Lysh, you have been there for every triumph, set back and moment of doubt. I can honestly say I would not have made it through this without your unwavering support and belief in my ability to achieve this, and I cannot thank you both enough.

To my Aunty Jenni, your passion for Early Childhood and mentorship were very much the catalysts for this wonderful path I have gone down. Your relentless drive and desire to further your own learning and support others in their learning journey is something I very much admire and hope to mirror in my own life and career.

To my family (and friends who have become family), thank you for always cheering me on from the sidelines and being such a positive presence in my life. A special thanks to my wonderful parents, from a young age you instilled in me a deep love of education and a strong work ethic which has helped me to achieve things far beyond what I thought possible.

Finally, to my incredible partner Dom. Your kindness, support and unfailing ability to make me laugh have seen me through some of the most challenging times I have come up against in this PhD journey. I am so happy I got to share in this experience, and all those to come, with you.

I dedicate this thesis to my wonderful mother and her mother who taught me how to work hard, love unconditionally, and push for everything I want out of life. There are no words which can convey how truly grateful I am for having had such strong and compassionate women as my role models in life.

Certification

I, Elena Vasseleu, declare that this thesis submitted in fulfilment of the requirements for the conferral of the degree Doctor of Philosophy, from the University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. This document has not been submitted for qualifications at any other academic institution.

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Elena Vasseleu

15th October 2021

List of definitions

Attitude   A belief related to the acceptability or preferability of something (Ajzen, 2001)

Belief   Personal constructs or judgements that are formed over time and considered to be true by the individual (Pajares, 1992)

Children   Individuals aged between 3 to 11 years of age

Early childhood   The period of time from birth to 5 years of age

Educator   In the context of this thesis the term educator is used to refer to all individuals (of any qualification) directly providing education and care to children in early childhood education and care settings.

Executive Functions   In the context of this thesis, core executive functions consist of: (1) activating and working with information in mind (working memory); (2) shifting attention between rules or concepts (cognitive flexibility); and (3) resisting prepotent responses or impulses (inhibition; Diamond, 2013).

Long-day-care   Centre-based education and care service typically catering to children 6 weeks to 5 years of age from early morning to early evening most weeks of the year.

Preschool   Centre-based education and care service typically catering to children 3 to 5 years of age and operating in adherence with school hours and school holidays.

Preschool children   Children aged between 3 and 5 years.

Self-efficacy   An individual's appraisal of their capabilities to perform a particular behaviour (Bandura, 2004).

Self-Regulation   The ability to both supress and overcome maladaptive impulses across cognitive, behavioural social and emotional domains, to an adaptive end.

List of Names or Abbreviations

ACECQA	Australian Children's Education & Care Quality Authority
CSRP	Chicago School Readiness Project
DIF	Differential Item Functioning
ECEC	Early Childhood Education and Care
EFA	Exploratory Factor Analysis
EYLF	Early Years Learning Framework
KASE	Knowledge Attitudes and Self-Efficacy
KMO	Kaiser-Meyer-Olkin
LDC	Long-day-care
NQS	National Quality Standards
NSW	New South Wales
PATHS	Promoting Alternative Thinking Strategies
PD	Professional Development
PRSIST	Preschool Situational Self-Regulation Toolkit
PSI	Person Separation Index
RCT	Randomised Controlled Trial
SEIFA	Socio-Economic Indexes for Areas
SSTEW	Sustained Shared Thinking and Emotional Wellbeing
TASEL	Teacher Attitudes about Social and Emotional Learning

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Chapter 1: Critical Review

Chapter 1 provides a brief background to the academic literature concerning early self-regulation and associated interventions and elaborates on current limitations from which the guiding aims and research questions for this PhD research were derived. This chapter situates this PhD research within the context of a broader program of research and outlines its unique contribution not only to the broader study but to the field. The chapter concludes with a brief overview of the remaining chapters highlighting key areas of focus.

1.1 Important background

1.1.1 Understanding Self-Regulation

Across the literature definitions of self-regulation are marked by considerable diversity (see Burman et al., 2015). Extending on earlier definitions, which focused on the regulation of physiological states in response to stressors (Bernard, 1865), control-based definitions emphasise inhibitory processes and encompass broader control over cognition, behaviour and emotion (Carver & Scheier, 1981). While common tendency has been to utilise the term self-regulation interchangeably with self-control (i.e. the ability to suppress maladaptive impulses), recasting of self-regulation as distinct from self-control in strength-based models have seen it positioned as the ability to self-select and sustain goal-oriented behaviour (Baumeister & Heatherton, 1996; Hofmann et al., 2012). The current research adopts a broad definition in which self-regulation encompasses the ability to inhibit, engage and integrate emotional, behavioural and cognitive processes in accordance with the requirements of the situation and in pursuit of one's goals, and considers programs that aim to target these capacities.

1.1.2 Development and importance of self-regulation

In the first 5 years of life, children undergo rapid and foundational development in their ability to successfully regulate their thoughts, feelings and behaviours (Montroy, Bowles, Skibbe et al., 2016; Raffaelli et al., 2005). While the early years are arguably the most significant period for the development of self-regulation (Montroy, Bowles, Skibbe, et al., 2016), there are considerable individual differences in its growth over this period, with implications for children's short- and long-term outcomes (Howard & Williams, 2018). In childhood, early self-regulation abilities are associated with later academic achievement (Allan et al., 2014; Robson et al., 2020), school adjustment (Denham et al., 2014; Williams et al., 2016), and social competence (Robson et al., 2020; Smithers et al., 2018). Further, the capacity to self-regulate between the ages of 3- to 5-years, longitudinally predicts outcomes experienced almost three decades later related to health, socioeconomic status, criminality and achievement (Howard & Williams, 2018; Moffitt et al., 2011). Encouragingly, research in this area highlights the potential for generating sustained improvements in self-regulation–over and above

expected developmental change–and suggests various influences likely to support this change (e.g., caregiver behaviour and instruction, peers and experiences; Cadima et al., 2015; Diamond & Lee, 2011; Ferreira et al., 2016; Montroy, Bowles, & Skibbe, 2016). Given the individual, economic and societal ramifications of poor self-regulation development in the early years (Heckman, 2006; Moffitt et al., 2011), and the potential for rapid growth and skill acquisition during this period (Montroy, Bowles, Skibbe, et al., 2016; Wass et al., 2012), early intervention may represent an opportune time to improve self-regulation abilities and mitigate the effects of challenging early years experiences.

1.1.3 ECEC embedded approaches to supporting self-regulation

Considering the above, recent efforts to shift population-level trajectories and outcomes have increasingly targeted early self-regulation development. These intervention efforts have tended to focus on children's experiences within early childhood education and care (ECEC), given both the ubiquity of these settings and the important role they play in the development of early skills and abilities (Melhuish et al., 2015; Tayler et al., 2017). When it comes to supporting children's development within ECEC settings, overwhelming evidence suggests the critical role of educator practice for enhancing the quality of provision and moderating the association between ECEC attendance and children's positive developmental outcomes (Sylva et al., 2011; Tayler et al., 2017). To capitalise on the critical role of educators, ECEC-embedded approaches to early self-regulation intervention often utilise educators as key drivers for intervention implementation (Luo et al., 2020; Pandey et al., 2018). To facilitate educator implementation, these interventions often consist of educator training to build knowledge and articulation of practices that are expected to foster self-regulation (Bodrova & Leong, 2007; Domitrovich et al., 2007; Raver et al., 2008). While findings on the extent to which these approaches impact children's self-regulation and associated skills are mixed, a reconciliation of this research suggests that ECEC-embedded approaches are among the most promising for generating pronounced and stable change to children's self-regulation (January et al., 2011; Luo et al., 2020; Pandey et al., 2018).

1.2   Problem statement

Despite their promise for enhancing children's early self-regulation abilities, current ECEC-embedded approaches have important limitations concerning their requirements and the extent to which they consider the role of educators as both the learner (i.e., within training) and facilitator (i.e., for program implementation). The following sections provide an outline of these limitations and introduce the theoretical concepts and frameworks which informed this PhD research.

1.2.1   Accessibility, Suitability and Social Validity of the Intervention

Regarding the use of currently available approaches to foster self-regulation in formal ECEC settings (reviewed in Chapter 2), issues around the accessibility, suitability and social validity of the intervention and its components may constrain access, uptake and the success of these approaches. In terms of program accessibility, for instance, many ECEC-embedded programs require educators to undergo extensive training (e.g., Barnett et al., 2008) and allocate considerable time to additional or alternative instructional delivery (Luo et al., 2020). Participation in these programs may also incur significant costs in terms of commissioning interdisciplinary professionals or coaches for induction (e.g., Raver et al., 2008), staff absence to attend training and additional resources required for program implementation (e.g., assessments, curriculum guides). When considering the suitability of intervention approaches, difficulties may also arise where the program content diverges from existing curricula or frameworks of practice, and the bounds of legislative and regulatory requirements. For instance, programs such as Tools of the Mind (Bodrova & Leong, 2007) require ECEC services to adopt and integrate a specific curriculum, which may only be possible where there is flexibility in statutory curricula/framework requirements and alignment with educational objectives of educators and families. While several programs have been developed in the United States (e.g., Tools of the Mind, Chicago School Readiness Project; Bodrova & Leong, 2007; Raver et al., 2008), these more-structured curriculum approaches are not readily transferrable to (or even available in) the Australian ECEC context.

In addition to issues surrounding the contextual suitability or applicability of ECEC-based approaches, issues pertaining to the social validity of the program (i.e., the extent to which educators'

perceived the program as being acceptable for implementation and are satisfied with its outcomes or potential outcomes; Luiselli & Reed, 2011) can also exert influence on program uptake. This sentiment is echoed in theoretical frameworks that emphasise the central role of educator beliefs for practice and practice change. For instance, the Theory of Planned Behaviour (Ajzen, 1991) suggests educators' intention to act relies on their belief that a certain behaviour is: (a) favourable (i.e., positive attitude); (b) socially acceptable or expected of them (i.e., perceived subjective norm); and (c) something they would be able to do (i.e., perceived behavioural control). Applying the principles of Social Learning Theory to receptiveness to 'innovations', Bandura (2006) likewise emphasised the importance of cognitive factors for influencing change in behaviour, such that individuals are less likely to do something if they perceive it to be unimportant, ineffective, or not possible to do (e.g., if they perceive the environment as lacking the necessary supports). While ECEC-based programs often aim to target educator beliefs via training (see Section 1.2.2) or capture these at post-intervention (e.g., via post-intervention process evaluation), few programs have sought to establish social validity of the program among educators prior to its implementation and evaluation. Yet, to successfully integrate these programs within diverse ECEC services and support educator buy-in, it is first important to ensure that intervention components: (a) are compatible with available resources (e.g., monetary and physical); (b) align with current routines, practice and pedagogies, and existing or required curricula (Burgess et al., 2010); and (c) are perceived as being acceptable and beneficial (i.e., socially valid) by early childhood educators responsible for their implementation (Luiselli & Reed, 2011; Turan & Meadan, 2011).

1.2.2 Consideration for a Multi-Level Model of Change within the Evaluation Framework

To realise the goal of improving children's self-regulation outcomes, theoretical models of change within a PD framework imply a multi-step path from educators' engagement with PD to improved child outcomes (e.g., Fukkink & Lont, 2007; NICHD Early Child Care Research Network, 2002). Multilevel approaches to enhancing outcomes for children leverage processes central to structural quality (i.e., educator qualifications and training) with the hope of impacting the quality of

provision (i.e., process quality) and thus children's outcomes (see Figure 1.1). In line with this model, the efficacy of ECEC-embedded approaches for enhancing children's self-regulation hinges on: (1) the extent to which training effectively influences educators' beliefs and knowledge; (2) the translation of beliefs and knowledge to practice; and (3) the efficacy of training endorsed practice and activities for enhancing self-regulation. While program evaluations have typically investigated the association between the provision of PD and child self-regulation change (point 3), self-regulation intervention evaluations have not often sought to consider the impact of the intervention on educators' knowledge and beliefs (point 1) and the translation of knowledge and beliefs to practice (point 2). In this sense, current evaluation approaches fail to conceive the educator as *both* the learner (i.e., within training) and the change agent (i.e., within the classroom context). Were these additional factors to be considered (i.e., impacts of the intervention of educators as the learners), this could yield important insights into the moderators of practice and child-level change (e.g., which educator characteristics appeared to have the greatest impact on practice and child-outcomes), and the likelihood of sustained practice change beyond the intervention period (i.e., the extent to which practice change reflects compliance with study requirements or an inherent shift in key determinants of practice; Borg, 2018).

Figure 1.1

Multi-Level Model of Change

Structural Quality		Process Quality	Child Outcomes
Professional Development	Educator Knowledge and Beliefs	Educator Practice and Pedagogy	Child Skills and Abilities
Trainer–Educator	Educator	Educator–Children	Children
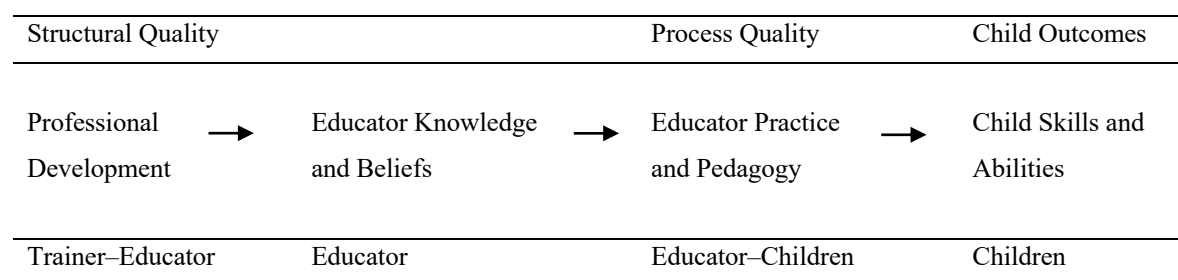
Note. This figure is adapted from Fukkink and Lont (2007).

1.3   The Preschool Situational Self-Regulation Toolkit (PRSIST) program.

The PRSIST Program was developed by Howard et al. (2020) to provide educators working in Australian ECEC contexts with a low-cost, play-based approach for supporting self-regulation

development. More specifically, the PRSIST Program was developed to address limitations in current approaches relating to high implementation costs (Barton et al., 2014), program inflexibility (i.e., programs such as Tools and PATHS require the adoption of a set curriculum), lengthy training (Luo et al., 2020), and a dearth of available evidence-based approaches suitable for implementation within Australian ECEC settings. Its individual program components–including online PD, adult practice guide and purpose-designed child self-regulation activities–were developed to support sustainable shifts in educator practice (i.e., by targeting knowledge and beliefs) and directly support children's self-regulation (i.e., targeting those abilities central to self-regulation; Baumeister & Heatherton, 1996; Hofmann et al., 2012).

1.4   Scope of broader program

Funded by an ARC Discovery Early Career Researcher Award (DECRA), the broader program of research led the development of child-focused aspects of the program, with the primary aim of evaluating their impact on children's self-regulation (and other related outcomes) in a cluster Randomised Control Trial (RCT) evaluation. In doing so, the broader program led and/or contributed to the development of 28 child-activities and 11 educator practices compatible with Baumeister and Heatherton's (1996) strength model of self-regulation (elaborated in Chapter 2 section 2.4.2), which considers goal setting, motivation and capacity (underpinned by executive functions; Hofmann et al., 2012) as necessary for successful self-regulation.

1.5   Scope of the PhD Research

Recognising the important role of educators as interventionists and key agents for change in child development (Fukkink & Lont, 2007; Sylva et al., 2011; Tayler et al., 2017), this PhD research sought to contribute important extensions to the broader program of research, by leading on educator-focused aspects of the PRSIST program development and evaluation. The following sections outline the approach to address the four overarching aims guiding this thesis and the research questions derived from these aims. A summary of aims, research questions, phases and methods are provided in Table 1.1.

1.5.1 Aim 1: Explore educator understanding of self-regulation and current practices for supporting its development within Australian ECEC services

Despite the widespread use of evidence-based curricular and curriculum-add-on approaches for supporting self-regulation in countries such as the United States (e.g., Tools of the Mind; Bodrova & Leong, 2007; Chicago School Readiness Project; Raver et al., 2008), there is little evidence of widely adopted approaches in Australian ECEC contexts. While the Australian Early Years Learning Framework (EYLF; Department of Education Employment and Workplace Relations, 2009) does acknowledge the importance of self-regulation and suggests that educators act to foster self-regulation development, it does not define self-regulation nor does it prescribe any specific means for supporting its development within the ECEC context. Thus, to generate important insights into educators' current understandings and practices for supporting self-regulation development in Australian ECEC settings, the first phase of this research (Chapter 4) adopted a qualitative case study approach. While the PRSIST Program draws on evidence-based literature around practices and experiences suggested to foster early self-regulatory development, researcher observations conducted in this phase of the research sought to identify the use of practices (including child activities) expected to support self-regulation based on the academic definition of self-regulation adopted for this PhD research (Research Question 1). Findings were expected to identify additional intervention inclusions and insights into the contextual constraints of Australian ECEC settings. To maximise opportunities for the observation of these practices, six ECEC centres were purposefully sampled based on high scores on: government quality ratings (Australian Children's Education and Care Quality Authority, 2017); environmental quality ratings (Siraj et al., 2015); and child outcomes achieved in a prior study of 90 ECEC services in NSW (Siraj et al., 2018). Using educator interviews and reflection journals, this phase of the research additionally sought to explore educators' current understandings of self-regulation (Research Question 2) and self-reported practices utilised to support self-regulation (Research Questions 3), to highlight areas of additional opportunity even among high quality ECEC services.

1.5.2 Aim 2: Engage educators in an iterative process of intervention piloting and refinement to support social validity of PRSIST program components

Phase 2 of the research (Chapter 5) focused on the refinement of intervention components, in part, based on findings from Phase 1 of the research (Chapter 4). The aim of this phase was to engage educators in an iterative process of intervention piloting and refinement to support social validity of the intervention components (i.e., child activities, adult practice, parent newsletters and purpose-made children's books). During this phase, educators from 14 ECEC services with diverse quality ratings were recruited to review and trial intervention components for a period of 2 weeks, and then provide written feedback. Findings from this phase were expected to provide insights into whether and to what extent educators perceived individual intervention components as being acceptable and beneficial for implementation within Australian ECEC settings (Research Question 4). Revisions were then made to intervention components based on educator feedback relating to feasibility (i.e., in terms of difficulty and time to implement), compatibility (i.e., with the context, children's abilities and educator practice) and enjoyability (i.e., for both children and educators).

1.5.3 Aim 3: Evaluate the impact of the PRSIST program on educators' beliefs around self-regulation

Whereas the broader program of research focused on the evaluation of the PRSIST Program in relation to child outcomes (Howard et al., 2020), this PhD research sought to address a gap in the literature by evaluating the impact of the PRSIST program on educator beliefs, understandings and practice. In response to a lack of available and suitable measures for evaluating educator-level change in beliefs related to self-regulation (the focus of the RCT evaluation in Phase 4a), the third phase of this research (Chapter 6) sought to develop and evaluate a quantitative measure of educator beliefs around self-regulation (i.e., the Self-Regulation Knowledge. Attitudes, and Self-Efficacy (KASE) Scale; Research Question 5). Construct validity, reliability and predictive validity of Self-Regulation KASE were evaluated with a sample of 165 educators who were involved in baseline data collection for the PRSIST cluster RCT evaluation (Phase 4a). This Phase provided insights into the important role of educator self-regulation beliefs in relation to educators' engagement with training and child

self-regulatory development. In Phase 4a, the Self-Regulation KASE Scale was used to evaluate the effects of the PRSIST Program on educators' perceived knowledge, attitudes and self-efficacy around supporting children's self-regulation. This leveraged the broader cluster RCT design, recruitment and implementation, to recruit and evaluate educator-level change with 152 educators from the 50 ECEC services across NSW, Australia (Research Question 6).

1.5.4 Aim 4: Explore educator perceptions of change to their knowledge and practice following from the intervention

In response to difficulties in assessing knowledge (i.e., given diverse conceptualisations in the literature, there are few agreed 'facts' about self-regulation that can be tested) and the constraints to observing change in educator practice (i.e., fiscal, geographic), a qualitative approach was adopted in Phase 4b to explore educators' self-reported changes to their knowledge and practices pertaining to self-regulation following from the intervention (Research Question 7). In this phase of the research 12 educators and 8 directors participated in post-intervention interviews. Educator interviews focused on perceptions of change to their understanding of self-regulation, change in practices for supporting its development and factors seen as contributing to this change. Director interviews focus on perceived change to educator practice, focusing on educators' interactions with children, specific practices and approaches for supporting self-regulation, and interactions with families with respect to their child's self-regulation. Findings from this stage of the research were expected to yield additional insights into change experienced at the educator level and perceived effectiveness of the intervention by those responsible for its implementation.

Table 1.1

Connecting Aims, Research Questions, Phases and Methods

Aims	Research Question	Research Phase	Method of Data Collection
Explore educator understanding of self-regulation and current practices for supporting its development within Australian ECEC services (i.e., to support the development of ECEC compatible intervention components and highlight additional areas of opportunity)	1. What practices do educators working in Australian ECEC services use to support self-regulation based on an academic definition of self-regulation?	Phase 1: Exploratory case studies	Researcher observations
	2. How do educators working in Australian ECEC services understand self-regulation and its development?	Phase 1: Exploratory case studies	Semi-structured interviews Educator reflection journals
	3. What practices do educators working in Australian ECEC services employ to support self-regulation as they understand it?	Phase 1: Exploratory case studies	Semi-structured interviews Educator reflection journals
Engage educators in an iterative process of intervention piloting and refinement to support social validity	4. To what extent, if any, do educator perceive individual intervention components as being acceptable and beneficial for implementation within Australian ECEC settings?	Phase 2: Intervention piloting and refinement	Educator surveys
Evaluate the impact of the PRSIST program on educators' beliefs around self-regulation	5. Does the Self-Regulation Knowledge, Attitudes and Self-Efficacy scale, developed for this PhD research, capture educators' confidence in their knowledge, attitudes and self-efficacy around supporting early self-regulation; and yield valid and reliable data?	Phase 3: Measurement development and evaluation	Educator self-report measure (Self-Regulation KASE) Child observational measure of self-regulation (PRSIST Assessment) Educator survey (Adapted TASEL) Professional development engagement metrics
	6. What impact, if any, does the PRSIST program have on educator beliefs around self-regulation?	Phase 4a: Intervention implementation and evaluation	Educator self-report measure (Self-Regulation KASE) (pre-/post-)
Explore educator perceptions of change to their knowledge and practice as a consequence of the intervention	7. What impact, if any, do educators perceive the PRSIST program as having on their knowledge and practice around supporting self-regulation?	Phase 4b: Post-intervention evaluation	Semi-structured interviews

1.6   Significance of the research

This research contributed to the development of an ECEC-embedded program for supporting early self-regulation based on a prominent theoretical model of self-regulation (i.e., Carver & Scheier, 1981) and with consideration for each of the aspects considered to be involved in self-regulation (i.e., goal setting, motivation and capacity; Baumeister & Heatherton, 1996; Hofmann et al., 2012). In making this contribution, this research sought to consider the unique contexts and important perspectives of educators–who often represent key drivers for intervention–and subsequently aided in addressing barriers associated with time, cost and compatibility of current approaches. This research additionally sought to evaluate the extent to which educators' participation in the PRSIST program may have impacted their beliefs about self-regulation and their perceptions of change to their understanding and practice for supporting self-regulation development. In doing so, this research introduced an approach to measuring educator beliefs about self-regulation (i.e., the Self-Regulation KASE scale; Vasseleu et al., 2021) and garnered key insights around the impact of the PRSIST program on educator beliefs and experiences of change, which are under-investigated in relation to early self-regulation intervention.

1.7   Structure of the thesis

This thesis is submitted in fulfilment of the requirements of a Doctor of Philosophy in Psychology and has been prepared as a thesis by compilation, where published or publishable journal articles are included as chapters. This thesis includes two published journal articles (Chapter 4 and Chapter 6) and one journal article which has been submitted for publication (Chapter 7). The remaining chapters were not intended for publication but are included herein for completeness of reporting on this PhD research. While articles were prepared for publication in accordance with the guidelines for each journal, all articles presented in this thesis document have been revised to ensure consistency in referencing (i.e., APA 7th edition), spelling (i.e., Australian English) and general formatting. The PhD candidate is referred to as the 'first author' in published chapters for this thesis and as the 'candidate' in unpublished chapters. A summary of each chapter is provided below.

Chapter 2 provides an in-depth review of the relevant literature which underpins this PhD research. This review takes an initial focus on the nature, importance and early development of self-regulation, and theoretical frameworks for self-regulation change. The important role of the ECEC setting and early childhood educators in shaping children's development, and their positioning as critical agents in self-regulation intervention, are then discussed. Finally, theoretical and empirical evidence for the nature, importance and function of educator beliefs for the uptake, efficacy and sustainability of ECEC-embedded interventions are elaborated. This chapter covers this breadth of topics to set the overarching context, evidence and gaps that inform the aims and program of PhD research that follows.

Chapter 3 details the overarching methodological approaches adopted in conducting this program of PhD research. In doing so, this chapter situates the PhD research within the context of a broader study, provides an overview of the sites and participants, and aligns the research questions with research phases and data collection instruments. This chapter aims to provide the reader with a guiding understanding of the overarching methodology for this series of studies.

Chapter 4 is the first publication within this thesis. This chapter details a qualitative study that explored educator understandings of self-regulation and self-reported practices for supporting its development. Findings from this study also explored researcher-observed practices suggested by the literature to support early self-regulation (as conceptualised within this research). This chapter was written by the candidate, with co-authors Associate Professor Cathrine Neilsen-Hewett, Dr Ken Cliff and Associate Professor Steven James Howard and is published in *The Australian Educational Researcher*.

Chapter 5 outlines the background, procedure, and results of a pilot evaluation of the PRSIST program's components among a sample of ECEC educators. The results from this pilot phase were used to revise and refine intervention components to ensure their feasibility, compatibility (i.e., within the context, children's abilities and educator practice) and enjoyability (i.e., for both children and educators). This chapter provides an overview of the collaborative approach to intervention design adopted by the research team.

Chapter 6 is the second publication in this thesis. It outlines development and validation of the Self-Regulation KASE scale. This tool was developed in response to a lack of valid and reliable measures for assessing early childhood educators' beliefs around supporting early self-regulation and to permit measurement of intervention effects on educators' beliefs in subsequent phases of this PhD research. This chapter was written by the candidate, with co-authors Associate Professor Cathrine Neilsen-Hewett, Dr John Ehrich, Dr Ken Cliff and Associate Professor Steven James Howard, and is published in *Frontiers in Education*.

Chapter 7 is the third and final publication in this thesis. This chapter details the cluster randomised control trial evaluation of the efficacy of the PRSIST Program for impacting educator beliefs and examines educator perceptions of change to knowledge and practice. Specifically, this study adopted a mixed-method approach to: (1) evaluate the effects of the PRSIST program on educator beliefs, using the Self-Regulation KASE scale; and (2) explore educators' perceptions of change to knowledge and practice as a consequence of the intervention. This chapter was written by the candidate, with co-authors Associate Professor Cathrine Neilsen-Hewett, Dr Ken Cliff and Associate Professor Steven James Howard, and is currently under review with the journal of *Early Education and Development.*

Chapter 8 provides an integration and overarching discussion of findings arising from this series of studies, while highlighting novel insights and contributions relative to the extant literature. Also presented is a discussion of the research limitations, key learnings and future directions.

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Chapter 2: Literature Review

Chapter 2 provides a comprehensive overview of the literature that underpins this program of PhD research. This chapter takes an initial focus on the nature and importance of self-regulation, to justify this as a viable and fruitful target for intervention. Upon outlining the limitations of current self-regulation intervention approaches–with respect to their accessibility, compatibility, and consideration of participating educators–this review then focuses on the importance of educator beliefs for enacted practice, which represents the specific focus of this PhD research.

2.1 Significance of the early years

The early years are characterised by the emergence of various skills and abilities which lay the foundation for development across the lifespan. In the first 5 years of life children experience rapid changes to cognition and physiology, influencing short- and long-term health and wellbeing, achievement and social functioning (Daelmans et al., 2015). Given the genetic and contextual nature of children's development, growth across these areas is neither homogenous nor linear (Tayler et al., 2015). Yet, to the extent that children experience growth across the early years, research demonstrates decreased risk of experiencing negative outcomes. This supports the value of earlier interventions in providing the greatest impact and return on economic investment (e.g., Heckman, 2006; Moffitt et al., 2011). As such, efforts to both ensure and enhance the development of early skills and abilities have increasingly focused on early childhood intervention. While these efforts are indeed diverse in focus–targeting various academic and non-academic domains–considerable efforts have concentrated on facilitating the development of early self-regulation (i.e., the ability to remain goal-directed despite competing impulses) given strong evidence for its importance (Howard & Williams, 2018), variable development (Montroy, Bowles, Skibbe, et al., 2016) and susceptibility to positive change (Moffitt et al., 2011).

2.2 Understanding self-regulation

The study of self-regulation has been of interest to researchers for well over a century, with broad and multidisciplinary interest creating considerable diversity in its definition and operationalisation (Burman et al., 2015). Early conceptions of self-regulation (or "homeostasis"; Cannon, 1929) considered it as the ability to regulate one's physiological state in response to stressors (Bernard, 1865). Control-based theories of self-regulation (or "self-control") have since extended on this perspective to emphasise the role of inhibitory processes for exerting broader control over cognition, behaviours and emotions (Carver & Scheier, 1981). While some researchers have attempted to distinguish self-regulation from self-control, with self-regulation encompassing any self-selected and goal-oriented behaviour and self-control referring to the ability to override unwanted

prepotent impulses (Baumeister & Heatherton, 1996; Hofmann et al., 2012), others have equated the two (i.e., self-control as a necessary component of self-regulation; Howard et al., 2019). Whereas the former conceptualisation would include anything an individual decides to do and completes (e.g., completing a painting or washing your hands), control-based definitions encompass a narrower set of behaviours requiring effortful control (e.g., packing away despite a desire to keep playing, or resisting the impulse to interrupt when someone else is talking). While there has been no resolution to this debate, evidence points to self-control (and related conceptions of self-regulation) as a particularly strong and broad predictor of later-life outcomes (Howard & Williams, 2018; Moffitt et al., 2011). The current research adopts a definition in which self-regulation encompasses the ability to engage and integrate emotional, behavioural and cognitive processes, and override maladaptive impulses which may impede goal attainment.

2.3   Importance of early self-regulation

In accordance with recent meta-analytic and systematic reviews, early variability in the capacity to direct and inhibit responses is a significant predictor of children's short- and long-term outcomes (Compas et al., 2017; de Ridder et al., 2012; Rademacher & Koglin, 2019; Robson et al., 2020; Smithers et al., 2018). In childhood, variance in self-regulation at school entry has been linked with school readiness (Blair & Diamond, 2008; Blair & Raver, 2015), school adjustment (i.e., students positive adaptation to classroom processes; Denham et al., 2014; Williams et al., 2016) and early academic achievement (i.e., in mathematics, reading and vocabulary; Allan et al., 2014; Robson et al., 2020; Smithers et al., 2018). Regarding children's interpersonal skills, enhanced self-regulation is associated with higher social competence (Robson et al., 2020; Smithers et al., 2018), peer acceptance (Blandon et al., 2010), and a decreased risk of peer victimisation (Robson et al., 2020). Early self-regulation is also important for children's psychological wellbeing, with better self-regulation linked to lower rates of internalising problems (e.g., depression, withdrawal, anxiety, loneliness and suicidal thoughts) and externalising difficulties (e.g., aggression, disruption and noncooperative behaviours; Compas et al., 2017; Robson et al., 2020). The ability to self-regulate has also been identified as a protective factor for coping with stress (Buckner et al., 2009) and is

positively and uniquely associated with resilience in school-aged children, even after controlling for self-esteem, negative life events and chronic strain (Buckner et al., 2003).

While these cross-sectional and short-term longitudinal studies are highly suggestive, perhaps the most compelling evidence for the importance of early self-regulation derives from large-scale longitudinal studies, which highlight early self-regulation as a robust predictor of adolescent and adult outcomes. In such studies, better self-regulation in the preschool years has been associated with: higher levels of educational attainment (Robson et al., 2020); enhanced work performance (de Ridder et al., 2012); increased likelihood of long-term employment (Robson et al., 2020); and enhanced interpersonal functioning (de Ridder et al., 2012; Robson et al., 2020). Conversely, low self-regulation in the early years is associated with increased likelihood of engaging in risky behaviour during adolescence (e.g., cigarette smoking, use/abuse of other substances, early school drop-out, unplanned teen pregnancy; Moffitt et al., 2011; Robson et al., 2020) and, in adulthood, more financial insecurity (Moffitt et al., 2011), higher rates of criminal offending (Moffitt et al., 2011), and poorer mental health (e.g., depression, anxiety, suicidal thoughts; Howard & Williams, 2018; Robson et al., 2020). Given the importance of self-regulation for early and later-life outcomes–with likely consequences at the individual, societal and economic level–self-regulation has attracted the attention of early education researchers, practitioners and policy-makers as a key focus for early intervention.

2.4   Development of self-regulation

The first 2000 days of life are a particularly critical time for the development of self-regulation. As infants and toddlers, children begin to acquire discrete skills and abilities that are essential for self-regulation, such as expressive and receptive language, motor control, working memory and cognitive flexibility (Diamond, 2002; Shonkoff & Phillips, 2000). As children enter the preschool years (i.e., ages 3 to 5 years) the ability to engage, integrate and manage these processes increases rapidly, signifying a qualitative shift from being largely regulated by others to an increasing ability for *self*-regulation (Montroy, Bowles, Skibbe, et al., 2016; Tayler et al., 2015).

While the early years are characterised by rapid improvements in self-regulation, inter- and intra-individual growth in self-regulation ability is marked by considerable heterogeneity. From a developmental perspective, research suggests differential growth across facets of self-regulation (e.g., the capacity for emotion regulation typically preceeds regulation of behaviour; Howse et al., 2003), as well as discrete skills implicated in self-regulation (e.g., children are often able to inhibit responses before being able to flexibly shift away from and between dominant mental sets; Zelazo et al., 2003). Differences in the development of self-regulation are also noted between individuals. For instance, Montroy et al. (2016) identified three common developmental trajectories for self-regulation: early developers, intermediate developers and late developers. While each trajectory showed some level of growth in self-regulation during the preschool years, the timing, duration and degree of change differed between individuals. Twenty percent of the sample (characterised as late developers) experienced few gains across the preschool years, and took three additional years (i.e., up until ~7 years of age) to attain the self-regulation levels that their 'early developer' peers had demonstrated at age 4. When young children experience self-regulation growth in these early years, research suggests that outcomes similarly improve (Howard & Williams, 2018; Moffitt et al., 2011). Utilising data from the Longitudinal Study of Australian Children, Howard and Williams (2018) noted a reduced risk of negative outcomes across 11 of the 13 outcomes considered (e.g., reading, numeracy, mental health outcomes, substance use and criminal offending) where children experienced an early positive change in self-regulation. Self-regulation intervention studies (profiled in greater depth later in this chapter), which can offer the strongest evidence for or against the significance of self-regulation change, also provide some support for a foundational and causal role for self-regulation in early child development.

2.4.1 Susceptibility of self-regulation to change

Given its longitudinal importance, considerable research has sought to investigate those factors impacting development of self-regulation. While factors relating to biological characteristics (e.g., temperament and sex; Frick et al., 2018; Montroy, Bowles, Skibbe, et al., 2016), psychopathology (e.g., anxiety and depressive disorders; Strauman, 2017), and demographic and

familial risk factors (e.g., socioeconomic status and maternal education; Berthelsen et al., 2017; Montroy, Bowles, Skibbe, et al., 2016) have been linked with variations in children's self-regulation development, targets for intervention have largely considered more-malleable contextual and experiential influences. These include factors relating to caregiver behaviour and instruction (e.g., responsiveness, closeness, autonomy support; Ferreira et al., 2016; Williams & Berthelsen, 2017), child-peer interactions (e.g., peer self-regulation, social exclusion; Montroy, Bowles, & Skibbe, 2016; Pahigiannis & Glos, 2020; Stenseng et al., 2015), and child engagement in enriching experiences (e.g., physical activity, music and movement, games with rules, mindfulness; Lakes & Hoyt, 2004; Razza et al., 2015; Tominey & McClelland, 2011; Williams & Berthelsen, 2019). A number of contextual and situational factors have also been evidenced as exhibiting a transient effect on the expression of children's day-to-day self-regulation, including: acute sleep deprivation (Miller et al., 2015); stress (Brophy-Herb et al., 2007); hunger (Gailliot et al., 2007); and negative social interactions (Stenseng et al., 2015). While such things as overtiredness may only have a temporal impact on children's self-regulation capacities, mitigation of these factors reduces the demand placed on children's emerging self-regulation skills and supports their engagement in learning experiences (Blair, 2002; Blair & Diamond, 2008; Williams et al., 2017). The impact of these contextual supports on children's self-regulation is not uniform, however, with children lower in self-regulation benefitting more from contextual supports and efforts to alleviate external and internal burdens (January et al., 2011).

2.4.2 Theoretical framework for self-regulatory change

While research in this area is yet to yield an accepted model for self-regulation change, one prominent model of self-regulation is Carver and Scheier's (1981) feedback-loop model. According to this model, the ability to self-regulate requires engagement in a cyclic 'test-operate-test-exit' (TOTE) process. During the test phase, the current state is compared to a desired goal state. Should there be a discrepancy between the two, a child will engage in certain behaviours (or 'operations') to change the current state. This cycle continues until they have achieved their desired state, which ends the process. For example, a child who is told it is time to pack away their toys and agrees to follow this instruction

would first evaluate the space relative to its cleaned state (test). Where the current and desired states are discrepant the child would engage in behaviours commensurate with packing away (operate). As they tidy, the child would continue to evaluate the current state of the room to its cleaned state (test), until the two states match, at which point they would stop (exit).

Whereas the TOTE model articulated a process for self-regulated behaviour, Baumeister and Heatherton's (1996) expansion of this framework elaborated on the skills needed for successful self-regulation. This, they propose, relies on three main components. First, one must select a specific goal to pursue, which identifies the target outcome the individual elects to direct their energy toward. In the previous example, this would be the child's agreement with the direction to pack away their toys. The next component involves self-monitoring (corresponding to the "test" phase of the TOTE model; Carver & Scheier, 1981) and investing sufficient motivation towards achieving the goal (in the "operate" phase of the TOTE model). In the above example, this would entail evaluating progress and maintaining activity until all toys have been put away. The final component is the capacity to mitigate internal and external 'distractors' that may impede attainment of the goal, and instead remain engaged in goal-oriented behaviours (Baumeister & Heatherton, 1996). Continuing with this example, this may include overriding the impulse to abandon the "boring" job of cleaning in favour of something that is more fun or being drawn back into play as the toys are picked up. Extending on this third component, Hofmann et al. (2012) suggested that executive functions–namely, the ability to coordinate information in mind (working memory), resist impulses and distractions (inhibition), and flexibly shift attention (cognitive flexibility)–may be core factors underlying this *capacity* to engage in successful self-regulation despite competing demands.

Informed by these models of self-regulation, and evidence for situational factors impacting self-regulation as noted previously (e.g., sleep, hunger, stress), it was expected that efforts to target self-regulation would need to address each of these component (i.e., goal setting, motivation and capacity), as well as create contextual conditions to optimise children's self-regulation. The content of the self-regulation program within this PhD research was designed with these theoretical frameworks and principles in mind.

2.5 ECEC as a critical context for child (self-regulation) development

Second only to the influence of the home, Early Childhood Education Care (ECEC) contexts play an important role in shaping children's development (Melhuish et al., 2015). While findings regarding the impact of ECEC attendance on children's later outcomes are mixed (Tayler et al., 2015), there is overwhelming evidence for the moderating role of quality provision, with higher quality settings predicting enhanced short- and long-term cognitive, social and academic adjustment (NICHD Early Child Care Research Network, 2002a; Sylva et al., 2011; Tayler et al., 2017). In line with traditional conceptualisations of ECEC quality, factors facilitating children's learning and development are typically categorised across two-dimensions: (1) structural quality; and (2) process quality. Whereas structural quality relates to the regulatory aspects of the setting (e.g., staff qualifications, adult-child ratios, group size and the physical space; Early et al., 2007), process quality captures its interactional features (e.g., quality of the curriculum, children's experiences and educator pedagogy; Slot et al., 2015). While both components of quality are important, process quality emerges as a stronger and more proximal predictor of child outcomes (Burchinal et al., 2008; Hamre et al., 2013; Lamb & Ahnert, 2007; Mashburn et al., 2008; Melhuish et al., 2015). This finding is particularly pronounced where children exhibit delays in their development (Broekhuizen et al., 2015; Phillips et al., 2012; Pluess & Belsky, 2009) or are exposed to risk factors such as socioeconomic disadvantage (Tayler et al., 2017).

2.5.1 The early childhood educator: influences and correlates of self-regulatory development

The significant role of the educator is highlighted through a proliferation of research linking high-quality educator practices to enhanced child outcomes (Mashburn et al., 2008; Melhuish et al., 2015). In the context of early self-regulatory development, both experimental (e.g., Barnett et al., 2008; Domitrovich et al., 2007) and observational studies (e.g., Burchinal et al., 2008; Mashburn et al., 2008; Sammons et al., 2014) have yielded key insights into the types of quality practices needed to promote positive development in this area. While the impact of educator practices is indeed more pronounced where children experience initially lower levels of self-regulation, research in this area

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suggests their importance for children across the full gradient of self-regulation ability (Broekhuizen et al., 2015; Phillips et al., 2012; Pluess & Belsky, 2009). These findings highlight the importance of the learning environment *as well as* educators' intentional and relational pedagogy. This is consistent with prominent theories of child development (e.g., Bronfenbrenner's Ecological Systems Model; Bronfenbrenner, 1992; Vygotsky's Sociocultural Theory; Vygotsky, 1978), which emphasise the importance of bidirectional exchanges between the child and the social-environmental setting, and which position ECEC as a proximal context of influence.

Research has established organisational, relational and instructional factors as influential on self-regulation development (Downer et al., 2010). For instance, the cultivation of highly organised classrooms has been positively linked with children's self-regulation development. Organised classrooms are those characterised by: appropriate management of children's time, attention and engagement; proactive management of children's behaviour; and the establishment of predictable routines (Downer et al., 2010; Hamre et al., 2013). The consistency with which children experience such contexts has been linked with higher behavioural and cognitive control (e.g., less off-task behaviour, lower rates of noncompliance and enhanced inhibitory control; Hamre et al., 2014; Rimm-Kaufman et al., 2005, 2009).

Classrooms characterised by high levels of emotional support (i.e., heightened educator warmth and attentiveness, lower levels of conflict and higher levels of peer cooperation), have also been positively linked to children's self-regulation development (Broekhuizen et al., 2017; Brophy-Herb et al., 2007; Curby et al., 2009; Fuhs et al., 2013; Hatfield et al., 2016; Moen et al., 2019). Central to this cultivation of emotionally supportive environments is the educator-child relationship (Downer et al., 2010), in which educators show heighten responsiveness to children (i.e., active engagement, cue detection and contingent responding; Pianta, 2008). Where educators demonstrate greater responsiveness, this has been linked with important factors contributing to self-regulation including greater gains in early literacy and language, enhanced working memory and decreased rates of educator-reported conflict (Hamre et al., 2014). Similarly, research suggests educator-child closeness is positively associated with important facilitators of self-regulation including working memory (de Wilde et al., 2016) and expressive vocabulary (Cadima et al., 2019), and predicts self-

regulation gains over the school-year (Cadima et al., 2015). Autonomy-supportive relationships in which educators encourage, respect and consider children's thoughts and ideas, although relatively less explored, have also been implicated as positive predictors of self-regulation growth over the school-year (Cadima et al., 2019).

High levels of instructional quality and intentional pedagogy have also been identified as important predictors for self-regulation development. For instance, educator efforts to encourage communication and reasoning (e.g., using open-ended questions and conversational turn-taking) have been linked with increased gains in self-regulation across the preschool years (Fuhs et al., 2013), particularly where children experience initially lower levels of self-regulation (Cadima et al., 2015). Further, educator practices to coherently develop concepts, promote children's higher order thinking and provide relevant feedback have been linked with the development of self-regulation (Burchinal et al., 2008; Cadima et al., 2015; Gialamas et al., 2014) and other abilities related to self-regulation (e.g., language; Burchinal et al., 2008; Hamre et al., 2014), with evidence for sustained improvements beyond the preschool years (Burchinal et al., 2008; Gialamas et al., 2014). Taken together, this evidence positions early childhood educators as important facilitators of children's self-regulation development.

2.6 ECEC as a setting for (self-regulation) intervention

Efforts to further stimulate early development have often leveraged ECEC as a key context for intervention (Luo et al., 2020; Pandey et al., 2018), given both widespread attendance and its demonstrated impacts on child development (Organisation for Economic Co-operation and Development, 2012). In terms of interventions with a specific focus on self-regulation, the utilisation of ECEC settings is made even more desirable given the convergence of key contextual drivers of self-regulation development (i.e., caregiver practices, peers and engagement with facilitative experiences; Cadima et al., 2015; Diamond & Lee, 2011; Hamre et al., 2014; Montroy, Bowles, & Skibbe, 2016). The specific approaches to fostering self-regulation in ECEC settings that are likely to be most efficacious, and the specific content/targets for intervention, however, are unclear.

2.6.1   Enhancing process quality through professional development

Despite the importance of high quality ECEC for children's developmental outcomes, current findings suggest suboptimal quality amongst a considerable portion of the Australian ECEC sector (Cloney et al., 2016; Tayler et al., 2013). For instance, the Effective Early Educational Experiences (E4Kids) study highlighted significant variability in quality of provision in the 250 ECEC settings assessed. Notably, findings from this study indicated low to moderate levels of quality in areas suggested as supportive of children's self-regulation development, namely: room organisation; instructional support; and interactions that support children's thinking, understanding and capabilities. When comparing these results internationally, the Australian ECEC sector was deemed to be broadly similar to that in the United States and United Kingdom (La Paro et al., 2009; Sylva et al., 2006; Tayler et al., 2013).

In response, efforts to bolster the quality of ECEC provision have increased, most commonly through an emphasis on educator training. While this includes educators' qualifications for entry into the sector, government and researchers have also sought to enhance educator effectiveness through ongoing professional development (PD) (Fukkink & Lont, 2007; Siraj et al., 2018; Slot, 2018; Zaslow et al., 2010). PD, while diverse in content and structure, typically encompasses facilitated, in-service learning opportunities to support the acquisition of professional knowledge, skills and beliefs among post-tertiary educators (Buysse et al., 2009). In proposing a conceptual framework for effective change in these educator characteristics through PD, Buysse et al. (2009) identified three intersecting core components labelled as the "who," "what," and "how" of PD. Within this framework, Buysse et al. (2009) identify the 'who' as encompassing both the learner and facilitator and emphasised the need for PD efforts to consider their diverse characteristics (e.g., qualifications, demographic characteristics and experiences) and organisational contexts (e.g., funding, structure and operations). The 'what' relates to the content of PD and, more specifically, the knowledge, skills and beliefs required to generate change in educators' practices. Finally, the 'how' relates to the organisation and delivery of learning experiences as they relate to the duration, intensity and mode of the PD.

For many quality-improvement efforts, including those focused on child self-regulation, their goal is achieving child-level growth. Theoretical models of change within a PD framework imply a

multi-step path from educators' engagement with PD to improved child outcomes (Fukkink & Lont, 2007; NICHD Early Child Care Research Network, 2002b). Within these models, it is assumed that educators' engagement with PD and its components (i.e., the who, what and how), will result in change to educators' latent characteristics (e.g., knowledge, skills and beliefs) and their observable behaviour. As a result of this change, these models anticipate subsequent change to the quality of provision and children's outcomes. In this sense, multi-level models position educators as both the learner (i.e., within training) and the agent for change (i.e., within the classroom context). Regarding their efficacy for improving observed quality, studies to date have reported the effectiveness of PD for improving educator pedagogy and practice (e.g., in areas such as developmentally appropriate practice; instructional support, classroom management and caregiver responsiveness; Fukkink & Lont, 2007; Markussen-Brown et al., 2017) and enhancing children's outcomes (Egert et al., 2018; Siraj et al., 2018; Wasik & Hindman, 2011).

2.6.2 Professional development approaches for supporting self-regulation in ECEC

In relation to efforts to foster child self-regulation, ECEC-embedded approaches that target educator practice and programming are among the most commonly and extensively researched in the early years (January et al., 2011; Luo et al., 2020; Pandey et al., 2018). These approaches, which most often leverage educators as the main drivers for intervention implementation (>80% of the 43 studies profiled in recent reviews used this approach; Barton et al., 2014; Luo et al., 2020), typically comprise elements of educator training (PD) alongside provision of activities expected to foster self-regulation growth (e.g., games with rules, book reading; socio-dramatic play; Bodrova & Leong, 2007). While results on the efficacy of self-regulation programs *en masse* are mixed, research supports the efficacy of various curriculum-approaches for incurring pronounced and stable changes in self-regulation (Barton et al., 2014; Diamond & Lee, 2011; Luo et al., 2020; Pandey et al., 2018). For instance, in their metanalytic review of child and adolescent self-regulation interventions, Pandey et al. (2018) reported improved self-regulation for 16 of the 21 curriculum-approaches examined. Findings from this review also suggested significant transfer of effects to academic achievement (i.e., in 8 out of 10 studies), social skills (Clarke et al., 2014), conduct problems (Webster-Stratton et al., 2008) and

behaviour problems (O'Connor et al., 2014). These findings are in line with Luo et al. (2020) metanalysis of curriculum-based social and emotional interventions, which yielded significant gains in children's social competence, emotional competence and behaviour problems.

Among these curriculum-approaches, prominent programs include Tools of the Mind (Tools; Bodrova & Leong, 2007), Promoting Alternative Thinking Strategies (PATHS; Kusche & Greenberg, 1994) and the Chicago School Readiness Project (CSRP; Raver et al., 2008), which are some of the most widely disseminated and extensively evaluated. Based on the principles of Vygotsky (1978), the Tools curriculum (Bodrova & Leong, 2007) maintains its primary focus on the important role of play for young children's academic and non-academic skill development. Within this theoretical framework, play which promotes self-guided inner speech (namely socio-dramatic play with the utilisation of symbolic objects) is suggested to support the development of higher mental functions (including executive functions), which support or make possible the regulation of behaviour, emotion and attention (Smolucha & Smolucha, 2021). Adopting this play-based approach, the Tools program aims to support children to regulate emotion and behaviour through the facilitation of symbolic make-believe play and more than 40 activities designed to simultaneously target children's academic skills (e.g., reading with a peer) and self-regulation abilities (e.g., taking turns reading; Bodrova et al., 2011). During activities, educators scaffold children's learning through the provision of cognitive strategies such as self-talk and use of external aids to guide attention and memory (e.g., displaying an image of an ear as a reminder to listen; Bodrova et al., 2011). As children progress, educators are encouraged to gradually withdraw their support. While efficacy findings have been mixed (see Baron et al., 2017), studies have indicated that committed participation in the Tools curricula can yield significant improvements on computer-based executive function tasks (Diamond et al., 2007) and on educator reports of problem behaviours (Barnett et al., 2008).

Diverging from the Tools approach, which aims to integrate the development of academic and self-regulation skills, the preschool adaptation of the PATHS program (Kusche & Greenberg, 1994) focuses exclusively on social and emotional competencies. In this program, educators are provided with interactive lesson content, instructional methods (e.g., role play), and resources (e.g., puppets) to promote children's emotional literacy, self-regulation, pro-social behaviours, and interpersonal

problem-solving skills. Once a week during 'circle time' educators deliver one lesson from a total of 30, which are categorised into thematic units (i.e., compliments, basic and complex feelings, self-control strategies, problem solving; Domitrovich et al., 2007). Educators are also asked to provide extension activities to promote the generalisation of target concepts. Children who engaged with Preschool PATHS have been shown to exhibit enhanced social competence, emotional knowledge, attentional skills and less problem behaviour than their control-group counterparts (Domitrovich et al., 2007; Hughes & Cline, 2015) with evidence for persisting effects after 9 months of program implementation (Domitrovich et al., 2007).

Finally, the CSRP (Raver et al., 2008), which was designed specifically to support the self-regulation skills of preschool-aged children from low-income backgrounds, has also shown success. Utilising existing curricula, the CSRP provides educators with 30 hours of training in strategies to support children's self-regulation in the classroom, such as reinforcing positive behaviour, redirecting negative behaviour and implementing clear rules and routines (Raver et al., 2011). As part of the program each classroom is assigned a mental health consultant who coaches educators in implementing these strategies, runs stress reduction workshops and provides direct child-focused consultation concerning children with low self-regulation (Raver et al., 2009). To date, evaluation of the CSRP has indicated improvement in classroom processes (i.e., enhanced classroom climate, educator sensitivity, effective behaviour management) and child-outcomes (i.e., executive functioning, self-regulation, internalising and externalising behaviour, academic abilities) after less than 12 months of participation (Lennon et al., 2011; Raver et al., 2008, 2009).

2.6.3 Limitations of current approaches

While curriculum-approaches appear particularly promising for fostering more pronounced and stable changes in self-regulation (January et al., 2011; Luo et al., 2020; Pandey et al., 2018), they are not without limitation. In addition to some unclear efficacy findings (Baron et al., 2017; Stanley, 2018), these approaches are often plagued by constraints related to uptake, engagement and adherence (e.g., time, cost, compatibility with ECEC context), as well as the extent to which they consider the dual role of the educator as the learner and curriculum facilitator.

To ensure widespread accessibility and acceptability of curriculum-approaches, it is critically important to consider the diverse characteristics and organisational contexts of the learners (i.e., the 'who'; Buysse et al., 2009). Issues relating to time, cost and compatibility represent some of the most significant barriers to access (Luo et al., 2020). To engage with these approaches, educators are often required to attend multiple training sessions before or throughout the program period. The Tools program, for example, requires educators to engage in 4 days of curriculum training, a half-day workshop, 5 hours of lunchtime meetings and 30 minutes of weekly in-services consultations with a Tools trainer (Barnett et al., 2008). Such time demands may ultimately represent a barrier to access where ECEC services are unable or unwilling to accommodate extended staff absence. Beyond this time for training, educators implementing these programs are also required to spend considerable time delivering program components to children. In their review of classroom-based self-regulation interventions, Luo et al. (2020) noted considerable diversity in the time required to deliver program components, with some programs requiring up to 5 sessions per week (M = 2.29 sessions per week) and some sessions lasting as long as 180 minutes (M = 42.20 minutes per session). They also noted diversity regarding the total intervention period, with programs ranging from 5 to 38.7 weeks (M = 19.14 weeks). Given the need for educators to allocate time and attention to responsibilities outside of intervention implementation, the time taken to be inducted into, master and implement these learnings/activities is an important factor likely to influence uptake, fidelity and sustainability of these programs (Buehl & Beck, 2014).

In addition to time demands, program uptake and engagement may also incur significant cost for organisations and governing bodies where they require an initial program purchase, staff absence (i.e., to attend training), the acquisition of resources (e.g., centres engaging with Tools were provided $300 worth of educational supplies to support program implementation; Barnett et al., 2006) and the employment of 'coaches' or interdisciplinary professionals (e.g., mental health councillors; Raver et al., 2008). Given the overrepresentation of children from disadvantaged or vulnerable communities requiring self-regulation support (Montroy, Bowles, Skibbe, et al., 2016) issues relating to cost are perhaps the most concerning yet under-considered barrier to access (e.g., only 1 of 18 classroom and parenting approaches included in a metanalytic review by Barton et al. examined cost-efficacy; 2014).

Another barrier to implementation fidelity and sustainability can arise if a program's content diverges from existing curricula or frameworks of practice. For instance, Tools and PATHS require ECEC services to adopt and integrate a specific curriculum, which may only be possible where there is flexibility in the statutory curricula/frameworks required and alignment with educational objectives of the educators and families. Given that efforts to map these curriculum programs against alternate curriculums/frameworks are limited to a few countries (e.g., implementation of Tools has only been studied in North and South America; Baron et al., 2017), these programs are currently not available for implementation in countries such as Australia. Further, despite the apparent importance of cost, demand, and compatibility of programs (Burgess et al., 2010), few self-regulation interventions have sought to capture and report on educators' perceptions of these factors in relation to the program(s) being implemented.

2.7   Nature and importance of educator beliefs

While the importance of program evaluation is widely recognised, and routinely undertaken, there has been less consideration of the mechanisms and/or mediators of change. In accordance with multi-level theories of change in ECEC, growth in child abilities beyond simple age-related change are generally instigated by educator-level changes (Fukkink & Lont, 2007; NICHD Early Child Care Research Network, 2002b). In this sense, the efficacy of ECEC-embedded approaches for enhancing children's self-regulation hinges on: (1) the extent to which training effectively influences educator beliefs and knowledge; (2) the translation of beliefs and knowledge to practice; and (3) the efficacy of training endorsed practice and activities for enhancing self-regulation. Whereas program evaluations have typically investigated the impact of PD provision on child self-regulation change (i.e., point 3), few self-regulation intervention evaluations have sought to consider the impact of the intervention on educators' knowledge and beliefs and the translation of this change to practice (i.e., points 1 and 2). Yet, this is often the more-direct target for PD (i.e., the 'what'; Buysse et al., 2009). There are several consequences of ignoring these important mechanistic factors. First, where a program evaluation does not detect child-level change, insights into educator-level change would inform conclusions about the approach being ineffective at improving child self-regulation or the program's inability to generate

sufficient educator-level change. Second, where interventions detect child-level change, educator-level changes can yield insights about: the moderators of child-level change (e.g., factors that appear more or less influential in achieving child-level change); and the likelihood of sustained practice change beyond the evaluation period (which is less likely without change in educator beliefs).

2.8   Understanding educator beliefs

Regarding the role of beliefs, there is both theoretical and empirical support for the mediating influence of educator beliefs on program uptake, fidelity and sustainability of practice beyond the evaluation period (e.g., Bandura, 2001; Borg, 2018; Brackett et al., 2012). Beliefs are broadly understood as personal constructs or judgements that are formed over time and considered to be true by the individual (Pajares, 1992), although there is variability in how these are operationalised. A recent synthesis of this literature by Fives and Buehl (2012) attributed inconsistencies in definition to differences in the characterisation of beliefs (e.g., as explicit or implicit, stable or dynamic, specific or generalisable). Given these inconsistencies, Fives and Buehl (2012) emphasised "the need for clarity in characterising the specific belief or belief system under investigation" (p. 487).

The current PhD research adopts Pajares' (1992) definition, in which beliefs are understood as personal constructs or judgements held by the individual, and are related to the truth or falsity of a preposition. In accordance with conclusions drawn by Fives and Buehl (2012), we (i.e., the candidate and supervisors) contend that educators may hold many types of beliefs and that these may be both known (i.e., explicit) and unknown (i.e., implicit) to the individual. This may include beliefs about: (1) the self (e.g., sense of efficacy, role as an educator); (2) the context or environment (e.g., perceived relationships with colleagues, structural and managerial support); (3) content or knowledge (e.g., the components of self-regulation or numeracy concepts); (4) teaching practices (e.g., scaffolding and cooperative learning); (5) pedagogical approaches (e.g., developmentally appropriate practice); and (6) children (e.g., development, abilities and learning; Fives & Buehl, 2012).

Beliefs are also subject to variability across time and experience. Regarding their stability across time and experience, we contend that educator beliefs can be considered on a continuum where long held or deeply integrated beliefs are the most stable while discrete or newly formed beliefs are

more susceptible to change (Fives & Buehl, 2012; Pajares, 1992). Further, we consider that beliefs may be stable or generalisable across contexts (Tschannen-Moran & Woolfolk Hoy, 2001) but may also shift in response to different situations or settings (Bandura, 1986). In terms of their interrelatedness, we hold that all beliefs exist within a complex, interconnected system which allows for inconsistent beliefs to coexist (Nespor, 1987; Pajares, 1992). Similarly, educator beliefs may also be inconsistent with knowledge. That is, educators' beliefs about practices likely to yield benefits for children's development may be at odds with knowledge of practices associated with enhanced child-outcomes (Nespor, 1987). Informed by the above conceptualisation of beliefs, this PhD research sought to capture status and/or change among different types of beliefs (i.e., confidence in knowledge, attitudes, self-efficacy and beliefs about change to knowledge and practice) and consider their role in relation to learning, practice and children's outcomes.

2.9   Role of educator beliefs

Research suggests educator beliefs as playing an important role in filtering information, providing a framework for decision making and guiding intention and behaviour (Fives & Buehl, 2012). As filters, educator beliefs are suggested to influence the ways in which educators attend to, interpret and integrate new information or experiences. In one study examining educator perceptions of children's externalising versus internalising behaviour, for instance, findings suggested educators were more likely to perceive children as having greater control over externalised behaviours and were more bothered by these behaviours (Liljequist & Renk, 2007). Attitudinal beliefs (i.e., beliefs related to the acceptability or preferability of something) may also influence how educators interpret information. For instance, in a study conducted by Nelson et al. (2019), educators' beliefs about gender were shown to influence their interpretation of children's behaviour. Specifically, reticence and relational aggression were identified by educators as being more appropriate for girls, whereas physical aggression was seen as more acceptable for boys. In the context of educator training, self-beliefs have also been highlighted as influencing the integration of new information. For instance, research suggests those with low confidence in their knowledge, or high recognition of gaps in their knowledge, demonstrate: (a) a better global comprehension of new information; (b) a greater

likelihood to downgrade the importance given to previously learned information; and (c) a greater tendency to resolve conflicts between old and new information by giving preference to new information (Park et al., 1988).

Once educators have considered the situation or information through the filter of their beliefs, beliefs then go on to influence the ways in which educators frame or conceptualise the situation at hand. For example, findings from one study suggested educators were more likely to adopt a proactive approach when dealing with aggressive behaviour, as opposed to withdrawn behaviour, where they perceive the former as being less appropriate. In fact, the more educators perceived withdrawn behaviour to be appropriate the more likely they were to report that they would do nothing in response to such behaviours (Nelson & Evans-Stout, 2019). This finding is consistent with others such studies where educators reported themselves as being more likely to react to physical and relational aggression over other behaviours (e.g., various forms of social withdrawal, rough-and-tumble play and exuberance; Coplan et al., 2015). This finding suggests educators' beliefs about the appropriateness of a behaviour provided a framework for decision making (i.e., whether the behaviour requires educator intervention).

Educator beliefs about the nature of child development may also play a role in framing their approach to pedagogy and their practice. Research shows educators who hold developmentally appropriate beliefs about children's learning (i.e., that practices and experiences should align with children's current abilities; National Association for the Education of Young Children [NAEYC], 2003) are more likely to emphasise child-directed choice, child play and emergent learning activities, while educators with more traditional or academically oriented beliefs are more likely to emphasise consistent routines, organised classrooms, pre-planned curriculum and educator-directed learning (McMullen et al., 2006). Educators' attitudinal beliefs about the importance of specific skills and abilities may also provide a framework for their decision making. For example, despite widespread emphasis on academic skills for school readiness and processes which reflect this (e.g., the use of a literacy and numeracy based assessment at the commencement of formal schooling in Australia; NSW Department of Education and Training, 2009), research suggests educators as more likely to recognise non-academic skills (e.g., independence, social competence, concentration and motivation) compared

to academic skills (e.g., literacy and numeracy) and physical development (e.g., fine and gross motor ability) as key components of school readiness (Hustedt et al., 2018; Niklas et al., 2018). In fact, among the 1198 early childhood educators who participated in an international study by Niklas et al. (2018), only one quarter identified literacy and numeracy as important school readiness skills. Findings such as these highlight the varied implications of educator beliefs for the prioritisation and implementation of practices.

Once educators have interpreted the situation and decided on an appropriate course of action, motivational beliefs (i.e., beliefs about the value of a teaching approach or their ability to successfully implement that approach) act to guide behaviour. For example, where educators maintain higher confidence in their capability to implement specific teaching practice (i.e., higher self-efficacy beliefs; Bandura, 1977) educators are more likely to implement these practices (see Abrami et al., 2004; Guo et al., 2012; Turner et al., 2011). In relation to self-regulation, research findings have suggested positive associations between educator self-efficacy and the implementation of practices important for self-regulation development (e.g., greater support and responsiveness and the establishment of positive classroom climates; Guo et al., 2012).

Educators' confidence in their knowledge is another type of belief which have been linked to instructional practice–although findings regarding the nature of this relationship remain mixed. For example, in some studies lower levels of confidence in knowledge have been linked with educators' avoidance of direct instruction and their engagement in responsive or incidental teaching (Borg, 2001, 2005) while other findings have suggested an overemphasis on content areas where educators' feels their own knowledge may be lacking (Pahissa & Tragant, 2009). Beliefs around the importance of a given construct (i.e., educator attitudes) may also play an important role in educator learning behaviours. For instance, Steinbach and Stoeger (2018), demonstrated educators' positive attitudes around the importance of self-regulated learning as predicting the likelihood of registering for an associated workshop.

Taken together, this evidence points to the individual and combined importance of educators' beliefs, such as their knowledge confidence, attitudes and self-efficacy, for influencing practice and thereby potentiating child-level change. While assessment of educator explicit knowledge of self-

regulation was constrained by prevailing diversity in definitions and operationalisation across the literature leading to a lack of assessable 'facts', this PhD research sought to consider and evaluate the program's impact on perceptions of knowledge (i.e., that which educators' believe to be true of self-regulation) as well as broader beliefs (e.g., confidence in knowledge, attitudes and self-efficacy) which represent important subjects for evaluation (Borg, 2018).

2.10 Linking beliefs to practice

Despite findings which suggest a direct concordance between educator beliefs and their enacted practice, research linking educator beliefs to practice suggests a more complex relationship. For example, some researchers have suggested the concordance between different types of beliefs as necessary for their enactment. The Theory of Planned Behaviour (Ajzen, 1991) suggests educators' intention to act relies on the convergence of three types of beliefs. Educator action depends on their belief that a certain behaviour is: (a) favourable (i.e., positive attitude); (b) socially acceptable or expected of them (i.e., perceived subjective norm); and (c) something they would be able to do (i.e., perceived behavioural control). To date, research seeking to evaluate this theory have demonstrated convergence between the aforementioned beliefs as significant predictors for educators' intention to engage in ongoing professional learning (Dunn et al., 2018) and the implementation of teaching practices (e.g., inclusive education; Yan & Sin, 2014).

Where educators' hold incompatible beliefs, research in this area has demonstrated tension between beliefs and practice. For instance, despite 98.9% of the 263 kindergarten to eighth grade educators surveyed by Buchanan et al. (2009) endorsing the importance of social and emotional learning, less than half (45.5%) were implementing some form of social and emotional learning program. When asked about their perceived responsibility and confidence to implement social and emotional learning strategies, 14% of educators indicated that educators should not be responsible and 37.5% indicated that they were unsatisfied with their knowledge in this area. Findings from this study also highlighted the importance of educator's beliefs about external supports and hinderances for their enacted practice. For instance, when asked about barriers preventing the implementation of social and emotional learning programs, educators identified several external factors as limiting their

engagement, including: the availability of time to prepare for lessons (88.3%); the availability of time to implement lessons (90.6%); the availability of resources to purchase social and emotional learning programs (78%); and class size (53.8%). Findings such as these suggest the necessary integration of PD which aims to target and enhance educators' knowledge of the target construct with the provision of learning activities and experiences, and suggest the importance of capturing perceived barriers to program implementation (e.g., time and cost) within the process of program development and refinement.

In addition to believing in the importance or effectiveness of certain approaches or practices, it is also necessary that educators sufficiently understand or know how to enact them. In examining educators content knowledge (i.e., knowledge about a particular subject matter or construct), research has identified instances in which educators did not enact their beliefs due to a lack of knowledge (e.g., in science; Akcay, 2007; and literacy; Hammond, 2015). In research focused on educator reading instruction this is termed 'The Peter Effect' wherein educators cannot provide students with the necessary knowledge and understanding of beginning reading skills if they themselves do not possess an understanding and knowledge of these skills (Applegate & Applegate, 2004). In terms of educator knowledge of self-regulation and the enactment of their beliefs, research in this area remains scarce where assessment of 'knowledge' is constrained by diverse characterisations of self-regulation. In a study examining educators' knowledge of emotions, however, findings from Zinsser et al. (2015) suggested an association between educators' knowledge of emotions and their emotionally supportive teaching practices. That is, educators who had a greater understanding of emotions were found to be more accepting of children's emotions despite sharing similar beliefs (i.e., regarding how they defined emotional competence and their perceptions around the expression of emotion in the classroom) to their less emotionally supportive colleagues.

Finally, the enactment of beliefs is dependent, in part, on educators' self-awareness or willingness to reflect on their own practice (Bandura, 2001). That is, to successfully align beliefs with practice educators need to be able to demonstrate an awareness of their beliefs as well as their actual (rather than intended) practice. While research examining educator espoused beliefs and enacted practice for supporting self-regulation is limited, examination of this association in other areas of

learning (e.g., science instruction; King et al., 2001) have demonstrated misalignment between educator reported versus enacted practice. For example, in a case study of science instruction in an elementary school, King et al. (2001) reported discrepancies between educator beliefs about their classroom practice (i.e., as being 'hands-on' and inquiry-based) and researcher observation of practice which suggested a more educator-led, direct-instruction approach. Where educators can acknowledge and discuss these discrepancies, research suggests this may lead to greater alignment (Akcay, 2007). As such, ECEC-embedded approaches for supporting self-regulation should likewise seek to integrate opportunities for reflection which would help ensure the translation of beliefs to practice.

2.11   The current study

Embedded within the context of a broader study by Howard et al. (2020), this PhD research focused on development, implementation and evaluation of educator-focused components of the Preschool Situational Self-Regulation Toolkit (PRSIST) Program for supporting self-regulation in ECEC services. With consideration for the limitations inherent in existing ECEC-embedded self-regulation approaches, this PhD research sought to make important contributions to the design of an ECEC-embedded early self-regulation program that is easily accessible and compatible for implementation within Australian ECEC services. Further, this research sought to investigate the impact of the PRSIST Program on educator beliefs around self-regulation and explore educature perceptions of change to their knowledge and practice as a consequence of intervention, which are under-investigated topics in relation to early self-regulation intervention. The next chapter will present the methodology used to investigate the six research questions and overarching aims of this PhD research.

2.12   References

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Chapter 3: Methodology

Chapter 2 highlighted the importance of self-regulation abilities in the prior-to-school years, reviewed relevant literature related to ECEC-embedded approaches to supporting self-regulation, and presented evidence indicating the importance (yet lack of research) considering educators' beliefs in evaluations of such programs. Chapter 3 overviews the overarching, four-phase study design to address the guiding research questions. It also situates and distinguishes this research from a broader study within which this PhD research was embedded.

3.1   Research aims and design

This PhD research was embedded within a broader program of funded research, which sought to develop and evaluate effects of a self-regulation intervention on children's outcomes (see Howard et al., 2020). While the broader study focused on child-level aspects of the intervention and associated outcomes, this PhD research focused on educator-level aspects of the intervention and outcomes. In doing so this PhD research sought to address four overarching aims:

1. Explore educator understanding of self-regulation and current practices for supporting its development within Australian ECEC services (i.e., to support the development of ECEC compatible intervention components and highlight additional areas of opportunity)

2. Engage educators in an iterative process of intervention piloting and refinement to support social validity

3. Evaluate the impact of the PRSIST program on educators' beliefs around self-regulation

4. Explore educator perceptions of change to their knowledge and practice as a consequence of the intervention

To address each of these aims this PhD adopted a mixed method approach conducted across four phases. A timeline of the research activities for both the broader program of research and this PhD research is provided in Figure 3.1. The following sections provide a brief overview of the four phases. A more detailed description of the specific aims, methodology, results, discussion and conclusions from each of these four phases are presented in Chapters 4 to 7.

3.1.1   Phase 1: Exploratory case studies

In the absence of any prescribed or pervasive approaches to supporting self-regulation within Australian ECEC settings, Phase 1 of this research involved an initial qualitative study of ECEC educator understandings of self-regulation and practices for supporting its development. To maximise opportunities for the observation of supportive practices and identify areas of additional opportunity, ECEC centres characterised by high quality (i.e., exceeding NQS, good to excellent on environmental quality ratings and above average child outcomes) were purposefully recruited for this study. The complete sample for this study included 17 educators working with children aged 3-5 years across six

preschool and long-day care services (*n* = 8 preschool rooms) in regional and metropolitan areas of NSW, Australia. Four of the services had one preschool room.

Data collection occurred in a set sequence for each centre. First, naturalistic observation was conducted by the PhD candidate across two consecutive days (one morning, one afternoon) to identify practices likely to support children's emerging self-regulation, in line with the adopted definition and theoretical framework for self-regulation (Baumeister & Heatherton, 1996; Hofmann et al., 2012). This included practices to support children's goal setting, motivation and capacity (i.e., executive functions). Practices that have additionally been found in the literature to either support or undermine self-regulation, as defined and operationalised for this research, were also documented (elaborated in section 4.2.5). Data from observations were recorded as detailed researcher notes documenting both occurrence and details of each practice (e.g., content, features, visuals, group size, location).

In the following three days, educator self-report data were collected in the form of reflection journals and semi-structured interviews to explore educators' understandings of self-regulation and their associated practices. In reflection journals (completed across three consecutive days) educators responded to three targeted prompts: (1) 'reflections on what happened over the day, related to self-regulation'; (2) 'activities I've engaged children in to promote their self-regulation today'; and (3) 'practices I've utilised to promote children's self-regulation today'. Semi-structured interviews were conducted with all participating educators either in a group or individually, per educator preference. The interviewer followed a general guide focusing on their: (1) knowledge of self-regulation and its development (e.g., 'what does self-regulation mean to you?'); (2) supportive practices and activities (e.g., 'what activities/practices do you use to support children's self-regulation?'); and (3) rationale behind these practices or activities (e.g., 'in what ways do you think that activity/practice supports children's self-regulation?'). Overall, findings from Phase 1 of the research were expected to support the development intervention components that aligned with current practices, while building upon existing understandings, competencies, and needs.

3.1.2   Phase 2: Intervention piloting and refinement

Phase 2 involved rapid prototyping of the intervention components, created based on Phase 1 findings and suggestions from the extant literature, to initially evaluate feasibility of implementing each of the individual intervention components. Rapid prototyping and the collection of educator feedback were conducted across three consecutive 3-week cycles (9 weeks total). For each three-week cycle, educators in each centre were asked to implement 3-4 child activities and 1-2 adult practices at least once (but as often as they like thereafter) across the first two weeks and return written feedback (using the provided feedback form) in the third week. In the final three-week cycle educators at each centre were additionally provided an excerpt from a purpose-made children's book and a copy of a parent newsletter, for review and comment. To ensure feedback on all activities within the available time, recruited services were randomly allocated to one of three groups, with each group receiving a unique set of activities and practices. This meant each activity and practice would be trialed by at least four centres. Unique benefits associated with this approach include: bridging a gap between literature and practice; enabling reciprocal transfer of knowledge between researchers and participants (i.e., educators); establishing mutual trust between researchers and communities; and providing a means by which to test and adapt intervention components, aligning these with the needs of the community and ensuring social validity of the intervention (Altman, 1995; Bagnato et al., 2014; Green & Mercer, 2001; Turan & Meadan, 2011).

3.1.3   Phase 3: Measurement development and evaluation

Not initially planned, Phase 3 involved development and validation of a quantitative measure of educator beliefs around early self-regulation (the Self-Regulation Knowledge, Attitudes and Self-Efficacy, or Self-Regulation KASE, scale; Vasseleu et al., 2021). This was undertaken given that, upon review of available measures of educator beliefs, no suitable measure existed (i.e., was valid, reliable, sensitive to change) to evaluate educator-level change as was planned for the next phase. Forty-five items designed to capture educators' confidence (in their knowledge about self-regulation), attitudes (around importance of self-regulation) and self-efficacy (to support its early development) were developed based on a review of the literature and the adopted definition/model of self-regulation

(see Baumeister & Heatherton, 1996; Hofmann et al., 2012). Initial scale items were reviewed by an independent sample of 50 early childhood educators, and evaluation of the scale's properties were undertaken using baseline data collected for Phase 4a (to ensure successful completion of the project to time).

3.1.4   Phase 4a: Intervention implementation and evaluation

Phase 4a of this PhD research involved a cluster RCT evaluation of the effects of the PRSIST Program on ECEC educators' confidence in their knowledge, attitudes and beliefs around self-regulation. At baseline, 152 educators from 50 centres across NSW, Australia completed the Self-Regulation KASE Scale (Vasseleu et al., 2021). Educators ($n = 73$) from 25 centres randomly assigned to the intervention group were instructed to implement the PRSIST Program for the seven-month program period. Educators assigned to the intervention group were inducted into the program via a hardcopy program manual, the program website (www.prsist.com.au) and monthly 1-hour teleconference calls (to reduce cost and increase reach). To target educator knowledge and beliefs around self-regulation, online and self-paced PD modules were designed to support educators to: refine their understanding of self-regulation based on the available best-evidence; understand those factors that contribute to or impede child self-regulation; develop and maintain realistic expectations of children's ability to self-regulate; and understand the significance of their role in supporting early self-regulation development. This PD was supplemented by the provision of supportive adult practices and child activities, which were expected to positively affect educators' self-efficacy to support children's self-regulation within their settings. While the program was designed to permit flexible implementation, over the 7-month intervention period educators were asked to engage with all seven online training videos in the first 2 months and implement at least three child activities per week. Educators ($n = 79$) from the 25 centres assigned to the control group engaged in practice as usual. At post-test, 117 educators completed the Self-Regulation KASE Scale. Educators from the intervention group additionally provided data on their engagement with program components and their perceptions of the PRSIST Program.

3.1.5   Phase 4b: Post-intervention evaluation

Following post-test data collection in the RCT evaluation, a subsample of 12 educators and 8 directors from the intervention group participated in individual semi-structured interviews exploring perceptions of change to knowledge of self-regulation (educator data only) and practice (educator and director data).

Figure 3.1

Timeline of Research Activities for the PhD Research and Broader Study
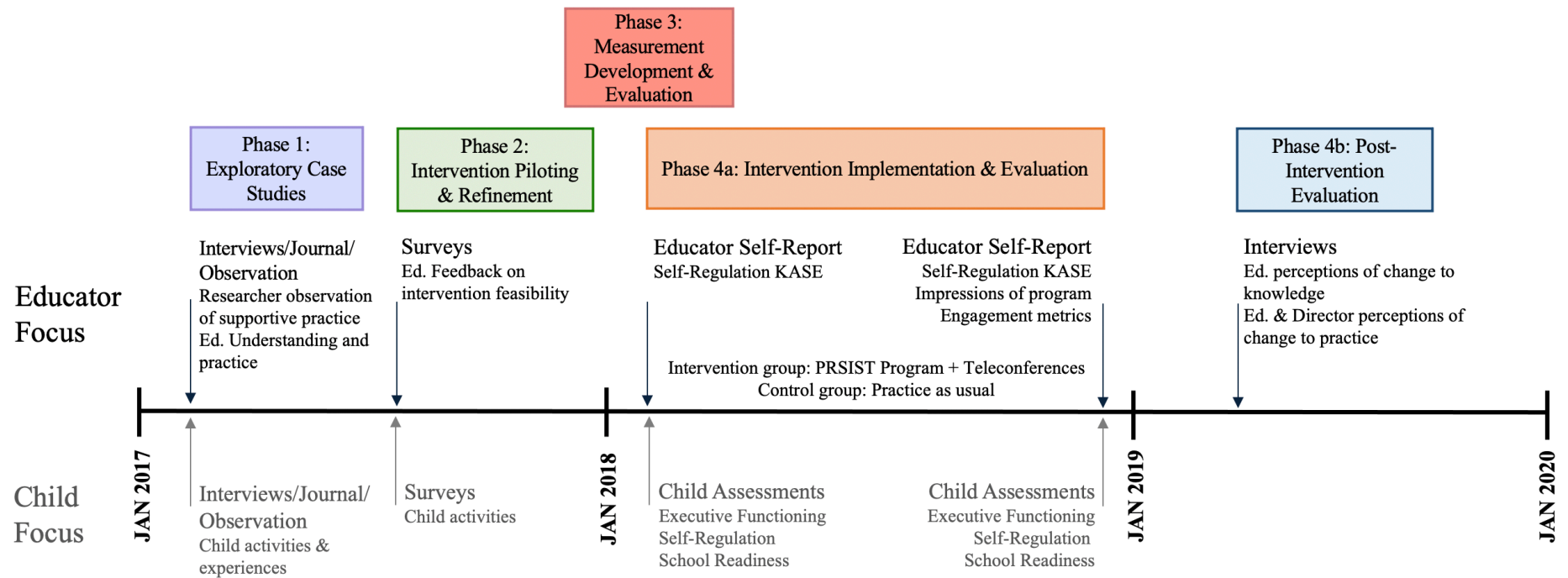
Note. The top half of the timeline (Educator Focus) provides an overview of research activities in relation to this PhD research. The bottom half of the timeline (Child Focus) presents coinciding research activities relevant to the broader study, which were outside the scope of this PhD research (and are reported elsewhere).

3.2   Site and participants

3.2.1   Australian ECEC context

The Australian ECEC sector comprises a range of settings providing education and care to children from infancy to 5 years of age, which is the year prior to formal schooling. Centre-based ECEC services in Australia are categorised as either long-day-care (LDC) or preschool services. While both service types are required to provide a prior-to-school (or 'preschool') program, points of difference largely relate to the age of the child (LDC typically caters for children 6 weeks to 5 years of age, whereas preschool caters to children 3 to 5 years of age) and hours of operation (LDC typically operates from early morning to early evening most weeks of the year, whereas preschools typically operate in adherence with school hours and school holidays).

In the absence of a national or state curriculum (prescribed or voluntary), Australian ECEC settings operate in adherence to the Australian Early Years Learning Framework (EYLF; Department of Education Employment and Workplace Relations, 2009). This Framework outlines key outcomes for children ages birth to 5 and guides educators in supporting key areas of development (yet does not prescribe specific curricula or practices to achieve this). To ensure compliance with the National Law and Regulations, and ensure quality practice, all ECEC services in Australia are rated in accordance with the National Quality Standards (NQS; ACECQA 2017). As part of this process, a government-authorised assessor rates the service across seven quality areas that broadly consider aspects related to structural and process quality, and child safety and regulatory compliance. Results from each of the seven quality areas are collated to determine an overall quality rating out of four possible ratings: significant improvement required, working towards NQS, meeting NQS, or exceeding NQS. Services that are exceeding NQS are permitted to apply for an 'excellent' rating that is then subject to further assessment.

The education and training pathways for ECEC educators working in Australia are diverse, creating a workforce with varied ECEC-related qualifications. The most recent ECEC National Workforce Census (The Social Research Centre, 2017) reported the following variability in the LDC workforce: 4-year Degree (12.9%); 2-year Diploma (38.8%); 1-year Certificate III / IV (39.1%); and

below a Certificate III (1%). While current regulations stipulate that all educators be at least working towards a Certificate III qualification in education and care, educators with no qualification (8.2%) are permitted to work in the service provided they have been employed on a probationary basis for no more than 3 months.

3.2.2 Participating ECEC services

Each phase of the research was conducted with educators that worked in ECEC services (i.e., LDC or Preschool) across New South Wales (NSW), Australia. In Phase 1, ECEC services were recruited on the basis of high-quality ratings on the NQS (ACECQA, 2017) and the Sustained Shared Thinking and Emotional Wellbeing scale (Siraj et al., 2015), as well as strong child outcome results (i.e., in language and numeracy) in a previous study–the Fostering Effective Early Learning (FEEL) study (Siraj et al., 2018)–to evaluate self-regulation practices in "effective" services and optimise opportunities to observe practices expected to support self-regulation development. Eligibility for this Phase 1 also considered proximity to the research hub (i.e., within 1 hour of the University of Wollongong). To trial proposed intervention components, Phase 2 included Phase 1 centres, as well as an additional eight ECEC services from existing networks of the candidate's institution (to optimise willingness and ability to implement intervention components and provide feedback). Phase 4a centres were selected on the basis that they: (a) were located in NSW, Australia; (b) provided education and care to preschool age children; (c) had a preschool room leader who was willing and able to participate in the study; and (d) had not been involved in Phase 1 or Phase 2 (due to having already been exposed to some of the program's components). Centres recruited for this phase of the research were identified based on existing networks of the candidate's institution. As the focus of the broader study was the final year prior to formal schooling, this yielded a total of 52 classrooms (most centres had one pre-K room, except for two services that had two). Given Phase 3 involved analysis of Phase 4a baseline data, participants in this phase were the same as those who commenced participation in Phase 4a (this included two additional ECEC services that did not participate in post-intervention data collection). ECEC services invited to participate in Phase 4b where those that: (a) adhered to per-protocol requirements in Phase 4a; (b) had at least one educator who had engaged with

the PD and was still working in the centre in the same role; and (c) were still under the same management (i.e., the director still worked in the centre in the same role). Participating ECEC services for each phase of this research were diverse in: geographic location (i.e., regional and metropolitan); provider status (i.e., preschool and long-day-care); and quality ratings against the National Quality Standards (NQS; ACECQA 2017). A breakdown of participating services is provided in Table 3.1.

Table 3.1

Overview of Participating ECEC Services

	Phase 1	Phase 2	Phase 3	Phase 4a	Phase 4b
No. Services	6	14	52	50	10
Provider status					
Preschool	2	2	9	9	3
Long Day Care	4	12	43	41	10
Location					
Regional	3	3	13	13	4
Metropolitan	3	11	39	37	6
Quality Ratings					
Working Towards	-	-	2	2	-
Meeting	-	2	26	25	3
Exceeding	6	11	23	22	7
Not Rated	-	1	1	1	-

3.2.3   Participating educators

Educators participating in each phase of the research were those who provided education and care to preschool-aged children in their centre and consented to participate in the research. Educators were not excluded based on qualifications, experience, or the duration of their employment in the centre. A brief overview of participant information is provided in Table 3.2. Detailed demographic information related to services and participants recruited for each phase of the research are reported in Chapters 4 to 7.

Table 3.2

Overview of Participant Information

	Phase 1	Phase 3	Phase 4a	Phase 4b
No. Educators	17	165	152	12
Sex (% female)	100%	98.8%	99.3%	100%
Years of experience				
Mean (SD)	17.20 (8.54)	10.41 (7.12)	10.21 (7.11)	14.94 (10.62)
Range	6.00–33.00	0.17–36.00	0.17–36.00	4.5–21.5
Years in centre				
Mean (SD)	7.00 (6.55)	4.35 (3.70)	4.25 (3.58)	4.65 (3.03)
Range	1.00–29.00	0.00–20.00	0.00–16.00	1.83–9.5
Qualifications				
Bachelor	9	61	52	7
Diploma	7	56	52	4
Certificate III	1	41	41	1
None completed	-	7	7	-
No. Children	-	207	-	-

Note. No participant data were collected for Phase 2 as consent was provided on a centre-level.

3.3 Instruments

Data collection approaches were diverse across studies, comprising those qualitative and quantitative data sources best suited to addressing each specific research question. Alignment between research questions and method(s) of data collection is outlined in Table 3.3. Specific data collection tools and approaches, as well as their method of triangulation, are reported in-depth in Chapters 4 to 7.

Table 3.3

Connecting Research Questions, Phases and Methods

Research Question	Research Phase	Method of Data Collection
1. What practices do educators working in Australian ECEC services use to support self-regulation based on an academic definition of self-regulation?	Phase 1: Exploratory case studies	Researcher observations
2. How do educators working in Australian ECEC services understand self-regulation and its development?	Phase 1: Exploratory case studies	Semi-structured interviews Educator reflection journals
3. What practices do educators working in Australian ECEC services employ to support self-regulation as they understand it?	Phase 1: Exploratory case studies	Semi-structured interviews Educator reflection journals
4. To what extent, if any, do educators perceive individual intervention components as being acceptable and beneficial for implementation within Australian ECEC settings?	Phase 2: Intervention Piloting and Refinement	Educator surveys
5. Does the Self-Regulation Knowledge, Attitudes and Self-Efficacy scale, developed for this PhD research, capture educators' confidence in their knowledge, attitudes and self-efficacy around supporting early self-regulation; and yield valid and reliable data?	Phase 3: Measurement development and evaluation	Educator self-report measure (Self-Regulation KASE) Child observational measure of self-regulation (PRSIST Assessment) Educator survey (Adapted TASEL) Professional development engagement metrics
6. What impact, if any, does the PRSIST program have on educator beliefs around self-regulation?	Phase 4a: Intervention implementation and evaluation	Educator self-report measure (Self-Regulation KASE)
7. What impact, if any, do educators perceive the PRSIST program as having on their knowledge and practice around supporting self-regulation?	Phase 4b: Post-intervention evaluation	Semi-structured interviews

Note. No research questions were generated for Phase 2 given its formative nature.

3.4   Ethics approval

Approval for each phase of the research was obtained from the University of Wollongong's Human Research Ethics Committee (HREC), as follows: Phase 1 (2017/029); Phase 2 (2017/347); Phase 3 and 4a (2017/451); and Phase 4b (2019/028). Educators provided written, informed consent (and, for children, parental consent) as a condition of participation (information and consent forms are provided in Appendices C-F). Other than the time taken to participate in this research, and other ubiquitous considerations relating to participants' informed consent and confidentiality/anonymity, no further ethical issues were identified by the research team or raised by the institutional HREC. This research was designed and conducted in line with the NHMRC National Statement on Ethical Conduct in Human Research and UOW's Data Management policies.

3.5   Chapter summary

This chapter overviewed the design and methods adopted for this PhD research. In the first two phases of this research, observation and collaborative work with key stakeholders (i.e., early years educators) supported the development of socially valid intervention components suitable for implementation within the Australian ECEC context and acceptable to educators responsible for their implementation. A quantitative tool for measuring educators' confidence in knowledge, attitudes and self-efficacy was developed and evaluated to permit measurement of intervention effects on educators' beliefs in subsequent phases of this PhD research. Efficacy of this intervention for influencing educators' beliefs on supporting early self-regulation were then investigated through a cluster RCT approach, followed by a qualitative investigation of educator's experiences of change. The next chapter reports the first, exploratory qualitative phase of this program of PhD research.

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Chapter 4: How educators in high-quality preschool services understand and support early self-regulation: A qualitative study of knowledge and practice (Phase 1)

Chapter 4 is the first of three publications in this thesis. This paper details a qualitative study that explored educator understandings of self-regulation and self-reported practices for supporting its development. Findings from this study also explored researcher-observed practices suggested by the literature to support early self-regulation (as conceptualised within this research). Aspects of this paper were presented at the International Society for the Study of Behavioural Development conference (2018).

4.1   Abstract

High-quality early childhood education and care (ECEC) has a robust and long-term impact on the development of children's skills and abilities, including self-regulation. While the importance of early self-regulation is acknowledged in national curricular frameworks (Australian Early Years Learning Framework), little is known about practices employed within Australian ECEC settings to support the development of self-regulation; nor do we know how educators understand self-regulation and seek to support its development based on their understanding. The current study sought to observe educators' practices in support of children's self-regulation development in six Australian ECEC services identified for their high-quality environments and strong child outcomes. This study also sought to investigate educators' understandings of self-regulation, its development and their self-reported practices to support self-regulation development of the children in their care. Researcher observations identified the use of diverse practices that theoretical and empirical literature suggest as beneficial for self-regulation, although the pattern of practices differed across services. In interviews and reflection journals educators tended to view self-regulation from a behavioural and deficit perspective. Educators were nuanced in their views of episodic and developmental change, and adopted a comprehensive set of evidence-supported practices to support children's self-regulation. Taken together, findings provide insight into the discrepancies between definitions, operationalisations and practices for supporting self-regulation, highlighting additional areas of opportunity for ongoing professional learning and continued research–even among high-quality services such as those participating in this research.

4.2   Introduction

The first 5 years of life are characterised by rapid developments in skills and abilities that set the stage for children's immediate, medium- and long-term development (Shonkoff & Phillips, 2000). Improvements in children's capacity to self-regulate (i.e., the ability to inhibit, engage and integrate cognitive, behavioural and emotional processes) has been emphasised as a significant predictor of outcomes relating to health and wellbeing, achievement and social functioning (Howard & Williams,

2018; Moffitt et al., 2011). Although the early years are indeed characterised by rapid growth in self-regulation (Montroy et al., 2016), evidence suggests variability of trajectories with implications for child outcomes (Moffitt et al., 2011). Given findings to suggest the individual, social and economic importance of self-regulation, and its early susceptibility to change (i.e., over and above typical development; Moffitt et al., 2011), researchers have increasingly focussed on self-regulation as a potential means of achieving population-level shifts in social, health and wealth outcomes. High-quality early childhood education and care (ECEC) is at the forefront of these investigations, given its ubiquity and established ability to influence the development of early self-regulation and children's trajectories more broadly (Tayler et al., 2017).

Despite the widespread use of evidence-based curricular and curriculum add-on approaches for supporting self-regulation in countries such as the United States (e.g., Tools of the Mind; Bodrova & Leong, 2007; Chicago School Readiness Project; Raver et al., 2008), there is little evidence of widely adopted approaches in Australian ECEC contexts. In lieu of a national curriculum, Australian ECEC services operate in adherence to the Australian *Early Years Learning Framework* (EYLF; Department of Education Employment and Workplace Relations, 2009), which stipulates developmental outcomes that should be achieved through ECEC-based early learning environments and experiences. Although the EYLF acknowledges the importance of self-regulation and suggests educators should act to foster its development, the EYLF does not specifically define self-regulation or prescribe the specific means by which self-regulation development can be supported. While research suggests educators endorse self-regulation as a necessary developmental skill (Niklas et al., 2018), there is uncertainty regarding how early childhood educators operationalise self-regulation. Moreover, little remains known about the practices in Australian ECEC services to support the development of early self-regulation; those suggested by the theoretical and empirical literature, and those derived from educators' definitions, training and experience. Drawing on data from 17 educators working across six high-quality ECEC services in New South Wales,

Australia, this study sought to address the following research questions:

1. What practices do educators employ to support self-regulation based on the researchers'
   definition of self-regulation?

2. How do educators understand self-regulation and its development?

3. What practices do educators employ to support self-regulation as they understand it?

Taken together, findings from this study could provide insight into the discrepancies between definitions, operationalisations and practices for supporting self-regulation, thereby highlighting areas of opportunity for professional learning and continued research.

4.2.1 Nature and importance of self-regulation

Given multidisciplinary interest, definitions of self-regulation throughout the literature diverge considerably, with 88 variations of the term identified by Burman et al. (2015). Extending on early conceptions of self-regulation (or 'homeostasis'; Cannon, 1929) as the regulation of physiological states in response to stressors (Bernard, 1865), control-based definitions have seen a recasting of self-regulation (or 'self-control'; Carver & Scheier, 1981) as providing broad control over behaviour, cognition and emotion. While some researchers have sought to distinguish self-regulation (i.e., any and all self-selected and goal-oriented behaviours) from self-control (i.e., the suppression of unwanted prepotent impulses in order to remain goal-directed; Baumeister & Heatherton, 1996) many others–including the current authors–view these as synonymous (Howard et al., 2019). According to this perspective, self-regulation refers to the ability to override maladaptive impulses in cognition, behaviour and/or emotion to instead remain goal directed. Using an early childhood example, a child with good self-regulation would be able to, among other things, put away their toys despite a desire to keep playing, wait their turn, communicate their feelings and resist impulses for physical aggression. While definition debates continue, robust evidence points to this conception of self-regulation/control as a particularly strong and broad predictor of later-life outcomes (Howard & Williams, 2018; Moffitt et al., 2011). In early childhood, self-regulation is related to school adjustment, academic success and positive engagement with educators and peers (Robson et al., 2020). Longitudinally, early difficulties in self-regulation are related to riskier choices in adolescence and poorer outcomes in adulthood,

leading to higher rates of criminality, substance use, debt and under-employment (Howard & Williams, 2018; Moffitt et al., 2011).

4.2.2   Development of self-regulation

As infants and toddlers, children begin to acquire discrete skills and abilities that are essential for self-regulation, such as expressive and receptive language, motor control, working memory and cognitive flexibility (Shonkoff & Phillips, 2000). As children enter the preschool years (i.e., ages 3-5 years in Australia), the ability to engage, integrate and manage self-regulatory processes increases rapidly, signifying a qualitative shift from being largely regulated by others to an increasing ability for *self*-regulation (Montroy et al., 2016; Whitebread & Basilio, 2012). Yet, the timing, duration and degree of change to self-regulation over this time is marked by considerable heterogeneity with implication for children's immediate and long-term outcomes (Montroy et al., 2016). Encouragingly, longitudinal empirical evidence suggests the malleability of self-regulation (Montroy et al., 2016; Wass et al., 2012), with various contextual and experiential factors influencing its development. These factors include: adult-child interactions (e.g., responsiveness, closeness, autonomy support; Ferreira et al., 2016); child-peer interactions (e.g., peer self-regulation, social exclusion; Pahigiannis & Glos, 2020); and child engagement in enriching experiences (e.g., music and movement, games with rules and self-regulation challenge, mindfulness; socio-dramatic play; Bodrova & Leong, 2007; Razza et al., 2015; Tominey & McClelland, 2011; Williams & Berthelsen, 2019).

In addition to age-related change, empirical evidence suggests self-regulation is further influenced by situational factors, including acute sleep deprivation (Williams et al., 2017), chronic stress (Brophy-Herb et al., 2007), hunger (Gailliot et al., 2007) and negative social interactions (Pahigiannis & Glos, 2020). While such things as overtiredness may have a temporal impact on children's self-regulatory capacities, mitigation of these factors reduces the demands placed on children's current self-regulatory capacity and thereby supports their engagement in positive learning experiences that can have longer-lasting implications (Blair & Diamond, 2008; Williams et al., 2017). As such, models of self-regulatory change often consider both factors that promote and impede the exercise of self-regulation.

4.2.3 Framework for self-regulatory change

While research in this area is yet to yield an accepted model for self-regulatory change, one prominent model of self-regulation is Baumeister and Heatherton's (1996) strength-model of self-regulation. In extending control-focussed frameworks (Carver & Scheier, 1981), Baumeister and Heatherton suggest three necessary ingredients to self-regulation: (1) goal selection; (2) motivation; and (3) a sufficient capacity to overcome impulses or distractions contrary to achieving one's goals (whereby 'capacity' is underpinned by executive functions, namely working memory, cognitive flexibility and inhibition; Hofmann et al., 2012). Following from this model, and evidence for situational factors impacting self-regulation (e.g., sleep, hunger, stress), research-based efforts to target self-regulation routinely seek to influence one or more of these ingredients of self-regulation, as well as create contextual conditions to optimise children's ability to exercise their self-regulation. While these definitions and frameworks are articulated and advanced in theoretical and empirical literature, it is unclear the extent to which they have permeated educators' understandings and practices.

4.2.4 High-quality ECEC as a critical context for child development

ECEC is a critical context impacting child development (Melhuish et al., 2015). While ECEC appears to confer benefit to those who participate, there is robust and compelling evidence that its effects are moderated by the quality of provision (NICHD Early Child Care Research Network, 2002; Sylva et al., 2014). In characterising service quality, recent reviews and studies have identified various aspects of ECEC as important predictors of children's learning, development and wellbeing (Melhuish et al., 2015; Tayler et al., 2017). With regard to regulable aspects of ECEC (i.e., structural quality), this includes factors such as smaller adult-child ratios, higher levels of educator educational attainment, engagement in professional learning and physically safe spaces. In terms of relational aspects of the setting (i.e., process quality), research finds a facilitatory role of warm and responsive adult-child interactions, effective pedagogies grounded in an understanding of children's development, leadership-endorsed collaboration, and the connections with the home learning environment. While both aspects of ECEC quality are related (e.g., small adult-child ratios may allow

for more frequent and prolonged adult-child interactions) and broadly associated with better cognitive, social and academic adjustment (Sylva et al., 2014), process quality is routinely found to be a stronger, more proximal predictor of children's outcomes (Melhuish et al., 2015). This is also the case in relation to children's self-regulation outcomes (Sylva et al., 2020).

4.2.5 Educator practice and child self-regulatory development

The significant role of the educator for ensuring process quality has been highlighted through research linking educator practices to children's outcomes (Mashburn et al., 2008; Melhuish et al., 2015). In the context of self-regulation, research has yielded insights into the instructional and relational practices that can promote positive self-regulation development (e.g., Barnett et al., 2008; Mashburn et al., 2008). For instance, highly organised classrooms–characterised by effective and appropriate management of children's time, attention and behaviour (Hamre et al., 2013)–are associated with higher ratings of children's behavioural and cognitive control (e.g., less off-task behaviour, lower rates of noncompliance, better inhibitory control; Fuhs et al., 2013; Hamre et al., 2014).

High levels of instructional quality have also been identified as an important predictor of self-regulation development. For instance, educator efforts to encourage communication and reasoning (e.g., through the use of open-ended questions and conversational turn-taking) have been linked with gains in early self-regulation (Fuhs et al., 2013), particularly where children experience initially lower levels of self-regulation (Cadima et al., 2015). Further, educator practices to support children's higher order thinking and concept development are found to be beneficial for self-regulation (Burchinal et al., 2008; Cadima et al., 2015) and other related abilities (e.g., oral language; Burchinal et al., 2008; Hamre et al., 2014), with evidence for sustained improvements beyond the preschool years (Burchinal et al., 2008).

Outside of educator instruction, research has also emphasised the facilitative role of affective and relational aspects of ECEC. Specifically, educator efforts to cultivate classrooms characterised by high levels of emotional support are associated with higher levels of social competence, adaptive behaviours and positive educator-child and child-child relationships (Brophy-Herb et al., 2007; Moen

et al., 2019). Practices include heightened responsiveness to children (i.e., active engagement, cue detection and contingent responding; Hamre et al., 2014), interpersonal closeness (e.g., educator warmth, physical affection and communication; Cadima et al., 2015) and autonomy support (i.e., encouragement and respectful consideration of children's ideas; Cadima et al., 2019). These and related findings (e.g., Domitrovich et al., 2007; Raver et al., 2008) identify practices that could be expected to foster self-regulation growth, however, it is unclear which practices are routinely employed in Australian ECEC settings. In fact, at present it is not even clear whether these suggested practices are consistent with educators' understandings of self-regulation. Similarly, it is unclear whether educators might be engaging in self-regulation practices which are not currently reflected in the theory or research yet hold similar promise for ensuring positive child outcomes.

4.2.6 The present study

To address this gap in understanding the current study sought to observe the self-regulation practices embedded within a sample of six high-quality Australian ECEC services, as defined by environmental ratings and strong child outcomes. This was done first to provide insight into whether/which research-derived practices have permeated higher quality services. Further, as little remains known about how educators conceptualise or seek to support self-regulation, interview and journal data were used to further explore educators' understanding of self-regulation, its development, and the practices they perceive as supporting its development. When reconciled, these findings could provide insight into discrepancies in definitions and practices for supporting self-regulation, thereby highlighting areas of opportunity for professional learning and continued research (including current practices that are not reflected in the literature but may be useful inclusions in education and intervention efforts).

4.3 Method

4.3.1 Sampling

A purposive sampling strategy (Palinkas et al., 2015) was adopted, wherein ECEC services were selected as 'high-quality' based on: government ratings (an 'Exceeding' rating against National

Quality Standards; ACECQA, 2017); environmental quality ratings (above a 'good' designation on the Sustained Shared Thinking and Emotional Wellbeing scale–which indicates 'excellent' quality practices that support development of positive relationships, effective communication and self-regulation–from a prior study: $M = 6.49$ out of a max. 7, range = 5.87–6.95; Siraj et al., 2018); and child outcomes achieved (above-average outcomes or change on standardised assessments of child language and numeracy in a prior study; Siraj et al., 2018). It was expected that this sampling would optimise opportunities for the observation of practices suggested in the literature to support self-regulation development (Tayler et al., 2017), as well as any self-regulation relevant practices not reflected in the empirical literature. Socioeconomic areas of the services were diverse, ranging from decile 1 to 8 on the Socioeconomic Indexes for Areas (Australian Bureau of Statistics, 2008).

4.3.2 Participants

Participants were 17 early childhood educators (100% female) working with children aged 3-5 years across six preschool and long-day care services in regional and metropolitan areas of NSW, Australia. Four of the services had one preschool room. The other two services had two preschool rooms. As such, recruitment of educators and observations were conducted across eight rooms. Educators varied in qualifications (Master's degree, $n = 1$; Bachelor's degree, $n = 8$; Diploma, $n = 7$; Certificate III, $n = 1$) and years of experience ($M = 17.20$, $SD = 8.54$, range = 6.00–33.00). On average, participants had been employed in their current workplace for 7 years ($SD = 6.55$, range = 1.00–29.00).

4.3.3 Procedure

Data collection occurred in a set sequence for each centre. First, two 3-hour observations of practice were conducted across two consecutive days (one morning, one afternoon). Observations taken on different days and times were done in recognition of the fact that educator practices can change with the time of day and different cohorts of children. Next was the collection of educator self-report data, which included: completion of reflection journals on practices aimed at supporting self-regulation, across three consecutive days and a semi-structured interview to further explore educators' understandings of self-regulation and their associated practices.

4.3.4 Data collection instruments

4.3.4.1 Observation protocol

Naturalistic observations were conducted by the first author to identify practices suggested to support children's emerging self-regulation, in line with the authors' theoretical framework for self-regulation (Baumeister & Heatherton, 1996; Hofmann et al., 2012). This included practices to support children's goal setting (e.g., establish clear expectations towards which children can regulate their behaviour), motivation (e.g., encourage children's efforts) and capacity (e.g., facilitate activities and experiences that engage and challenge children's executive function and self-regulation abilities). Practices that have additionally been found in the literature to support self-regulation, as defined and operationalised by the authors, were also documented. This included practice related to: classroom organisation (e.g., proactive and positive management of routines and behaviour; Hamre et al., 2014); instructional quality (e.g., using questioning and discussion to support children's concept development; Fuhs et al., 2013); and emotional support (e.g., responding to children's emotions and fostering their independence; Cadima et al., 2015). Practices suggested to undermine children's capacity to self-regulate (e.g., tiredness and stress) were also documented. While these practices could be expected to have benefits that extend beyond self-regulation development, the observation framework sought to observe practices that have specifically been associated with self-regulation in early childhood. Many other high-quality practices have been identified, which may or may not have specific impact on self-regulation, that were not the focus of this observation. Data from observations were recorded in the form of detailed researcher notes documenting both occurrence and details of each practice (e.g., content, features, visuals, group size, location). Observations focused on educators' practices. Where educators were observed interacting with children, the behaviours of children were documented only for the purpose of providing relevant context for the interaction (e.g., noting the behaviour exhibited by a child that may have elicited an observed response by the educator).

4.3.4.2 Reflection journals

Reflection journals involved entries to be completed across three consecutive days. Each of the three entries gave the same three targeted prompts encouraging educators to detail: (1) 'reflections

on what happened over the day, related to self-regulation'; (2) 'activities I've engaged children in to promote their self-regulation today'; and (3) 'practices I've utilised to promote children's self-regulation today'. By virtue of not specifying the researchers' definition of self-regulation, educators were free to apply their own definition. At a minimum, the room leader was asked to complete a journal, while other educators were invited to either contribute to this same journal or complete one individually. Completed journals were returned by all eight room leaders (two included a combined contribution of all educators in that room) and a further three individual journals were returned by other participating educators ($n = 11$ journals in total). While reflection journals preceded interviews, they were intended as a supplement to the interviews to minimise the memory vagueness that can occur in an interview situation (Alaszewski, 2006).

4.3.4.3 Interview protocol

Semi-structured interviews were conducted with all participating educators either in a group ($n = 4$ group interviews, each with two to three educators) or individually ($n = 6$ individual interviews), per educator preference. The interviewer followed a general guide–yet maintained a conversational, open-ended approach to establish rapport and allow for further discussion around areas of interest (Potter & Hepburn, 2005)–focused on: (1) knowledge of self-regulation and its development (e.g., 'what does self-regulation mean to you?'); (2) supportive practices and activities (e.g., 'what activities/practices do you use to support children's self-regulation?'); and (3) rationale behind these practices or activities (e.g., 'in what ways do you think that activity/practice supports children's self-regulation?'). Interviews lasted approximately 1 hour.

4.3.5 Data analysis

Data were analysed for each research question following Braun and Clarke's (2006) guidelines for thematic analysis. In the first phase, the first author familiarised themselves with the data through multiple readings and deductively organised data into three clusters pertaining to the research questions, namely: (1) researcher observation of practices expected to support self-regulation (observation); (2) educators' understanding of self-regulation (interview and journal data); and (3) educators' self-reported practices and activities for supporting self-regulation development (interview

and journal data). Second, the first author generated and collated codes, identifying important features of the data that may be relevant to answering the particular research question (see *coding of data*) and categorised consistent codes to generate higher-order themes. Third, to ensure consistency in coding, initial codes and raw data were provided to the second author for critical review (see *trustworthiness*). Fourth, higher-order themes and raw data were provided to all authors and an iterative review process was undertaken to ensure an accurate representation of the raw data (Srivastava & Hopwood, 2009). Fifth, higher-order themes were organised into descriptive categories, which reflected a coherent account of the findings. Finally, the manuscript was prepared and reviewed in an iterative process involving all authors to ensure a coherent and accurate account of the data in relation to the research aims (Braun & Clarke, 2006). Response frequencies were recorded at a centre-level (for researcher observations and self-reported practices), educator level (for interviews) or relative to the number of journals returned, to indicate salience of themes, subthemes and codes in the data. To provide a common metric, salience is indicated in text and in tables as a percent of total centres or educators. Where illustrative examples are used, names of educators (E) and centres (C) are replaced by codes (E1 to E17, C1 to C6).

4.3.5.1 Coding of data

Observation data were deductively coded on the basis of evidence for situational factors impacting self-regulation, the authors' theoretical framework for self-regulation (Baumeister & Heatherton, 1996; Hofmann et al., 2012) and further practices suggested in the literature as supportive of self-regulation. Generated codes were then grouped by conceptual similarity and deductively organised into two overarching themes reflecting educator practices seen as supporting: (1) contextual conditions which optimise children's ability to self-regulate; and (2) the development of key components of self-regulation development.

Following an inductive approach, interview and journal data on educators' understandings of self-regulation were semantically coded to reflect their explicit ideas. Generated codes were grouped by conceptual similarity to generate latent themes representing implicit or underlying patterns in these understandings. This resulted in the generation of three themes reflecting: (1) an understanding of

self-regulation as a sense of control; (2) the tendency toward disruption; and (3) the perception of self-regulation as being influenced by multiple factors. Interview and journal data reflecting practices and activities used to support self-regulation were semantically coded to reflect educators' explicit ideas. Following an inductive approach, generated codes were grouped by conceptual similarity to identify subthemes reflecting specific practices or activities, which were then deductively organised into two themes separating practices from activities (see Table 4.1).

Table 4.1

Themes and Subthemes by Research Question

Research Question	Themes	Subthemes
What practices do educators employ to support self-regulation based on the researchers' working definition?	Contextual conditions which optimise children's ability to self-regulate	Support transitions
		Manage arousal
	Develop key components of self-regulation	Clear expectations
		Support children's motivation
		Engage children in problem solving
		Scaffold language and communicative skills
		Support children to recognise and respond to emotion
		Opportunities to practice self-regulation
How do educators working in Australian ECEC centres understand self-regulation and its development?	Self-regulation as a sense of control	
	Tendency toward disruption	
	Multiple factors of influence	Child-centred factors
		Contextual factors
What practices and activities do educators employ to support self-regulation as they understand it?	Embedded practices	Guide and manage behaviour
		Pre-empt challenges to children's self-regulation
		Engage in sensitive and responsive interactions
		Scaffold
		Differentiate
	Supportive activities	Group games
		Gross motor activity
		Sensory play
		Yoga, mindfulness, relaxation
		Literacy
		Dramatic play

4.3.5.2 Trustworthiness

Peer debrief was conducted with other members of the research team to enhance the credibility of data coding and theme development. In doing so, all authors engaged in a process to critically review and challenge researcher assumptions during the analysis and writing stages (Creswell & Miller, 2000). Through this process, authors acted as 'critical friends' and were encouraged to: (a) consider semantic coding of initial data against their own interpretations; (b) consider the generation of themes against raw data; (c) identify prominent themes evident in raw data but not captured in the analyses (and vice versa); and (d) critically review categorisation of themes into clusters addressing key research questions.

4.4 Results

4.4.1 Research question 1: What practices do educators employ to support self-regulation based on the researchers' definition of self-regulation?

Educators were observed implementing various practices that clustered across two themes: (1) contextual conditions which optimise children's ability to self-regulate; and (2) development of key components of self-regulation. Educator practices aiming to address contextual influences on self-regulation largely clustered around supporting children to prepare for unwanted change that may lead to feeling stressed or disappointed and managing arousal in a manner that prevents and/or mitigates instances of hyper-arousal. Observed practice expected to support key components of self-regulation included: establishing clear expectations (i.e., so that children may set goals aligned with contextual expectations); supporting children's motivation to adhere to expectations and persist with challenging tasks; scaffolding skills and abilities that may help children *overcome* maladaptive impulses (e.g., problem solving, language and communicative skills and emotion recognition); and facilitating opportunities for *self*-regulation (e.g., through group games, semi-structured experiences and opportunities to lead and make choices). The frequency of observed practices across centres and indicative examples of practices are provided in Table 4.2.

Table 4.2

Themes, Subthemes, Frequencies and Examples of Observed Practices

Theme	Subtheme/Code	%	Example Practice
Contextual conditions which optimise children's ability to self-regulate	Support transitions	100.0	
	Provide warning	83.3	Children notified 5-minutes before transition
	Consistent routine	66.7	Establish consistent and structured daily routines
	Visual displays	50.0	Visual map of daily experiences
	Consistent cues	50.0	Same drum sound used to signal pack away time
	Manage arousal	100.0	
	Support children to regulate emotion and physiological arousal	100	Provide physical comfort and verbal reassurance
	Environmental supports	66.7	'Quiet space' for solitary play
	Small groupings	50.0	Limit the number of children that can play by the number of seats
Develop key components of self-regulation	Clear expectations	100.0	
	Direct instruction	100.0	Educators talk to children about the '5 L's of listening' (i.e., looking at the person talking, hands in laps, listening, lips together, legs still)
	Visual prompts	100.0	'Walking zone' painted on the ground outside
	Redirect	83.3	Refocus children's attention and remind them of noise expectations
	Room rules	50.0	Establish overarching 'rules' (e.g., 'walking feet inside', 'pack away our toys before playing with another activity')
	Consistent cues	50.0	Same drum sound used to signal pack away time
	Modelling	50.0	Educators model sharing and turn taking or draw children's attention to a peer demonstrating those behaviours
	Support children's motivation	100.0	
	Encouragement	83.3	Encouraging children to make a second attempt after a failed first attempt
	Praise	66.7	Individually praised children that were paying attention
	Recognition	33.3	Educators selected children to talk who had put their hand up first
	Engage children in problem solving	100.0	
	Suggest strategies/alternatives	83.3	Educator suggested that they each get 10 laps on the bike track before the next person has a turn
	Questioning	50.0	"What do you think could happen if you do that?"
	Support conflict resolution	50.0	Give children an opportunity to express their feelings and support them to negotiate and find a resolution
	Scaffold language and communicative skills	83.3	
	Support children to communicate with others	66.7	Scaffold conversational turn-taking "when one person talks the other person listens"
	Modelling	66.7	"If you need some room and someone is in your way you can say 'excuse me'"
	Active waiting	50.0	Pause for children to speak and wait until they have finished
	Support children to recognise and respond to emotion	100.0	
	Questioning	83.3	"How do you think it might make them feel?"
	Cross-curriculum experiences	83.3	Reading books about feelings; drawing emotional expressions
	Suggest strategies	50.0	Encouraging children to take deep breaths
	Opportunities to practice self-regulation	100.0	

Lead and make choices	83.3	Children creating their own visual routine of activities they want to engage with	
Group Games	66.7	Children take turn rolling a number dice then matching the number on the dice to a number card	
Open-ended experiences	50.0	Children follow a series of steps to try and guess what fruit is hiding in a bag (e.g., looking at the bag, smelling, feeling, looking and tasting)	

Note. Percentages indicate the salience of subthemes and codes across ECEC centres ($n = 6$). Italicised text represents initial codes capturing practices conveyed in raw data which were then grouped to generate overarching subthemes

4.4.2 Research question 2: How do educators understand self-regulation and its development?

4.4.2.1 Self-regulation as a sense of control

Educators defined self-regulation as the ability to 'control' emotion ($n = 16$ educators), behaviour ($n = 14$ educators) and/or social interactions ($n = 7$ educators) in accordance with what is 'expected' or 'appropriate' within their setting. When defining self-regulation, educators referred both to the ability to independently suppress or resist maladaptive responses (e.g., 'to stop doing something even though they might feel like they want to', E15; $n = 17$ educators) and the ability to direct behaviour towards expectations (e.g., 'being able to bring [themselves] back to a state of calm', E10; $n = 14$ educators). For two educators, self-regulation was seen as distinct from compliance, in that it allows children to engage in responses regardless of the audience or potential consequences:

> …it's about having the ability to control your emotions, your decisions about what's appropriate sort of behaviour as well as what's not, but being able to control it regardless of whether you've got someone watching you and making you make those decisions. (E15)

4.4.2.2 Tendency towards disruption

Educator reflections of self-regulation in the classroom emphasised instances of poor self-regulatory control, namely externalising problem behaviours and emotionality. In reflection journals, educators similarly tended to document instances of poor behavioural control (e.g., difficulty turn taking, refusal to follow instruction and physical and verbal aggression; $n = 11$ journals), negative emotionality (e.g., sadness, frustration, anger; $n = 6$ journals), poor adaptability (e.g., difficulties transitioning between experiences; $n = 2$ journals) and poor attentional control ($n = 7$ journals).

During interviews five of the educators (from three centres) noted this bias towards externalising behaviours and emotionality: "I find if they're emotionally upset you kind of notice them but I think sometimes the ones who just become a bit more withdrawn and don't interact so much can fly under the radar a little bit" (E10).

In characterising 'good' self-regulation, educators identified various adaptive behaviours, including the ability to: resist impulses ($n = 14$), communicate with others ($n = 10$), recognise and respond to emotion ($n = 7$), adapt to expectations ($n = 5$), problem solve ($n = 5$), persist with challenging tasks ($n = 2$) and sustain attention ($n = 1$). When reflecting on instances involving self-regulation in journal entries, however, educators disproportionately documented instances of poor self-regulation over self-regulated behaviour (i.e., instances of poor self-regulation were documented in all 11 journals, whereas instances of self-regulated behaviour were documented in only 6 journals). Where educators did document instances of 'good' self-regulation, this was limited to a small number of behaviours including engagement ($n = 3$ journals) and waiting their turn ($n = 3$ journals), or the absence of disruptive behaviour ($n = 3$ journals): "Children self-regulated today–no conflicts" (C5). In the case of the latter, educator observations implied self-regulation as a binary construct–something that children either demonstrate or do not–rather than on a continuum.

4.4.2.3 Multiple factors of influence

Educators identified various child-centred and contextual factors they believed influence the development or expression of self-regulation. For child-centred factors, educators referred to psychological factors (e.g., neurological and developmental disorders, personality or temperament) and physiological states (e.g., illnesses, hunger and tiredness). While psychological factors were seen as having an enduring effect on children's capacity for self-regulation, physiological states were seen as exerting a transitory influence. Contextual factors educators perceived as having a transitory or enduring impact on children's capacity for self-regulation, included expectations that are either inconsistent (i.e., between adults or across contexts) or inappropriate (i.e., those which exceed children's capabilities), unexpected or unwanted change (e.g., parental dissolution of marriage or the birth of a new sibling), factors within the social context (e.g., heightened emotional climate, negative

social interactions or modelled behaviour), and environmental stimuli (e.g., noise and cluttered visual displays). In elaborating on the effects that contextual factors may have on children's self-regulation, educators acknowledged how structural factors inherent to the ECEC context may add to the demands placed on children's capacity to self-regulate:

> So someone who can regulate themselves at home might find it more difficult to do that in this environment because of the noise level, the other children here, even irritants in the environment, that might upset them that they wouldn't experience at home. (E11)

Subthemes, codes, frequencies and illustrative examples from the data are provided in Table 4.3.

Table 4.3

Subthemes, Codes, Frequencies and Illustrative Examples of Factors Influencing Children's Self-Regulation

Subtheme	Code	%	Sample quotations from interview data
Child Centred	Psychological factors	70.6	
	Neurological and developmental disorders	29.4	I think any behaviour problems they might have or any diagnoses they might have or anything, like we have a child who's got development delay, so his self-regulation is not the best just because he doesn't quite understand. We have another kid who's been diagnosed with low functioning autism so therefore he obviously can't regulate his emotions as well, so I think just stuff like that. (E16)
	Personality/ Temperament	41.2	I think part of it comes down to temperament; some people just have a shorter fuse than others, some people are more patient, so I think part of it is temperament. (E10)
	Physiological states	41.2	
	Illness	17.6	I mentioned their health because it's very difficult for them to focus or stay on task and remember things if they're not well or they're not receiving appropriate nutrients or not sleeping properly or whatever the case might be at the time. (E4)
	Hunger	29.4	I know for myself, I find it much harder to remain calm if I'm hungry or if I'm tired… so I think there's lots of similar things with children. (E10)
	Tiredness	41.2	Yeah, actually tiredness is probably one for...when you think about that you think about everyone–adults, children, everybody. (E15)
Contextual	Adult expectations	64.7	
	Inconsistent expectations	64.7	You've got your home expectations and then two cares and then maybe they're doing a ballet class–there's an expectation there as well–so there's a lot of things that they're challenged by every day. (E7)
	Inappropriate expectations	11.8	...if you have that expectation for them to be functioning like a 4 year old but they're really not, it's a very debilitating for them. (E5)
	Unexpected or unwanted change	41.2	
	Life events	17.6	Like if there's trauma or something going on at home, someone's in hospital or a new baby always creates self-regulation issues. (E17)
	Routine change	23.5	Changes in routine as well; some of our children, when there's a change or if they're expecting something to happen and then for whatever reason it can't happen…we can definitely usually see it throughout the day that they do struggle a little bit more with being able to regulate the emotion. (E13)
	Social context	64.7	
	Emotional climate	41.2	…if one becomes heightened then quite a few of them will come up to that same level. (E2)
	Social interactions	35.3	Yeah, the interactions with their peers and especially if they're involved and fully immersed in their own play and another peer enters or they're interrupted by an educator for whatever reason then you often see lapses in self-regulation. (E8)
	Modelled behaviour	23.5	I mean sometimes some of them will do like [well in their] self-regulation and you think they've got it all but then to have a relationship with someone new you might see a few lapses, you know, like "Oh, he threw that and that was hilarious so I'm going to do that too" (E7)
	Environmental stimuli	35.3	I think as well, some children become quite overwhelmed with a lot of sensory stimuli so if the room is noisy or there's lots of pictures and stuff on the walls or there's a lot going on or people are all up in their space they can be really overwhelmed by that. (E10)

Note. Percentages indicate the salience of latent codes and semantic codes among educators (*n* = 17). Italicised text represents initial semantic coding of data used to generate overarching latent codes which capture the underlying ideas conveyed in raw data.

4.4.3 Research question 3: What practices do educators employ to support self-regulation as they understand it?

Educators identified various pre-emptive and responsive practices and activities perceived to support self-regulation, yet neither interview nor journal data yielded evidence for the adoption of a formal or systematic approach to supporting self-regulation. Distribution and frequency of themes, subthemes and practices (or codes) across centres are reported in Table 4.4.

4.4.3.1 Embedded practices

Educators routinely guided children's behaviour by establishing clear expectations around appropriate or desirable behaviour, and steered children towards these through reminders, positive reinforcement and redirection (i.e., supporting children to move away from inappropriate and towards appropriate behaviour). To ensure children's understanding of expectations, consistency among staff members was highlighted as fundamental:

> …if you've got someone who's very loud and doesn't expect the children to remain calm and quiet or to talk through their emotions or to talk through their situations but you've got two who are, then it really makes a difficult dynamic to be able to have the children understand where those expectations are. (E11)

Establishment of consistent and predictable routines were also identified as supporting children to regulate their behaviour in accordance with expectations:

> And I guess just from the routine, they know what's coming up next, they know that, "Okay, so now it's time to go wash your hands to go outside, now it's time to go do this" so just having a very strict routine that we keep to helps them. (E16)

Educators also proactively supported children's capacity for self-regulation by pre-empting and mitigating factors that may undermine children's ability to self-regulate. To prevent instances of hyper-arousal, educators managed visual and auditory stimuli in the environment by setting expectations around appropriate noise levels indoors, minimising visual displays (e.g., ensuring the classroom did not become too 'cluttered') and playing 'calm music'. Acknowledging the influence of peer behaviour, educators ensured that groups remained small in both supported and unsupported play

(e.g., "That really limits all of those kinds of behaviours which means everybody can really focus on themselves and what's going on at the time", E11) and integrated 'quiet spaces' for solitary play. While the establishment of consistent routines was viewed by some educators as supporting children to regulate behaviours, educators also identified consistent routines and the provision of warnings (e.g., 5 minutes before a transition) as beneficial in minimising negative emotional states that may arise from unexpected or unwanted to change: "I think if they can anticipate it, if they can predict that that's what's going to happen in their routine…I think it makes them a lot more comfortable–there's no surprises I suppose" (E6).

Educators were sensitive and responsive to individual children and ensured children felt safe, secure and supported. In doing so, educators reflected on how they talk calmly and at children's eye-level, responded to and encourage children's interests (e.g., using a child's favourite book to engage them) and supported children to regulate their emotions (e.g., through breathing exercises, hugs and verbal reassurance).

With the aim of enhancing children's capacity to self-regulate, educators described practices that they employ to scaffold cognitive skills and abilities important for self-regulation (e.g., problem solving, persistence, perspective taking, expressive and receptive language). This included the use of open-ended questioning and discussions, modelling, suggesting strategies (e.g., "What about if we smile and we say to those children, 'Can I join in too'", E1) and intentional grouping (i.e., engaging the help of a more capable peer). As children became more capable, educators increased the level of self-regulatory challenge by altering rules or requirements of the situation (e.g., increasing group size or wait times) and/or gradually decreased supports. By providing opportunities for children to lead and make choices within the classroom educators aimed to provide children with opportunities for *self*-regulation and to foster their motivation to be self-regulated rather than compliant (e.g., "so we'll give them choices, like, 'Well you can do this, or you can go do this' but it still centers around what we want them to do but they think they have power because they've chosen", E16). In providing choices, however, educators emphasised the importance of developmentally appropriate choices (e.g., limited choices), particularly in instances where children had difficulty regulating for themselves. Relatedly, educators noted how routine experiences (e.g., serving their own meals, lining up to walk

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outside, packing away their toys) were leveraged to support children to be able to self-regulate (e.g., engaging children in afternoon relaxation or 'quiet' time) and encouraging them to engage self-regulatory abilities (e.g., serving their own meals, lining up to walk outside, packing away their toys).

Educators further ensured appropriate challenge and support for the development of self-regulatory skills by differentiating expectations relative to the developmental abilities and needs of individuals or groups of children (e.g., altering requirements of the task or activity, or shortening the experience to minimise the time children must self-regulate), and tailoring practice to suit children's capabilities or preferences (e.g., communicating through visuals rather than direct verbal instruction).

4.4.3.2 Supportive activities

Educators identified various activities and experiences that they employed to support children's self-regulation. Most commonly, educators noted the use of group games (e.g., dancing to music and freezing when it stops, memory matching games where children take turns trying to find matching picture cards), which were seen as inherently beneficial for children's self-regulation by creating opportunities for turn taking, sharing, listening, and sometimes potential for winning or losing:

> So say they're playing a game of Memory, you've got to take turns and wait for your turn and make sure that you're following those rules so that it's fair for everyone and then the ability to concentrate and focus on what's happening so you know, turning over the two cards, remembering location but also things like dealing with the disappointment or the frustration that can come, you know, if you have your turn and, "Oh I still haven't found any cards" or "I really wanted to find the ducks and now someone else has got the ducks". (E10)

Activities including sensory play (e.g., playing with sand or play-dough), gross motor activity (e.g., running and jumping outdoors), and yoga and mindfulness activities were also noted to support children's regulation of emotion and physiological arousal. Educators also noted the use of literacy-based experiences (e.g., individual and group reading) for supporting children's emerging understanding of concepts central to self-regulation (e.g., emotion recognition and prosocial behaviour). Similarly, dramatic play was identified by educators as providing children an opportunity to explore concepts (e.g., emotion recognition), engage with their peers and process emotion (e.g.,

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"we set up a dramatic play which is just helping them to process those emotions and to experience it themselves and play it out; I suppose play out their emotions during their play", E6).

Table 4.4

Frequency and Distribution of Themes, Subthemes and Codes Relating to Educator Self-Reported

Practice

Theme	Subtheme/Code	%	C1	C2	C3	C4	C5	C6
Embedded practices	Guide children's behaviour	100.0						
	Clear expectations	100.0	X	X	X	X	X	X
	Remind children of expectation	83.3	X	X	X	X		X
	Reinforce	50.0	X	X		X		
	Redirect	100.0	X	X	X	X	X	X
	Educator consistency	50.0	X	X		X		
	Consistent routines	66.7	X	X	X			X
	Pre-empt challenges to children's self-regulation	100.0						
	Manage visual and auditory stimuli	100.0	X	X	X	X	X	X
	Small groupings	50.0	X			X	X	
	Quiet spaces	50.0		X	X	X		
	Consistent routines	66.7	X	X	X			X
	Provide warning	83.3	X	X	X	X		X
	Engage in sensitive and responsive interactions	100.0						
	Communicate calmly and at children's eye-level	83.3	X	X	X	X		X
	Encourage and respond to children's interests	83.3	X	X	X	X	X	
	Support children to recognise and regulate emotion	100.0	X	X	X	X	X	X
	Scaffold	100.0						
	Question and discussion	100.0	X	X	X	X	X	X
	Model self-regulation	83.3	X	X	X	X		X
	Suggest strategies	66.7	X	X		X	X	
	Intentional grouping	66.7	X	X	X	X		
	Decrease supports	33.3	X	X				
	Opportunities to lead and make choices	83.3	X	X	X		X	X
	Routine experiences	100.0	X	X	X	X	X	X
	Differentiate	100.0						
	Adjust self-regulatory demands	83.3	X	X	X	X	X	
	Tailor practice to individual need	100.0	X	X	X	X	X	X
Supportive activities	Group games	83.3	X	X	X	X		X
	Gross motor activity	83.3	X	X	X		X	X
	Sensory play	66.7	X		X		X	X
	Yoga, mindfulness, relaxation	66.7	X		X	X		X
	Literacy	66.7	X	X	X	X		
	Dramatic play	50.0		X	X	X		

Note. Percentages indicate the salience of subthemes and codes across ECEC centres (*n* = 6). Italicised text represents initial codes used to capture practices conveyed in raw data which were then grouped to generate overarching subthemes

4.5   Discussion

The current study sought to investigate early childhood educators' understandings and practices to support self-regulation, given the absence of a prescribed curricular or prevalent approach to supporting self-regulation in Australian ECEC contexts. Results indicated that although educators had highly nuanced definitions of self-regulation, which were largely consistent with prominent definitions in the research literature, their operationalisations and observations tended to concentrate on instances of *dys*regulation. Yet this contrasted with their practices to support self-regulation, which mirrored and went beyond quality practices suggested by research. There was little evidence of there being a formal or systematic approach to supporting self-regulation, but rather took an ad hoc form. These results highlight self-regulation as an area of focus and concerted activity in ECEC settings, while also indicating additional areas of opportunity for professional learning and continued research.

Educators' definitions of self-regulation were largely consistent with common conceptualisations in the literature, namely control-focused definitions that emphasise the ability to suppress salient maladaptive impulses and the ability to initiate and sustain more-adaptive responses (Baumeister & Heatherton, 1996; Hofmann et al., 2012). With regard to the development of self-regulation, educators' implicit models positioned self-regulation as subject to episodic and developmental change and recognised both child-centred and contextual factors central to these changes. That is, educators made explicit mention of individual and contextual factors shown to be influential to transitory and lasting self-regulation change.

While various cognitive skills (e.g., cognitive flexibility, persistence, problem solving) were identified by educators as defining features of good self-regulation, both definitions and reflections of manifest self-regulation revealed a tendency for educators to focus on control of emotion and, to a slightly lesser extent, behaviour, such that instances of 'good' self-regulation were often framed as the absence of disruptive behaviour and emotionality. As such, while there was little explicit mention of some of the other influential factors identified within prominent models of self-regulation success (e.g., goal settings, motivation, executive function; Hofmann et al., 2012), these were nonetheless reflected in the diversity of practices educators brought to bear in their efforts to foster children's self-

regulation. This shows a disconnect between interventionists' prevailing focus on cognitive capacity (Diamond & Lee, 2011) and educators' focus on manifest behaviours and emotions.

Paralleling the overlap between educators' and the authors' definition of self-regulation (i.e., as encompassing the ability to *overcome* contrary impulses to become/remain goal-directed), practices that the educators reported using to foster self-regulation similarly overlapped with, and supplemented in some cases, effective practices suggested by theoretical models and empirical studies. Taking an approach consistent with strength-based models (Baumeister & Heatherton, 1996), observation and self-report data revealed practices designed to minimise undermining factors (e.g., negative emotionality and arousal) and optimise children's ability to self-regulate (e.g., establishing clear and appropriate expectations, supporting children to pre-empt unexpected and unwanted change, managing emotional and physiological arousal). Educators also employed a range of practices, often concurrently, expected to support self-regulation growth (e.g., supporting children's motivation, scaffolding cognitive skills and abilities through practice and experiences, encouraging children's autonomy; Barnett et al., 2008; Cadima et al., 2015). This approach is consistent with the evidence for a stable self-regulation ability that develops over time (Moffitt et al., 2011), and evidence of contextual factors that influence deployment of this capacity (Blair & Diamond, 2008). Supplementary practices noted in self-reports included practices which are consistent with the literature but may not have been readily observable (e.g., differentiating practice, decreasing supports, intentional grouping, integrating children's interests) and/or practices not yet explored in the self-regulation literature (e.g., use of quiet spaces, provision of warnings/reminders, communicating calmly and at children's eye level, routine experiences, sensory play, etc.).

While educators' practices were many and diverse, neither observations nor self-reported practices yielded evidence for an intentional, differentiated and planned approach to supporting self-regulation for children of all capabilities. Instead, practices were often implemented in response to overt difficulties or to target the group more broadly. This lack of differentiation for each child is likely exacerbated, in part, by the dearth of formative assessment tools allowing reliable and sensitive appraisal of early self-regulation (Howard et al., 2019), as well as educators' tendency to focus on and respond to instances of poor self-regulatory control, and in particular externalising behaviours (e.g.,

hitting, pushing, screaming, anger; Nelson & Evans-Stout, 2019). While episodes of dysregulation that manifest as aggression or behavioural disruption can negatively impact children's relationships and their ability to engage in developmental experiences (Williford et al., 2013), children with internalising behaviours–whom educators in this study acknowledged as more likely to 'fly under the radar'–are equally at risk of poor outcomes, including increased incidence of mental health difficulties (e.g., social phobia and depression; Goodwin et al., 2004), peer difficulties (Coplan et al., 2013) and greater sensitivity to rejection (Gazelle & Druhen, 2009). In the context of the findings by Moffitt et al. (2011) that show improved self-regulation having flow-on benefits for children at initially low, average and high self-regulation abilities, these results suggest the need for future professional development to redirect or extend educator focus to a broader range of behaviours and facilitate opportunities to provide individualised support for all children's self-regulation.

Comparisons between services indicated disparities in both observed and self-reported practices, with educators prioritising different practices to support the self-regulatory development of children in their care. Reasons for this may reflect the appropriateness of practices given children's needs, or educator beliefs with regard to practice (e.g., confidence to implement; perceived efficacy; compatibility with their specific context; Bandura, 2006). Nevertheless, this finding highlights the opportunity for professional learning and communities of practice through which effective strategies can be shared, tailored and elaborated. More importantly, it underscores a need for the adoption of a more systematic approach to supporting self-regulation in Australian ECEC settings.

4.5.1   Limitations

While high-quality ECEC services were selected to enhance opportunities for observation of practice likely to support self-regulation, there are also limitations to this sampling methodology. For instance, the extent to which these results characterise the sector more broadly is unclear. However, this was not the aim of this study; rather, we aimed to investigate the understandings and practices of educators in services that were characterised as 'effective' and were achieving good child outcomes. This allowed not only identification of practices consistent with the academic evidence base, but also suggest areas in which practice surpasses and differs from this evidence. Yet, it is noted that the limited observation and reporting period may similarly truncate the full range and frequency of

practices in use to support self-regulation. Although resultant practices identified were consistent with theorised and empirically supported mechanisms for self-regulation development (e.g., Barnett et al., 2008), it could also be argued that practices identified herein are simply reflective of high-quality practice (e.g., open-ended questioning and discussion) that would be expected to be beneficial across a broad range of outcomes (Melhuish et al., 2015; Tayler et al., 2017). While most of the identified practices could be expected to confer benefit beyond solely self-regulation, the observation framework and educators' reported practices were specifically those practices with demonstrated or expected benefit to self-regulation. Further research is needed to investigate whether and to what extent practices (or various combinations of these) are indeed influential to self-regulatory development. Nevertheless, the current study identified a range of currently embedded practices–thereby demonstrating their compatibility and sustainability in ECEC contexts–from which to build, refine and/or stimulate across the sector more broadly.

4.6   Conclusion

Findings from this study provide contemporary insight into Australian early childhood educators' understandings and practices to support early self-regulation, among an intentional sample of high-quality services. In these settings, nuanced understandings of self-regulation (paralleling academic frameworks of self-regulation and its development) converged with diverse practices to target various aspects identified in theory and research for self-regulation development. Conversely, educators' operationalisation of self-regulation as the absence of dysregulation, and typical absence of planned and differentiated self-regulation practices for children, suggest opportunities for further development even among services already demonstrating high-quality practices. Moreover, given these practices are already embedded, they are likely to be particularly feasible, scalable, and sustainable across the ECEC sector and thus suggest potential targets for education and intervention efforts that may not currently be widespread.

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Chapter 5: Intervention Piloting and Refinement (Phase 2)

Chapter 4 detailed Phase 1 of the PhD research, which sought to explore educators' understanding of, and practices for supporting, early self-regulation in Australian ECEC services. Chapter 5 elaborates on the process of intervention piloting and refinement conducted in partnership with early childhood educators. In this Phase the candidate sought to explore to what extent, if any, educators perceived individual intervention components as being acceptable and beneficial for implementation within Australian ECEC settings.

5.1   Purpose of this phase

Whereas Phase 1 (Chapter 4) contributed to the identification of ECEC-compatible practices and experiences expected to support self-regulation development, the current phase sought to engage educators in an iterative process of intervention piloting and refinement to ensure or support a socially valid program. To achieve this, educators working in ECEC services throughout NSW, Australia were invited to implement and provide feedback on each of the planned intervention components, including: child activities, adult practices, parent newsletters, and purpose-designed children's books. Other program components, including the online PD videos and PRSIST formative assessment tool, were excluded from the piloting phase given feedback had already been garnered from previous research (Howard et al., 2019; Neilsen-Hewett et al., 2019; Siraj et al., 2018). An elaboration of the methodology, educator feedback and finalised intervention components is provided below.

5.2   Social Validity

In addition to issues surrounding the contextual suitability or applicability of ECEC-based approaches, issues pertaining to the social validity of the program (i.e., the extent to which educators perceived the program as being acceptable for implementation and are satisfied with its outcomes or potential outcomes; Luiselli & Reed, 2011) can also influence program uptake and sustainability of practice change (Ajzen, 1991; Bandura, 2006; Buehl & Beck, 2014). That is, educators may be more likely to adopt and sustain new practices where they: (a) believe that these practices will be effective in achieving anticipated outcomes (e.g., Hur et al., 2015); (b) believe as though they can successfully implement these practices (e.g., they have the capabilities or contextual supports required for implementation; Bandura, 2001; Turner et al., 2011); and (c) perceive the target outcomes (or their role in supporting the target outcome) to be important (e.g., Yan, 2018; Youn, 2016).

To evaluate social validity of intervention programs or components, Wolf (1978) identified three levels at which to evaluate the intervention. At the first level, program developers should seek to confirm the social significance of the program (and its goals) with the consumers. Second, program developers should seek to evaluate the consumers' perspectives around the suitability or acceptability

of intervention procedures. Finally, program developers should seek to explore the consumers'

perceptions of the program relating to its outcomes and efficacy. At the first level, the candidate and

research team leveraged interactions with educators (including Phase 1 educators and educators

affiliated with the candidate's organisation) to gauge perceived value of the program, drawing upon

evidence that identifies the developmental importance of self-regulation (Howard & Williams, 2018)

and the common endorsement by ECEC educators of self-regulation as a fundamental developmental

ability in young children (Niklas et al., 2018). While ECEC-based programs often target educator

perceptions of the importance of self-regulation and utility of intervention components (i.e., through

the provision of content-based professional development; Pandey et al., 2018) or capture these at post-

intervention (e.g., through process evaluation), few programs have sought to establish social validity

of the program in terms of its acceptability (or appropriateness) by capturing and considering educator

perceptions of the program prior to its implementation and evaluation. In the current phase of the

research, the candidate sought to engage educators in an iterative process of intervention piloting and

feedback to ensure perceived acceptability of intervention components.

5.3   Methods

5.3.1   Participants

Participants for this study were educators from two preschool and 12 LDC services across

NSW, Australia. Participating services were made up of those that participated in Phase 1 of the

research ($n = 6$), as well as a supplemental sample of services ($n = 8$). Services recruited for this study

varied in geographic location ($n = 3$ regional, $n = 11$ metropolitan) and NQS ratings ($n = 10$

exceeding; $n = 3$ meeting; $n = 1$ not yet rated). All but two participating services had one preschool

room (two services had two preschool rooms, yielding 16 rooms participating in this phase of the

research; for characteristics of these centres, see Table 5.1). Consent to participate in this study was

obtained on a service-level (see Appendix D), and all data were collected at a preschool-room/cohort

level so as not to be attributable to any specific educator(s) or child(ren). Given the considerable

number of intervention components to be reviewed in this phase of the research, participating centres

were split into three group (n = 4-5 centres per group; see Table 5.1 for group allocations) with each group receiving a different subset of intervention components. This approach was adopted to ensure that all intervention components were able to be implemented/reviewed within a 9-week period while also minimising burdens of participation for educators.

Table 5.1

Centre Characteristics and Group Assignment

Centre ID	Preschool rooms	Age range	NQS	Group
1	2	4 to 5 years (Room 1)	Exceeding	1
		3 to 4 years (Room 2)		
2	1	3 to 5 years	Exceeding	3
3	1	4 to 5 years	Meeting	1
4	1	3.5 to 5 years	Exceeding	2
5	1	3 to 5 years	Meeting	3
6	1	3 to 5 years	Exceeding	1
7	2	4 to 5 years (Room 1)	Exceeding	2
		4.5 to 5.5 years (Room 2)		
8	1	3 to 5 years	Exceeding	3
9	1	3 to 5 years	Exceeding	1
10	1	4 to 5 years	Exceeding	2
11	1	3 to 5 years	Exceeding	3
12	1	3 to 5 years	N/A	1
13	1	4 to 5 years	Meeting	2
14	1	4 to 5 years	Exceeding	3

5.3.2   Intervention content

Given the previous use of some intervention components (i.e., online PD videos and PRSIST formative assessment tool) in prior studies (e.g., Howard et al., 2019; Neilsen-Hewett et al., 2019; Siraj et al., 2018) and research activities (e.g., coaching and mentoring opportunities run through the candidate's organisation), these components of the program were not piloted in this phase of the research. The below sections provide a brief overview of intervention content piloted in this phase of the research (see section 5.6 for a complete overview of the final program).

5.3.2.1 Child Activities

Informed by Phase 1 findings and based on evidence from the theoretical (e.g., Baumeister & Heatherton, 1996; Hofmann et al., 2012) and empirical literature (e.g., Razza et al., 2015; Tominey & McClelland, 2011; Williams & Berthelsen, 2019), 29 child activities were designed to support the cognitive, behavioural and social-emotional aspects of self-regulation. For the pilot study, educators

were provided with a one-page information sheet for each activity that they were asked to trial (see Appendix G for an example). Information sheets provided educators with details around: how to implement the activity (e.g., procedural instructions, ideal location, optimal group size and equipment required), methods for increasing or decreasing the challenge, the anticipated benefits of the activity (e.g., to children's self-regulation development and real-world functioning), and links to the EYLF (i.e., to assist with planning and programming).

5.3.2.2 Adult Practices

A compendium of adult practices grouped by 11 core principles were developed to support content delivered in professional development videos and provide explicit examples of practice. For the pilot program, educators were provided with a 1-2-page information sheet for each of the 11 core principles (see Appendix H for an example). Each of the 11 information sheets: (1) provided a description of the principle (e.g., provide encouragement around children's processes to foster intrinsic motivation); (2) contextualised the principle within an ECEC-based scenario (e.g., an educator acknowledging a child's efforts in a play scenario); (3) specified practices for enacting the principle (e.g., ask open-ended questions and acknowledge children's ideas); and, (4) provided links to relevant sections of the EYLF (DEEWR, 2009).

5.3.2.3 Children's book excerpt

To facilitate the easy and authentic implementation of child activities within the educational setting and programming, three children's books were developed that each centred around one theme of behavioural, cognitive or social-emotional self-regulation. Each included child activities linked to central plot points. For the pilot program, educators were provided with a one-page excerpt from the cognitive self-regulation book for review and comment about this as a vehicle to support induction (see Appendix I).

5.3.2.4 Parent Newsletters

To support connections with the home learning environment six parent newsletters providing key information around early self-regulation were developed by the research team. For this pilot

process, each centre was provided with a copy of the first parent newsletter to comment on general content and format (see Appendix J).

5.3.3   Data collection/feedback instruments

Both qualitative and quantitative feedback were solicited from educators who implemented intervention components, using bespoke feedback forms created by the research team. For child activities, educators were asked to respond to various question prompts designed to capture procedural details to inform implementation guides (i.e., group size utilised) and help to gauge social validity (Turan & Meadan, 2011). To provide an indication of program acceptability (or appropriateness), educators were asked to respond to five items (rated on a 1-5 Likert scale from 1 = 'poor' to 5 = 'very good') as follows: three items capturing procedural difficulty (i.e., time to set up, ease of set up, and ease of managing children); one item around compatibility (i.e., with resources, routines and practice); and one item capturing perceptions of developmental appropriateness of the activity. For each activity educators were additionally asked to indicate whether these were similar to or differed from current practices (using a dichotomous yes/no response) and elaborate on points of similarity or difference. To gauge perceived satisfaction with the activity, educators were additionally prompted to respond to three items (also rated on a 1-5 Likert scale from 1 = 'poor' to 5 = 'very good') capturing educators' enjoyment in the experience, perceptions of children's enjoyment of the experience and perceived benefits to children's self-regulation. For each activity educators were also prompted to indicate: (1) how often they implemented the activity in the two-week cycle; (2) whether they would do the activity again (yes/no); and, (3) whether they thought children would do the activity again (yes/no). To support program revision, educators were prompted to suggest ways in which the activities or written instructions could be improved. For all other intervention components the educators were prompted to provide open-ended feedback that could be used to refine or revise these components (see Appendix K for an example feedback form). These forms were completed in the final week of each three-weekly pilot and feedback cycle.

5.3.4 Procedure

Rapid prototyping and collection of educator feedback occurred across three consecutive 3-week cycles (9 weeks total). For each cycle, educators were required to spend the first two weeks implementing and/or reviewing intervention components. In the third week of the cycle, educators were asked to complete a bespoke feedback form and return this to the research team via post or email. For each of the three cycles educators were sent 3-4 child activities (see Appendix G for an activity example) and 1-2 adult practices (see Appendix H for an example practice) to implement. In the third and final cycle each center was additionally sent an excerpt from a purpose-made children's book (see Appendix I) and a copy of a parent newsletter (see Appendix J), for review and comment (see Figure 5.1 for an overview of the piloting sequence for Group 1). Of the 48 feedback forms expected to be returned for each participating preschool room, 85% were returned ($n = 3$ missing due to school holidays; $n = 4$ missing due to insufficient time to implement intervention components).

Figure 5.1

Overview of Piloting Sequence for Group 1

CYCLE 1			CYCLE 2			CYCLE 3		
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
Activities: 1. Head'n Shoulders 2. Managing Musicians 3. Mr Wolf 4. Filling Buckets **Adult Practice:** Modeling Sensitive and Responsive Practices		Feedback	**Activities:** 1. Perfect Pass 2. Market Mixup 3. Blind Spot **Adult Practice:** Fostering a Sense of Community		Feedback	**Activities:** 1. Balloon Bounce 2. Split Singing 3. Holding Fast **Adult Practice:** Recognising and Responding to Emotions **Additional Resources:** Children's book excerpt, parent newsletter		Feedback

Note. This figure provides an illustrative overview of the intervention components piloted and reviewed by Group 1 centres.

5.3.5 Data analysis

5.3.5.1 Quantitative data

All quantitative data were analysed descriptively to provide an overview of mean activity ratings and response frequency. For Likert scale responses, response options were scored from 1- 5. An overall average was calculated for each item and activity based on centre responses (reported in

Table 5.2). For dichotomous items, results were reported as a percentage of centres that indicated a 'yes' response (see Table 5.3).

5.3.5.2 Qualitative data

Qualitative data were analysed thematically. First, centre-level feedback was deductively organised by intervention component (i.e., activity, adult practice, parent newsletter or book excerpt). For child activities, qualitative data were grouped based on the specific activity or general feedback. These data were semantically coded to reflect their explicit content and grouped on this basis (i.e., perceptions of acceptability or benefit and suggestions for improvement) to supplement quantitative findings. For adult practices, parent newsletter and children's book excerpt, data were semantically coded to reflect their explicit content (i.e., perceptions of acceptability or benefit and suggestions for improvement), which were then grouped to reflecting patterns in educator responses.

5.4   Results

5.4.1   Child activities

In their feedback educators reflected on the compatibility of activities in relation to both their setting and children's developmental abilities. Quantitative feedback was provided for each activity on a 5-point scale, with the majority of activities (i.e., 72.4%) receiving an overall rating of 'good' to 'very good'. In terms of the physical setting, educators identified the activities as being compatible with current resources, requirements and practices ($M = 4.5$, $SD = 0.5$, range = 3.3–5.0) and relatively easy to set up ($M = 4.3$, $SD = 0.5$, range = 3.3–5.0). Noting the significant time demands in completing their day-to-day responsibilities, however, educators made suggestions for optimizing the accessibility and ease of implementing activities through the inclusion of an 'equipment list' in written instructions and the creation of a 'resource kit that is quick to access, durable and visual'. While a considerable number of activities were identified as being similar to existing activities (see Table 5.3) educators still perceive the activities as providing them with new and unique ways to focus on children's early self-regulation:

So much of what we do in our day-to-day interactions involved challenging aspects of the children's self-regulation. The children in my class who can struggle with self-regulation (at times) had a great rate of positive participation and outcomes to each activity, a good reminder for me to keep sourcing new games to challenge.

Regarding the children, educators considered most of the activities as being suitably aligned with children's developmental abilities (i.e., 69% of activities scored as at least 'good' for developmental appropriateness). Where educators noted activities which exceeded the abilities of their children, educators flagged these as more suitable for 'older' preschool children (i.e., ages 4 to 5 years) and/or provided suggestions around how the activity could be altered to decrease the level of challenge (e.g., using a visual 'stop sign' in Managing Musicians rather than a verbal prompt). Looking beyond their own settings, educators noted the breadth and adaptability of activities as enhancing the opportunity for services to be able to select activities well suited to the specific requirements of their setting ('Most were good and different activities would suit different services') as well as the differing needs of their children ('Many options were given to extend, meeting range of needs').

While activities were identified as being compatible with children's abilities for the most part, educators also noted them as being inherently challenging for children's self-regulation. This is reflected both in open-ended feedback where children were reported as becoming impatient or 'too excited' as well as educators' ratings around the ease of managing children during activities ($M = 3.9$, $SD = 0.7$, range = 2.5–5.0). To overcome this challenge, educators often suggested the use of small group sizes ('I would introduce the games in small group settings first and then more to larger groups') and/or increased educator involvement.

Despite their challenge, educators identified the child activities as enjoyable for both children $M = 4.2$, $SD = 0.7$, range = 2.5–5.0) and educators ($M = 4.2$, $SD = 0.6$, range = 3.0–5.0). In some instances, educators noted additional opportunities to further enhance children's enjoyment by incorporating their current interests (e.g., focusing on animals as the category in Brace Race: 'The children love anything to do with animals'). Beyond enjoyment, educators also perceived the

activities as beneficial in supporting children's self-regulatory development ($M = 4.2$, $SD = 0.5$, range = 2.5–5.0):

> We like to try out all these activities and most of them have become our children's favourite games. They certainly challenge our preschoolers' abilities to resist certain impulses and problem-solving skills more importantly, promote their self-regulation skills.

Where children were highly capable, educators suggested possible extensions to enhance the level of self-regulation challenge (e.g., by changing the rules: 'We also changed chairs moving to the right when the music started to play and then mixed it up as we were so clever by moving to the left this confused us a bit but we got it'). The engagement of children in activities was also perceived as beneficial for educators by providing them with opportunities to observe children's self-regulation skills across different situations:

> These activities gave us the tools/opportunity to reflect on the children's development of this ongoing skill. A child might have been successful in one activity but not another–building a broader picture of the development of these skills.

> Overall, educators described the written instructions and supplementary information as both clear ($M = 4.4$, $SD = 0.4$, range = 3.5–5.0) and informative (''what it does', 'real life implications' and 'links to the EYLF' were very helpful and informative to read. Found this useful to use in conversations with families and in my own planning'). The provision of written explanations was also noted as beneficial in providing a means for all educators to become familiar with experiences ('The written explanations were really helpful and made it easier to get all staff on board'). As an overarching commentary, educators suggested providing more information with regard to group size and how this affects children's self-regulation ('Giving a more detailed description of the rationale of how self-regulation occurs in a large and small group will be beneficial so educators can choose the size that is most beneficial') as well providing links to additional information ('Perhaps more science based links to why/how the activities develop self-regulation so that we can integrate into practice with more focus'). For some activities (e.g., Mind Reader and Who Says?) educators also made recommendations where the text could be reduced or clarified

Overall activities were well received by both educators and children. For each of the 29 activities over 50% of educators said they and the children would do it again, and for 19 of these 100% of educators said they and the children would do these again. In the final round of feedback one service even reported having already integrated the activities as part of their ongoing experiences ('the activities we participated in have become part of our routine, especially the puppet play and reading rounds, which the children request to play often'). Activity ratings and educator feedback are provided in Table 5.2 and Table 5.3 below.

Table 5.2

Activity Ratings and Feedback Summary

Area of self-regulation	Activity	Compatibility	Developmental Appropriateness	Potential benefit	Ease of setup and conduct	Educator enjoyment	Child enjoyment	Time	Management	Clarity	Overall Average	Feedback
Behavioural	Bursting Bubbles	5.0	5.0	4.7	5.0	5.0	5.0	5.0	4.7	5.0	4.93	Similar to existing activity but children stand.
	Who Says?	5.0	4.7	4.7	5.0	4.3	4.3	4.3	4.7	4.0	4.56	Used during the day to change the tempo as children feel calmer and relaxed. Written explanation too wordy.
	Brace Race	5.0	4.0	3.3	5.0	3.7	4.0	4.0	4.3	4.3	4.18	Easy to set up. Activity was suitable for age group and enjoyed by children.
	Awkward Opposites	4.8	4.5	4.3	4.8	4.5	5.0	4.3	4.5	4.5	4.58	Similar to existing activities but challenged children in a fun way.
	Managing Musicians	4.8	3.8	4.2	4.5	4.0	4.2	3.8	3.3	4.3	4.10	Liked the use of chairs in this activity and indicated the activity worked well.
	Disciplined Dance	4.7	4.1	4.3	4.7	4.4	4.7	4.7	3.8	5.0	4.49	Similar to existing activity [musical statues] but with more rules. Most enjoyed the rules and perceived them as adding value and challenging children. In one instance different rules created some confusion and children lost interest.
	Same Kind	4.6	4.6	4.0	4.6	4.6	4.6	4.6	4.4	4.4	4.49	Similar to existing activities. Highly enjoyed by children and attracted large groups. Easy to modify to children's interests.
	Holding Fast	4.5	4.3	4.7	4.3	4.3	4.0	4.0	4.0	4.2	4.26	Difficult for centres that do progressive meals but compatible with current practices for others that do whole group meals.
	Head'n Shoulders	4.5	4.2	4.5	4.8	4.5	4.3	4.5	4.3	4.4	4.44	Challenging and children began to lose interest. Suggested further explanation be provided.
	Hot Potato	3.8	3.1	3.4	3.4	3.4	3.2	2.8	2.7	3.8	3.29	Similar to pass the parcel and musical statues which contributed to children's enjoyment. In one instance educators found the activity difficult and children lacked engagement.
Cognitive	Rhythm Repeat	5.0	4.6	4.2	4.8	4.4	4.2	4.6	4.4	4.2	4.49	Similar to existing activities. Attracted a large group of children but suggested using in small groups.
	Eye Spy	5.0	4.3	5.0	4.7	5.0	4.7	5.0	4.3	4.7	4.74	N/A
	Mind Reader	4.5	4.9	4.5	4.4	4.8	4.6	4.5	4.6	4.6	4.60	Encouraged children to think in different ways.
	Hidden Hunt	4.5	4.5	4.5	4.0	4.5	4.5	4.0	2.5	4.5	4.17	Limited time to prep for this activity. Similar to existing activity but educators provide clues.

Area of self-regulation	Activity	Compatibility	Developmental Appropriatenes	Potential benefit	Ease of setup and conduct	Educator enjoyment	Child enjoyment	Time	Management	Clarity	Overall Average	Feedback
Cognitive	Mr Wolf	4.3	4.4	4.4	4.0	4.3	4.4	4.4	3.6	4.4	4.24	Liked the idea of children having to remember the numbers but said children were not interested in remembering the number when caught as they wanted to be Mr Wolf. Suggested using small groups.
	Split Singing	4.2	3.8	4.2	3.6	4.0	4.0	3.8	3.4	4.0	3.89	Challenging for children this age as they easily became distracted.
	Market Mixup	3.8	4.3	4.1	3.3	3.5	3.5	3.8	4.0	4.3	3.84	Somewhat challenging and confusing. Suggested having different levels of challenge that can build up over time and implementing in small groups.
	Secret Shadow	3.8	3.0	3.5	4.0	3.5	3.0	2.8	3.0	3.5	3.34	Difficult for children to keep their eyes closed and some children lost interest.
	Favourite Things	3.3	3.3	3.7	3.3	3.3	3.0	3.7	3.3	4.0	3.43	Children's interest was limited due to subject matter.
Social and Emotional	Reading Rounds	5.0	4.8	4.3	5.0	5.0	5.0	4.7	5.0	4.8	4.84	Children engaged somewhat independent of educators. Small groups preferable.
	Song & Story Lucky Dip	5.0	4.7	4.3	4.3	5.0	4.7	5.0	4.7	5.0	4.74	Challenging for children's self-regulation. Choosing the songs/stories at random seemed to ease children's disappointment.
	Acting Out	4.7	4.5	4.2	4.3	4.2	4.7	4.5	4.0	4.7	4.42	Assigning children to a role helped them to be more focused. Harder for shy children.
	Actor's Studio	4.6	3.8	4.0	4.0	3.6	3.8	4.3	3.8	4.2	4.01	Similar to existing activities. Suited to older children (4 to 5 years).
	Puppet Persuasion	4.5	4.3	5.0	4.5	4.5	4.5	4.5	4.3	4.8	4.54	Similar to existing activities but with different purpose.
	Filling Buckets	4.5	4.3	4.8	4.5	4.5	4.7	4.0	3.8	4.5	4.40	The book was useful in providing children new language. Suggested using coloured paper to help children visualise
	Blind Spot	4.4	3.7	4.2	4.4	4.2	4.2	3.8	4.3	4.4	4.18	May be too challenging for younger children (i.e., 3 to 4 years) but older children enjoyed the activity.
	PRSIST Yoga	4.0	3.5	4.0	4.0	3.5	3.5	4.0	4.0	4.0	3.83	Used to change mood and tempo of the day. Children felt calmer and more relaxed. Children not interested in one instance.
	Balloon Bounce	3.8	4.2	3.8	3.4	3.6	3.6	3.6	3.0	4.4	3.71	Similar to existing activities. Suggested implementing in smaller groups to manage enthusiasm.
	Same Difference	3.5	2.0	2.5	3.5	3.0	2.5	3.5	2.5	4.0	3.00	Children not particularly interested and needed a lot of educator support.

Note. Feedback is presented in summary form rather than direct quotations.

Table 5.3

Similarity of Activities to Current Practice, Likelihood of Continued Use and Group Size.

Area of self-regulation	Activity	Centres	Rooms (missing)	Would you do this activity again? (% yes)	Would the children do this activity again? (%yes)	Have you done this or a similar activity? (% yes)	What was the group size for this activity?
Behavioural	Awkward Opposites	4	4 (1)	100%	100%	75%	1 to 15
	Who Says?	3	3 (2)	100%	100%	67%	10 to 15
	Head'n Shoulders	5	6	100%	100%	67%	1 to 15
	Same Kind	5	5	100%	100%	60%	4 to 15
	Bursting Bubbles	3	3 (2)	100%	100%	33%	6 to 15
	Brace Race	2	2 (3)	100%	67%	33%	5 to 8
	Holding Fast	5	6	83%	83%	40%	3 to 25
	Disciplined Dance	4	5	83%	83%	83%	5 to 28
	Managing Musicians	5	6	80%	100%	67%	1 to 11
	Hot Potato	4	5 (1)	60%	60%	20%	3 to 25
Cognitive	Mr Wolf	5	6	100%	100%	100%	5 to 10
	Rhythm Repeat	5	5	100%	100%	80%	4 to 25
	Mind Reader	3	3 (2)	100%	100%	66%	2 to 15
	Hidden Hunt	3	3 (2)	100%	100%	50%	5 to 10
	Favourite Things	3	3 (2)	100%	100%	0%	2 to 15
	Eye Spy	3	3 (2)	100%	100%	0%	5 to 7
	Split Singing	5	5 (1)	60%	60%	20%	6 to 25
	Market Mixup	4	4 (2)	50%	50%	75%	3 to 15
	Secret Shadow	4	4 (1)	50%	50%	50%	3 to 10
Social and Emotional	Filling Buckets	5	6	100%	100%	67%	8 to 25
	Song & Story Lucky Dip	3	3 (2)	100%	100%	67%	6 to 25
	PRSIST Yoga	2	2 (3)	100%	100%	50%	5 to 10
	Reading Rounds	3	3 (2)	100%	100%	50%	2 to 6
	Actor's Studio	5	5	100%	100%	40%	3 to 20
	Puppet Persuasion	4	4 (1)	100%	100%	25%	5 to 10
	Acting Out	2	2 (3)	100%	100%	0%	4 to 8
	Balloon Bounce	4	5 (1)	80%	80%	50%	4 to 8
	Blind Spot	4	5 (1)	60%	80%	40%	2 to 12
	Same Difference	3	3 (2)	50%	50%	0%	4 to 10

5.4.2 Adult Practices

Educators described the adult practices as 'clear', 'informative' and 'relevant' to their contexts, and noted having learnt new information: ('[the adult practices were] very useful and [I] learnt that children's language development and skill influences their self-regulating skills'). Educators described these materials as beneficial for all educators and particularly for those who are new to the sector or have little knowledge in this area ('This would be a great resource for any centre, particularly to share with educators who are new to working in early education or who do not have a lot of knowledge of how to support children's emotional wellbeing'). While practices were more specifically intended for educator use, educators saw these as being likewise beneficial for families ('I thought they were really interesting reading and would be of benefit to families'). To enhance the use of these materials, educators suggested that the research team seeks to incorporate links between adult practices and the child activities.

5.4.3 Parent newsletter

While educators did not distribute parent newsletters to solicit feedback from families, four centers provided feedback regarding their own impressions of the materials. Educators identified the newsletters as beneficial for involving parents in supporting children's self-regulation ('It is great getting the parents involved in these self-regulation strategies'), while also saving educators time in having to compile and distribute this information themselves ('Helpful to have accessible, pre-written information which can be easily distributed to families, particularly when time for educators to compose this information themselves may be limited'). To improve these materials educators suggested reducing the amount of text and including links where additional information can be found.

5.4.4 Children's book (a compilation of child activities, linked to a story)

Centers were only provided a one-page excerpt of the children's book, so they were unable to provide detailed feedback regarding the overarching books or storyline. In their feedback, however, educators expressed that linking the activities to key plot points was beneficial in creating visual links and providing a convenient introduction to activities for adults ('Linking activities to the story content will appeal to the children and provide a convenient introduction for adults'). It was suggested that

activities should not appear on every page of the book ('Having activities listed on the pages seems like a good idea, but if there are activities listed on every page it may make the pages too busy').

5.5   Intervention revisions following feedback

5.5.1   Activity revisions

Revisions were made to 19 of the child activities based on feedback garnered from each centre. Broadly speaking, revisions related to: recommended group size ($n = 10$ activities), written instructions ($n = 6$ activities), extensions to increase the challenge ($n = 4$ activities), and variations to decrease the challenge ($n = 7$ activities; see Table 5.4 for a breakdown by activity). As per educator feedback, recommended group size was revised to suggest the utilisation of small groups until children become more familiar with the activity (except in the case of Same Kind where both small and large groups were recommended). Regarding the written instructions, revisions typically aimed to condense or enhance the clarity of instructions (e.g., Who Says?) or supplement information provided (e.g., elaborating on the potential benefits of the activity, inclusion of an equipment list). Given feedback related to the developmental appropriateness of activities, revisions also sought to note opportunities to either increase or decrease the level of self-regulation challenge. Suggestions to extend the level of challenge typically centred on involving children in the planning and decision-making process (e.g., coming up with their own words to the song for Awkward Opposites) or increasing the number of instructions to follow (e.g., including signals to play instruments 'soft' and 'loud' as well as 'fast' and 'slow' in Managing Musicians). Conversely, variations to decrease the level of challenge often included reducing or removing distractions/temptation (e.g., standing behind children while you call instructions rather than making them try to keep their eyes closed in Secret Shadow) and the simplification of instructions (e.g., using a visual 'stop' sign in Managing Musicians rather than a verbal prompt). One activity (i.e., Same Difference) was removed based on feedback, resulting in a total number of 28 activities.

Table 5.4

Activity Revisions

Area of self-regulation	Activity	Revisions			
		Group size	Written Instructions	Extension	Variation to simplify
Behavioural	Same Kind	X			
	Disciplined Dance	X			
	Who Says?		X		
	Awkward Opposites			X	
	Hot Potato		X		
	Head'n Shoulders	X		X	X
	Managing Musicians	X		X	X
Cognitive	Mr Wolf				X
	Mind Reader		X		
	Secret Shadow				X
	Market Mixup	X			X
	Rhythm Repeat	X			
	Favourite Things	X	X		
Social and emotional	Acting Out				X
	Puppet Persuasion			X	
	Blind Spot	X	X		
	Filling Buckets				X
	Actor's Studio	X			
	PRSIST Yoga	X	X		

5.5.2 Adult Practice

In response to educator feedback, links to child activities or other program materials were integrated in adult practices where possible to support links between intervention elements.

5.5.3 Parent newsletter

In response to educator feedback, links to other helpful information (including links to information hosted on the PRSIST website) were included on the parent newsletters.

5.5.4 Children's books

In line with educator feedback, child activities were only implemented on every two to three pages in children's book to limit "crowding", and the full compendium of child activities was provided at the back of each book.

5.5.5 Supplementary revisions

During the RCT evaluation of the PRSIST program educators were encouraged to provide ongoing feedback around the implementation of adult practices and child activities in monthly

teleconferences. During this process, educator feedback largely related to the difficulties experienced when implementing practices or activities with children who have limited language. In response to this feedback the following resources were developed and made available for download on the PRSIST website (www.prsist.com.au) during the intervention period:

1. Emotional Response Cards: visual cue cards with images portraying seven emotions (i.e., happy, sad, excited, scared, angry, confused and lonely) were created to use both in Actor's Studio and when communicating with children about emotions (see Appendix L).

2. Mind Reader Visuals: three cards depicting visual categories (i.e., shape, colour and size) were created for use in Mind Reader where children are required to guess the category the educator has sorted various objects by (see Appendix M).

3. Problem Solving Process Visuals: four visual cards depicting the scientific approach to problem solving (i.e., observe, predict, experiment and reflect). These visuals were developed to support the adult practice around engaging children in problem solving and encouraging persistence (see Appendix N).

4. Problem Solving Visuals: five cards depicting problems or conflicts typically experienced by children in the ECEC setting (e.g., someone is playing with a toy you want to play with, someone tells you that you cannot play with them etc.) and 13 solution cards (e.g., take turns, share, ask for help etc.). These cards were developed to support the adult practice around supporting children to engage in conflict resolution (see Appendix O).

5.6   Final PRSIST program

The PRSIST program aims to engage and enhance children's self-regulation skills–including their ability to set goals, sustain motivation and problem-solve–in ways that are low- to no-cost, play-based and compatible with the routines and practices of early childhood settings. Having been developed (in part) based on observation of current practices (Phase 1), piloting and refinement with early childhood educators (Phase 2), the PRSIST program is designed to provide a flexible approach to supporting self-regulation that can be adapted across a range of settings and in accordance with the variable needs of children. The complete program is comprised of several components including:

online PD videos, adult practices, child activities, a formative assessment tool for measuring self-regulation, and parent newsletters. All program elements are freely accessible and available for download on the PRSIST website (www.prsist.com.au). A general overview of the components within the PRSIST program are provided below. For a more detailed overview around the implementation of the program as part of the RCT evaluation see Chapter 7 and/or Howard et al. (2020).

5.6.1 Online professional development videos (PRSIST Talks)

The PRSIST Talks are a collection of nine PD videos accredited with the NSW Education Standards Authority and designed to support educators understanding of self-regulation and the ways in which they can foster its development. The total length of the professional learning videos are 1.5 hours (broken down into 5-15 minute segments for educator convenience). The PD was developed by Associate Professor Cathrine Neilsen-Hewett and was delivered as part of an evidence-based PD focused on enhancing ECEC quality and children's outcomes (see Fostering Effective Early Learning (FEEL) Study; Neilsen-Hewett et al., 2019; Siraj et al., 2018). Educators engaging with the PRSIST program are encouraged to watch the PRSIST Talks as a preface to engaging with the rest of the programs varied components.

5.6.2 Adult practices

The adult practices component of the program includes a collection of 11 core principles, and associated practices, for supporting children's early self-regulation. These principles suggest that educators:

1. Monitor children's development and use this to shape learning environments and experiences

2. Ensure children feel safe, secure and supported

3. Model self-regulation skills and engage in sensitive and responsive practices

4. Provide encouragement around children's processes to foster intrinsic motivation

5. Encourage children to lead and make choices

6. Engage children in problem solving and encourage them to take measured risks and persist with difficult tasks

7. Set and communicate appropriate expectations and boundaries relevant to the ECEC context

8. Support children to develop effective conflict resolution skills

9. Foster children's capacity to recognise and appropriately respond to their own emotions and those of others

10. Develop a sense of community within the setting and encourage children to engage in thinking about others

11. Promote effective communication by supporting children's language development

Adult practices were purposefully designed for the PRSIST program to complement the PRSIST Talks and provide opportunities for further learning. Both in the manual and on the website each principle is described (e.g., set and communicate appropriate expectations and boundaries relevant to the ECEC context), contextualised within an ECEC-based scenario (e.g., a child knocking down another child's construction) and specific practices for enacting the principle are detailed (e.g., employ the use of clear visuals to serve as a reminder for children not to touch the work of others). Specific links to relevant sections of the EYLF (DEEWR, 2009) are also included for each principle to ensure the adherence of practices to the EYLF and to support educators' documentation around the use of such practices. The development of adult practices was led by the candidate with the contribution of Associate Professor Cathrine Neilsen-Hewett and Associate Professor Steven Howard.

5.6.3   Child activities

The PRSIST program includes a collection of 28 play-based activities designed to engage and extend children's self-regulation skills. Activities were developed from activities and practices already occurring in high-quality settings (see Chapter 4) or newly created activities developed based on theoretical and empirical evidence (e.g, Bodrova & Leong, 2007; Hofmann et al., 2012; Razza et al., 2015; Smolucha & Smolucha, 2021; Tominey & McClelland, 2011; Williams & Berthelsen, 2019) and revised based on feedback from early childhood educators (see above). This includes activities such as games with rules, socio-dramatic play, yoga, mindfulness and other open-ended experiences (e.g., craft, literacy-based activities and problem solving tasks). To support educators understanding

of self-regulation as well as their planning around children's specific self-regulation needs, child activities are divided in to three categories corresponding to the domains of self-regulation, including: (1) behavioural; (2) cognitive; and (3) social and emotional. In addition to being made available online and in hard copy manuals, child activities were also compiled into three children's books (each relating to a different domain of self-regulation). Within each book, a selection of activities are linked to central plot points to provide educators with an authentic means of introducing the activity to the children (see Appendix I). At the back of each book the full compendium of activities for the relevant domain are also included. While the PRSIST program was specifically developed to ensure educator autonomy regarding the selection, timing, intensity and sequencing of activities, educators participating in the RCT evaluation were encouraged to complete a minimum of three activities of their choosing per week. The development of child activities and the children's books were led by Associate Professor Steven Howard with the contribution of the candidate and Associate Professor Cathrine Neilsen-Hewett and Illustrations by Simon Chadwick.

5.6.4   Formative assessment of self-regulation (PRSIST Assessment)

To appropriately plan for and address children's self-regulation needs it is essential that educators have a firm, objective understanding of children's current developmental capacities. To assist in this area, educators were given access to online training in the PRSIST Assessment (Howard et al., 2019) via the PRSIST website (www.prsist.com.au). This formative assessment involves the structured observation of children as they engage in two play-based activities (one individual and one group-based; see Appendix P for activity instructions). The observation is structured to focus educators' attention on key areas of self-regulation (e.g., attention, engagement, impulse control) and to provide actionable data based on children's developmental capacities (see Appendix Q for a copy of the score sheet). With consideration for the time burden imposed on educators implementing the program, the PRSIST Assessment was included as an optional component of the self-regulation intervention in this study.

5.6.5   Parent newsletters

To facilitate a connection with the home, six parent newsletters providing key information around early self-regulation were purpose designed and hosted online. Each newsletter is double-sided and provides information related to the nature and development of self-regulation, the important role it plays in children's development and the ways in which families can support its development within the home environment. The development of parent newsletters was led by Associate Professor Steven Howard with the contribution of the candidate and Associate Professor Cathrine Neilsen-Hewett.

5.7   Chapter summary

This chapter elaborated on the second phase in a two-phase approach to developing (in part) and refining an ECEC-based self-regulation intervention. While at its foundation the PRSIST Program draws on evidence-based literature around practices and experiences suggested to foster early self-regulatory development, consideration for the social validity of the program through engagement of educators in a piloting process allowed for the development of an ecologically valid approach to supporting self-regulation informed by the constraints and barriers of the ECEC context.

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Chapter 6: Educator beliefs around supporting early self-regulation: Development and evaluation of the Self-Regulation Knowledge, Attitudes and Self-Efficacy (Self-Regulation KASE) scale

Chapter 6 is the second publication in this thesis. It outlines development and validation of the Self-Regulation Knowledge, Attitudes and Self-Efficacy (Self-Regulation KASE) scale. This tool was developed to enable subsequent phases of this PhD research, in response to a lack of valid and reliable measures for assessing early childhood educators' beliefs around supporting early self-regulation. Creation of this tool permitted measurement of intervention effects on educators' beliefs.

6.1   Abstract

The current study sought to investigate the extent to which early childhood educators' confidence in knowledge, attitudes and self-efficacy for supporting early self-regulation predicted educator behaviour and children's self-regulation outcomes. Data from a diverse sample of 165 early childhood educators participating in a cluster Randomised Control Trial evaluation of a self-regulation intervention were utilised to evaluate the construct validity, reliability and predictive properties of the Self-Regulation Knowledge, Attitudes and Self-Efficacy scale. Evaluation via traditional (EFA, Cronbach's Alpha) and modern approaches (Rasch Analysis) yielded a valid and reliable 25-item scale, comprising three distinct yet related subscales (i.e., confidence in knowledge, attitudes, self-efficacy). For educators assigned to the intervention group, self-efficacy significantly predicted educators perceived competency to implement the self-regulation intervention as well as their perceptions around the effectiveness of the intervention to enhance children's self-regulation. For educators assigned to the control group (i.e., practice as usual), educator attitudes longitudinally predicted children's end-of-year status and change in self-regulation (over 6 months later). Findings from this study suggest the importance of pre-school educators' beliefs for fostering early self-regulation and highlight a need to further explore the impact of these beliefs with regard to educator engagement with intervention.

6.2   Introduction

Compelling evidence for the pivotal role of self-regulation for lifelong outcomes, and its susceptibility to change over and above age-related development, have propelled it to the forefront of contemporary efforts to enhance children's developmental trajectories (Moffitt et al., 2011; Wass et al., 2012). In terms of enacting self-regulatory change in the early years, the ubiquity of Early Childhood Education and Care (ECEC) and critical role of educator practice for shaping children's outcomes (Melhuish et al., 2015) have seen a proliferation of ECEC-based self-regulation interventions (e.g., Bodrova & Leong, 2007). While such approaches often utilise educators as

mediators for enacting child self-regulatory change, no ECEC-based self-regulation intervention studies to date have sought to consider or measure intervention effects on educator characteristics which underpin practice (e.g., educator beliefs); nor have they considered how differing levels of such characteristics (e.g., more positive attitudes) may influence educator engagement in training or effective implementation of intervention endorsed practice. This is likely exacerbated by lack of valid and reliable tools for measuring such characteristics as they relate to supporting early self-regulation. The current study thus sought to construct and evaluate an educator-report questionnaire of confidence in knowledge, attitudes and self-efficacy for supporting early self-regulation development. Predictive validity analyses were also undertaken to investigate whether and to what extent educator scores on this scale predicted educator's engagement with and perception of a self-regulation intervention and the self-regulation abilities of children in their care.

Although it is diversely conceptualised in the literature (Burman et al., 2015), self-regulation can be generally defined as encompassing the ability to direct and control cognitive, behavioural, social and emotional processes facilitating goal attainment or desirable outcomes. More specifically, and adhering to strength-based models of self-regulation (to which the authors subscribe; Baumeister & Heatherton, 1996), successful self-regulation requires children to: (1) select a goal; (2) maintain sufficient motivation towards achieving said goal; and (3) have the capacity to overcome barriers towards achieving goals (whereby 'capacity' is underpinned by executive functions; i.e., working memory, cognitive flexibility and inhibition; Hofmann et al., 2012). In the context ECEC-based settings a well-regulated child will be able to, among other things, persist with challenging tasks, sustain attention and resist distraction, engage in prosocial behaviour (e.g., share toys, wait their turn) and appropriately manage emotional responses. While these skills develop rapidly across the first 5 years of life, there remains considerable heterogeneity in the development of early self-regulation (Montroy, Bowles, Skibbe, et al., 2016), with implications for both short- and long-term development. Individual differences in early self-regulation are linked with academic performance and social-emotional wellbeing in childhood (Howard & Williams, 2018), as well as health, financial and social outcomes in adulthood (Moffitt et al., 2011). Rather than fixed trajectories, however, longitudinal data

supports self-regulation as susceptible to change, with early interventions offering the greatest potential for pronounced and more stable improvements (Wass et al., 2012).

Efforts to mitigate early disparities in self-regulation acknowledge socializing agents such as parents (Sanders & Mazzucchelli, 2013) and early childhood educators (Diamond & Lee, 2011) as key catalysts for child-level change. Given the ubiquity of ECEC experiences and robust evidence of the positive impacts of educator practice (Mashburn et al., 2008), recent efforts have increasingly focused on early childhood educators as mediators for self-regulatory change (Diamond et al., 2019). Much of this research has sought to enhance educators' ability to support early self-regulation via training that targets factors which influence practice (e.g., knowledge, beliefs and skills; Fukkink & Lont, 2007; Zaslow et al., 2010).

While evaluations of ECEC-based interventions routinely investigate changes in reported or observed educator practice, and the extent to which these indicate program fidelity and influence child-level outcomes (e.g., Barnett et al., 2008); few studies have sought to investigate how intervention efficacy may vary by educator beliefs, through their impact on perceptions of and engagement with the program. Indeed, few tools exist to capture these characteristics, and none specifically in relation to children's self-regulation. This domain-specificity is important given suggestion that educator beliefs may vary across domains (i.e., self-efficacy for numeracy instruction can differ from self-efficacy for literacy instruction; Gerde et al., 2018). Given the prevalence of ECEC-based self-regulation interventions, investigation of educator beliefs that can influence program engagement, practice and child outcomes is of importance.

Theoretically, educator beliefs have been positioned as central to educator behaviour including instructional practice and engagement with training. Applying the principles of Social Learning Theory to receptiveness to 'innovations'–which includes, but is not limited to, openness to and implementation of a novel approach–Bandura (2006) suggested the interplay between behavioural, cognitive and environmental factors as contributing to innovation adoption. For instance, Bandura (2001) emphasised the importance of cognitive factors for influencing change in behaviour (e.g., individuals are less likely to enact something if they think it is unimportant or ineffective) and influencing interpretations of the environment (e.g., individuals are less likely to enact something if

they perceive the environment as lacking the necessary supports). In his research, Bandura (2001) highlights beliefs, including educator attitudes and self-efficacy, as important variables influencing educator behaviour. Within other models of educator behaviour and child outcomes (e.g., multidimensional models of professional competence; Baumert & Kunter, 2013; Blömeke, 2017; models of effective professional development; Fukkink & Lont, 2007; Zaslow et al., 2010) the integration of both professional knowledge and professional beliefs for enhancing educator practice and outcomes is likewise considered essential. In this context, knowledge and beliefs function in a distinct but complementary manner for influencing behaviour.

In terms of beliefs impacting educator behaviour, empirical evidence suggests educator perceptions of their own knowledge as influential to both practice and engagement with professional learning. Variability in perceptions of one's own knowledge has been found to be associated with information-search behaviours as well as assimilation of new information (Park et al., 1988; Radecki & Jaccard, 1995). That is, greater confidence in one's knowledge–regardless of the accuracy of these perceptions–is associated with lesser motivation to seek out or acquire new information (Radecki & Jaccard, 1995). This is particularly problematic given the low correspondence between genuine and perceived knowledge (Hammond, 2015; Sangster et al., 2013). Further, research suggests those with low confidence in their knowledge, or high recognition of gaps in their knowledge, demonstrate: (a) a better global comprehension of new information; (b) a greater likelihood to downgrade the importance given to old pre-learned information; and (c) a greater tendency to resolve conflicts between old and new information by giving preference to new information (Park et al., 1988). In education, confidence in knowledge is also linked with instructional practice, yet the exact nature of the relationship between knowledge and receptiveness to intervention remains unclear (Borg, 2001).

Pedagogical attitudes are another belief identified as shaping educator practice for support children's development. For instance, educator endorsement of child-centred learning (i.e., children as having shared authority and reciprocity in learning, versus their passive reception of knowledge and instruction; Hur et al., 2015), is associated with organised classroom structures (Rimm-Kaufman et al., 2009) and the promotion of children's autonomy and decision-making (McMullen et al., 2006)– both of which are associated with enhanced self-regulation. Children who are taught by educators

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taking a child-centred approach also tend to show enhanced outcomes in both academic (Marcon, 2002) and non-academic domains (Hur et al., 2015). Research also suggests that the alignment of educators' domain-specific (e.g., self-regulation) attitudes and related training is important for adoption of training-endorsed practice (Brackett et al., 2012; Schultz et al., 2010). In the context of self-regulation and learning teacher attitudes about self-regulated learning have been evidenced as positively correlating with and predicting self-reported practices (i.e., the design of learning environments and implementation of instructional strategies conducive to self-regulated learning; Dignath-van Ewijk & van der Werf, 2012; Steinbach & Stoeger, 2018; Yan, 2018) as well teacher openness to engaging with and implementing professional learning (Steinbach & Stoeger, 2018), although these findings have been mixed (Spruce & Bol, 2015).

Lastly, educators' pedagogical self-efficacy–beliefs about their capacity to engage in practices that achieve desired instructional outcomes (Bandura, 1977)–are found to influence educator's willingness and efficacy for implementing endorsed practices. Where educators are confident in their ability to implement instructional practices, research shows they are more likely to do so (Turner et al., 2011). In relation to self-regulation, research finds positive associations between educator self-efficacy and the implementation of practices suggested to be important for self-regulation development (e.g., greater support and responsiveness, establishment of positive classroom climates; Guo et al., 2012). In the context of children's outcomes, however, there is research to suggest a dyadic relationship between teachers' self-efficacy to support self-regulation and the expression of children's self-regulatory abilities. In considering the effects of children's behaviour on teacher self-efficacy Zee et al. (2016) demonstrated externalised behaviour as negatively predicting teacher self-efficacy for supportive practice. Findings also suggested that this association was further exacerbated by the perceived level of classroom misbehaviour. Conversely, the same study also found a positive association between children's prosocial behaviour and teacher self-efficacy to engage in supportive practices. Together these findings suggest triadic reciprocal causation (Bandura, 1986) between teacher self-efficacy, educator behaviour and children's self-regulation and necessitate the need for a scale which allows for the investigation of this within early childhood samples.

This study sought to develop and evaluate a tool for measuring educators' confidence in knowledge, attitudes and self-efficacy in relation to fostering young children's self-regulation. Evaluation of the *Self-Regulation Knowledge, Attitudes and Self-Efficacy (Self-Regulation KASE)* scale's construct validity, reliability and predictive validity were conducted utilising a sample of educators participating in a cluster randomised controlled trial evaluation of the Preschool Situational Self-Regulation Toolkit (PRSIST) Program (Howard et al., 2020). Baseline data (i.e., prior to intervention) were used to evaluate the construct validity and reliability of the scale. Post-intervention data were used to investigate the predictive validity of the Self-Regulation KASE scale with regard to: children's self-regulation after a year with control group educators (i.e., to what extent did educators' beliefs predict child self-regulation, uninfluenced by intervention); and educators engagement with and perceptions of the intervention. It was expected that lower levels of educator confidence in knowledge and more positive attitudes and higher self-efficacy would be associated with greater program fidelity, thereby suggesting a greater 'readiness for change'. It was further expected that child outcomes would be predicted by these educator beliefs, thereby supporting these factors (as captured by this scale) as correlates of children's development and outcomes.

6.3   Methods

6.3.1   Participants

Participants for this study were recruited from 52 ECEC services to ensure diversity in geography (75% metropolitan), catchment area SES (socioeconomic deciles 1-10; $M = 6.20$, $SD = 2.48$), and statutory government assessment rating (i.e., 44% Exceeding, 50% Meeting, 4% Working Toward, 2% unrated against the National Quality Standard). From these services, consent was obtained for 180 educators working with children in their final pre-school year. Complete Self-Regulation KASE scales were returned by 165 educators (98.8% female), a 91.7% participation rate. Participating educators were diverse in their qualifications (4-year degree, $n = 61$; 2-year diploma, $n = 56$; 1-year certificate, $n = 41$; no formal qualifications, $n = 7$), positions (Director, $n = 9$; Room Leader, $n = 30$; Educators, $n = 126$), employment status (full-time, $n = 99$; part-time, $n = 47$; casual, n

= 10, did not report, *n* = 9), and years of experience (*M* = 10.41, *SD* = 7.12, range = 0.17–36.00). On average, respondents were employed in their current workplace for 4.35 years (*SD* = 3.70, range = 0.00–20.00). Responses to 19 individual items were missing for a small number of participants (n = 6). Rather than estimate these values these cases were listwise delete from each analysis.

6.3.1.1 Predictive validity sampling

Predictive validity of children's self-regulation was investigated in the control group. This subsample was comprised of 66 early childhood educators (98.5% female), from 24 services, who provided start-of-year Self-Regulation KASE data and were still working in the service at post-test data collection (to ensure sufficient opportunity to impact children's development). While the initial sample included educators from 26 services, one service was excluded from analyses given all participating educators were no longer working in the service at post-test data collection and the second was excluded as they were unable to recruit child participants. The self-regulation of their 207 control group children (47.8% girls, mean age = 4.99 years, *SD* = 0.39, range = 3.74–5.88) was assessed an average of 6 months after administration of Self-Regulation KASE scales to educators (*M* = 203.78 days, *SD* = 18.76, range = 175.50–239.00).

Predictive validity of educators' program engagement and perceptions was examined with the 56 intervention group educators (100% female), from 24 services. As above, the initial sample included educators from 26 services, however, one service was excluded as participating educators were no longer working in the service at post-test data collection and the other did not participate with the program as they were unable to recruit child participants. Participants again included only those who were still working in the service in the same role at post-test data collection and completed all measures. Given random assignment to groups, characteristics of the intervention and control group participants were consistent with those of the full sample (i.e., educator characteristics, child characteristics, average time from baseline to post-test). Informed, written consent was obtained for all participating educators and from the parents/caregivers of all children from whom data were collected.

6.3.2 Measures

6.3.2.1 Educator Knowledge, Attitude and Self-Efficacy scale

The Self-Regulation KASE scale was developed to measure educators' cognitive beliefs (i.e., perceived confidence in knowledge, attitudes and self-efficacy) in relation to supporting the development of early self-regulation in ECEC contexts. The content of the Self-Regulation KASE scale was devised and revised following a three-step approach (similar to that outlined by Osterlind, 2006). First, a content review of the topic was conducted to determine aspects important for early self-regulation development. On the basis of this review, 45 items were developed that distributed across three hypothesised subscales: confidence in knowledge of self-regulation and self-regulatory development (16 items); attitudes on the nature and importance of early self-regulation (10 items); and self-efficacy for supporting self-regulation (19 items). To reduce positively skewed responses among participants, items in the attitudes subscale included four reverse-scored items. Scale items were then reviewed by an independent sample of 50 early childhood educators for items' clarity, comprehension and appropriateness and the items were revised on the basis of this feedback.

The final revised scale consisted of 45 statements distributed across three subscales: confidence in knowledge (e.g., 'I understand the range of factors that undermine children's self-regulation'), attitudes (e.g., 'I think educators play an important role in fostering children's self-regulation') and self-efficacy (e.g., 'I feel confident that I can challenge and extend children's self-regulation abilities in everyday activities'). Whereas self-report measures routinely adopt Likert scales to indicate subjective interpretations of degree (e.g., strongly agree), frequency (e.g., very often) or accuracy of item statements (e.g., very true), the Self-Regulation KASE scale involves a 0 to 100 rating (following the direction of Bandura, 2006). This was done for two main reasons: (1) easier interpretability for respondents as a percentage (e.g., 'I believe I know ~X% about this topic'; 'I am X% confident I could implement this to positive effect'); and (2) to potentiate sufficient sensitivity to change (whereas even just a one point improvement on a 5-point Likert scale requires a substantial real-world change to detect–e.g., from 'most of the time' to 'all the time'). In the current scale, ratings ranged from 0 to 100 for each item in the confidence in knowledge (from 0 = 'no knowledge' to 100 = 'know everything'), attitudes (from 0 = 'do not agree' to 100 = 'fully agree') and self-efficacy

subscales (from 0 = 'cannot do' to 100 = 'very certain can do'). At the time of the preliminary review (see above) educators reported to the researcher that the scale was intuitive and consistent with how they reflect on knowledge and skill (e.g., 'I am 80% confident I can do this'). No respondents who completed the scale in the preliminary review or in the current study reported difficulty using this scale (and there were no anomalous values or patterns indicating issues in understanding), and data showed good range and distribution (see Table 6.1).

6.3.2.2 Preschool Situational Self-Regulation Toolkit (PRSIST) Assessment

The PRSIST Assessment (Howard et al., 2019) is an observational measure of early self-regulation whereby children engage in activities and are rated on items relating to their cognitive self-regulation (e.g., 'Was the child engaged in the activity throughout its duration?') and behavioural self-regulation (e.g., 'Did the child remain in their seat and rarely fidget?'). The first activity is a group memory card game whereby a group of four children take turns flipping two-cards over at a time to find matching pairs. The number of matching pairs varies by child age (e.g., 8 pairs for 4-year-olds, 14 pairs for 5-year-olds) with each game taking approximately 10 minutes to complete. The second activity is an individual curiosity boxes activity which takes approximately 5-minutes to complete. In this activity children are presented with three boxes of increasing size and are asked to guess the contents of each box. To guess, children are instructed to follow four sequential steps and provide a guess after each step, this includes: (1) looking at the box (no touching); (2) gently lifting the box (no shaking); (3) shaking the box; and (4) closing their eyes and feeling the object in the box (no peeking). Rather than accuracy, children's performance on each of these tasks is scored based on observed behaviours. Specifically, observers rate each item on a 7-point Likert scale, with these scores reflecting the frequency and/or extent of that behaviour. Children's self-regulation was rated at the end of each activity, yielding two self-regulation ratings per child, which were averaged to derive cognitive and behavioural self-regulation indices. For this study the PRSIST Assessment was administered by trained research assistants who had exceeded minimum inter-rater reliability thresholds (i.e., a minimum correlation between ratings greater than $r = .70.$, a mean difference in ratings less than 0.75 points and at least 80% of item ratings within 1 point). Training included the

completion of an online training and assessment of rating (www.eytoolbox.com.au) as well as five joint observation and rating sessions alongside a member of the research team using video data. This measure has shown good construct validity, reliability (α ranging from .86 to .95), and concurrent validity with task-based self-regulation (rs ranging from .50 to .63) and school readiness measures (rs between .66 and .75; Howard et al., 2019).

6.3.2.3 Educator program engagement

Educators' engagement with the program was evaluated in terms of their completion of the online professional development modules. This was captured via log in and tracking functionality of the program website (and confirmed with educator report). A stated requirement of the intervention was the educators' engagement with the online training modules. Participant engagement was considered as an ordinal construct (i.e., 0 = did not make any attempt to engage with online training, 1 = engaged with less than half of the online training modules; 2 = engaged with more than half of the online training modules; and 3 = engaged with all of the online training modules).

6.3.2.4 Educator program perceptions

An adaptation of the Teacher Attitudes about Social and Emotional Learning (TASEL; Schultz et al., 2010) questionnaire was administered to intervention group educators at the end of the program, over 6 months later (M = 197.46 days, SD = 18.12, range = 161.50–225.60). The original TASEL questionnaire includes 22-items scored on a 6-point Likert scale (from 1 = 'strongly disagree' to 6 = 'strongly agree') yielding six subscales (for the complete list of items and subscales, see Schultz et al., 2010). This study used only eight relevant items relating to: (1) self-perceived confidence to deliver the program (Competence); and (2) perceptions of program effectiveness (Effectiveness). The original wording of each item was retained, with 'The PRSIST Program' identified as the program and 'self-regulation' identified as the targeted skill (e.g., 'Programs such as the PRSIST Program are effective in helping children learn self-regulation skills').

6.3.3 Procedure

Prior to any data collection, written informed consent was obtained from the centre directors, educators and parents/caregivers of children who participated in this research. Proceeding this, the

Self-Regulation KASE scale was distributed to participants electronically (or hard copy via registered post as needed) at the time of baseline data collection, before commencement of the intervention. Completed scales were collected either by research assistants attending the service for child data collection or emailed back electronically. Predictive validity measures (i.e., PRSIST Assessment, TASEL adaptation, engagement metrics) were collected at post-test assessment, per protocols published prior to study commencement (Howard et al., 2020). The average duration between baseline and post-test assessment was 200.62 days (SD = 18.52, range = 161.50–239.00). Ethics approval for this research was provided by the University of Wollongong's Human Research Ethics Committee (2017/451).

6.3.4 Plan for analysis

Construct validity of the Self-Regulation KASE scale was evaluated using exploratory factor analyses (EFA) and internal consistency analyses. Given that traditional analyses overlook other important features of a scale's function, however, Rasch analyses were also conducted. Rasch analyses permitted the additional evaluation of: whether items discriminated well between those higher and lower in the underlying construct (confidence in knowledge, attitudes, self-efficacy), *item misfit*; whether the scale functioned similarly across respondent characteristics (e.g., educator qualifications), or *differential item functioning*; whether some items were too highly correlated, or *local dependence*; and whether each subscale measured a single underlying construct, or *unidimensionality*. Together, the analyses offer comprehensive and robust evaluation of validity, reliability, and appropriate function of the scale–essential conditions for its use in subsequent research.

To also investigate the predictive validity of educators' responses to Self-Regulation KASE, linear regression analyses were conducted. Educators' start-of-year Self-Regulation KASE scores were used to predict, at end-of-year: (a) child self-regulation scores (control group); and (b) engagement and perceptions of the program (intervention group). To predict end-of-year child outcomes, a room-average of child self-regulation scores were regressed on room-average Self-Regulation KASE scores, given the influence of multiple educators per child, and small and

inconsistent numbers of educators per room that precluded multi-level analyses. Further, ordinal logistic regression was also conducted on the intervention group educators' start-of-year Self-Regulation KASE scores to predict engagement with the professional development training.

6.4   Results

6.4.1   Construct Validity: Exploratory Factor Analysis (EFA)

First, separate EFAs were conducted for each item set (confidence in knowledge, attitudes, self-efficacy), using maximum likelihood estimation and oblique (direct oblimin) factor rotation as it was expected that items would be correlated. The number of factors extracted was determined by the Guttman-Keiser criterion (eigenvalues > 1; Kaiser, 1960) and inspection of scree plots. Item assignment was determined by factor loadings (>.30) and theoretical justification (in cases of cross-loadings). In all cases, Kaiser-Meyer-Olkin (KMO) values were acceptable (all >.75) and Bartlett's tests of sphericity were significant (ps < .01), indicating that the sample and inter-item correlations were sufficiently large to justify EFA analysis. All items retained in the final scale and their descriptive statistics, factor allocation and factor loadings are provided in Table 6.1.

Table 6.1

Descriptive Statistics for Self-Regulation KASE Items by Subscale and EFA Factor Loadings

Subscale 1: Confidence in Knowledge (α = .97)	M	SD	Min	Max	Factor Loadings		
1 I understand the factors that contribute to the development of self-regulation	68.33	18.31	20.00	100.00	.88	.33	
2 I understand that self-regulation skills can change as children grow older	76.88	16.63	20.00	100.00	.81		.30
3 I understand how a child's self-regulation is linked to other areas of development	73.45	15.97	20.00	100.00	.79		
4 I understand the range of factors that undermine children's self-regulation	63.63	19.06	0.00	100.00	.89	.37	
5 I understand when self-regulation develops, and the extent of self-regulation children should be capable of at different ages	66.76	19.28	10.00	100.00	.86	.33	.30
6 I understand how to extend children who have difficulties self-regulating, in a range of ways, to support their development	66.18	18.69	10.00	100.00	.88	.36	
7 I understand how to extend children who have good self-regulation skills, in a range of ways, to support their continued development	66.00	19.43	0.00	100.00	.91	.30	
8 I understand that children's ability to self-regulate can vary across days, contexts and groups	75.64	17.82	10.00	100.00	.84		
9 I understand the distinction between encouragement and praise, and the implications of each for self-regulation	71.07	18.56	0.00	100.00	.86	.33	
10 I understand how different social groupings can influence children's self-regulation	73.09	16.54	10.00	100.00	.87		

Subscale 2: Attitudes (α = .79)	M	SD	Min	Max	Factor Loadings		
1 I think how children self-regulate now (prior to school) is important for their life-readiness	93.29	11.68	50.00	100.00	.30	.37	.74
2 I think that self-regulation skills can change as children grow older	92.04	11.60	40.00	100.00			.70
3 I think educators play an important role in fostering children's self-regulation	94.30	9.23	60.00	100.00		.43	.72
4 I think that assessment of children's self-regulation is important	89.94	14.22	40.00	100.00		.37	.50

Subscale 3: Self-Efficacy (α = .93)	M	SD	Range		Factor Loadings		
			Min	Max			
1 I feel confident that I can work collaboratively with co-workers in supporting children's self-regulation	89.29	13.77	20.00	100.00		.57	.42
2 I feel confident that I can implement practices that have a positive effect on children's self-regulation	86.52	13.48	50.00	100.00		.71	.48
3 I feel confident that I can challenge and extend children's self-regulation abilities in everyday activities	81.58	14.91	40.00	100.00		.72	.55
4 I feel confident I can engage in and extend children's play to scaffold their self-regulatory development	82.33	15.01	30.00	100.00	.44	.77	.46
5 I feel confident that I can effectively manage children's challenging behaviours	76.76	13.58	50.00	100.00		.75	.33
6 I feel confident that I can develop children to be self-directed (i.e., self-regulated instead of other-regulated, autonomous rather than reliant)	74.66	15.62	0.00	100.00	.37	.82	
7 I feel confident I can effectively deal with children's conflicts	80.70	13.49	50.00	100.00	.31	.82	.35
8 I feel confident I can enforce expectations consistently across the setting	78.62	16.08	10.00	100.00		.80	.45
9 I feel confident engaging children in a structured process of problem solving	80.84	14.88	20.00	100.00		.82	.45
10 I feel confident I can work effectively with parents to promote consistency between ECEC and the home	78.20	17.20	10.00	100.00		.80	
11 I feel confident I can provide useful information to parents about how to support their child's self-regulatory development at home	75.88	18.34	0.00	100.00	.43	.80	

Note. Mean (*M*), standard deviation (*SD*) and range are reported for all items. Data in this table were derived from a sample of 159 educators. Items are presented and bolded for the factors they were assigned to for Cronbach alpha (*α*) computations. Only factor loadings > .30 are presented here.

6.4.1.1 Confidence in knowledge

For the 16 items on confidence in knowledge of self-regulation, examination of eigenvalues and scree plots supported a one-factor structure that explained 74.8% of the variance in educators' ratings. All items loaded well on this factor. Reliability analysis indicated high internal consistency for confidence in knowledge items ($\alpha = .98$).

6.4.1.2 Attitudes

For the 10 attitude items, eigenvalues and scree plot supported a three-factor solution that explained 60.7% of the variance in educators' responses. The first factor can broadly be considered as attitudes around the importance and development of self-regulation, consisting of three items. Although loading most highly on a separate factor, two additional items cross-loaded onto this factor and were conceptually similar, and thus were included in this factor. Reliability analysis indicated high internal consistency amongst these items ($\alpha = .81$). The resultant factor thus includes items around: the importance of early self-regulation; its growth with age; and educators' role in supporting its growth. The two other attitudes factors were unreliable (αs = .66, .44), and thus were not considered for further analysis. To confirm the one-factor structure, a final EFA was conducted on retained items, which yielded a one-factor structure that explained 58.6% of the variance.

6.4.1.3 Self-efficacy

For the 19 items on self-efficacy to support children's self-regulation, eigenvalues suggested a 4-factor structure with a strong first factor explaining 56.4% of variance (the second through fourth factor each explained <10%), whereas scree plots suggested a 1-factor structure. All factor loadings were >.39 on the first dominant factor, providing further support for a one-factor solution. Reliability analysis indicated high internal consistency amongst these items ($\alpha = .95$), supporting this one-factor solution.

6.4.2   Modern Test Theory Evaluation: Rasch analysis

The polytomous Rasch model (PRM) with partial credit parameterization was run for all subsequent analyses, using Rasch Unidimensional Measurement Modeling 2030 software (Andrich et al., 2010).

6.4.2.1 Model fit

Overall fit of the data to theoretical expectations of the Rasch model is tested by the item-trait interaction X^2 statistic, whereby the null hypothesis is that the data fit the model. All three subscales indicated good fit to the model (all $ps > .10$; see Table 6.2). The person separation index (PSI), which provides a reliability estimate similar to Cronbach's alpha, indicated good to excellent reliability (.79-.96) for all three scales.

Table 6.2

Fit of Subscales to the Rasch Model

Subscale	Item-Trait Interaction			PSI	Unidimensionality
	Value (*df*)	*p*			
Confidence in Knowledge	21.30 (22)	.500		.96	16.7%*
Attitudes	15.20 (10)	.120		.79	3.6%
Self-Efficacy	13.41 (20)	.859		.91	8.5*

Note. PSI = person separation index. For Item-Trait Interaction, $p<.05$ is statistically significant. Unidimensionality >5% (*) suggests potential multidimensionality. These results were obtained after misfitting items were removed. Data is derived from a sample of 159 educators.

6.4.2.2 Item fit

Each item was examined to determine whether they discriminated well between those higher and lower in the underlying construct (e.g., confidence in knowledge). Item misfit is detected by: (1) fit residuals that exceed the acceptable ranges (i.e., <-2.50 or >2.50); (2) significant chi square and F statistics, whereby the null hypothesis is that an item fits the Rasch model (i.e., $p < .05$ indicates misfit); and (3) graphically through each item's characteristic curves (ICCs), which plots the item's raw data against the theoretical model estimates. Inspection of fit statistics and ICCs indicated misfit in three items of the confidence in knowledge subscale: *I understand what self-regulation is*, fit residual = 3.50, X^2 = 12. 94, $p < .002$, F =4.95, $p < .009$; *I understand the ingredients of successful self-regulation are (i.e., the factors that are required for a child to succeed in self-regulating),* fit residual = -4.43, X^2 = 7.67, $p < .03$, F = 7.75, $p < .001$; *I understand how language influences children's self-regulation,* fit residual = 2.88, X^2 = 1.57, $p = .46$, F = 0.47, $p = .623$). In the Self-Efficacy subscale, misfit was detected in 7 items: *I feel confident that I can actively improve (over*

and above what can be expected due to increasing age) a child's self-regulation over the course of a

year, fit residual = 3.74, X^2 = 13.60, *p* < .002; *F* = 4.92, *p* < .009; *I feel confident that I can have an*

impact on the aspects of my setting that influence children's self-regulation, fit residual = 3.17; *I feel*

confident that I can communicate productively with co-workers about children's self-regulatory

needs, fit residual = 3.17, *I feel confident I can observe children to understand their developmental*

progress in self-regulation, *F* = 8.01, *p* < .001; *I feel confident I can support children to quickly*

recover from negative emotional states, fit residual = 2.74; *I feel confident discussing children's*

challenging behaviours with parents, fit residual = 2.51; *I feel confident I can support children's self-*

regulatory development even without support from the home, fit residual = 6.56, X^2 = 53.63, *p* < .001;

F = 13.08, *p* < .001. For a summary of fit and misfit statistics see Table 6.3. Misfitting items were

removed due to these issues of misfit and, on further reflection on the scale items, conceptual

misalignment with remaining items. All other subscales indicated appropriate item fit.

Table 6.3

Individual Item Fit of the Three Subscales

Item #		Fit Residual	Chi Square	*p*	*F*	*p*
Confidence in Knowledge						
1	I understand the factors that contribute to the development of self-regulation	-0.69	0.87	.647	0.48	.617
2	I understand that self-regulation skills can change as children grow older	0.73	0.88	.644	0.38	.685
3	I understand how a child's self-regulation is linked to other areas of development	1.99	5.56	.062	2.50	.085
4	I understand the range of factors that undermine children's self-regulation	-0.72	2.95	.229	1.69	.188
5	I understand when self-regulation develops, and the extent of self-regulation children should be capable of at different ages	0.61	0.72	.697	0.43	.649
6	I understand how to extend children who have difficulties self-regulating, in a range of ways, to support their development	-0.41	0.41	.813	0.27	.763
7	I understand how to extend children who have good self-regulation skills, in a range of ways, to support their continued development	-2.26	5.13	.077	4.14	.018
8	I understand that children's ability to self-regulate can vary across days, contexts and groups	-0.19	0.82	.663	0.40	.670
9	I understand the distinction between encouragement and praise, and the implications of each for self-regulation	-0.58	0.28	.869	0.20	.818
10	I understand how different social groupings can influence children's self-regulation	-0.93	1.07	.585	0.68	.509
	I understand what self-regulation	3.50	12.94	.001	4.95	.008
	I understand the ways that self-regulation will influence a child's choices, behaviours and reactions	-0.34	1.17	.556	0.59	.558
	I understand the different types of self-regulation, and the ways each can manifest in a child's behaviours	1.30	0.99	.609	0.32	.724
	I understand the ingredients of successful self-regulation are (i.e., the factors that are required for a child to succeed in self-regulating)	-4.43	7.67	.022	7.75	.000
	I understand how language influences children's self-regulation	2.88	1.57	.457	0.47	.623
	I understand how taking risks influences children's self-regulation	-0.89	0.73	.686	0.56	.575
Attitudes						
1	I think how children self-regulate now (prior to school) is important for their life-readiness	-0.52	2.30	.317	0.79	.456
2	I think that self-regulation skills can change as children grow older	-0.15	3.35	.187	1.66	.195
3	I think educators play an important role in fostering children's self-regulation	-0.49	4.10	.129	2.02	.138
4	I think that assessment of children's self-regulation is important	0.43	4.59	.101	1.37	.259
	I think that my practices (e.g., routines, room layout, activities provided for) can have an impact on children's self-regulation	0.86	0.90	.636	0.30	.745

Item #		Fit Residual	Chi Square	*p*	*F*	*p*
Self-efficacy						
1	I feel confident that I can work collaboratively with co-workers in supporting children's self-regulation	0.13	1.07	.585	0.32	.726
2	I feel confident that I can implement practices that have a positive effect on children's self-regulation	0.19	0.645	.742	.317	.729
3	I feel confident that I can challenge and extend children's self-regulation abilities in everyday activities	0.23	0.264	.876	.179	.821
4	I feel confident I can engage in and extend children's play to scaffold their self-regulatory development	-0.046	1.60	.449	0.94	.390
5	I feel confident that I can effectively manage children's challenging behaviours	.795	1.93	.381	1.02	.361
6	I feel confident that I can develop children to be self-directed (i.e., self-regulated instead of other-regulated, autonomous rather than reliant)	-1.16	3.89	.142	2.52	.083
7	I feel confident I can effectively deal with children's conflicts	-1.38	2.61	.270	1.87	.157
8	I feel confident I can enforce expectations consistently across the setting	-0.381	0.58	.745	0.27	.757
9	I feel confident engaging children in a structured process of problem solving	-1.30	6.70	.035	4.38	.014
10	I feel confident I can work effectively with parents to promote consistency between ECEC and the home	0.50	0.38	.827	0.12	.880
11	I feel confident I can provide useful information to parents about how to support their child's self-regulatory development at home	0.59	0.42	.808	0.17	.843
	I feel confident that I can actively improve (over and above what can be expected due to increasing age) a child's self-regulation over the course of a year	**3.74**	**13.60**	**.001**	**4.92**	**.008**
	I feel confident that I can have an impact on the aspects of my setting that influence children's self-regulation	2.92	6.44	.039	2.55	.081
	I feel confident that I can communicate productively with co-workers about children's self-regulatory needs	2.52	0.67	.715	1.32	.271
	I feel confident that I can observe children to understand their developmental progress in self-regulation	-2.19	9.45	.008	8.01	.000
	I feel confident that I can use observation data to plan effective strategies to support each child's self-regulatory development	-1.97	3.14	.207	2.50	.084
	I feel confident I can support children to quickly recover from negative emotional states	2.74	4.94	.084	2.92	.103
	I feel confident discussing children's challenging behaviours with parents	-2.51	6.96	.035	2.46	.088
	I feel confident I can support children's self-regulatory development even without support from the home	**6.56**	**53.63**	**.000**	**13.08**	**.000**

Note. Data in this table were derived from 159 educators. Items with fit residuals < -2.5 and > 2.5 are considered misfiting and appear in bold. Chi squares and *F* statistics (*F*) are evaluated against Bonferroni adjusted *p*-values (*p*), significant at: *p* < .003 (.05/16) for Confidence in Knowledge; *p* < .01 (.05/5) for Attitudes; *p* < .01 (.05/8) for Self-efficacy 1; *p* < .003 (.05/19). Items causing response dependency were considered misfiting and are italicised.

6.4.2.3 Differential item functioning (DIF)

DIF was conducted to evaluate whether the scale functioned similarly across respondent characteristics (e.g., educator experience). That is, DIF evaluates whether two or more groups of individuals with differing characteristics (e.g., recent graduates, mid-service professionals, long-service professionals) with the same levels of the trait respond differently to certain items. Ideally, measurement scales should be sample independent, and significant DIF can indicate misfit to the Rasch model. We evaluated DIF as a function of: (1) educator qualification; and (2) number of years in the sector. DIF was found for one item in the Attitudes subscale – *I think that my practices (e.g., routines, room layout, activities provided for) can have an impact on children's self-regulation* – which differed in function by educators' qualifications ($F = 7.78$, $p < .001$ at Bonferroni adjusted alpha $= .01$). The main source of variation occurred in the mid-service professionals who were responding to this item much lower than expected. This was confirmed when the item was split (i.e., by removing the mid-service professionals from the analysis). This item was removed from the scale due to its differential item functioning.

6.4.2.4 Test of local dependence

An important assumption of the Rasch model is that how a person responds to one item should not affect their response on any other. In order to test this assumption a principal components analysis (PCA) is run on standardised residuals (the 'left over' components after the variance associated with the construct under measure is extracted from the data; Tennant & Conaghan, 2007). The residual correlation matrix revealed that in the confidence in knowledge subscale, four pairs of items were highly correlated ($r > .30$): *I understand the ways that self-regulation will influence a child's choices, behaviours and reactions* with Item 3 ($r = .48$); *I understand the different types of self-regulation, and the ways each can manifest in a child's behaviours* with Item 4 and Item 5 (rs $= .31$ and $.32$); and *I understand how taking risks influences children's self-regulation* with Item 10 ($r = .32$). In Self-Efficacy, the residuals were highly correlated for Item 4 with *I feel confident that I can use observation data to plan effective strategies to support each child's self-regulatory development* ($r = .47$); and Item 9 with *I feel confident discussing children's challenging behaviours with parents*

($r = .33$). The italicised items above were removed on the basis of retaining the stronger item (e.g., had less effect on subscale reliability, most conceptually aligned), which resolved these response dependency issues and significantly improved fit statistics (from $p = .29$ to $p = .86$ of the item trait interaction X^2). The decision was made to retain item 9 over *I feel confident discussing children's challenging behaviours with parents*, given the latter was problematic in terms of item misfit.

6.4.2.5 Unidimensionality

Final analyses evaluated whether resultant subscales measured a single underlying construct. When a small number of cases are significantly different from each other (< 5% of the total sample) this is taken as evidence of the scale's unidimensional structure. Smith's (2002) *t*-tests at the 5% level indicated that subscale for Attitudes (3.6%) had a unidimensional structure. The self-efficacy (8.5%) and confidence in knowledge (16.7%) subscales indicated some evidence of violation of unidimensionality assumptions (see Table 6.2), suggesting these subscales may have been tapping into more than one common dimension. A final EFA was conducted on the Rasch-reduced scale to further examine this possibility.

6.4.3 Final EFA on Rasch-reduced scale

A final EFA was run on all retained scale items. Again, the KMO statistic indicated sufficient sampling, KMO = .91, and Bartlett's test of sphericity was significant $X^2(300) = 3482$, $p < .01$. Eigenvalues and scree plots supported a three-factor structure–such that all items loaded on their anticipated confidence in knowledge, attitudes or self-efficacy subscale–that explained 69.1% of the variance. Item allocations and factor loadings are presented in Table 6.1.

6.4.4 Correlations between subscales

Correlation analyses were used to investigate the relationship between the three subscales after item removal. Results suggest that correlations between all subscales were statistically significant ($ps < .01$). Analysis showed moderate associations between attitudes and self-efficacy (r = .49) and weaker associations for confidence in knowledge with attitudes (r = .25) and with self-efficacy (r = .39).

6.4.5 Prediction of child outcomes: Linear regression

To extend evidence for the validity of the scale in relation to its associations with educators' actual behaviours and child outcomes, two linear regressions were undertaken. In the control group subsample, when all predictor variables were analysed together educator attitudes at the start of the year significantly predicted children's end-of-year self-regulation scores, $F(3, 20) = 4.39$, $p = .016$, $R^2 = .40$, $\beta = .52$, $p = .017$, as well as change in children's self-regulation scores across the year (i.e., evaluated by inclusion of children's baseline self-regulation as a covariate), $F(4, 19) = 3.97$, $p = .017$, $R^2 = .46$, $\beta = .44$, $p = .045$. Neither confidence in knowledge nor self-efficacy significantly predicted children's self-regulation outcomes. All predictor standardised beta (β) weights and p values are reported in Table 6.4.

Table 6.4

Predictors of Children's Scores on the Preschool Situational Self-Regulation Toolkit (PRSIST) Assessment

	PRSIST Time 2				PRSIST Time 2		
	B	*SE B*	*β*		*B*	*SE B*	*β*
Model 1				**Model 2**			
Confidence in Knowledge	-.013	.011	-.231	Confidence in Knowledge	-.011	.011	-.198
Attitudes	.037	.014	.516*	Attitudes	.031	.014	.436*
Self-Efficacy	.013	.014	.194	Self-Efficacy	.013	.013	.195
-	-	-	-	PRSIST Time 1	.303	.213	.255

Note. PRSIST = Preschool Situational Self-Regulation Toolkit assessment. *B* = unstandardised regression weights. *SE* = Standard error for the unstandardised beta; β = standardized regression weights. *p<.05. Data in this table were derived from 66 educators and 207 children from 24 services.

6.4.6 Prediction of Perceived Program Effectiveness and Competency to Implement: Linear Regression

Linear regression analyses were undertaken to examine the relationship between educators' confidence in knowledge, attitudes and self-efficacy and: (1) educator perceptions about the potential efficacy of self-regulation intervention programs like the PRSIST Program; and (2) educators' perceived competency to implement the PRSIST Program, controlling for years of experience. When all predictor variables were analysed together only the self-efficacy subscale was a significant

predictor of educators' perceptions of self-regulation program effectiveness, $F(4, 51) = 2.69$, $p = .041$, $R^2 = .17$, $\beta = .37$, $p = .037$, and their perceived competence to implement the PRSIST Program, $F(4, 51) = 2.19$, $p = .084$, $R^2 = .15$, $\beta = .37$, $p = .037$. Confidence in knowledge, attitudes and years of experience in the sector were not significant predictors for either outcome variable (although attitudes was a significant predictor of perceived effectiveness when considered independently, $F(2, 53) = 2.58$, $p = .085$, $R^2 = .09$ $\beta = .30$, $p = .029$). All predictor standardised beta (β) weights and p values are reported in Table 6.5.

Table 6.5

Predictors of Educators' Perceptions of Program Effectiveness and Competence to Implement the PRSIST Program

	Effectiveness			Competence		
	B	***SE***	***β***	***B***	***SE***	***β***
Confidence in knowledge	-.007	.005	-.191	-.008	.006	-.184
Attitudes	.009	.012	.124	.002	.014	.023
Self-Efficacy	.022	.010	.368*	.026	.012	.373*
Years in sector	.008	.012	.089	-.010	.014	-.091

Note. B = unstandardised regression weights. SE = Standard error for the unstandardised beta; β = standardised regression weights. *$p < .05$. Data in this table were derived from 56 educators.

6.4.7   Prediction of Educator Engagement: Ordinal Logistic Regression

Finally, to investigate the extent to which Self-Regulation KASE ratings predicted educators' actual engagement with the PRSIST Program, an ordinal logistic regression was run using participation in the online professional development modules as the outcome variable. Results indicated that none of the subscales significantly predicted educator engagement in the online professional development training when analysed together, $\chi 2(3) = 4.20$, $p = .241$: confidence in knowledge, $B = -.001$, $SE = .015$, $p = .971$ [95% CI -0.03–0.03]; attitudes, $B = .048$, $SE = .037$, $p = .196$ [95% CI -0.03–0.12]; and self-efficacy, $B = .014$, $SE = .029$, $p = .644$ [95% CI -0.04–0.07].

While these results indicated no significant prediction of educator beliefs on their engagement with the intervention, there was a priori theoretical reason to expect that these beliefs may be influential to educators' instigation of an intervention. Follow-up binary logistic regressions thus

regressed perceived knowledge, attitudes and self-efficacy on educators' instigation of the intervention (0 = did not commence, n = 16 educators; 1 = any to complete engagement, n = 40 educators). Results indicated both attitudes, $\chi^2(1)$ = 6.94, p = .008, OR = 1.09 [95% CI 1.02 –1.17], p = .015, and self-efficacy, $\chi^2(1)$ = 4.80, p = .028, OR = 1.06 [95% CI 1.00 –1.12], p = .035, significantly predicted whether educators instigated engagement with online professional development, however, confidence in knowledge was not a significant predictor, $\chi^2(1)$ = 2.24, p = .134, OR = 1.02 [95% CI 0.99–1.06].

6.5   Discussion

The current study sought to develop and evaluate a new self-report measure of early childhood educators' confidence in knowledge, attitudes and self-efficacy for supporting children's self-regulation development. Evaluation of the Self-Regulation KASE scale supported a 25-item scale yielding three distinct–yet related–reliable subscales: confidence in knowledge about self-regulation (10 items); attitudes around the importance and development of self-regulation (4 items); and self-efficacy to support self-regulation development (11 items). Predictive validity was also demonstrated. For participants engaging in routine practice, educators' attitudes at baseline significantly predicted children's end-of-year status and change in self-regulation, more than 6 months later. For educators engaged in a practice-based self-regulation intervention, self-efficacy at baseline predicted educator perceptions around the effectiveness of the program and their confidence to implement it. In contrast to other scales for assessing educators' cognitive beliefs in relation to child development, this scale provides: insights specifically related to child self-regulation; integration of multiple important factors influencing educators' practice and readiness for change; and predictive validity evidence supporting this. While further use of this scale should be evaluated among different and broader samples of early childhood educators, the triangulation of validity evidence supports the integrity and practical utility of the Self-Regulation KASE scale.

Results indicated a valid and reliable four-item attitude subscale, capturing aspects related to the importance and development of early self-regulation. While educator attitudes around self-regulation were generally positive (e.g., early self-regulation is important; educators can have an

impact on children's self-regulation), this was not universally the case and variability in responses predicted children's end-of-year self-regulation status and change for those engaging in routine practice. This is consistent with suggestions that educators' attitudes towards children's learning differentially predict adopted practices (McMullen et al., 2006) and the developmental outcomes of children in their care (Youn, 2016). Replication of this finding in the current study, in relation to self-regulation, suggests the valid and sensitive capture of educators' self-regulation attitudes using this scale.

For those engaging in a professional practice intervention, contrary to expectations (Bandura, 2006) educator attitudes at the commencement of the study were not significantly associated with their program perceptions (i.e., program effectiveness and competence to implement) or engagement with the professional development training (Steinbach & Stoeger, 2018). Given the positive association between attitudes and self-efficacy (Özokcu, 2018; Savolainen et al., 2012), and their moderate correlation in these data, it may be that when analysed concurrently self-efficacy serves as a stronger, more-direct predictor of educators' program perceptions and engagement. Attitudes, by contrast, might have a more indirect role in this regard (e.g., attitudes influencing information search behaviours and self-efficacy). Alternatively, it may be that other factors related to the individual (e.g., educator burnout) or the organisation (e.g., perceived curricula or managerial support) play a moderating role (Ransford et al., 2009). When analysing engagement as a binary construct, however, educators' attitudes did predict whether educators made any initial attempts to engage with the program (irrespective of whether they completed it). This finding is consistent with the literature which suggests cognitive beliefs such as attitudes to be important for intentions to engage with professional learning (Demir, 2010; Dunn et al., 2018). It is important for future research to investigate the nature of this relationship between educator attitudes, behaviour and children's self-regulation outcomes.

Consistent with suggestions in the literature (Deforest & Hughes, 1992), educators' self-efficacy was the stronger predictor of perceptions of effectiveness of the self-regulation intervention and their competence to implement it. While perceptions of a program and its probability of success are likely to be important precursors to engagement with said program, findings from this study did

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not support a significant association between educator self-efficacy and variable engagement with the program. When analysing engagement as a binary construct, however, self-efficacy did predict whether educators made any initial attempts to engage with the program (irrespective of whether they completed it). Rationalising this finding, engagement with the intervention may have been moderated by contextual factors (e.g., time, managerial support, accessibility of resources) or educator perceptions regarding the novelty of content (i.e., whether or not it contained already acquired information). Nevertheless, the above findings in conjunction with evidence for the variability of self-efficacy across content areas (i.e., self-efficacy differs across mathematics and literacy instruction; Gerde et al., 2018) highlights the necessity for measurement of domain-specific self-efficacy where currently it is often measured as a general construct (e.g., the Teacher Sense of Efficacy Scale; Tschannen-Moran & Woolfolk Hoy, 2001). The validation of a reliable scale for measuring educators' self-efficacy to support self-regulation development is thus potentially useful for appraising readiness for change in ECEC-based self-regulation interventions.

While research supports the facilitative role of educator self-efficacy for children's outcomes–a finding which was non-significant in the current study–it may be that other factors moderated the strength of this association. For instance, despite educator confidence to support self-regulatory development, structural aspects within the ECEC setting (e.g., time, allocation of resources, managerial support) may have inhibited the enaction of such practice. In the instance that educators did enact practice supportive of self-regulatory development, confounding variables related to the child (Blair, 2010; Bohlmann et al., 2015; Williams & Berthelsen, 2017), the home learning environment (e.g., parental instruction; Williams et al., 2017) or peers (Montroy, Bowles, & Skibbe, 2016) may have exerted a stronger influence on children's self-regulatory development. Despite a non-significant finding in these data, the development and validation of a scale measuring educators' self-efficacy specifically with regard to supporting early self-regulation potentiates further investigation of the suggested relationship between self-efficacy, enacted practice and children's self-regulatory outcomes (e.g., Guo et al., 2012).

Despite a documented tendency for respondents to overestimate their knowledge (Epstein et al., 1984), there are also findings that confidence in knowledge is influential to consequent behaviours

(Borg, 2001; Radecki & Jaccard, 1995). This scale captured variability amongst educator responses of their confidence in knowledge; however, this did not predict educators' perceptions of, or engagement with, the program, or children's self-regulation outcomes. Indeed, there is a prevailing lack of clarity around the specific nature of this purported relationship. On the one hand, low confidence in knowledge has been associated with implementation of shallower learning experiences (e.g., lecturing versus interactive child-centred approaches) and the avoidance of direct instruction and spontaneous or impromptu teaching (Borg, 2001, 2005). On the other hand, studies examining confidence in knowledge in grammar instruction have reported a negative relationship between confidence in grammar knowledge and incidence of grammar instruction (Pahissa & Tragant, 2009). While the exact nature of the relationship between confidence in knowledge and learning/instructional practice is unclear, the current scale provides a means from which to further investigate these issues.

6.5.1 Limitations and future directions

Following from these comprehensive analyses (i.e., EFA, Rasch) and triangulation of results (i.e., predictive validity) to evaluate this scale, future research should seek to confirm the structure and function of the scale through confirmatory factor analysis with different and broader samples of educators. While the high proportion of females in this sample (98.8%) is reflective of the sector, future research should seek to explore potential gender differences in terms of the scale's function. Given the good range in distribution afforded by the 0 to 100 scale and extending the utility of the scale, future research should also seek to investigate the extent to which self-report ratings on this scale are susceptible to change (i.e., after time) to examine the viability of this scale as measure of change for self-regulation interventions targeting educator characteristics and instructional practice.

6.6   Conclusions

Results from this study demonstrate support for the viability of this educator-report questionnaire of their confidence in knowledge, attitudes and self-efficacy around supporting early self-regulation development. The scale showed converging evidence of construct reliability and predictive validity, which potentiates theoretical, empirical and intervention research for exploring

early childhood educators' roles in generating change in children's self-regulation (and under what conditions this occurs). Given the importance of self-regulation for children's short- and long-term outcomes, and the significant role of early education in influencing this development, this scale is an important facilitator for understanding those characteristics that are likely to underpin the engagement, learning and practices of educators in relation to fostering children's early self-regulation.

6.7   References

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Chapter 7: An Early Start to Self-Regulation: Evaluating the Effects of an Early Childhood Self-Regulation Intervention on Educator Beliefs, Knowledge and Practice

Manuscript submitted for publication to *Early Education and Development.*

Vasseleu, E., Neilsen-Hewett, C., Cliff, K., & Howard, S.J. (2021). Evaluating the effects of a self-regulation intervention on educator beliefs and examining perceptions of change to knowledge and practice [Manuscript submitted for publication]. *Early Education and Development.*

Chapter 7 is the third of three manuscripts that comprise this thesis. This chapter details the cluster randomised control trial evaluation of the efficacy of the PRSIST Program utilising a large and geographically dispersed sample of 117 educators from 50 ECEC services across NSW, Australia. Specifically, this study adopted a mixed-method approach to: (1) evaluate the effects of the PRSIST intervention on educator beliefs, using the Self-Regulation KASE scale; and (2) explore educators' perceptions of change to knowledge and practice as a consequence of the intervention.

7.1   Abstract

This mixed-methods study reports on a cluster RCT evaluation of the Preschool Situational Self-Regulation Toolkit (PRSIST) program with 50 ECEC services across New South Wales, Australia. Supplementing previous reporting of the program's effects on child outcomes, this study reports on the effects of the PRSIST Program on educator beliefs (i.e., confidence in knowledge, attitudes and self-efficacy) and explores perceptions of change to educators' knowledge and practice. *Research findings:* Following involvement in the PRSIST Program early childhood educators experienced increased confidence in their knowledge of self-regulation and reported a change to their understanding of what self-regulation is and how it develops. Educators and their directors also noted a positive change to educator practice for supporting self-regulation. No significant changes to educators' attitudes related to self-regulation or self-efficacy for supporting its development were found. *Policy and practice:* Increasingly, the field of ECEC is looking at factors which relate to quality practice and, more importantly, shifts in practice. Findings from this study suggest the importance of examining educator-level change within a professional development framework and suggests opportunities for future program evaluations.

7.2   Introduction

Early childhood education and care (ECEC) is a critical context influencing children's short- and long-term outcomes (Melhuish et al., 2015). Within these ECEC settings, educator practice has been highlighted as a particularly strong predictor of children's outcomes across health, academic and social domains (Sylva et al., 2014). Given both the ubiquity and influence of ECEC, recent efforts to shift children's developmental trajectories have increasingly focused on ECEC (and early childhood educators) as key contexts and drivers for intervention. For instance, considerable efforts have leveraged these contexts to promote the development of early self-regulation (i.e., the ability to both supress and overcome maladaptive impulses), given evidence for its longitudinal importance (Howard & Williams, 2018), its variable development (Montroy, Bowles, Skibbe, et al., 2016) and its susceptibility to change (Moffitt et al., 2011). Despite frequent utilisation of educators as

'interventionists' for ECEC-based self-regulation programs, few studies have moved beyond evaluating intervention effects on children's outcomes, to additionally consider the impact of training on educators' beliefs and behaviours. Without this, it is unclear to what extent programs may yield necessary and lasting change amongst the educators to generate child-level change and, for programs with limited efficacy evidence, whether this is due to the program or issues in implementation (e.g., educator buy-in). The current study thus reports on the effects of a self-regulation intervention on educators' beliefs (i.e., confidence in knowledge, attitudes and self-efficacy), and perceived changes to their knowledge and practices, supplementing previous reporting on effects of the program on child outcomes (Howard et al., 2020).

7.2.1 Self-regulation as a promising target for intervention

Although diversely conceptualised in the literature (see Burman et al., 2015), self-regulation is commonly defined by the ability to both supress and overcome salient, maladaptive impulses across cognitive, behavioural, social and emotional domains. In the preschool years, a child with good self-regulation will often readily share with other children, clean up without prompting and persist when faced with difficult tasks. That is, they can resist urges and impulses and behave in a manner that is compatible with the context or their current goals. While the early years are characterised by rapid growth in the development and integration of processes central to self-regulation (e.g., language, motor control, executive functions; Diamond, 2002; Whitebread & Basilio, 2012), research suggests variability in the trajectories of children's early self-regulation development, with implications for their short- and long-term outcomes (Howard & Williams, 2018; Robson et al., 2020). In childhood, for instance, early variability in self-regulation predicts outcomes relating to school success, interpersonal functioning and psychological wellbeing (Robson et al., 2020; Smithers et al., 2018). Through adolescence and into adulthood, better self-regulation in the preschool years predicts better health, higher levels of educational attainment, better work performance and enhanced interpersonal functioning (Howard & Williams, 2018; Robson et al., 2020). Encouragingly, longitudinal findings imply the possibility for generating sustained improvements in self-regulation–over and above expected developmental change–and suggests various influences likely to support this change

(Cadima et al., 2015; Diamond & Lee, 2011; Ferreira et al., 2016; Hamre et al., 2012; Montroy, Bowles, & Skibbe, 2016). Given this rapid growth and potential for change, interventions targeted towards the early years may represent our best opportunity to achieve significant and sustained improvements in children's self-regulation skills (Wass et al., 2012).

7.2.2 ECEC as a setting for intervention

Following only the home environment, research consistently finds ECEC as one of the most influential settings impacting child development (Melhuish et al., 2015). Over and above the effects of attendance alone, international longitudinal studies (e.g., the Effective Pre-School, Primary and Secondary Education (EPPSE) project; Sylva et al., 2010) provide robust evidence for the moderating effect of ECEC quality on children's outcomes–with high quality settings predicting enhanced cognitive, social and academic adjustment (NICHD Early Child Care Research Network, 2002; Sylva et al., 2011; Tayler et al., 2017). While research in this area suggests the influential role of both structural aspects of ECEC (e.g., smaller adult-child ratios; higher levels of educator educational attainment; ongoing engagement in training; safe facilities) and process-related aspects (e.g., warm and responsive adult-child interactions; developmentally appropriate curricula; leadership-endorsed collaboration; engagement with the home learning environment), the latter has been identified as a stronger, more proximal predictor of children's outcomes (Mashburn et al., 2008; Melhuish et al., 2015).

The significant role of the educator for ensuring process quality is highlighted in research that shows educator practices strongly and longitudinally predicting children's outcomes (Mashburn et al., 2008; Melhuish et al., 2015). In the context of supporting early self-regulation, research of high-quality practice has yielded some insights into pedagogical strategies associated with greater self-regulation development. For instance, classrooms characterised by high levels of emotional support (i.e., heightened educator responsiveness, promotion of autonomy and educator-child closeness) have been positively associated with important facilitators of self-regulation (e.g., language and working memory; Cadima et al., 2019; de Wilde et al., 2016; Hamre et al., 2014), as well as predicting self-regulation gains across the school-year (Cadima et al., 2015). Similarly, high levels of classroom

organisation characterised by appropriate management of children's time, attention and engagement, have been found to support the self-regulation, engagement and academic achievement of young children (Hatfield et al., 2016; Rimm-Kaufman et al., 2009). High instructional quality has also been identified as a predictor of self-regulatory growth, including practices to support children's active and extended engagement in learning experiences, encourage conflict resolution, communication and reasoning, and provide feedback (Fuhs et al., 2013; Gialamas et al., 2014; Rimm-Kaufman et al., 2009). Despite the influence of high-quality ECEC for children's development and outcomes, current findings suggest suboptimal quality amongst a considerable proportion of the Australian ECEC sector (Cloney et al., 2016; Siraj et al., 2019; Tayler et al., 2013). For instance, both regulatory assessments of quality (i.e., the National Quality Standards; ACECQA, 2017) and data collected in large scale research studies of Australian ECEC quality (see Cloney et al., 2016; Siraj et al., 2019; Tayler et al., 2013) identify significant variability in quality of provision. This is the case for several areas identified as supportive of children's self-regulation development, namely: educator-child relationship (ACECQA, 2022); support for children's social and emotional wellbeing (Siraj et al., 2019); room organisation and instructional support (ACECQA, 2022; Cloney et al., 2016; Tayler et al., 2013); and interactions that support children's thinking, understanding and capabilities (Siraj et al., 2019; Tayler et al., 2013).

7.2.3 Enhancing educator practice through professional development

Recent efforts to bolster the quality of provision within ECEC have increasingly emphasised educator training. While this has included increasing the attainment and quality of educators' formal qualifications, research also shows evidence for efficacy among professional development (PD) approaches, which aim to enhance process quality via training that targets in-service educators' knowledge, skills and beliefs (Fukkink & Lont, 2007; Slot, 2018). Theoretical models of change within a PD framework imply a multi-step path from educators' engagement with PD to improved child outcomes (see Fukkink & Lont, 2007). Within these models, it is proposed that educators' engagement with PD and its components (i.e., the who, what and how; Buysse et al., 2009) can change educator knowledge and beliefs, and thus their practice, with consequent benefits for

children's development. Amongst efforts to foster self-regulation, ECEC-embedded approaches that target educator practice and programming are among the most extensively researched (Pandey et al., 2018). While efficacy findings *en masse* are mixed, ECEC-embedded approaches–which typically comprise elements of educator training (PD) alongside the provision of activities expected to support self-regulation development–often have been found to generate significant and stable changes in self-regulation (Barton et al., 2014; Diamond & Lee, 2011; Luo et al., 2020; Pandey et al., 2018).

Among these curriculum approaches, programs including Tools of the Mind (Tools; Bodrova & Leong, 2007) and Preschool Promoting Alternative Thinking Strategies (Preschool PATHS; Kusche & Greenberg, 1994) are some of the most widely used and investigated. Based on Vygotskian principles (1978), the Tools curriculum requires educators to deliver more than 40 play-based activities designed to simultaneously target children's academic skills (e.g., reading with a peer) and self-regulatory abilities (e.g., taking turns reading; Bodrova et al., 2011). During activities, educators scaffold children's learning through the provision of cognitive strategies such as self-talk and use of external aids to guide attention and memory (e.g., displaying an image of an ear as a reminder to listen; Bodrova et al., 2011). As the key drivers for program implementation, educators are required to attend extensive training (i.e., workshops, lunch-time meetings and in-service consultation) designed to enhance their understanding of self-regulation and how they can support its development, and support educators' capacity to scaffold individual learning using Tools activities. Notwithstanding some mixed efficacy findings (see Baron et al., 2017), studies have indicated that committed participation in the Tools curriculum can yield significant improvements in computer-based executive function tasks (Diamond et al., 2007) and on educator reports of problem behaviours (Barnett et al., 2008).

Diverging from the Tools curriculum, which includes some focus on academic domains (i.e., literacy and numeracy), Preschool PATHS adopts a curriculum focused exclusively on the promotion of social and emotional competencies. For this program, educators deliver one out of a total 30 lessons per week categorised into thematic units (i.e., compliments, basic and complex feelings, self-control strategies and problem solving; Domitrovich et al., 2007). In addition to lessons, educators are required to provide extension activities to promote the generalisation of concepts. To deliver this

program, educators attend 2 days of training focused on key principles of the program, its research and exploration of resources. During this time educators are also provided an opportunity to practice example lessons from the curriculum (Hughes & Cline, 2015). In accordance with findings from Domitrovich et al. (2007), children who participated in Preschool PATHS for 9 months became more emotionally literate, had more social competence and were less socially withdrawn than their control-group counterparts.

Despite the prevalence of these and other PD efforts to impact child self-regulation through change in educational curricula and educator practices, the extent to which PD successfully influences educators' knowledge, beliefs and practice is not often considered in the evaluation of these programs. Rather, change in child outcomes are the primary, and often only, outcome variable of interest and are taken as implicit evidence of educator-level change. Evaluation of change in educator beliefs can yield important insights into moderators of practice and child-level change (e.g., whether a program with low efficacy is more likely related to an ineffective approach, or insufficient educator buy-in or uptake), and the likelihood of sustained practice change beyond the intervention period (e.g., if the educators "believe in" the approach, its efficacy and its sustainability; Borg, 2018).

7.2.4 Important role of educator beliefs

Beliefs are broadly understood as personal constructs or judgements that are formed over time and considered to be true by the individual (Pajares, 1992). Given diversity in the characterisation of beliefs (e.g., as explicit or implicit, stable or dynamic, specific or generalisable), Fives and Buehl (2012), emphasised "the need for clarity in characterising the specific belief or belief system under investigation" (p. 487). In accordance with conclusions of Fives and Buehl (2012), the authors contend that educator beliefs may: (a) be both known and unknown to the individual; (b) exist within a complex and interconnected system, such that inconsistent beliefs may coexist; (c) be inconsistent with knowledge; (d) be susceptible to change; (e) either relate to or exist independent of the situation or setting; and (f) serve different functions or roles in relation to educator learning and practice.

Empirical support for the importance of educator beliefs shows the influential role they play in supporting educators to interpret or 'filter' information, providing educators with a framework for

decision-making, and guiding educators' intentions and behaviour (Fives & Buehl, 2012). Moreover, different beliefs contribute to different functions (Buehl & Beck, 2014; Fives & Buehl, 2012). These different types of beliefs include, but are not limited to, attitudinal beliefs (i.e., beliefs related to the acceptability or preferability of something; Ajzen, 2001), self-beliefs (e.g., confidence in one's own knowledge and capabilities; Borg, 2001; Guo et al., 2012), and beliefs about content (e.g., beliefs about the different bodies of knowledge they teach to children or learn themselves, including beliefs about self-regulation; Fives & Buehl, 2012). Consistent with Fives and Buehl's conceptualisation of beliefs, these beliefs need not be wholly consistent or stable, and can have differential impacts on expectations and practice.

In terms of attitudinal beliefs, research suggests educators' acceptance of specific principles–such as children's role in the learning process, the value of certain child abilities, or of teaching practices–as influential to educators' practice (Hur et al., 2015). For example, endorsement of child-centred learning over direct instructional approaches (i.e., children as having shared authority and reciprocity in learning versus their passive reception of knowledge and instruction; Hur et al., 2015) is associated with the promotion of children's autonomy and decision-making (McMullen et al., 2006), higher global ratings of care, and greater sensitivity (Hughes-Belding et al., 2012). The alignment of educators' content-specific attitudes (e.g., on self-regulation) with the content of in-service training has also been suggested as important for the adoption of training-endorsed practice (Brackett et al., 2012; Schultz et al., 2010). In the context of self-regulation and learning, for instance, better alignment between educators' attitudinal beliefs and training content has been identified as predicting educators' openness to implementing professional learning strategies, and changes in practice (Dignath-van Ewijk & van der Werf, 2012; Steinbach & Stoeger, 2018; Yan, 2018).

Similarly, self-beliefs about educators' capacity to engage in practices that achieve desired instructional outcomes (i.e., self-efficacy; Bandura, 1977) are a particularly salient predictor of behaviour. For example, in one study by Abrami et al. (2004), educators' self-reported self-efficacy to implement cooperative learning strategies was a stronger predictor of their actual implementation than were their beliefs about the cost or value of such strategies. Extending this to self-regulation, research has found positive associations between educators' self-efficacy to positively influence children's

development and their implementation of practices important for self-regulation development (e.g., greater support and responsiveness, establishment of positive classroom climates; Guo et al., 2012).

Educators' knowledge beliefs, irrespective of their accuracy, are another type of self-belief associated with their behaviours. In terms of educators' learning, confidence in knowledge has been found to be negatively associated with information search behaviours (Radecki & Jaccard, 1995) and consolidation of new information (i.e., educators with lower confidence in their knowledge are more likely to adopt and give preference to new information; Park et al., 1988). Confidence in knowledge has also been linked to instructional practice, although the nature of this relationship remains unclear (Borg, 2001). On the one hand, lower levels of perceived knowledge have been associated with the implementation of shallower learning experiences (e.g., educator-centred approaches) and avoidance of responsive or incidental teaching (Borg, 2001, 2005). On the other hand, studies examining perceived knowledge in grammar instruction report a negative relationship between confidence in grammar knowledge and incidence of grammar instruction (Pahissa & Tragant, 2009), suggesting an overemphasis on content areas where educators feel their knowledge may be lacking. Taken together, the above findings suggest a need for ECEC-embedded interventions to consider the extent to which intervention engagement may influence educator beliefs and explore educator perceptions of change, both of which may yield key insights into moderators of practice and child-level change, and the likelihood of sustained practice change beyond the intervention period.

7.2.5   The current study

The current study addressed this gap by evaluating educator change following from an ECEC-embedded self-regulation program: The Preschool Situational Self-Regulation Toolkit (PRSIST) program. The PRSIST Program was developed by Howard et al. (2020) to provide educators working in Australian ECEC contexts with a low-cost, play-based approach for supporting self-regulation development. More specifically, the PRSIST Program was developed to address limitations in current approaches relating to high implementation costs (Barton et al., 2014), program inflexibility (i.e., programs such as Tools and PATHS require the adoption of a set curriculum), and lengthy training (Luo et al., 2020), as well as a dearth of available evidence-based approaches suitable

for implementation within Australian ECEC settings (i.e., Tools and PATHS are not available for implementation in Australia). Its individual program components–including online PD, adult practice guide and purpose-designed child self-regulation activities–were developed in consideration of the important role of educator knowledge and beliefs and a model of self-regulation that considers goal setting, motivation and capacity (where capacity is underpinned by executive functions; Hofmann et al., 2012), as necessary for successful self-regulation (Baumeister & Heatherton, 1996). To target educator knowledge and beliefs around self-regulation, online PD was designed to support educators to: refine their understanding of self-regulation based on the available best-evidence; understand those factors that contribute to or impede child self-regulation; develop and maintain realistic expectations of children's capacity to self-regulate; and understand the significance of their role in supporting children's self-regulatory development. This information was coupled with the provision of supportive adult practices and child activities, which were expected to have a positive effect on educators' self-efficacy to support children's self-regulation within their settings.

While the efficacy of the PRSIST Program for achieving child-level change has been reported elsewhere (see Howard et al., 2020), the current study sought to (i) evaluate the effects of the PRSIST Program on educators' beliefs related to self-regulation, and (ii) explore educators' perceptions of change to knowledge and practice following from their participation. A mixed-method cluster randomised controlled trial (RCT) design was adopted to evaluate efficacy of the program for effecting change in educators' perceived knowledge (given the importance of educators' perceptions of their knowledge, and the few agreed 'facts' about self-regulation that can be tested), attitudes and self-efficacy for supporting early self-regulation. Educators' quantitative ratings of their self-regulation perceived knowledge, attitudes and self-efficacy were collected at the beginning and end of children's final pre-school year. It was hypothesised that engagement in the PRSIST Program would enhance educators' confidence in their knowledge of self-regulation, foster more positive attitudes related to self-regulation and enhance their self-efficacy for supporting children's self-regulation. Qualitatively, educators' experiences of change in their knowledge and practice were also examined via interviews, conducted with participating intervention group educators and their directors (where the educator and director were still working at the same centre in the same role the following year).

7.3 Methods

7.3.1 Participants

Participating educators were recruited from 50 pre-school centres participating in a cluster RCT evaluation of the PRSIST self-regulation program (Howard et al., 2020). Centres were sampled from metropolitan and regional areas of New South Wales, Australia and were broadly representative of the ECEC sector with respect to geography (84% metropolitan), socio-economic decile for their catchment area ($M = 5.91$, $SD = 2.24$, range $= 1–10$), and statutory quality assessment rating (i.e., 44% Exceeding, 48% Meeting, 4% Working Toward, 4% unrated against the National Quality Standard). Given the study's focus on children in the final year of pre-school (i.e., children ages 4-5 years) educators were recruited if they worked directly with children in this age range. This yielded a baseline sample of 152 educators ($n = 79$ control; $n = 73$ intervention). Educators in this sample were: predominately female (99.3%), which is consistent with the characteristics of the sector (The Social Research Centre, 2017); and diverse in their qualifications (4-year degree, $n = 52$; 2-year diploma, $n = 52$; 1-year certificate, $n = 41$; no formal qualifications, $n = 7$), employment status (full-time, $n = 91$; part-time, $n = 44$; casual, $n = 10$, did not report, $n = 7$), and years of experience ($M = 10.21$, $SD = 7.11$, range $= 0.17–36.00$). On average, respondents were employed in their current workplace for 4.25 years ($SD = 3.58$, range $= 0.00–16.00$). One-hundred and seventeen educators participated at follow-up, with attrition due to resignation ($n = 19$), maternity or other leave ($n = 9$), a change in work roles ($n = 5$), withdrawal ($n = 1$), or invalid data at baseline (i.e., participant engaged with training prior to baseline data collection; $n = 1$). Demographic splits were largely comparable to baseline sample.

Educators and directors from the intervention group were also invited to participate in follow-up interviews where: (a) the centre was included in the per-protocol sample; (b) both the educator(s) and director still worked at the centre, and in the same role; and (c) the educator(s) had themselves engaged with the PD. Of the 25 intervention centres, 11 were identified as meeting the eligibility criteria ($n = 5$ were not per-protocol and $n = 5$ had a change in leadership; n = 4 no longer employed educators who had completed the PD). From eligible centres, 10 provided written consent to

participate ($n = 1$ declined), yielding a sample of 12 educators and 10 directors. A final sample of 12

educators and 8 directors participated in post-intervention interviews ($n = 2$ directors went on leave

prior to scheduling their interview). The flow of participants throughout the study is depicted in

Figure 7.1.

Figure 7.1

CONSORT Flowchart of Stages and Participants in the Study
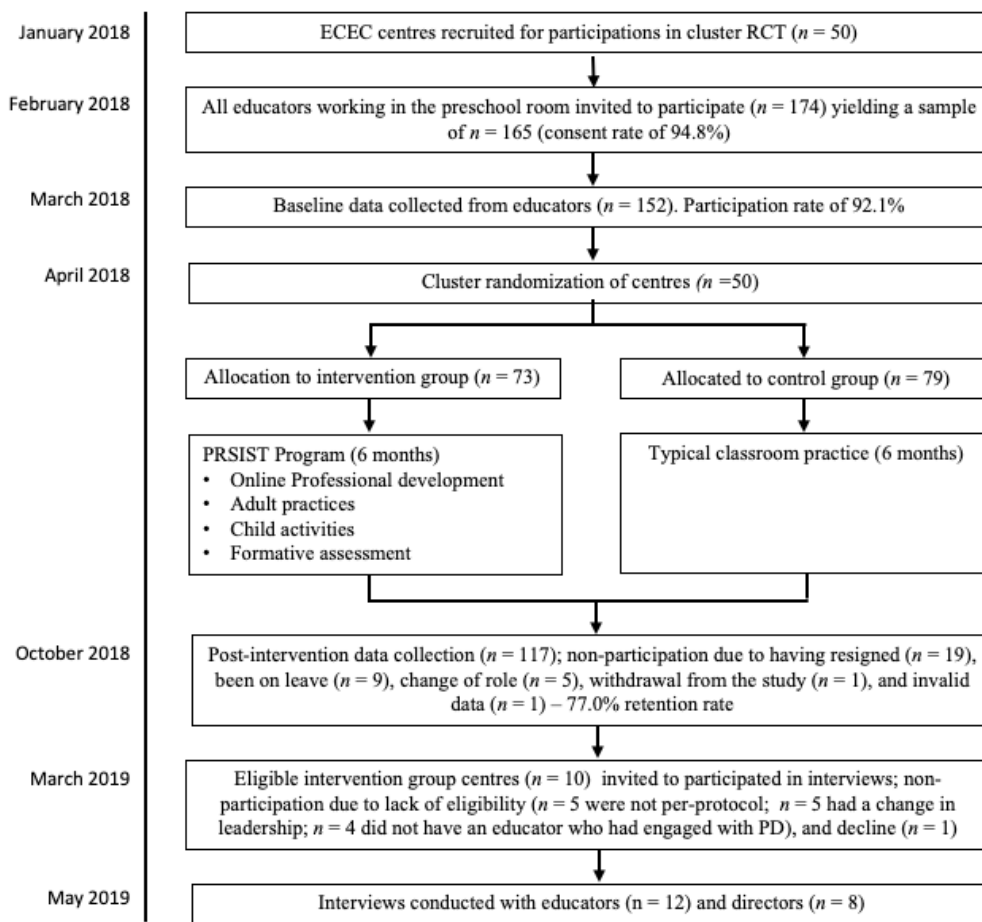
7.3.2 Intervention

The PRSIST Program, which is described in full elsewhere (Howard et al., 2020) sought to

provide a low-cost, flexible and ECEC-compatible approach to engaging, challenging and extending

children's early self-regulation abilities. The program–which was developed in part through direct

consultation with educators–included online PD, educator practices, child activities, home-based

resources, and training in a formative assessment of self-regulation (as an optional component).

Educators participating in this study were inducted into the program through a hardcopy manual, the

program website (www.prsist.com.au) and monthly 1-hour teleconference calls (to reduce cost and to

increase reach). While the program was designed to permit flexible implementation, over the 7-month

intervention period educators were asked to engage with all seven online training videos in the first 2

months and implement at least three child activities per week.

7.3.3   Control (typical practice)

Educators assigned to the control group continued to engage with their existing program. In

the absence of a national curriculum, Australian ECEC centres operate in accordance with the

Australian Early Years Learning Framework (EYLF; Department of Education Employment and

Workplace Relations, 2009), which highlights developmental outcomes for preschool-aged children

and suggests principles for supporting their development. While the EYLF does not outline specific

practices for supporting self-regulation, it does acknowledge the importance of self-regulation and

suggests educators act to foster its development. As such, it is likely that some practices implemented

by control group educators also targeted self-regulation. Further, it is expected that at least some of

the educators would have attended some form of PD during the trial, and some of this may have

concerned self-regulation. However, this can be considered current routine practice and represents a

suitably active control condition.

7.3.4   Data Collection Instruments

7.3.4.1 Perceived knowledge, attitudes and self-efficacy

Educators' beliefs were measured using the Self-Regulation KASE scale (Vasseleu et al.,

2021). This scale consists of 25 statements across three subscales: perceived knowledge (e.g., *I*

understand the factors that contribute to the development of self-regulation; 10 items), attitudes (e.g.,

I think educators play an important role in fostering children's self-regulation; 4 items) and self-

efficacy (e.g., *I feel confident that I can implement practices that have a positive effect on children's*

self-regulation; 11 items). Educators respond to each statement using a percentage-like 0 to 100 rating

reflecting their perceived knowledge (from 0 = 'no knowledge' to 100 = 'know everything'), attitudes

(from 0 = 'do not agree' to 100 = 'fully agree') or self-efficacy (from 0 = 'cannot do' to 100 = 'very certain can do'). KASE subscales have shown good to excellent reliability (α ranging from 0.79 to 0.97) and, longitudinally, are predictive of children's self-regulation outcomes (Vasseleu et al., 2021). In consideration of the broader study context, demands and timings, for the purposes of this evaluation a shorter 8-item self-efficacy subscale was utilised, which showed comparable properties to the full scale (Vasseleu et al., 2021).

7.3.4.2 Interviews

Semi-structured interviews were conducted individually with educators and directors, either in person or via telephone (as per participant preference). Educator interviews focused on educators' perceptions of change to their understanding of self-regulation, change in practices for supporting its development and factors seen as contributing to this change. Director interviews focus on perceived change to educator practice, focusing on educators' interactions with children, specific practices and approaches for supporting self-regulation in their classrooms and interactions with families in relation to their child's self-regulation. Interviews were audio-recorded and transcribed verbatim for later analysis. Educator and director interviews each lasted approximately 45 minutes.

7.3.5 Procedure

Educators completed the Self-Regulation KASE scale at the start of the school year (March-April 2018), prior to random group assignment (intervention/control) by cluster. Educators assigned to the intervention group engaged with the PRSIST Program for the next 7 months while educators in the control group engaged in practice as usual. After the intervention (October-November 2018), educators again completed the Self-Regulation KASE scale. The average duration between baseline and post-test assessment was 199.40 days ($SD = 24.66$, range = 146.00–243.00). Eligible educators and directors from the intervention group were invited to participate in interviews following the completion of child assessments and educator-report data (i.e., Self-Regulation KASE).

7.3.6 Plan for Analyses

Initial analyses sought to evaluate the effectiveness of group randomisation; t-test and chi squared analyses investigated group differences in educator qualifications, employment, experience

and time in service. Intervention analyses consisted of separate linear regression analyses for each of the subscales (i.e., perceived knowledge, attitudes and self-efficacy), with group as primary predictor, while controlling for baseline rating of this factor (to evaluate change). Although the broader study adopted a cluster RCT design to evaluate change in child-level self-regulation (Howard et al., 2020), the low number of educators per service ($M = 2.44$, $SD = 1.13$) precluded cluster adjustment in the current analyses. Responses to individual items were missing for a small number of participants (10 data points for knowledge, 14 data points for self-efficacy, representing <0.01% of all data points); in such cases mean subscale ratings were computed from available items. Quantitative analyses were run using first the full-sample and then the per-protocol sample (i.e., at least one educator at the service had engaged with all seven online training videos in the first 2 months and at least three child activities were implemented per week). Given the pattern of significance was the same in these analyses, the results reported here are drawn from the full sample to provide a more conservative estimate of program efficacy that reflects what might be expected with broader program dissemination.

Qualitative analysis followed Braun and Clarke's (2006) guidelines for thematic analysis. To enhance trustworthiness, *peer debrief* was conducted with each of the co-authors throughout the study (described above) with the intention of critically evaluating the process of data collection, analysis and interpretation (Creswell & Miller, 2000). Following audio transcription and data anonymisation, the first author engaged in multiple readings of the entire dataset to enhance familiarisation with the data. The first author then engaged in an open coding process whereby meaningful quotes were assigned a code based on their semantic interpretation. Codes were then grouped based on conceptual similarity to derive themes (Braun & Clarke, 2006) and deductively organised where they related to: (1) educator perceived change to knowledge; (2) educator perceived change to practice; or (3) director perceived change to educator practice. Once themes were generated the second author provided critical feedback on the analysis and generated themes. Response frequencies were recorded at the educator- and director-level and were used to indicate the salience of themes and subthemes across the data. Where writing is integral to analysis verification in thematic analysis procedures (Braun &

Clarke, 2006) the manuscript was prepared in various iterations throughout which each author refined and made further revision to the theme's content, structure and names.

7.4   Results

7.4.1   Initial data checks

Independent samples t-tests were conducted to investigate whether there were any differences in years of experience or years in the centre groups. Results indicated no significant difference in years of experience, $t(112) = -0.09$, $p = .925$, between the intervention group ($M = 10.86$, $SD = 7.50$) and control group ($M = 10.74$, $SD = 7.02$). Similarly, no significant difference was found for years in the centre, $t(114) = 1.02$, $p = .308$, between educators in the intervention group ($M = 4.26$, $SD = 3.33$) and control group ($M = 4.98$, $SD = 4.11$). Chi-square analysis was conducted to investigate whether educator qualifications were associated with their group assignment. Results indicated no significant association between group and qualifications, $X^2(3) = 5.30$, $p = .151$. Results indicated comparability of the groups on these educator characteristics.

7.4.2   Quantitative evaluation of program efficacy on educator outcomes

7.4.2.1 Analysis of intervention efficacy

Confidence in knowledge. To evaluate intervention efficacy for influencing educators' perceived knowledge, educators' ratings of confidence in their knowledge after the intervention period were regressed on group and start-of-year confidence in knowledge ratings. Group assignment ($\beta = .14$, $p = .041$) significantly predicted educators' ratings of knowledge at post-test, controlling for start-of-year ratings, $F(2, 114) = 59.91$, $p < .001$, $R^2 = .51$.

Attitudes. To evaluate intervention efficacy for influencing educators' attitudes related to self-regulation, educators' attitude ratings after the intervention period were regressed on group and start-of-year attitude ratings. Group assignment ($\beta = .09$, $p = .262$) did not significantly predict educators' post-test attitudes although the overall regression was significant, controlling for start-of-year ratings, $F(2, 114) = 18.03$, $p = .000$, $R^2 = .240$.

Self-efficacy. To evaluate intervention efficacy for influencing educators' self-efficacy for supporting self-regulation, educators' self-efficacy ratings after the intervention period were regressed on group and start-of-year self-efficacy ratings. Group assignment ($\beta = .09$, $p = .262$) again did not significantly predict educators' post-test self-efficacy although the overall regression was significant, controlling for start-of-year ratings, $F(2, 114) = 28.12$, $p = .000$, $R^2 = .330$.

Descriptive statistics for Self-Regulation KASE subscale at pre-test and post-test by group assignment are provided in Table 7.1.

Table 7.1

Descriptive Statistics for Control and Intervention Group by Self-Regulation KASE Subscale at Pre-Test and Post-Test

	Control				Intervention			
	M	**SD**	**Range**		**M**	**SD**	**Range**	
			Min	Max			Min	Max
Confidence in Knowledge								
Pre-test	68.80	15.05	24.00	94.00	71.85	15.85	25.00	100.00
Post-test	77.28	15.09	36.00	100.00	82.81	10.95	37.00	100.00
Attitudes								
Pre-test	93.33	8.90	60.00	100.00	90.93	9.17	62.50	100.00
Post-test	93.31	8.77	63.00	100.00	93.77	8.19	68.00	100.00
Self-efficacy								
Pre-test	78.63	12.71	51.25	100.00	79.31	11.10	53.75	100.00
Post-test	80.32	12.29	43.00	100.00	82.64	10.07	55.00	100.00

7.4.3   Qualitative exploration of program effects on educator outcomes

The following findings report on educator perceptions of change to their knowledge and practice following participation in the PRSIST Program. Thematic analysis of educators' perceived change to knowledge resulted in the generation of four themes reflecting educators' new understanding of self-regulation as: (1) multifaceted; (2) developmentally differentiated; (3) contextual influenced; and (4) fundamental to broader development. Thematic analysis of perceived practice change resulted in the identification of 6 themes: (1) intentional pedagogy; (2) child-centeredness; (3) relational pedagogy; (4) family engagement; (5) educator self-regulation; and (6) staff collaboration. Corroboration of self-reported change to practice among centre directors largely supported identified themes. Names of educators (E) and directors (D) are replaced by codes (E1 to

E10, D1 to D10) where the numeral is used to denote centre number. Demographic information and

descriptive statistics for educator and child measures by centres/educators involved in qualitative data

collection are presented in Table 7.2.

Table 7.2

Demographic Information and Descriptive Statistics for Educator and Child Measures by Centre

	Centre 1	Centre 2	Centre 3	Centre 4	Centre 5	Centre 6	Centre 7	Centre 8	Centre 9	Centre 10
Demographics										
Type	LDC	LDC	LDC	LDC	LDC	LDC	LDC	Preschool	Preschool	Preschool
Location	Regional	Regional	Metropolitan	Metropolitan	Metropolitan	Metropolitan	Regional	Regional	Metropolitan	Metropolitan
Quality Rating	Exceeding	Meeting	Exceeding	Exceeding	Meeting	Exceeding	Exceeding	Exceeding	Exceeding	Meeting
Educators	E1	E2-1 / E2-2	E3	E4	E5	E6	E7	E8	E9-1 / E9-2	E10
Qualification	Degree	Degree / Cert III	Diploma	Degree	Degree	Degree	Degree	ACCW	Diploma / Diploma	Diploma
Years in sector	17.5	37.5 / 6.5	11.5	19.5	14.5	4.5	-	6.5	6.5 / 21.5	-
Years in centre	9.5	2.00/3.00	8.50	9.5	1.83	2.50	4.5	2.75	3.50/7.50	4.5
Director	D1	D2	D3	D4	D5	D6	-	D8	D9	-
Educator Beliefs (Pre/Post *M*)										
Confidence in Knowledge	64.00 / 77.00	65.00 / 88.00 84.00 / 86.00	72.00 / 77.00	67.00 / 90.00	54.00 / 74.00	89.00* / 99.50	69.00 / 83.00	89.00 / 89.00	90.00 / 91.00 56.00 / 79.00	81.00 / 94.50
Attitudes	95.00 / 100.00	100.00 / 93.00 100.00 / 100.00	95.00 / 100.00	70.00 / 100.00	100.00 / 95.00	100.00* / 95.00	92.50 / 100.00	92.50 / 93.00	97.50 / 95.00 80.00 / 83.00	100.00 / 100.00
Self-efficacy	71.25 / 78.00	65.63 / 89.00 81.25 /85.00	60.00 / 86.00	70.00 / 99.00	90.00 / 84.00	95.00* / 100.00	71.25 / 83.00	82.50 / 89.00	87.50 / 94.00 66.25 / 79.00	86.25 / 95.00
Child Self-Regulation (Pre/Post *M*)										
PRSIST Cognitive	3.38 / 3.63	3.56 / 4.35	2.92 / 4.78	3.70 / 3.20	3.77 / 4.94	3.39 / 3.54	3.52 / 3.55	3.46 / 4.48	3.19 / 4.14	3.43 / 3.76
PRSIST Behaviour	4.37 / 4.28	4.29 / 5.29	3.73 / 5.00	4.81 / 4.42	4.43 / 5.90	4.48 / 4.38	4.13 / 4.00	4.26 / 5.08	4.23 / 4.48	4.33 / 4.64
HTKS	14.11 / 48.22	19.67 / 50.27	12.30 / 44.30	14.33 / 50.75	35.33 / 41.63	22.78 / 36.00	12.46 / 39.58	27.00 / 33.17	23.88 / 41.50	24.64 / 54.71

Note. * indicates data excluded from quantitative analyses due to the participant having watched to online PD prior to self-reporting their beliefs

7.4.3.1 Perceived change to knowledge

Educators noted having gained a greater overall 'understanding' of self-regulation and noted specific changes in how they understood the nature, development and importance of self-regulation. Where previously those educators had understood self-regulation as a unidimensional construct focusing on behavioural control, educators now spoke about adopting a multifaceted view in which self-regulation comprises behavioural, cognitive, social and emotional dimensions ($n = 3$; 25%). Regarding its development and expression, educators ($n = 4$; 33%) indicated they now adopt a more developmentally differentiated perspective, wherein self-regulation is seen to develop across time and at different paces for individual children, leading to a greater acceptance of individual variability. Educators also noted having gained a greater understanding of the ways environment and experiences can contribute to fluctuation in children's self-regulation ($n = 2$; 17%). Regarding its importance, educators ($n = 4$; 25%) developed an appreciation of self-regulation as a foundational skill related to and underpinning other areas of children's development. Illustrative quotations for each theme are provided in Table 7.3.

Table 7.3

Themes and Sample Quotations for Educator Perceived Change to Knowledge

Theme	Sample quotation
Self-regulation as multifaceted	Well since doing the PRSIST Program, it has changed my thinking about self-regulation. In the past…I didn't actually understand the different parts of self-regulation so originally would just go, 'the child's knocking down blocks or having tantrums, they're not self-regulating'. But then being able to understand the cognitive self-regulation aspects or being able to maintain attention and plan their actions and be thoughtful about that…Because a child may not have to have tantrums to be able say they are struggling with self-regulation. Self-regulation is across many aspects of the children's lives. It encumbers everything (E5).
Self-regulation as developmentally differentiated	[I am] being more open-minded and understanding that children are at different levels in their self-regulation and that does change throughout the year (E8).
Self-regulation as contextually influenced	I knew about emotions and trying to control them and stuff, but you never really go into detail about what's really causing them…You can go from a child just being angry over a toy when really, it's something deeper than that. It could be trauma or it could be what's happening at home… you've got to look at the big picture in a way (E8).
Self-regulation as fundamental	I didn't understand until I had done the training, just how broad it was and how much it affects every area of children's engagement (E7).

When asked about the factors that may have contributed to their enhanced understanding of self-regulation, educators referred to two key aspects of the program. Foremost, educators ($n = 4$; 33%) referred to the online training modules, which drew on the empirical and theoretical literature base to provide an important background to self-regulation ('I really, really liked the PRSIST talks to start off with. It really laid the foundation to understand self-regulation a bit deeper than what we were thinking about before', E5). Second, educators ($n = 3$; 25%) cited the reading materials which included practices to support self-regulation ('The PRSIST book had a lot about self-regulation and it explained a lot of things in that adult practice book', E6).

7.4.3.2 Self-reported change to practice

Educators noted several changes to their practice following from the intervention, which were largely corroborated by director report. Foremost, educators ($n = 8$; E1, E2-2, E3, E5, E6, E7, E9-2; E10) and directors ($n = 7$; D1, D2, D3, D4, D5, D6, D9) identified educators as having adopted a more intentional approach to supporting children's self-regulation. That is, educators became more observant of children's self-regulation, engaged in planning to support children's self-regulation, and were more deliberate and purposeful in practices with children. In their interactions with children, both educators ($n = 6$; E2-2, E4, E5, E6, E7, E8) and directors ($n = 4$; D1, D3, D4, D6) noted adopting a more child-centred approach. This included providing children with more opportunity to 'lead' (rather than being led by adults) and differentiating their practice to align with individual children's capabilities and needs. Shifts were also noted with respect to educators' relational pedagogy ($n = 5$ educators; E1, E2-1, E4, E9-2, E10; $n = 3$ directors; D5, D6, D8). After the intervention, educators noted that they placed greater emphasis on fostering respectful and responsive relationships with children, by responding to their emotions and expressing genuine interest in them. One educator (E9-2) also noted being more aware of their colleague's challenges with their own self-regulation.

Regarding families, educators ($n = 5$; E2-2, E5, E8, E9-1, E9-2) and directors ($n = 3$; D2, D6, D8) reflected on how engagement with the PRSIST Program enhanced familial connections and communication around children's self-regulation. Educators felt they were better able to share their knowledge and ensure families held developmentally appropriate expectations of children's self-

regulatory ability (i.e., perceiving self-regulation as an ability that children will develop through time and experience).

Reflecting on their own behaviours within the classroom, educators ($n = 5$; E2-1, E2-2, E4, E5, E9-1) and one director (D3) identified the PRSIST Program as having helped educators 'learn how to self-regulate too' (E2-1) and become 'calmer' (E2-2) or 'more patient' (E3, E4, E9-1) in their interactions with children. Consequently, educators perceived themselves as having become more intentional in how they conducted themselves in the learning environment, better able to model self-regulation, and better able to take the perspective of children experiencing difficulties self-regulating ('If I feel like that in this situation then this is how that child must feel'; E2-2). For two educators (E3, E5), participation in the program was also seen as helping facilitate a more collaborative relationship with other educators by creating a shared goal. Illustrative quotations for themes and subthemes are provided in Table 7.4.

Table 7.4

Themes, Subthemes and Sample Quotations for Educator Perceived Change to Practice

Themes/Subthemes	Sample quotation
Intentional pedagogy	
Observation	We were using the language a lot more in our observations. So when I was writing up my observations on the children, I was actually writing a lot more about their self-regulation abilities in the terms of the observations and learning outcomes that I wanted. (E7)
Planning	Using those adult practices and my understanding of the three different area of self-regulation…I was really able to think more critically about how my actions influenced the child, and the planning. I was having more success with the planning and with that relationship with the child, as well. (E5)
Practice	Just going into an experience using some of the adult practices like modelling or like verbalising thinking just became a part of my practice. (E5)
Child-centredness	
Children lead	[I'm] more mindful of just really adjusting ourselves to the children and actually to the room…letting the room flow at their pace, not my pace. (E1)
Differentiate practice	I think [my interactions] became more positive rather than trying to get the children to do an activity that they couldn't do, I've been able to adapt and do it in a different way to sort of support where they're at. Yeah, which I think has really opened my eyes to see that like all children are at different levels and yeah. I adapted to different needs. (E8)
Relational pedagogy	
Relationships with children	I think our interactions were built on, yes. We worked with the children quite closely in those activities, so no, I think they could see that we were showing an interest in what they were doing as well, so we were building on that relationship together. (E2-1)
Relationship with colleagues	Even us as educators, too, you're a little bit more aware of your colleague like, "Yeah, they're having a bad day," so that [we can] support them a bit or ask them about how they're going. (E9-2)
Family engagement	
Enhanced opportunities for communication	It actually built a relationship between the families and the educators because we were able to talk to them in regards to how their child was going. Whereas previous to that you'd have the conversation but there was nothing to back it up sort of thing. But having a program in place–some parents like programs. They physically see. Yeah. So the conversations with parents who'd been to see that the educators were doing something for their child because every parent wants to see that their child's being supported and that was a way of showing that as well. (E2-2)
Share information	Just helping them understand the different aspects of self-regulation and that it is something it is a skill to work on, like it is to write their name. That it's not so much a deficit in that it's like it's this biggest thing in their life. It's just one part and they are only four and they are only three. So just helping them step out of the, kind of like embarrassment they have when their children don't have the self-regulation ability. Just helping them understand it from a different perspective, I could see that it helped them feel better about it all and then they were more strategic in how they dealt with it as well. Which helped the child. (E5)
Educator self-regulation	It taught me how to self-regulate too so that I could work better with the children. (E2-1)
Staff collaboration	It was really good to see us all focused on the one thing; so just focusing on this study, and implementing a lot of the activities. (E3)

Consistent with changes to knowledge, information provided in the online training ($n = 1$; E7) and supportive practices ($n = 3$; E1, E5, E6) were seen as instrumental to change in practice. For one educator (E7), their own observations of children engaging in PRSIST activities were identified as challenging their perceptions of children's self-regulatory capabilities and positively impacting practice ('Yeah, so watching going 'okay yeah, this is really, really tricky for them' or 'no they can actually do this one, this is one we really enjoy...we enjoy doing and we can work on'; E7). Six of the educators ($n = 6$; E3, E5, E6, E7, E8, E9-1) attributed change in practice to an overall enhanced understanding of self-regulation, garnered from participation in the program ('so knowing more in depth about what self-regulation is, and how we can support them, really helped'; E3).

7.5   Discussion

This study sought to investigate the effects of a self-regulation intervention on educators' beliefs (i.e., confidence in knowledge, attitudes and self-efficacy), and explore perceived changes to educator knowledge and practice, supplementing previous reporting on the effects of the program on child outcomes (Howard et al., 2020). Results showed significant gains in educators' confidence in their knowledge and perceived changes to their knowledge of self-regulation and practices for supporting its development. However, some discrepancy was noted between quantitative and qualitative findings. Specifically, despite a self-reported change to practice in the qualitative data, quantitative findings did not show a statistically significant change in educators' self-efficacy for supporting self-regulation when compared to the control group. Findings from this study contribute to an emerging literature base which highlights the importance of examining educator beliefs in shifting practice outcomes within ECEC settings (Borg, 2018; Fukkink & Lont, 2007).

Both quantitative and qualitative data suggested positive changes to educators' knowledge of self-regulation. Whereas quantitative data revealed a significant improvement to educators' confidence in their knowledge of self-regulation, qualitative findings conveyed educator perceptions of having experienced an overall growth in their knowledge of self-regulation and in specific areas related to the nature, development, and importance of self-regulation. Educators' post-intervention recognition of self-regulation as multi-faceted diverge from prior research findings that show a

tendency for educators to focus on behaviour and emotion (Papadopoulou et al., 2014) and instead aligns with theory and literature which also considers self-regulation of cognition (Baumeister & Heatherton, 1996). Further, and consistent with empirical literature, educators identified having a greater appreciation of self-regulation as developmentally differentiated (Montroy, Bowles, Skibbe, et al., 2016), contextually influenced (Cadima et al., 2015) and fundamental to other developmental trajectories and outcomes (Robson et al., 2020).

Coinciding with this change to knowledge, educators and their directors noted a change to practice attributed to participation in the PRSIST Program. Self-reported practice changes comprised high-quality practices that have been linked with more-positive child outcomes (e.g., developmentally differentiated practice, educator collaboration, and engagement with the home learning environment; Melhuish et al., 2015), as well as practices specifically linked to positive self-regulatory development (e.g., fostering close relationships with children and the adoption of a child-centred approach; Cadima et al., 2015, 2019; Hamre et al., 2014). While there was limited opportunity to independently verify the extent to which practice changed (e.g., through centre observations, due to the geographical spread of services), a change in knowledge stimulating changes in practice is consistent with the theoretical and empirical literature that positions educator knowledge as an important target for interventions seeking to generate practice change (Buysse et al., 2009; Fukkink & Lont, 2007).

While such changes to knowledge and practice provide at least partial support for a multilevel process of change, findings from Howard et al. (2020) suggest that this had only a small effect on children's development and only in particular areas targeted (i.e., executive function). As noted above, one possible explanation for the lack of benefit conferred to children despite educator practice change is that educators' self-reported changes to practice may have been overstated in terms of the extent to which these had become embedded. Alternatively, the duration of the intervention might have been insufficient for child-level change to occur at a detectable level (e.g., generalised improvements that would be detected on post-intervention assessments). Given both the short intervention period and incremental implementation (i.e., each of the first four months focused on a different element of the PRSIST Program), educators' implementation and mastery of program components may have been

incomplete until several months into the 6-month intervention. As such, children's exposure to these practices may have been limited to a shorter and perhaps insufficient period.

Inconsistencies among educators with respect to their practices may also account for differences in children's exposure to supportive practices and/or their engagement with child activities. While qualitative findings are not necessarily representative of change experienced across the whole intervention group (nor can they speak to observable, objective change in educator practice), these findings–although positive–were not suggestive of a systematic or consistent change to both knowledge or practice between or within centres (i.e., not all educators and all directors noted the same changes). Rather, self-reported change seemed to reflect individual change which, when considered alongside high staff turnover, may have had negative implications for children's exposure to supportive practices. While the program was intentionally implemented at scale rather than under the most rigorous and controlled conditions to ensure low-cost and flexibility, the provision of a coaching model which supports a consistent room-level approach (e.g., the Chicago School Readiness Program; Raver et al., 2008), a more-structured and intensive protocol for program implementation (e.g., PATHS; Kusche & Greenberg, 1994; Tools of the Mind; Bodrova et al., 2011), and the implementation of a longer intervention period may represent plausible options for facilitating systematic and sustained practice change among educators (Schachter, 2015).

Findings from this study did not reveal a statistically significant change to educators' self-efficacy. Where intervention research fails to detect or incur statistically significant change to educators' self-efficacy, Borg et al. (2018) acknowledge two plausible explanations. First, educator ratings prior to the intervention may reflect a false (higher) sense of confidence where less was known about the intervention target and associated evidence-based practices. For example, educators may have felt quite confident that they '*can challenge and extend children's self-regulation abilities in everyday activities*' based on their initial understandings of self-regulation as largely controlling disruptive behaviour and emotions. Following the intervention, educators may be challenged by implementing new understandings of self-regulation as also encompassing cognitive capacities and involving efforts to proactively promote self-regulation in times of good regulation. In this case, future research in this area may seek to consider measurement of self-efficacy at three time points

(i.e., prior to PD, immediately following PD and at the end of the intervention period), which may provide insights around the immediate effects of knowledge-based PD content on educators' self-efficacy. Alternatively, educators may not have had enough time to experience success or see the results of their changed practices (i.e., 'mastery experiences'; Bandura, 1977), which is an important antecedent to increasing self-efficacy. Indeed, given the absence of statistically significant change to child self-regulation (see Howard et al., 2020), it may be that educator self-efficacy was influenced by a lack of noticeable change to children's self-regulation. This is consistent with research that suggests a dyadic relationship between an educator's self-efficacy and children's behaviour (Zee et al., 2016). Finally, despite some suggestion of practice change among a subsample of educators who participated in post-intervention interviews (and who appeared to experience descriptive improvements to self-efficacy; reported in Table 7.2), these null findings may also reflect limited practice change among the broader sample. Given the flexible delivery of the program – such that not all educators were required to engage with or implement all aspects of the program (e.g., formative assessment, all child activities) – it may be that program engagement was variable among participating educators. Despite criticisms for burdens of participation invoked in more structured and intensive programs (e.g., PATHS; Kusche & Greenberg, 1994; Tools of the Mind; Bodrova et al., 2011), future implementations of the PRSIST Program may benefit from the adoption of a more-structured and intensive protocol for implementation (e.g., the provision of coaching and mentoring experiences and/or a prolonged intervention period, which may provide greater opportunities for mastery experiences).

Educator interviews indicated a change in attitudes regarding self-regulation insofar as they reported reprioritising self-regulation in practice and better appreciating the fundamental role of self-regulation for children's development. Yet the quantitative results showed no significant change in attitude ratings. One possible explanation is that the high ratings at baseline (M = 90.93% confident) limited the possibility for detecting statistically significant growth in this area (indeed, there was little room for growth). Given the opt-in recruitment of participating centres, it may be that educators with already positive attitudes of self-regulation were those who also self-selected to participate. This is consistent with research that suggests attitudes as a significant predictor for educator willingness to

engage with PD (Dignath-van Ewijk & van der Werf, 2012; Steinbach & Stoeger, 2018). In contrast, this non-significant result may support theoretical models that position attitudes as more resistant to change given both their evaluative nature (Pajares, 1992) and the extent to which they may derive from personal and practical knowledge versus theoretical and technical knowledge about children's development (Spodek, 1988). While the first explanation would suggest a greater need to consider the role of attitudes in intervention uptake versus as an outcome variable, the second suggests the possible benefit of a longer intervention period with PD that explicitly targets attitudinal shifts that can support sustained practice change. Both would be useful inclusions to a future implementation and evaluation.

7.5.1 Limitations and future directions

Although findings from this study provide important insights into educator-level change resulting from the PRSIST intervention, there are several limitations which future research should aim to address. While self-reported changes to practice were beneficial where cost and the geographic spread of centres prohibited observed practice change, the extent to which perceived changes reflect or are indicative of actual change to educators' practice cannot be gleaned from these findings. Future research should seek to independently verify the nature and extent of practice change among all educators exposed to the program. Despite the authors intention to evaluate the PRSIST Program at scale, mixed findings from Howard et al. (2020) and this study suggest the need for future evaluations to consider the implementation of a coaching and mentoring model which may allow for adoption of a more consistent and tailored in-centre approach (Schachter et al., 201). Further, the application of a more prolonged intervention period (perhaps spanning from age 3-5 years) should likewise be considered to provide children with greater exposure to intervention elements and provide educators more time for mastery experience and to observe self-regulatory change among children.

7.6 Conclusion

Findings from this study suggest both the importance and feasibility of achieving educator-level change in a PD based intervention seeking to target child-outcomes. Where change was not observed among some beliefs, findings from this study support the need for a more concerted effort

which may ensure sustained long-term change to practice. While the adoption of a coaching and mentoring approach would almost certainly aid in intervention implementation and tailoring, programs that can be scaled without significant cost are needed. Thus, future research which seeks to bridge these two aims should be explored. Further research in this area should also seek to consider educator beliefs in terms of readiness for change, as well as to explain change (or lack thereof) as a consequence of intervention. This is an under-researched area but could be an important source of information for intervention design, implementation and development.

7.7   References

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Chapter 8: General Discussion

This chapter will present an overarching discussion of this program of PhD research and its pattern of findings. The key results will be considered in relation to the research questions and will be compared with contemporary literature. Strengths and limitations will then be discussed, and recommendations for future research proposed, followed by a conclusion to the thesis.

8.1 Summary of Key Findings

Embedded within the context of a broader study by Howard et al. (2020), this program of PhD research focused on the development, implementation and evaluation of educator-facing aspects of what eventually became the Preschool Situational Self-Regulation Toolkit (PRSIST) Program. To ensure the development of a program that was relevant and responsive to educator needs in supporting children's emerging self-regulation, the candidate first sought to explore educators' understandings of self-regulation and their current practices for supporting its development in Australian ECEC services (Chapter 4). Six services characterised by high-quality were purposefully sampled for this study to enhance opportunities for the observation of effective practices and to identify any areas of prevailing need even amongst high-quality settings. Findings from this study identified educator understandings of self-regulation that were largely consistent with control-based definitions (i.e., self-regulation as the ability to supress and overcome salient maladaptive impulses; Baumeister & Heatherton, 1996; Hofmann et al., 2012) yet revealed a tendency to focus on manifest behaviour and emotion–and particularly so when this created a level of disruption. Self-reported and observed practices were broad and largely consistent with practices suggested in the literature to be beneficial for children's self-regulation development (e.g., minimising factors that may undermine self-regulation and directly targeting skills central to self-regulation; see Hofmann et al., 2012). However, there was little evidence for the adoption of a systematic or consistent approach to supporting child self-regulation either between or within ECEC services (Vasseleu, Neilsen-Hewett, Cliff, et al., 2021). Based on these findings, as well as findings from theoretical and empirical literature, various intervention components were developed and then piloted with a broader sample of educators from 14 ECEC services across NSW, Australia (Chapter 5). Educator feedback was used to inform revisions to intervention components to ensure suitability, sustainability and scalability of the developed program.

Next, the research team sought to implement and evaluate the impact of the PRSIST program. Whereas the broader research focused on program implementation (supported by the PhD candidate) and on evaluation of impacts on child outcomes, the candidate focused on evaluating the impacts on educators' knowledge, beliefs and practices regarding self-regulation. It was envisioned that this could

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yield important insights into not only intervention efficacy and mechanisms of effect, but may also suggest the long-term sustainability of the program and practice change (Borg, 2018). Given the theoretical and empirical suggestion of the importance of educator beliefs for practice change and child outcomes (Buehl & Beck, 2014) and a lack of valid and reliable tools for measuring educator beliefs related to self-regulation, the candidate developed and validated a measure for capturing educators' confidence in their knowledge, attitudes and self-efficacy as they pertain to self-regulation (Chapter 6). The Self-Regulation Knowledge, Attitudes and Self-Efficacy (Self-Regulation KASE) scale was created and evaluated, with results showing that this yielded a valid and reliable 25-item scale, comprising three distinct yet related subscales: confidence in knowledge; attitudes; and self-efficacy (Vasseleu, Neilsen-Hewett, Ehrich, et al., 2021).

Development of Self-Regulation KASE permitted evaluation of the effects of the PRSIST Program on educator beliefs among a large and geographically dispersed sample of 117 educators from 50 ECEC services across NSW, Australia participating in the cluster RCT evaluation (Chapter 7). Findings revealed significant improvement to educators' confidence in their knowledge following the 6-month intervention period. No significant changes to educators' attitudes or self-efficacy around supporting self-regulation were found in the quantitative results. The candidate additionally sought to explore educators' perceptions of change to their knowledge and practice following the intervention using qualitative methods. Findings from educator interviews suggested a positive perceived change to their knowledge of self-regulation, specifically related to its nature, development and importance. Educators and directors also noted a positive perceived change to enacted practices for supporting self-regulation, with educators largely attributing this change to an enhanced understanding of self-regulation and its development.

The iterative and collaborative approach to intervention development undertaken within this PhD research supported the development of a program that considers current practice and contextual constraints of Australian ECEC settings, and the unique perspectives of educators as key intervention agents for ECEC-embedded programs. In the absence of any widely adopted or prescribed approaches for supporting self-regulation in Australian ECEC settings, the PRSIST Program provides educators with a flexible approach to supporting self-regulation that demonstrates alignment with principles and

outcomes that are stipulated within the Australian Early Years Learning Framework (EYLF; Department of Education Employment and Workplace Relations, 2009). Beyond solely a program of research to develop and evaluate an early childhood self-regulation intervention, results presented in this thesis add valuable insights into educator understandings, beliefs and practices for supporting self-regulation. These suggest important opportunities and areas of prevailing need in similar early childhood contexts. In reconciling these findings, there emerged higher-order patterns that warrant further discussion, which have been broadly organised as: status and importance of educators' self-regulation beliefs; susceptibility of educator beliefs to change; and educator knowledge of self-regulation and embedded practice. Findings from this PhD research will also be considered in relation to existing empirical and theoretical literature. Future directions and implications for continued research in these areas are also discussed. This is followed by a discussion of limitations, additional future directions and general conclusions.

8.2   Status and importance of educators' self-regulation beliefs

Theoretical and empirical literature has positioned educator beliefs–such as those about their knowledge, capabilities and the content they teach–as important precursors for practice (Buehl & Beck, 2014). As such, contemporary efforts to enhance children's outcomes via educator practices have often leveraged approaches which seek to target educator beliefs (in addition to educators' skills and knowledge) in hopes of generating shifts in practice (Fukkink & Lont, 2007). This is also the case for ECEC-embedded self-regulation programs which, rather than provision of practices and activities alone, typically include educator training or PD that aims to enhance educators' understanding around self-regulation, convey its developmental importance, and highlight the role that educator practices may play in its development (Bodrova & Leong, 2013). Despite the frequency of targeting educators' beliefs around self-regulation, most programs nevertheless evaluate efficacy of the program or approach via change in child outcomes, and do not explicitly evaluate the mechanisms through which such change may have been achieved (i.e., through change to educator knowledge and beliefs). For instance, in a review of 80 studies evaluating the effects of self-regulation-based interventions targeting preschool children, nearly 60% of these studies were conducted in ECEC settings and more

than 40% used educators as the intervention agent, yet only five studies reported effects on educator outcomes (Murray et al., 2016). Two of these studies examined classroom climate only (Arda & Ocak, 2012; Upshur et al., 2013); one examined classroom climate and instruction quality (Barnett et al., 2008); one examined classroom climate and co-regulation strategies (Webster-Stratton et al., 2008); and one examined co-regulation strategies and knowledge of self-regulation (Perels et al., 2008). While several of the parent-based interventions reviewed examined intervention effects on parents' attitudes and self-efficacy (e.g., Morawska et al., 2011; Wiggins et al., 2009), none of the included studies examined the effects of participation on these outcomes among early childhood educators. As such, the role of educator beliefs in intervention efficacy remains an important but under-investigated area. This PhD research makes a unique contribution to the ECEC-based self-regulation literature through its focus on educator beliefs, and creation of a tool for its measurement. Evaluation and use of this tool in this PhD research (Chapter 6) yielded valuable insights into the status and importance of educators' self-regulation beliefs and suggests future directions and implications for facilitating change to educator beliefs.

In contrast to other scales for measuring educator beliefs around teaching more broadly (e.g., Gibson & Dembo, 1984; Tschannen-Moran & Hoy, 2001), the Self-Regulation KASE scale integrates multiple types of beliefs suggested as influential to educators' practice (i.e., confidence in knowledge, attitudes, and self-efficacy; Buehl & Beck, 2014; Fives & Buehl, 2012). Importantly, evaluation of this scale showed evidence of predictive validity for educators' engagement with PD, as well as of the self-regulation abilities of children in their care. That is, more positive educator attitudes around the importance of self-regulation and the role of educators in supporting its development were predictive of children's subsequent self-regulation ability and of growth in this ability. While the Self-Regulation KASE scale was evaluated in a sample that was not wholly representative of the population (i.e., respondents were those who had already consented to engage with a self-regulation intervention), examination of mean subscale scores and the range of responses revealed considerable variability in educators confidence in their knowledge ($M = 70.10\%$, range = 0%–100%), attitudes ($M = 92.39\%$, range = 40%–100%), and self-efficacy ($M = 80.49\%$, range = 0%–100%). In evaluating

this scale, such variability was shown to have important practical and theoretical implications for educators' learning behaviours and practice.

Regarding educators' learning behaviour, variability in educators' beliefs (i.e., attitudes and self-efficacy) were shown to significantly predict whether educators commenced engagement with PD in separate analyses. This is consistent with previous empirical evidence focused on educators' attitudes, which suggests educators with more positive attitudes are more likely to register for PD than those with less positive attitudes related to the PD content (Steinbach & Stoeger, 2018). Empirical evidence for association between educator self-efficacy and learning behaviour is more limited, with most research focusing on the associations between self-efficacy and practice implementation. Yet it is plausible, and indeed probable, that educators with a feeling of greater capacity to successfully deliver the program would also be those who are more likely to commence it. Theoretically, both findings (i.e., attitudes and self-efficacy as predictors of engagement) are consistent with theories such as Bandura's Social Cognitive Theory of Social Diffusion (2006), wherein individuals are posited to be more likely to engage with innovation if they perceive it to be important, effective and possible (e.g., due to beliefs in their own capabilities or the level of support provided to them). Given a critical role of PD for enhancing quality across the ECEC sector (Egert et al., 2018; Siraj et al., 2019), future research would do well to further explore the role of educators' content-specific and generalised beliefs in relation to their engagement with PD and their commitment to professional growth. Additionally, future intervention research may evaluate the utility of measures, such as the Self-Regulation KASE scale, as a means of identifying and tailoring efforts for educators who may be at risk for poorer program engagement. Such an approach would be particularly suited to a coaching and mentoring model, where supports can be individually tailored to identified areas of need (Schachter et al., 2019).

Beyond predicting educators' own learning behaviours, educator attitudes on Self-Regulation KASE predicted status and change in children's self-regulation more than 6 months later. Although the current data cannot attest to the ways in which educator attitudes may have influenced practice, it is consistent with prior research wherein educators' positive attitudes (e.g., of child-centred learning) have been linked to implementation of specific practices (i.e., autonomy support; McMullen et al.,

2006) with consequent benefits for children's self-regulation (Cadima et al., 2019). This association is also consistent with theories such as Theory of Planned Behaviour (Ajzen, 1991), wherein educators' favourable attitudes (e.g., about certain practices or the outcomes resulting from these practices)–in addition to perceived subjective norms and perceived behavioural control–are important precursors to the implementation of practices that are beneficial to children's outcomes. While the current findings cannot speak to the specific association between educator attitudes and practices to support children's self-regulation, these findings make an important contribution to an increasing body of research which seeks to identify key components of effective PD (Zaslow et al., 2010) and highlights educator attitudes as an important mechanism through which to target educator practice.

8.3   Susceptibility of beliefs to change

In developing the PRSIST program, the candidate (supported by the research team) sought to promote positive educator beliefs–including their confidence in their knowledge and attitudes around self-regulation–by supporting them to refine their understanding of self-regulation (i.e., what it is, how it develops and the role it plays in children's outcomes) and to understand the significance of their role in supporting children's self-regulation development. This information was coupled with the provision of specific and aligned adult practices and child activities, to support educators' sense of efficacy to promote growth in children's self-regulation within their settings.

For educators in the cluster RCT evaluation of the PRSIST program, beliefs regarding self-regulation were already high at baseline–although there was evidence for change in confidence in knowledge and attitudes amongst the intervention group (i.e., the quantitative and qualitative findings supported change in knowledge, while qualitative findings from several educators suggested shifts in the perceived value of self-regulation for influencing other areas of development). In explaining these findings, it is important to consider educator starting points, as well as methodological nuances that may have impacted findings. For instance, for educator attitudes it is possible that high ratings at baseline (i.e., $M = 90.93\%$ for attitudes, compared to $M = 71.85\%$ for confidence in knowledge and $M = 79.31\%$ for self-efficacy) may have precluded the possibility of creating or detecting change. While these highly positive attitudes reflect evidence for strong perceptions of importance of self-regulation

in the ECEC sector more broadly (see Niklas et al., 2018), variability in educator attitudes even at follow-up (range = 68.00%–100.00%) highlights the possible utility of Self-Regulation KASE as a formative tool. That is, within a PD framework that provides coaching and mentoring–one of the enhancements to the PRSIST Program suggested in Chapter 7–educators' baseline attitudes (as captured by tools like Self-Regulation KASE) could inform an individually differentiated approach to supporting educator engagement with the intervention where there is an identified risk for low engagement (i.e., initially less-positive attitudes around self-regulation). Such an approach may be particularly fruitful given evidence from this PhD research on the important role of educators' self-regulation attitudes for their PD engagement and for children's self-regulation development (Vasseleu, Neilsen-Hewett, Ehrich, et al., 2021).

In contrast, given the non-ceiling levels of self-efficacy at commencement of the program, it is likely that there were aspects of the program or its delivery that failed to achieve a change in self-efficacy. While a remote model of delivery was intentionally selected to reduce fiscal and logistical constraints of participation, and thus optimise scalability, this approach provided little opportunity for researchers to provide individualised support to educators in implementing intervention components. Theory and research which examines the specific underpinning of self-efficacy suggest several key sources of self-efficacy, including: repeated successful implementations of practice or experiences (i.e., mastery experiences); witnessing or being informed of the successes of others in a similar position (i.e., vicarious experiences); input from others that can inform self-appraisal of practice implementation (i.e., feedback or verbal persuasion); and the provision of strategies for managing negative physiological and affective states which may influence self-appraisals of performance (Bandura, 1977; Pfitzner-Eden, 2016). Despite efforts to facilitate mastery experiences (i.e., through the provision of compatible practices and experiences) and to promote a community of practice (i.e., through provision of teleconferences where educators could share positive experiences in program implementation and receive feedback), the remote induction, initiation, and support for implementation of the program may not have been conducive to an increase in self-efficacy. While the adoption of a coaching and mentoring model may increase the costs associated with program implementation, such an approach may prove more efficacious for ECEC-embedded programs which

seek to enhance educator self-efficacy (Pfitzner-Eden, 2016). Through the provision of in-service support, mentors can model effective program implementation (i.e., vicarious experiences) and provide real-time, individualised feedback based on direct-observations of practice versus educator-reported practice (Artman-Meeker et al., 2015) which may enhance self-confidence more directly (i.e., through positive appraisals) and/or enhance opportunities for mastery experiences (i.e., through constructive feedback; Pfitzner-Eden, 2016; Tschannen-Moran & Mcmaster, 2009). Within a face-to-face model, mentors may also be better positioned to observe and manage arousal states that can impede practice implementation (e.g., supporting educators through feelings of anxiety or self-doubt; Tschannen-Moran & Mcmaster, 2009).

Conversely (or additionally), while we may expect to see changes to perceived knowledge soon after engagement with content-based aspects of the program, change to self-efficacy might take more time (i.e., to accumulate enough mastery experiences and/or to perceive positive changes to children's self-regulation; Bandura, 1977; Zee et al., 2016). As discussed in Chapter 7, change to educators' self-efficacy may also occur in a non-linear way. Given evidence suggesting temporary dips in self-efficacy with the implementation of new programs or curricula (McCormick & Ayres, 2009), it may be that educator's baseline self-efficacy reflected a 'false' sense of confidence such that educators sense of confidence was evaluated based on a different understanding of self-regulation or the specific practices which may support its development. In this case, an inability to detect genuine growth in self-efficacy following the PD may have stemmed from an initial decline in self-efficacy before returning to pre-PD levels (yet now with a broader conception and suite of practices for supporting self-regulation). While efforts to capture and measure change in educator self-efficacy in this PhD research represents an important initial step for ECEC-embedded self-regulation interventions, future research should seek to consider how we can more effectively measure and detect change in this area. In doing so, future efforts may seek to implement multiple time points of measurement, which may yield insights into variable trajectories of change over time and into the time and conditions needed to generate sustainable shifts to educators' self-efficacy.

While engagement with the PRSIST program resulted in educators experiencing enhanced confidence in their knowledge, how this change impacted their practice remains uncertain. There is

literature suggesting that educators' confidence in their knowledge has an impact on the nature of practices and the frequency of their implementation. For instance, low confidence in knowledge has been associated with implementation of shallower learning experiences and the avoidance of direct instruction and spontaneous or impromptu teaching (Borg, 2001, 2005). There was some suggestion that enhanced confidence may have impacted practice in this study as well. For instance, educators reported how enhanced confidence in their knowledge supported discussions with families about self-regulation. While an evaluation of the associations between confidence in knowledge and practice was not possible in this PhD research (i.e., due to the use of qualitative methodologies), future research should seek to explore possible associations between educators' confidence in their knowledge and practice in the context of self-regulation specifically, and child development more broadly. Research in this area should likewise seek to explore how change to educators' confidence in their knowledge might contribute to their intentions or motivation to implement supportive practices.

8.4 Educators' knowledge of self-regulation versus their self-regulation practices

In addition to educators' beliefs, research examining the antecedents or determinants of educator practice has similarly highlighted the important, predictive role of educator knowledge (as distinct from their beliefs about knowledge, such as confidence in knowledge). Although some of this evidence is indeed theoretical (e.g., Blömeke, 2017; Shulman, 1986), a growing body of empirical evidence around early language and literacy supports this relationship (e.g., McCutchen, Harry, et al., 2002; Piasta, Park, et al., 2020; Spear-Swerling & Zibulsky, 2014). Despite theoretical support for a *causal* link between knowledge and practice, such that change in knowledge may lead to a change in practice (e.g., Buysse et al., 2009; Desimone, 2009), and some evidence to support this link (e.g., McCutchen, Abbott, et al., 2002; Piasta, Soto Ramirez, et al., 2020), few studies have sought to examine this link in the context of self-regulation-focused PD. In the current series of studies links between educator self-regulation knowledge and practices were explored (Chapter 4), as were changes to their knowledge and practices following engagement with the PRSIST program (Chapter 7).

Considering diverse conceptions and operationalisations of self-regulation in the literature (Burman et al., 2015) and subsequent difficulties in assessing knowledge (i.e., educators' knowledge of self-regulation must be reconciled to observers' conceptual frameworks rather than assessible 'facts'), a qualitative approach was adopted to explore educators' understandings/knowledge of self-regulation. While the current series of studies is unable to provide conclusive evidence for the nature, direction and degree of association between educators' self-regulation knowledge and their practice, findings from this PhD research point to the importance of targeting educator knowledge for supporting intentional pedagogy.

Consistent with research suggesting a correlational relationship between educators' content knowledge and their embedded practice (e.g., McCutchen, Harry, et al., 2002; Piasta, Park, et al., 2020; Spear-Swerling & Zibulsky, 2014), findings from the first phase of this research (Chapter 4) suggested a correspondence between aspects of educator understanding/knowledge and their self-reported/observed practice. For instance, where educators participating in Phase 1 identified contextual factors as influential to the development or expression of self-regulation (e.g., inconsistent or inappropriate adult expectations; unexpected or unwanted change; modelled behaviour; challenges in the physical or social environment) they also self-reported and/or were observed utilising practices aligned with this perspective (e.g., communicating clear expectations; supporting children to pre-empt change; modelling language and behaviour; and managing the physical environment). Further, where educator definitions prioritised behavioural and emotional control (with the omission of cognitive control), educators' observations of children showed an aligned tendency to focus on manifest behaviour and emotion.

While a longitudinal experimental design would be needed to evaluate whether this is a causal sequence, whereby change in knowledge stimulates a change to practice, findings in Phase 4 (Chapter 7) are suggestive on this point. In support of downstream impacts of a change to educators' understanding of self-regulation and its development, educators also noted changes to practice that they largely attributed to their enhanced knowledge. For instance, having gained a greater understanding of self-regulation as developmentally differentiated (i.e., developing at different rates for individual children), educators reported making greater efforts to differentiate practice in

accordance with children's variable needs following the intervention. Further, reflecting a greater understanding of self-regulation as contextually influenced, educators and directors noted an increase in educators' efforts to share information with families, foster more secure relationships with children and fellow staff, and monitor/model their own self-regulation within the ECEC context. Taken together, these findings provide support for an increasing body of literature highlighting educator knowledge as central to intentional pedagogy (e.g., Dwyer & Schachter, 2019) and reiterates the likely benefits of targeting educators' knowledge to generate sustainable shifts in practice (e.g., Buysse et al., 2009; Desimone, 2009).

Yet current and previous findings do not imply that this sequence is deterministic, as some aspects of practice appeared inconsistent with, and unchanged by, knowledge. For instance, while educators who participated in Phase 1 demonstrated a nuanced understanding around the range of self-regulation abilities (i.e., encompassing both withdrawn and externalised behaviour), findings from Phase 1 (Chapter 4) nevertheless highlighted the tendency for ECEC educators to *prioritise* behaviour and emotionality that involved a level of disruption. This bias toward addressing disruption not only underpinned educators' observations of self-regulation, but also their priorities and practice (even in high-quality ECEC settings). Indeed, in Phase 1 (Chapter 4), neither researcher observations nor educators' self-reported practices yielded evidence of an intentional, differentiated or planned approach to supporting self-regulation for children across the full spectrum of self-regulation abilities. Moreover, findings from Phase 4 (Chapter 7) suggested some changes to knowledge that did not appear to stimulate commensurate change in practice. That is, despite suggestion for an enhanced understanding of the multiple aspects of self-regulation, educators implementing the PRSIST program nevertheless maintained a tendency to prioritise behavioural components of self-regulation in their practice. For instance, while educators were encouraged to self-select three diverse child self-regulation activities to implement each week, activities supporting behavioural self-regulation were implemented almost twice as frequently as those supporting cognitive self-regulation (despite researcher-collected data suggesting initially better behavioural self-regulation than cognitive self-regulation at baseline; $M = 4.24$ for behavioural self-regulation and $M = 3.27$ for cognitive self-regulation). The current findings thus suggest that change in knowledge may not necessarily beget

change in practice, or at least that change in different aspects of educator knowledge may not have a uniform effect upon practice change.

Findings from this PhD research thus suggest both areas of concordance and disconnect between educator' self-regulation knowledge and practice, and thereby highlight important directions, areas and opportunities for future research. First, given the seeming importance of educator knowledge for practice in this and previous studies (e.g., McCutchen, Harry, et al., 2002; McCutchen, Abbott, et al., 2002; Piasta, Park, et al., 2020; Piasta, Soto Ramirez, et al., 2020), future research should seek to identify approaches for capturing educator knowledge of self-regulation that allow empirical investigation of possible links between different dimensions of knowledge and practice. Where we are better able to measure change in educator knowledge, research could additionally seek to explore conditions (e.g., educators' low confidence in existing knowledge) or characteristics (e.g., workshops, mentoring, training manuals, or the provision of practices and activities) that facilitate or constrain change in knowledge, as well as the type of change (e.g., change to content knowledge or pedagogical content knowledge) and extent of change required to instigate practice change. Understanding the ways in which knowledge is causally influential to practice is important not only for studies such as these, but also for prevailing approaches to PD that aim to generate practice change largely through knowledge dissemination.

Considered alongside the PD and theoretical literature (e.g., Blömeke, 2017; Buysse et al., 2009; Fukkink & Lont, 2007), which suggest that knowledge may be a necessary but not sufficient predictor of practice, findings from these studies highlight a need for ongoing efforts to investigate and/or more specifically target unique and cumulative predictors of practice change which may interact with knowledge. While beliefs and knowledge were examined separately in this PhD research, future efforts may seek to explore an intersection between knowledge and beliefs and the implications of this for practice. For instance, given findings from previous studies that identify a tendency for educators to prioritise the importance of behavioural skills (e.g., over 90% of Australian educators in the E4kids study endorsed the importance of behaviour-related skills versus 71% % endorsing the importance of concentration and attentional skills for school readiness; Niklas et al., 2018), a more concerted effort may be required not only to enhance educators' knowledge around

self-regulatory skills, but to explore and target specific–and perhaps contrary–beliefs which may be influential to practice (e.g., beliefs in the importance of various self-regulatory skills). Alternatively, or additionally, prioritisation of certain activities (in this case, behavioural self-regulation activities) by intervention group educators may reflect a tendency for educators to preference children's interests. Where educators select activities based on children's interests or enjoyment, this may lead to an overemphasis on activities that simply reinforce rather than build skills (i.e., children may be more likely to avoid or dislike activities which challenge their self-regulation).

Finally, future efforts may also seek to consider where enactment of educator knowledge may be impeded by limited skill. That is, for educators to plan to target areas of need in self-regulation, they need not only to have sufficient content knowledge of self-regulation but also require sufficient knowledge of children's individual self-regulation abilities. This requires educators to engage in and with accurate and developmentally sensitive formative assessment. At present, assessment in ECEC remains largely observational, and subject to the knowledge, experience, skills and beliefs of the educator (Harrison et al., 2019). While behaviour–particularly that which is disruptive–may be more readily observable, practices to support cognitive-based abilities or less overt behavioural or emotional dysregulation (e.g., withdrawal) may be less likely to be prioritised given the tendency for strengths and difficulties in these abilities to fly under the radar. While a formative assessment tool and training were provided in the current intervention (i.e., the PRSIST Formative Assessment; Howard et al., 2019), this was an optional and underutilised resource. In line with an increasing chorus of researchers advocating for differentiated learning experiences that are enabled by reliable formative assessment (Harrison et al., 2019; Moon et al., 2020; Tomlinson, 2014), it may be the case that the provision of tools that provide educators with reliable information about children's abilities should be a more prominent and a core component of future intervention work.

8.5   Limitations and future directions

While study-specific limitations have been elaborated in previous chapters (see sections 4.5.1, 6.5.1 and 7.4.1), broad limitations and future directions relating to this body of work should also be considered. For instance, despite a concerted effort to consider perspectives and contextual constraints

of educators working in Australian ECEC settings, it is important to note that participants sampled in Phase 1 and 2 of this research were intentionally not representative of the broader population. Given the significance of other settings for children's development (in particular the home learning environment; Sammons et al., 2014) and the number of children who do not attend centre-based ECEC (i.e., approximately 10% of eligible children not enrolled in preschool in the year before school; Steering Committee for the Review of Government Service Provision, 2019), future efforts to target and enhance self-regulation of young children may seek to explore the suitability of supportive practices and experiences (such as those included in the PRSIST Program) within the home and other education and care settings.

Though development and evaluation of the Self-Regulation KASE scale represents one of the secondary contributions of this PhD research, limitations related to this scale and its evaluation should be addressed in future research. Evaluation of Self-Regulation KASE provided partial support for a role of beliefs in intervention uptake (e.g., attitudes and self-efficacy predicted uptake when analysed alone); future research should continue to explore the role that educator beliefs may play in terms of educators' learning behaviours. For instance, future studies may look to consider whether and to what extent educator scores on Self-Regulation KASE may predict educators' broad intention and action to engage with professional learning related to self-regulation. Moreover, while this evaluation of the PRSIST Program sought to explore effects of participation on three core beliefs, future evaluations may seek to capture and observe change to additional beliefs not considered here (e.g., endorsement of practices or pedagogical approaches conducive to self-regulation development). The current data do not preclude the possibility of additional educator beliefs being important precursors of practice and behaviour.

8.6   Conclusions

This program of PhD research made important contributions to the development of an ECEC-embedded program for supporting early self-regulation, drawing on a prominent theoretical model of self-regulatory change (i.e., Carver & Scheier, 1981) and its elaborations (Baumeister & Heatherton, 1996; Hofmann et al., 2012). This was supplemented by insights, understandings and practices related

to self-regulation collected from Australian ECEC educators. Results from this research identified a need for PD that shifts and broadens educators' conceptions of self-regulation, beyond behavioural and emotional disruption. It also emphasised the need for more intentional approaches to fostering child self-regulation, and the need to support educators in the use of valid and reliable formative assessment tools to help tailor planning and practices to the individual child. Using a purpose-designed and validated tool to capture educator beliefs (i.e., Self-Regulation KASE scale; Vasseleu et al., 2021), evaluation of the PRSIST program's effects on educator beliefs showed improvements in confidence in knowledge, as well as educators' perceptions of change in knowledge of self-regulation and implementation of supportive practices. In addition to examining change to educator beliefs following from intervention engagement, findings from this PhD research (namely evaluation of the Self-Regulation KASE scale) further suggest the utility of capturing educators' initial beliefs which may facilitate the implementation of differentiated supports. While educator beliefs are a prominent target in intervention research, they remain understudied as a mediator of intervention engagement and outcomes. Findings from this research contribute to emerging literature base that emphasises the need to consider educator perspectives and experiences around engagement with intervention and suggests opportunities for future research.

8.7   References

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Appendices

Appendix A – Thesis Format Agreement

Thesis Format Agreement

I agree that the thesis submitted by the PhD candidate, Elena Vasseleu, has been prepared in journal article compilation style format.

Principl   **J. Howard**

Signature:_____   Date: 25/08/2021

Co-Supervisor: A/Prof Cathrine Neilsen-Hewett

Signature:_____   Date: 25/08/2021

Co-Supervisor: Ken Cliff

Signature:_ _____   Date: 26/08/2021

PhD Candidate: Elena Vasseleu

Signature:_____   Date: 25/08/2021

Appendix B – Statement of Contribution of Others

Statement of Contribution of Others

As a co-author on the following papers:

1. Vasseleu, E., Neilsen-Hewett, C., Ehrich, J., Cliff, K., & Howard, S. J. (2021). Educator beliefs around supporting early self-regulation: Development and evaluation of the Self-Regulation Knowledge, Attitudes and Self-Efficacy scale. *Frontiers in Education,* 6, 1–13. https://doi.org/10.3389/feduc.2021.621320

2. Vasseleu, E., Neilsen-Hewett, C., Cliff, K., & Howard, S.J. (2021). How educators in high-quality preschool services understand and support early self-regulation: A qualitative study of knowledge and practice. *The Australian Educational Researcher.* https://doi.org/10.1007/s13384-021-00466-4

3. Vasseleu, E., Neilsen-Hewett, C., Cliff, K., & Howard, S.J. (2021). Evaluating the effects of a self-regulation intervention on educator beliefs and examining perceptions of change to knowledge and practice [Manuscript submitted for publication]. *Early Education and Development.*

I declare that the greater part of the work is directly attributable to the PhD candidate, Elena Vasseleu. I confirm that the candidate has made contributions in the design of the research, data collection and analysis, and the writing and editing of the manuscripts.

As a supervisor or co-author, I have been involved in the formulation of research ideas and editing of the manuscripts.

Principle Supervisor: A/Prof Steven J. Howard

Signature:

Date: 25/08/2021

Co-Supervisor: A/Prof Cathrine Neilsen-Hewett

Signature:

Date: 25/08/2021

Co-Supervisor: Dr Ken Cliff

Signature:

Date: 26/08/2021

Co-author: Dr John Ehrich

Signature:

Date: 26/08/2021

PhD Candidate: Elena Vasseleu

Signature:

Date: 25/08/2021

Appendix C – Participant Information and Consent Forms: Phase 1

Educator Information Sheet

We would like to invite the Room Leader(s) in your centre who are responsible for 3–5-year-old children to participate in a research project. This project is being conducted by researchers from Early Start at the University of Wollongong. This project is the first phase of a study titled *An Early Start to Self-Regulation.*

PURPOSE OF THE RESEARCH
Self-regulation refers to the ability to control our thoughts, behaviours, emotions and social interactions – an ability that develops rapidly in the preschool years. Research has shown that self-regulation is related to important abilities such as social competence, school readiness and academic achievement. However, we know comparatively less about the experiences and activities that foster children's self-regulation, and there are few self-regulation programs that have good evidence of effectiveness, are easily accessed and used by educators, and do not place additional burdens on these already busy educators. This first phase of the research seeks to gain insight into current understandings, practices and opportunities for fostering early self-regulation. These insights will be reconciled with evidence and suggestions from the research, to develop a theoretically, evidence-based and community-consulted program for fostering self-regulation that takes into account the children, context, demands and educators themselves. Note that while there will be subsequent phases of this research (e.g., consultation on intervention elements, piloting, and then full-scale evaluation), participation in this phase of the research does not obligate you to participate in those later phases.

METHOD AND DEMANDS ON PARTICIPANTS
If you agree to participate, we will engage you in: (1) researcher observations, (2) educator journals and (3) semi-structured interviews. Specifically, (1) initial 2-day observations will involve the research team visiting your centre for a brief meeting (to explain the focus of the observations) and to observe the activities and opportunities that you create for fostering self-regulation (including aspects such as group formation, duration, instructions given, type of activity and resources used). The initial meeting will take ~15 minutes, followed by 4-hour fly-on-the-wall observations of your practices on two consecutive days. There are no specific demands on you from this aspect of the data collection, as you will simply continue your routines uninterrupted and unencumbered.

Participating Room Leader(s) will then be asked over the next 3 days to (2) keep a journal detailing any self-regulatory activities you engage children in. You can complete this at your convenience, but we request that it is completed at least once each day for the 3-day period. It is expected that this should take no more than 20 minutes per day to complete.

In the following week, (3) we will invite participating Room Leader(s) to participate in a 1-hour semi-structured interview in your centre, to get a more detailed insight into your practices, planning, aims and understandings in relation to self-regulation. These interviews will be audio recorded for later transcription and analysis.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS
Apart from the time taken to participate in this study, we foresee no risks to participation in this research. Please note that your involvement in the study is entirely voluntary and you may decline to participate or withdraw from the study at any time. In either event, declining to participate or withdrawing from the study will not affect your relationship with the researchers, your employer or

the University of Wollongong. Note that all data collected will be kept strictly confidential. You will not be identified in any part of the research.

Note also that while children in your centre will be not involved in this research (i.e., we will not interact directly with children as part of this research, nor will we collect any data from or about them), the researchers all have valid working with children checks and have ample experience working with young children. As such, we do not expect the presence of the researchers to be overly disruptive to the children either.

FUNDING AND BENEFITS OF THE RESEARCH
This research is funded by an Australian Research Council Discovery Early Career Researcher Award grant. The findings of this research will be used to reconcile current practices with existing theory and research, to inform the design and piloting of a self-regulation intervention (Phase 2) and its subsequent evaluation (Phase 3). As such, findings from this research may be reported at academic conferences and published in educational journals. However, at all times confidentiality will be assured, and neither you nor your centre will be identified in the reporting of this research.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong. If you have any concerns or complaints regarding the way the research is or has been conducted, you can contact the Ethics Officer on (02) 4221 3386 or e-mail rso-ethics@uow.edu.au.

Should you require any further information please do not hesitate to contact members of the research team.

Yours sincerely,

Dr Steven Howard   Dr Cathrine Neilsen-Hewett   Dr Ken Cliff   Ms Elena Vasseleu
School of Education   School of Education   School of Education   School of Psychology
(02) 4221 5165   (02) 4221 5543   (02) 4221 4011
stevenh@uow.edu.au   cnhewett@uow.edu.au   cliff@uow.edu.au   elenav@uow.edu.au

Educator Consent Form

Research Title: An Early Start to Self-Regulation (Phase 1)

Researchers: Drs Steven Howard, Cathrine Neilsen-Hewett, Ken Cliff, & Ms. Elena Vasseleu

I have read the Educator Information Sheet and have had an opportunity to ask the researchers any further questions I may have. On the basis of that information, I understand that there are no expected risks to me or the children at my centre as a result of participating in this study. I understand that my participation in this research is completely voluntary and I may decline to participate without affecting my relationship with the researchers, my employer or the University of Wollongong. I understand that I may also withdraw any data I have provided up until two weeks after the completion of my data being collected, by contacting the researchers.

I understand that my participation in this research will involve permitting observations of my practice (over 2 days), completing a day journal (over 3 days) and participate in a 1-hour interview in the next week, as described in the Educator Information Sheet. I understand that I may also be contacted in the future to participate in the next phase of this study, which I may agree to or decline at the time. I understand that participation in this phase of the research does not obligate me to participate in any future research that has not been outlined in the Educator Information Sheet.

I understand that the data collected will only ever be reported in anonymised, aggregate summary form or, where a direct quote is used, with a pseudonym to ensure my anonymity. It is expected that the results of this study will be presented at national and international conferences and/or published in academic journals. However, at all times confidentiality is assured. I understand that all information collected will be anonymous, will be kept strictly confidential and that I will not be identified in any part of the research.

By signing below I am indicating my consent to participate in this research.

Signed   Date

_____   ____/____/_____

Name (please print)   Centre Name

_____   _____

Appendix D – Participant Information and Consent Forms: Phase 2

Educator Information Sheet

We would like to invite you, as a Room Leader(s) responsible for 3-5 year old children, to participate in a research project. This project is being conducted by researchers from Early Start at the University of Wollongong. This is the second phase of a study titled *An Early Start to Self-Regulation.*

PURPOSE OF THE RESEARCH
Self-regulation refers to the ability to control our thoughts, behaviours, emotions and social interactions – an ability that develops rapidly in the preschool years. Research has shown that self-regulation is related to important abilities such as social competence, school readiness and academic achievement. However, we know comparatively less about the experiences and activities that foster children's self-regulation, and there are few self-regulation programs that have good evidence of effectiveness, are easily accessed and used by educators, and do not place additional burdens on these already busy educators. This second phase of the research seeks to gain educators' feedback and insights on the activities and materials of a proposed self-regulation program–derived in part from educators' practices and insights from Phase 1 of this research–that addresses these issues. These insights will be used to further refine these intervention materials to account for the experiences and feedback of professionals who we would hope would adopt such a program. Note that while there will be subsequent phases of this research (e.g., implementation and evaluation of the program in 2018 and 2019), participation in this phase of the research does not obligate you to participate in those later phases.

METHOD AND DEMANDS ON PARTICIPANTS
If you agree to participate, we will involve you in trialling and providing feedback on our self-regulation activities and practices. These activities are compatible with regular early childhood education and care programming and were drawn from existing practices, or minimal modifications of current practices, so they are not expected to place much additional demand on educators. In fact, you may already be doing some of these. The activities include modifications of popular activities like 'I Spy', 'Musical Statues', and 'Simon Says'. The trialling will occur in 3-week cycles between September and November 2017. This will be broken down into three parts for each cycle.

(1) At the start of each cycle, we will send you a collection of 3-4 activities/practices to trial (these will be sent by e-mail and post, and followed up with a phone call to ensure receipt and answer any questions you may have).

(2) We will then ask that you trial each of these activities/practices at least once over the next two weeks. While the length of the activities vary, none should take more than 20 minutes to do. It is also fine if the activities we ask you to trial are the same or similar to your current practices – we would still ask that you trial them over the two weeks.

(3) Finally, in the third and final (3rd) week of each cycle, we will ask for your feedback either in writing by email or via phone conversation – whichever you prefer. We will provide you with prompts to indicate desired areas of feedback, such as: your experience of set up and conduct of the activity; impressions of how the activity was received by children; insights into the developmental benefit and appropriateness of the activity; suggestions for refinement of the

activity or our explanation of it. We expect compilation and communication of this feedback to take about 20 minutes per cycle to complete.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS
Apart from the time taken to participate in this study, we foresee no risks to participation in this research. Please note that your involvement in the study is entirely voluntary and you may decline to participate or withdraw from the study at any time. You can withdraw from the study by contacting Steven Howard within two weeks of the completion of the study. In either event, declining to participate or withdrawing from the study will not affect your relationship with the researchers, your employer or the University of Wollongong. Note that all data collected will be kept strictly confidential. You will not be identified in any part of the research.

Note also that while children in your centre will be not involved in this research (i.e., we will not interact directly with children as part of this research, nor will we collect data from or about them), the research team have valid working with children checks and have ample experience working with young children. Further, given our consultation of educators in developing these initial activities and practices, we do not expect the conduct of this research to be overly disruptive to the children either.

FUNDING AND BENEFITS OF THE RESEARCH
This research is funded by an Australian Research Council Discovery Early Career Researcher Award grant. The findings of this research will be used to inform the design of a self-regulation intervention (Phase 2) and its subsequent evaluation (Phase 3). As these data will be used only to inform development of the self-regulation materials, they will not be publicly reported (at academic conferences, published in educational journals).

If you would like to participate in this research, please complete the attached consent form and return it to your Centre Director, for collection by the research team.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong. If you have any concerns or complaints regarding the way the research is or has been conducted, you can contact the Ethics Officer on (02) 4221 3386 or e-mail rso-ethics@uow.edu.au.

Should you require any further information please do not hesitate to contact members of the research team.

Yours sincerely,

Dr Steven Howard	Dr Cathrine Neilsen-Hewett	Dr Ken Cliff	Ms Elena Vasseleu
School of Education	School of Education	School of Education	School of Psychology
(02) 4221 5165	(02) 4221 5543	(02) 4221 4011	
stevenh@uow.edu.au	cnhewett@uow.edu.au	cliff@uow.edu.au	elenav@uow.edu.au

Educator Consent Form

Research Title: An Early Start to Self-Regulation (Phase 2)

Researchers: Drs Steven Howard, Cathrine Neilsen-Hewett, Ken Cliff, & Ms. Elena Vasseleu

I have read the Educator Information Sheet and have had an opportunity to ask the researchers any further questions I may have. On the basis of that information, I understand that there are no expected risks to me or the children at my centre as a result of participating in this study. I understand that my participation in this research is completely voluntary and I may decline to participate without affecting my relationship with the researchers, my employer or the University of Wollongong. I understand that I may also withdraw any data I have provided up until two weeks after the completion of my data being collected, by contacting the researchers.

I understand that my participation in this research will involve:
1. In 3-week cycles between Sep. and Nov. 2017, trialling each of 3-4 self-regulation activities or practices in the first two weeks of the cycle; and
2. Then providing feedback on these in the third week of the cycle, as described in the Educator Information Sheet.

I understand that I may also be contacted in the future to participate in the next phase of this study, which I may agree to or decline at the time. I understand that participation in this phase of the research does not obligate me to participate in any future research that has not been outlined in the Educator Information Sheet.

I understand that the data collected will be used solely for development of the program materials and thus will not be subject to publication or dissemination in any form. Nevertheless, at all times confidentiality is assured. I understand that all information collected will be anonymous, will be kept strictly confidential and that I will not be identified in any part of the research.

By signing below I am indicating my consent to participate in this research.

Signed   Date

_____   ____/____/_____

Name (please print)   Centre Name

_____   _____

Appendix E – Participant Information and Consent Forms: Phase 3 and 4a

Educator Information Sheet

We would like to invite you to participate in a research project being conducted by researchers from Early Start at the University of Wollongong. This is the third phase of a study titled ***An Early Start to Self-Regulation.***

BACKGROUND TO THE RESEARCH
Self-regulation refers to the ability to control our thoughts, behaviours, emotions and social interactions – an ability that develops rapidly in the preschool years. Research has shown that self-regulation is related to important abilities such as social competence, school readiness and academic achievement. However, we know comparatively less about the experiences and activities that foster children's self-regulation, and there are few self-regulation programs that have good evidence of effectiveness, are easily accessed and used by educators, and do not place additional burdens on these already busy educators. This third phase of the research seeks to implement and evaluate a self-regulation program–derived in part from educators' practices and insights from earlier phases of this research–that addresses these issues.

WHAT THE RESEARCH WILL ENTAIL
The self-regulation program we would like to involve you in implementing, so that we may evaluate its effectiveness, consists of a series of practices and game-like activities that are compatible with regular early childhood education and care programming. These were drawn from existing practices, or minimal modifications of current practices, so are not expected to place much additional demand on educators. In fact, they may already be doing many of these. The program's practices are those that are thought to be necessary for self-regulatory development (e.g., encouraging children to lead and make choices, engaging children in problem solving, and persist with difficult tasks). The activities include modifications of popular activities like 'I Spy', 'Musical Statues', and 'Simon Says'. Your involvement in implementing the program would consist of attending an accredited half-day professional development session on self-regulation (either face-to-face or online), and then embedding the practices discussed as appropriate and doing some brief self-regulation activities with children at least a few times per week. The activities are relatively brief (~10 minutes each) and there are options for individual, small and large group activities.

To evaluate the program we require some of the participating centres to implement the program, and the others to continue with their normal practice. This allows us to compare progress related to the program in comparison to normal expected development. Which centres will implement the program in 2018 must be decided randomly, but all centres will have access to the program from 2019. An additional part of the evaluation involves collecting data before and after the program to evaluate any changes that may have occurred. As such, if you agree to participate, we would involve you in the following:

In March and April 2018, prior to the program starting, completing brief ratings of participating children's self-regulation. While the time this takes depends on how many children participate, it is expected that this should take around 1.5 hours in total to complete (~8 minutes per child). We will also ask you to complete a survey of your perceived knowledge, attitudes and self-efficacy around self-regulation (a single 10-minute survey).
We will then ask that you (and at least one other educator at your centre) engage with approximately 1.5 hours of online professional development on practices that support early self-regulation. We will ask that you embed the practices discussed into your routines, where appropriate.

Alongside the professional development, we will also provide you with a series of game-like activities to engage your children in. These are brief, play-like and you may already be doing many of them (e.g., Simon Says, I Spy). You will receive these in a manual, but also embedded within 3 children's books to provide opportunities to link the activities to developmentally appropriate self-regulatory stories. We will also provide you with monthly newsletters for parents that you can send home, to inform the parents about self-regulation and so they are able to try some of these at home as well. If you would like to review any of these materials in full prior to consenting, please contact Steven Howard (contact below) with this request.

Lastly, in October or November 2018, we would visit your centre again to collect data using the same measures again (as described in #1 above), so we can evaluate any changes that have occurred.

NEXT STEPS TO PARTICIPATION
To join the study, you need only to provide a signed copy of the Educator Consent Form.

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS
Apart from the time taken to participate in this study, we foresee no risks to participation in this research. Please note that your involvement in the study is entirely voluntary and you may decline to participate, or withdraw from the study, at any time. You can withdraw from the study by contacting Steven Howard within two weeks of the completion of the study. Your data can also be withdrawn, by request in writing within two weeks of the program's completion. In either event, declining to participate or withdrawing from the study will not affect your relationship with the researchers, your employer or the University of Wollongong. Note that all data collected will be kept strictly confidential. You will not be identified in any part of the research.

FUNDING AND BENEFITS OF THE RESEARCH
This research is funded by an Australian Research Council Discovery Early Career Researcher Award grant. The findings of this research will allow us to evaluate the effects this self-regulation program and, if successful, make the program freely and widely accessible to educators and parents.

ETHICS REVIEW AND COMPLAINTS
This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong. If you have any concerns or complaints regarding the way the research is or has been conducted, you can contact the Ethics Officer on (02) 4221 3386 or e-mail rso-ethics@uow.edu.au. Should you require any further information please do not hesitate to contact members of the research team.

Yours sincerely,

Dr Steven Howard	Dr Cathrine Neilsen-Hewett	Dr Ken Cliff	Ms Elena Vasseleu
School of Education	School of Education	School of Education	School of Psychology
(02) 4221 5165	(02) 4221 5543	(02) 4221 4011	
stevenh@uow.edu.au	cnhewett@uow.edu.au	cliff@uow.edu.au	elenav@uow.edu.au

Educator Consent Form

UNIVERSITY
OF WOLLONGONG
AUSTRALIA

Research Title: An Early Start to Self-Regulation (Phase 3)

Researchers: Drs Steven Howard, Cathrine Neilsen-Hewett, Ken Cliff, & Ms. Elena Vasseleu

I have read the Educator Information Sheet and have had an opportunity to ask the researchers any further questions I may have. On the basis of that information, I understand that there are no expected risks to me as a result of participating in this study. I understand that my participation in this research is completely voluntary and I may decline to participate without affecting my relationship with the researchers, my employer or the University of Wollongong.

I understand that my participation in this research will involve:
Completing brief ratings of participating children's self-regulation (taking an estimated 1.5 hours, or ~8 minutes per child) and self-rating of my perceived knowledge, attitudes and self-efficacy around self-regulation (a single 10-minute survey);
Engaging with 1.5 hours of online professional development on practices that support early self-regulation;
Implementing the professional development practices and child activities throughout the year;
Collection of child assessment data again in October and November 2018, to evaluate any changes that have occurred.

I understand that I may also be contacted in the future to participate in the next phase of this study (case studies of effective practice), that I may agree to or decline at the time. I understand that participation in this phase of the research does not obligate me to participate in any future research that has not been outlined in the Educator Information Sheet.

I understand that the data collected will be reported in anonymous, aggregate form in academic journals and conferences. Nevertheless, at all times confidentiality is assured. I understand that all information collected will be anonymous, will be kept strictly confidential and that I will not be identified in any part of the research.

By signing below I am indicating my consent to participate in this research.

Signed   Date

_____   ____/____/_____

Name (please print)   Centre Name

_____   _____

Parent/Caregiver Information Sheet

We would like to invite your child to participate in a research project being conducted by researchers from Early Start at the University of Wollongong. This is the third phase of a study titled *An Early Start to Self-Regulation.*

BACKGROUND TO THE RESEARCH
Self-regulation refers to the ability to control our thoughts, behaviours, emotions and social interactions – an ability that develops rapidly in the preschool years. Research has shown that self-regulation is related to important abilities such as social competence, school readiness and academic achievement. However, we know comparatively less about the experiences and activities that foster children's self-regulation, and there are few self-regulation programs that have good evidence of effectiveness, are easily accessed and used by educators, and do not place additional burdens on these already busy educators. This third phase of the research seeks to implement and evaluate a self-regulation program–derived in part from educators' practices and insights from earlier phases of this research–that addresses these issues.

WHAT THE RESEARCH WILL ENTAIL
Over the course of the year your child's centre will be implementing some routine practices and activities to support children's development. The program's practices are those that are thought to be necessary for self-regulatory development (e.g., encouraging children to lead and make choices, engaging children in problem solving, and persist with difficult tasks). The activities include modifications of popular activities like 'I Spy', 'Musical Statues', and 'Simon Says'.

To evaluate the program we need to collect data before and after the program to evaluate any changes that may have occurred. As such, if you agree to allow your child to participate, we would involve them in the following:

In March and April 2018, prior to the program starting, a pair of researchers would visit your child's centre to collect data about children's current self-regulation and associated abilities. The measures we will administer with children involve: playing a memory card game; guessing what is in a box; doing the opposite of instructions (e.g., touch their knees when told to touch their head); remembering the location of stickers on a cartoon ant; catching fish and avoiding sharks that swim past on an iPad; sorting by colour and shape; and identifying colours, letters and numbers. This will take an estimated 1 hour, split across 4 x 15-minute sessions over two days. The research team all have experience in early childhood contexts and have the required working with children checks.
Lastly, in October and November 2018, we would visit your child's centre again to collect data using the same measures again (as described in #1 above), so we can evaluate any changes that have occurred.

To evaluate whether any positive effects from the program are maintained over time we also seek your consent to be contacted regarding the collection of follow-up data from your child. As the specific measures used will be determined on previous results (that is, we will only collect data in areas where positive effects were found), a description of what they will entail and timing cannot yet be provided, however you will be informed of these prior to the collection of any data. Broadly speaking, the data collected will likely focus on school-readiness, self-regulation, academic performance (e.g., NAPLAN results) and related abilities. The collection of any follow-up data will be conducted at your child's school and will done so in a manner that is not disruptive to their schooling.

For those who consent to follow-up data collection, the research team will make a maximum of one attempt per year to contact you, however follow-ups will not be sought for every child each year so contact may be even less frequent. Please note that agreeing to participate in the program in 2018 does

not require you to consent to follow-up data collection. Further, if you do agree to be contacted you may still decline any of these follow-ups and/or request that we do not contact you for any future follow-ups.

NEXT STEPS TO PARTICIPATION

If you feel that you have sufficient information about the study and do not have any further questions, feel free to review this information sheet, and sign and return the consent form to your child's centre. Please also complete and return the attached questionnaire providing basic demographic information on factors that are know to be related to self-regulation (e.g., sleep time, age, screen time), as well as questions about your child's current self-regulation. If you do have any further questions, please feel free to contact Steven Howard (details below).

POSSIBLE RISKS, INCONVENIENCES AND DISCOMFORTS

Apart from the time taken to participate in this study, we foresee no risks to participation in this research. Please note that your child's involvement in the study is entirely voluntary and you or they may decline to participate, or withdraw from the study, at any time. You can withdraw from the study by contacting Steven Howard within two weeks of the completion of the study. Their data can also be withdrawn, by requesting this in writing within two weeks of the program's completion. In either event, declining to participate or withdrawing from the study will not affect your or their relationship with the researchers, your child's centre or the University of Wollongong. Note that all data collected will be kept strictly confidential. Your child will not be identified in any part of the research. If you decline to participate, your child will still receive the benefit of these self-regulation practices and activities (they are routine practices in high-quality centres), but no information will be collected from or about your child.

FUNDING AND BENEFITS OF THE RESEARCH

This research is funded by an Australian Research Council Discovery Early Career Researcher Award grant. The findings of this research will allow us to evaluate the effects this self-regulation program and, if successful, make the program freely and widely accessible to educators and parents. While we are not able to provide individual results given the expected size and scope of the research, all centres will get a centre-level aggregate summary of participating children's results and the overall results of the program evaluation.

ETHICS REVIEW AND COMPLAINTS

This study has been reviewed by the Human Research Ethics Committee (Social Science, Humanities and Behavioural Science) of the University of Wollongong. If you have any concerns or complaints regarding the way the research is or has been conducted, you can contact the Ethics Officer on (02) 4221 3386 or e-mail rso-ethics@uow.edu.au. Should you require any further information please do not hesitate to contact members of the research team.

Yours sincerely,

Dr Steven Howard	Dr Cathrine Neilsen-Hewett	Dr Ken Cliff	Ms Elena Vasseleu
School of Education	School of Education	School of Education	School of Psychology
(02) 4221 5165	(02) 4221 5543	(02) 4221 4011	
stevenh@uow.edu.au	cnhewett@uow.edu.au	cliff@uow.edu.au	elenav@uow.edu.au

Parent Consent Form

Research Title: An Early Start to Self-Regulation (Phase 3)

Researchers: Drs Steven Howard, Cathrine Neilsen-Hewett, Ken Cliff, & Ms. Elena Vasseleu

I have read the Parent Information Sheet and have had an opportunity to ask the researchers any further questions I may have. On the basis of that information, I understand that there are no expected risks to my child as a result of them participating in this study. I understand that their participation in this research is completely voluntary and I, or they, may decline to participate without affecting their relationship with the researchers, their pre-school centre or the University of Wollongong.

I understand that my child's participation in this research will involve:
Collection of child assessment data in March or April 2018, taking about 1 hour, split across 4 x 15-minute sessions over two days;
Collection of child assessment data again in October or November 2018, to evaluate any changes that have occurred.

I understand that participation in this phase of the research does not obligate me to participate in any future research that has not been outlined in the Parent Information Sheet.

I understand that the data collected will be reported in anonymous, aggregate form in academic journals and conferences. Nevertheless, at all times confidentiality is assured. I understand that all information collected will be anonymous, will be kept strictly confidential and that my child will not be identified in any part of the research.

By signing below I am indicating my consent for my child to participate in this research.

Your Child's Name (please print)

_____

Your Name (please print)   Name of Your Child's Centre

_____   _____

Signed   Date

_____   ____/____/_____

Appendix F - Participant Information and Consent Forms: Phase 4b

Participant Information Sheet for Centre Directors

Dear Centre Director,

We would like to invite you and key staff from your preschool room to participate in the next phase of the ***Early Start to Self-Regulation Study*** that you participated in over 2018. In this phase, we want to better understand your experiences of the program, as well as the supports and barriers that you may have experienced in its implementation. We are writing to seek your approval to conduct this follow-up research with you and your staff.

What is the purpose of the research?
The aims of this study are to identify and understand potential facilitators and barriers for the implementation of the PRSIST program. Findings from the study will contribute to the refinement of program and its delivery, and an understanding of developmentally appropriate practice associated with enhanced self-regulation outcomes for children.

What would participation involve?
To achieve these aims, we would like to spend some time talking to you and your staff (at times that are convenient to you). In particular, we seek your permission to conduct individual phone *interviews* with you (`~40 minutes) and each of the educators (~60 minutes)_who were engaged in the PRSIST program, at a time that is convenient to you and them. These will be informal and conversational, aimed at understanding how the PRSIST program influenced practice in your centre. The educator interviews will also explore changes to the environment and practice made following involvement in the PRSIST program. The researcher will provide yourself and educators with a list of questions prior to the interviews for your review. Interviews will be audio recorded for later transcription and analysis.

Accordingly, approval is sought for your participation in this study and to conduct the interview with you and educators at your service between April and May 2019 at a time when you would deem it to be minimally disruptive for all involved.

Please note that participation in the previous Early Start to Self-Regulation study does not obligate you to participate in this phase of the research. You and your centre's participation in this research are completely voluntary, and you may decline to participate without affecting your relationship with the researchers, the University of Wollongong or your employer. The educators at your centre are similarly free to decline participation without repercussion. If you commence the study, you and your staff are also free to withdraw your participation and any data you have provided by contacting the researchers up until July 2019, after which reporting of findings will preclude removal of data.

Are there any benefits for participating?
It is expected that the findings of this research will help to evaluate and inform a professional development approach informed by research and practitioners.

Are there any risks involved in participating?

Apart from the time involved in participation, we foresee no risks as a result of your centre's participation in this research. Ethics for this research has been reviewed by the University of Wollongong's Human Research Ethics Committee.

How will privacy and confidentiality be maintained?
Aggregated and summary findings of the study will be sent in an anonymised summary report to all PRSIST centres, without identifying the centres or individuals who contributed to the results. Results may also be reported at national and international conferences and/or published in academic journals. However, at all times confidentiality will be assured. Data will not be reported for individuals and no individual identifying information will be reported about participating individuals or centres.

Who is organising and funding the research?
This research is funded by an Australian Research Council Discovery Early Career Researcher Award grant and conducted by researchers from Early Start at the University of Wollongong. Specifically, the project team consists of: Associate Professor Steven Howard, Dr Cathrine Neilsen-Hewitt, Dr Ken Cliff and Ms. Elena Vasseleu.

Where can questions about the research be directed?
If you have any questions about this research, please contact Dr Cathrine Neilsen-Hewett (contact details below). If there are any ethical concerns you can also contact the Ethics Officer, Human Research Ethics Committee, University of Wollongong by phone on (02) 4221 3386 or via email at rso-ethics@uow.edu.au.

What do you do if you are interested in participating?
If you would like to participate in this research, we ask that you please sign and return the attached Centre Director Consent Form to the Project Coordinator Elena Vasseleu (contact details below), either via e-mail or we can collect on our first visit to your centre. We will also provide the educators in your preschool room with the Educator Information Sheet and Consent Form for their review and consideration. Should you require any further information please do not hesitate to contact Dr Cathrine Neilsen-Hewett of the research team.

Yours sincerely,

Dr Cathrine Neilsen-Hewett	Associate Professor	Dr Ken Cliff	Ms Elena Vasseleu
School of Education	Steven Howard	School of Education	School of Psychology
(02) 4221 5543	School of Education	(02) 4221 4011	(02) 4221 4716
cnhewett@uow.edu.au	(02) 4221 5165	*cliff@uow.edu.au*	*elenav@uow.edu.au*
	stevenh@uow.edu.au		

Centre Director Consent Form

Research Title: An Early Start to Self-Regulation Study: Case Studies for Successful Program Implementation

Researchers: Dr Cathrine Neilsen-Hewett, Associate Professor Steven Howard, Dr Ken Cliff, and Ms. Elena Vasseleu

I have read the Centre Director Information Sheet and have had an opportunity to ask the researchers any further questions I may have. On the basis of that information, I understand that there are no expected risks to me, my staff and the children at my centre in this study. I understand that my centre's participation in this research is completely voluntary and I may decline to have my centre participate without affecting my relationship with the researchers, the University of Wollongong or my employer. I understand that I may also withdraw my participation and any data I have provided up until two months from completion of the data collection by contacting the researchers.

I understand that my centre's participation in this research will involve nominated staff, and myself participating in semi-structured phone interviews with the researcher, as described in the Centre Director Information Sheet.

I understand that the findings from this study will be reported in an anonymised format to participating centres and may also be reported at national and international conferences and/or published in academic journals. However, at all times confidentiality is assured. I understand that all information collected will be anonymous, will be kept strictly confidential and that none of my staff, the children or my centre will be identified in any part of the research.

By signing below I am indicating my consent for me and my ECEC centre to participate in each of the aspects of the research outlined above.

Signed   Date

_____   ____/____/_____

Name (please print)   Centre Name

_____
                  _____

Educator Information Sheet

We would like to invite you and key staff from your preschool room to participate in the next phase of the *Early Start to Self-Regulation Study* that you participated in over 2018. In this phase, we want to better understand your experiences of the program, as well as the supports and barriers that you may have experienced in its implementation. We are writing to seek your approval and assistance to conduct this follow-up research.

What is the purpose of the research?
The aims of this study are to identify and understand potential facilitators and barriers for the implementation of the PRSIST program. Findings from the study will contribute to the refinement of program and its delivery, and an understanding of developmentally appropriate practice associated with enhanced self-regulation outcomes for children.

What would participation involve?
To achieve these aims, we would like to spend some time talking to you and observing typical days in your preschool room. In particular, we seek your permission to conduct individual phone *interviews* with you (~60 minutes), at a time that is convenient to you. These will be informal and conversational, aimed at understanding how the PRSIST program influenced practice in your centre. The educator interviews will also explore changes to the environment and practice made following involvement in the PRSIST program. The researcher will provide you with a list of questions prior to the interview for your review. Interviews will be audio recorded for later transcription and analysis.

Accordingly, approval is sought for your participation in this study and to conduct the interview with you between April and May 2019 at a time when you would deem it to be minimally disruptive for you.

Please note that your participation in this research is completely voluntary and you may decline to participate without affecting your relationship with the researchers, the University of Wollongong or your centre. If you commence the study, you are also free to withdraw your participation and any data you have provided by contacting the researchers up until July 2019, after which reporting of findings will preclude removal of data.

Are there any benefits for participating?
It is expected that the findings of this research will help to evaluate and inform a professional development approach informed by research and practitioners.

Are there any risks involved in participating?
Apart from the time involved in participation, we foresee no risks as a result of your participation in this research. Ethics for this research has been reviewed by the University of Wollongong's Human Research Ethics Committee.

How will privacy and confidentiality be maintained?
Aggregated and summary findings of the study will be sent in an anonymised summary report to all PRSIST centres, without identifying the centres or individuals who contributed to the results. Results may also be reported at national and international conferences and/or published in academic journals. However, at all times confidentiality will be assured. Data will not be reported for individuals and no individual identifying information will be reported about participating individuals or centres.

Who is organising and funding the research?

This research is funded by an Australian Research Council Discovery Early Career Researcher Award grant and conducted by researchers from Early Start at the University of Wollongong. Specifically, the project team consists of: Associate Professor Steven Howard, Dr Cathrine Neilsen-Hewitt, Dr Ken Cliff and Ms. Elena Vasseleu.

Where can questions about the research be directed?
If you have any questions about this research, please contact Dr Cathrine Neilsen-Hewett (contact details below). If there are any ethical concerns you can also contact the Ethics Officer, Human Research Ethics Committee, University of Wollongong by phone on (02) 4221 3386 or via email at rso-ethics@uow.edu.au.

What do you do if you are interested in participating?
If you would like to participate in this research, we ask that you please sign and return the attached Consent Form to your Centre Director or directly to our Project Coordinator, Elena Vasseleu (contact details below). Should you require any further information please do not hesitate to contact Dr Cathrine Neilsen-Hewett of the research team.

Yours sincerely,

Dr Cathrine Neilsen-Hewett	Associate Professor	Dr Ken Cliff	Ms Elena Vasseleu
School of Education	Steven Howard	School of Education	School of Psychology
(02) 4221 5543	School of Education	(02) 4221 4011	(02) 4221 4716
cnhewett@uow.edu.au	(02) 4221 5165	*cliff@uow.edu.au*	*elenav@uow.edu.au*
	stevenh@uow.edu.au		

Educator Consent Form

Research Title: An Early Start to Self-Regulation Study: Case Studies for Successful Program Implementation.

Researchers: Dr Cathrine Neilsen-Hewett, Associate Professor Steven Howard, Dr Ken Cliff, and Ms. Elena Vasseleu

I have read the Educator Information Sheet and have had an opportunity to ask the researchers any further questions I may have. On the basis of that information, I understand that there are no expected risks to me in this study. I understand that my participation in this research is completely voluntary and I may decline to participate without affecting my relationship with the researchers, the University of Wollongong or my centre. I understand that I may also withdraw my participation and any data I have provided up until two months from completion of the data collection.

I understand that my participation in this research will involve: myself participating in semi-structured interviews with the researcher as described in the Educator Information Sheet.

I understand that the findings from this study will be reported in an anonymised format to participating centres and may also be reported at national and international conferences and/or published in academic journals. However, at all times confidentiality is assured. I understand that all information collected will be anonymous, will be kept strictly confidential and that none of my staff, the children or my centre will be identified in any part of the research.

By signing below I am indicating my consent to participate in each of the aspects of the research outlined above.

Signed   Date

_____   ___/____/_____

Name (please print)   Centre Name

_____   _____

Appendix G – Child Activity Example

Managing Musicians

What to do: Place one instrument on each chair in a large circle. Instruct children to go sit on a chair and put the instrument on their lap 'silently' (no sound). Have the children play their instruments when the music is on (or when a conductor is moving their arms) and stop as soon as it stops. After each pause, have children move to the seat next to them with a different instrument – again being careful to put the instrument silently on their lap.

Too easy? How to increase challenge: Have children do the opposite – play when the music is off (or the conductor is still) and be still when the music is on (or the conductor is moving their arms). For even more challenge, have children keep their legs still (feet firmly planted on the floor) as the rest of their body is active playing along with the music.

Ideal location(s): Indoors or outdoors.

Ideal formation(s): Large group or small group.

What you need: One instrument per child.

What it does: This activity challenges children's ability to inhibit/discontinue urges and natural reactions that may feel compelling, but should no longer be undertaken.

Real life application and implications: Life is full of urges and impulses, at least some of which we are better off resisting. We may be full, but continue eating the snacks in front of us. We may have enough shoes, but get tempted by the sales at the mall. One child may want to grab a toy that another child is already playing with. A foundational ability in early childhood and beyond is the ability to resist urges and impulses that are contrary to our goals or current context. Yet these abilities don't develop on their own. As with nearly everything, practice makes perfect. This activity gives children an opportunity to challenge and extend their ability to discontinue actions that may feel compelling but should no longer be undertaken.

Links to EYLF:

- Demonstrate an increasing capacity for self-regulation; Persist when faced with challenges and when first attempts are not successful; Increasingly cooperate and work collaboratively with others (from Outcome 1.2)
- Gradually learn to 'read' the behaviours of others and respond appropriately; Cooperate with others and negotiate roles and relationships in play episodes and group experiences (from Outcome 2.1)
- Persist even when they find a task difficult (from Outcome 4.1)
- Develop an ability to mirror, repeat and practice the actions of others, either immediately or later (from Outcome 4.3)

Provide encouragement around children's processes to foster intrinsic motivation

A key factor influencing children's ability to self-regulate is whether or not they are sufficiently motivated to do so. When motivation is lacking, adults often seek to encourage positive behaviours by using external rewards such as stickers, treats or praise. Research in this area indicates that when adults rely on praise to shape children's behaviour, this undermines children's intrinsic motivation and results in an over-reliance on external rewards. If we are to take a behaviourist perspective, the implicit lesson being taught here is that a main reason for engaging in 'good' behaviours is to receive a reward. Children who are truly self-regulated are those who will engage in positive behaviours regardless of audience or reward (e.g., packing away their toys because it is time for lunch, even though they would prefer to keep playing). How can we foster children's intrinsic motivation? One important way is through the use of encouragement around children's processes by showing interest, asking questions and engaging in talk around what the child is doing or has done.

Scenario: After spending most of the morning play session building in the block construction area, Shaylan excitedly calls to an educator, asking her to come and see what he has made. As she approaches, the educator can see Shaylan standing proudly beside a very detailed structure and notes how much effort he must have put in to constructing it.

Practices

Praise and encouragement are not the same thing. While both acknowledge children's behaviour, praise comes with a value judgement (e.g., 'Wow, that's such an amazing tall tower. You're so clever.') Encouragement, on the other hand, involves children in the process and encourages self-evaluation (e.g., 'How were you able to build that tower so tall?') Try it. Have a colleague show you something that they have done. How would you demonstrate your appreciation for this without the use of praise? Below are some ways that you can encourage children and foster their intrinsic motivation.

Demonstrate your interest in what they have done by playing alongside and participating in their play.

Ask open-ended questions, encouraging children to describe their ideas, efforts and activities. Questions should be genuine and relate directly to what the children have done or are doing. For example: 'Why did you decide to use those particular blocks?' or 'Which part did you start building first?'

Acknowledge children's ideas by making non-judgemental statements and describing what you see. Talk about what the children are doing rather than the children themselves. For example: 'You've used many different kinds of blocks to build this. I can see you've spent a long time working on this.' Avoid evaluating what they are doing. Engaging children in conversation also supports language development.

This is not to say that praise should never be used. There are times when praise is valuable. For instance, if a child helps another child you might say 'Steven, I really like how you helped Shaylan sort the blocks at pack up time.' It is the overuse of praise that can undermine children's internal motivational systems.

Links to the Early Years Learning Framework

This principle and associated practices are referenced in the following sources of evidence in the EYLF:

- Intentional teaching (Practice 4)
- Children develop dispositions for learning such as curiosity, cooperation, confidence, creativity, commitment, enthusiasm, persistence, imagination and reflexivity (Outcome 4.1)

Appendix I – Children's Book Excerpt

The noise rings across the store,
As cans roll about the floor.
Dexter's had a dreadful fright
But he says, "I'll put this right."
Barnaby helps make the stack,
Piling cans to bring it back.
Dexter does his very best,
soon has cans piled past his chest.

Mind Reader

What to do:
Tell the children that you want to play a mind-reading game: That you are thinking of a particular way to sort objects, and you want to see if the children can 'read your mind' to figure it out. Use up to 20 objects that can be sorted according to different categories (e.g., colour, size, shape).

Let the child decide when they are finished sorting. If a child has sorted correctly, tell them *That's right. Now I'm going to think of a different way.* If a child sorts incorrectly, tell them *That's a clever way to put them into groups, but that's not the way I was thinking of. Let's try a different way to see if you can work out what I am thinking.*

If you are doing this in a group, have children take turns sorting the objects. In between attempts to sort, support children to think and talk about ways the objects are the same and different from each other (to aid sorting).

Too easy? How to increase challenge:
Choose sorting rules that incorporate two dimensions at once (sort by colour and size: large red, small red, large green, small green). This will require some explanation, demonstration, and practice with the children.

For more detail, visit page 27

Appendix J – Parent Newsletter

An Early Start to Self-Regulation: Parent Newsletter

Your child's pre-school centre is participating in a program of games, activities and practices to support young children's developing self-regulation. If you have provided consent for your child to participate in the evaluation of this program, we will collect information about their self-regulation before and after the program to evaluate its impact. If you preferred to have your child not participate in the evaluation, they will still get to engage in the activities but we will not collect any information from or about them. The program will run over the course of the year, and we want to let you know the sorts of self-regulation supports your child will be receiving – you may even want to try some of them at home. So each month through to the end of the program we will send out a parent newsletter with self-regulation information, games and practices so you can connect with your child's pre-school experiences, and maybe even try some of them at home. This month we will focus on a background to self-regulation – what it is, and how we can support it. On the back is a quick and easy sample activity that is taken from our children's book, *I Don't Miss the Shopping List*, which we have provided a copy of to your child's centre.

About Self-Regulation
Self-regulation refers to our ability to control our thinking, behaviours, emotional reactions and social interactions to achieve our goals or react appropriately to the situation – even if it is difficult to do so. Even adults struggle with self-regulation: when we say we are full, but continue nibbling snacks in front of us; when we know we don't need another pair of shoes, but give in because they are on sale; when we should be doing something productive (e.g., chores), but watching TV is more enticing. The same applies to children, except they have an even harder time than we do.

Research has shown that our ability to self-regulate is important. By the end of the pre-school years a well self-regulated child can sustain their attention and resist distraction, resist temptation and delay gratification, wait their turn, consider the consequences of their actions, and persist with challenging activities. They can do this even despite often-contrary urges and impulses. They are also able to stop doing enjoyable things (e.g. playing) to engage in less-enjoyable but necessary things (e.g., tidying up their toys before lunch) when needed. As a consequence, children who are better able to self-regulate are more likely do well at school, experience more positive relationships, and avoid problematic lifestyle choices that can lead to negative adult outcomes (e.g., poorer health, less wealth, more anti-social behaviour).

Supporting Self-Regulation
So what can we do to support children's self-regulation development? Children are not born with the ability to self-regulate; these skills develop slowly and over time, and are sensitive to influences and experiences both inside and outside the home. Research has shown that the pre-school and early primary years are a particularly significant time to learn and acquire the skills necessary for self-regulation. Yet much of the research that explores what can actually improve self-regulation has focused on costly and time-consuming options, like computerised "brain training".

Instead, we believe there are everyday things that parents, educators and caregivers can do to provide experiences and opportunities for children to apply and develop their self-regulatory skills. Over the coming months, in each newsletter, we will discuss practices and activities we believe support the development of early self-regulation. As a starting point in this first newsletter, we provide an activity on the reverse as an example of this approach.

What to do: Tell the children that you want to play a mind-reading game: That you are thinking of a particular way to sort objects, and you want to see if the children can 'read your mind' to figure it out. Use up to 20 objects that can be sorted according to different categories (e.g., colour, size, shape). Tell the children:

I am thinking of a way you could put these things into groups, and I want to see if you can read my mind and put them into the groups I am thinking. For example, I could put the blue ones together and the red ones together. But I'm thinking of a different way to put them into groups. Can you guess what I am thinking, and put them into groups in a different way?

Let the child decide when they are finished sorting the objects. If a child has sorted correctly, tell them *That's right. Now I'm going to think of a different way.* If a child sorts incorrectly, tell them *That's a clever way to put them into*

groups, but that's not the way I was thinking of. Let's try a different way to see if you can work out what I am thinking.

If you are doing this in a group, have children take turns sorting the objects. In between attempts to sort, support children to think and talk about ways the objects are the same and different from each other (and thus can be sorted).

Too easy? How to increase challenge: Choose sorting rules that incorporate two dimensions at once (sort by colour and size: large red, small red, large green, small green). This will require some explanation, demonstration, and practice with the children.

Ideal location(s): Indoors or outdoors.
Ideal formation(s): Individual or small group (no more than three children).

What you need: A collection of objects that can be sorted by a number of different dimensions (e.g., colour, size, category, where it is normally located, its function, etc.) For example, these may be objects found in nature that can be sorted by colour, size, whether they are hard, whether they are found on the ground, whether they grow (stone, leaves of different types, stick, grass, pine cone, flower, etc.), blocks (of different colours, sizes, and shapes), or cards depicting digits and quantities (to be sorted as less or more than a specific number).

What it does: This activity challenges children's ability to direct and redirect their thinking. It also supports problem solving and emergent classification.

Real life application and implications: Our first attempts to solve a problem may not be effective. Instead, we have to think of alternative solutions, not being boxed in by our initial idea. This is one hallmark of creativity. Similarly, we often need to flexibly switch between tasks, disengaging (e.g., from play when it is time to pack up) and reengaging as necessary. This also happens when children need to disengage with a task to perform an alternate task (e.g., to go to the toilet), and then re-enter play. As with nearly everything, practice makes perfect. This activity gives children an opportunity to challenge and extend their ability to flexibly shift their thinking, as the task requires.

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Appendix K – Extended Feedback Form

Feedback Prompts

For each of the activities and practices you received and implemented in the previous two weeks, we would like to hear about your experiences, feedback and suggestions. We have created the following stimulus prompts to outline the sorts of things we would like to hear from you about – however, feel free to provide feedback that extends outside these prompts. You can complete this in writing below or we can call you to discuss over the phone – whichever you prefer. In either case, we will ask for the following:

Centre: _____   Date: _____   Age Range in your Room: _____

1. **How many times did you implement each activity or pedagogical strategy over the two weeks:**

Song and Story Lucky-Dip: _____   Eye-Spy: _____   Bursting Bubbles: _____

2. **Have you done this or a similar activity before?**   YES   NO

   a. **If yes, which activities are similar to your current practices?**   1   2   3   4

   b. **How often do you that/those activities**:   Daily   Weekly   Half-Yearly   Yearly

   c. **Please describe how this activity differed, if at all, from your current practices and what you thought of the modification(s).**

3. **For each of the following, please indicate your experiences or impressions of each activity**

Song and Story Lucky-Dip	1 Poor	2 Not Good	3 Average	4 Good	5 Very Good
a. Ease of setup and conduct of the activity					
b. Your enjoyment of the activity					
c. The children's enjoyment of the activity					
d. Compatibility of the activity with current resources, requirements and practices					
e. Time taken to complete the activity					
f. Ease of managing the children					
g. Developmental appropriateness of the activity					
h. Potential benefit to children's self-regulation					
i. Clarity of the written explanation of the activity					
j. What was the group size for this activity?					

Eye-Spy	1 Poor	2 Not Good	3 Average	4 Good	5 Very Good
a. Ease of setup and conduct of the activity					
b. Your enjoyment of the activity					
c. The children's enjoyment of the activity					
d. Compatibility of the activity with current resources, requirements and practices					
e. Time taken to complete the activity					
f. Ease of managing the children					
g. Developmental appropriateness of the activity					
h. Potential benefit to children's self-regulation					
i. Clarity of the written explanation of the activity					
j. What was the group size for this activity?					

Bursting Bubbles	1 Poor	2 Not Good	3 Average	4 Good	5 Very Good
a. Ease of setup and conduct of the activity					
b. Your enjoyment of the activity					
c. The children's enjoyment of the activity					
d. Compatibility of the activity with current resources, requirements and practices					
e. Time taken to complete the activity					
f. Ease of managing the children					
g. Developmental appropriateness of the activity					
h. Potential benefit to children's self-regulation					
i. Clarity of the written explanation of the activity					
j. What was the group size for this activity?					

4. **Would you do this activity again?**

   1. **Song and Story Lucky-Dip**   YES   NO

   2. **Eye-Spy**   YES   NO

   3. **Bursting Bubbles**   YES   NO

5. **Do you think the children would want to do this activity again?**

   1. **Song and Story Lucky-Dip**   YES   NO

   2. **Eye-Spy**   YES   NO

   3. **Bursting Bubbles**   YES   NO

6. **Do you have any suggestions you have for improvement of the activities or strategies?**

7. **Regarding our written explanation of the activity, what was useful and what was not and how might we revise this (if necessary)?**

8. **Do you have any other feedback that may be useful in refining, revising and developing our collection of self-regulation activities?**

9. **Do you have any feedback regarding the Pedagogical Practices that may be useful in refining, revising and developing our self-regulation program?**

10. **Do you have any feedback regarding the Parent Newsletter?**

11. **Do you have any feedback regarding the sample children's book pages?**

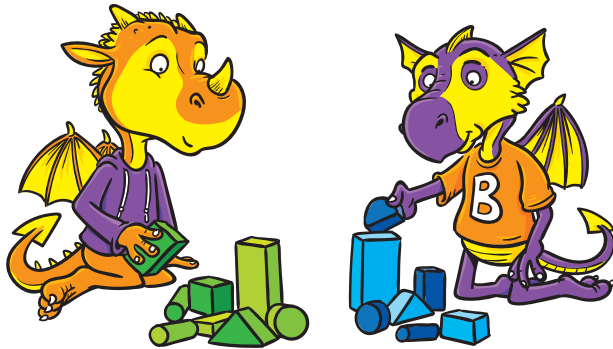# Appendix L – Emotional Response Cards
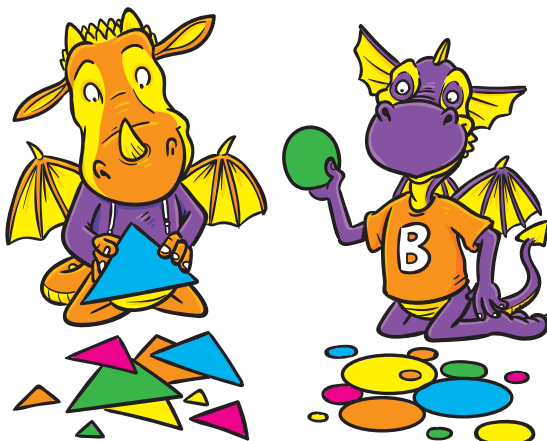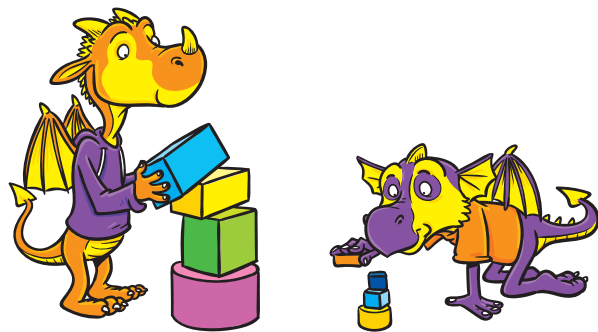

Happy

Confused

Sad

Angry

Scared

Lonely

Excited

Colour

Size

Shape

Observe: What is happening?

Predict: What do you think might happen?
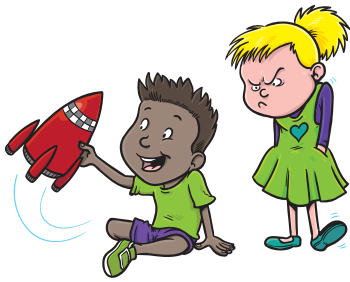
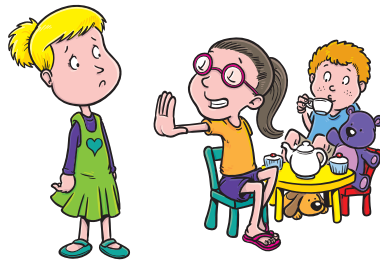Experiment: Try out different things.

Reflect: What happened when?

Someone is playing with a toy you want to play with.

You accidentally knocked over someone's construction.

Someone says you can't play with them.

Someone accidentally hurts you.

Someone looks upset.
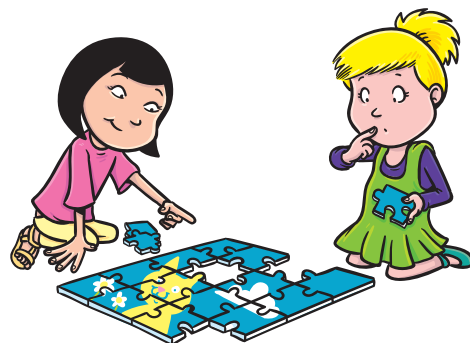
Ask for help.

Say 'Please stop'.

Ask 'Can I play?'.

Ask 'Are you OK?'

Take turns.

Share.

Appendix P – PRSIST Assessment Activity Instructions

Activity 1: Memory Card Game

In this activity, a group of four children will be invited to play a 10-minute memory game (try to find matching pairs among cards that have been placed face-down in rows on a table) using Australian native animal cards (or other available cards). Children will play this game in groups of four, plus the facilitating researcher. The children should be familiar with one another prior to playing the game (i.e., attend the same preschool room) and should all be around the same age. The number of pairs of cards included in the memory game depends on the age of the children (i.e., 6 pairs with just quantities for 3-year-olds, 8 pairs of digits and matching quantities for 4 year-olds, 14 pairs of digits and matching quantities for 5 year-olds).

Tell the children that the goal of the game is to collect the most matching pairs of cards, and then explain the rules of the game (e.g., need to take turns, can only flip over two cards per turn, if you find a pair you get to go again). The game should then progress as follows:

1. Shuffle the cards and lay them on the table, face down, in rows;
2. The child sitting to the left of you goes first. Play then continues in a clockwise direction – children should be explicitly shown the order of play, which can be supported by you pointing to each child and telling them who goes 'first', 'second', 'third' and 'fourth';
3. On each turn, a child turns over any two cards and keeps them if the cards match (for instance, two kangaroos on one card and the digit 2 on the other card – if playing with 4+ year olds);
4. If a child successfully matches a pair they get to keep the pair, and they gets another turn;
5. When a child turns over two cards that do not match, those cards are turned face down again (in the same position) and it becomes the next child's turn;
6. The child with the most pairs at the end of the game wins – although emphasis is on counting pairs and congratulating children on their play.

Activity 2: Curiosity Boxes

This activity is done with a child and adult, one on one. In this activity, the child will be presented with 3 square boxes, one at a time, and will proceed through a series of steps to help them guess what might be inside. Each box will contain an object that is unknown to, and unseen by, the child. The boxes will include contents of 'increasing' difficulty (for repeated administrations or administration across a large number of children, these contents will likely need to be swapped/replaced at regular intervals to ensure children are unaware of what the hidden objects are):

1. Box 1 contains something easier to guess (e.g., a small tennis ball)
2. Box 2 contains something moderately difficult to guess (e.g., small wooden twigs)
3. Box 3 contains something quite difficult to guess (e.g., a broken CD/DVD)

Each box is presented individually to the child in the order described above. For each box, a series of instructions should be given to the child, directing them to how they can interact with the box in order to guess what is inside. This sequence is as follows:

1. Place the first box in front of the child and tell them you will explain what you want them to do.
2. Explain that for each box you want them to follow these steps, in order: (1) look at the box, without touching it, and try and guess what's in it; (2) hold the box carefully to feel its weight (no shaking!) and guess again; (3) shake the box and guess again; and finally (4) close their eyes and feel what is inside the box (no peeking!). The child can then make unlimited guesses after feeling what's inside the box.
3. Have the child proceed through this sequence for each box, leaving sufficient time to see if they can recall the steps/instructions and providing reminders only when necessary.

Appendix Q – PRSIST Assessment Score Sheet

Preschool Situational Self-Regulation Toolkit (PRSIST) Assessment

Child Name/ID: _____ **Child Sex:** M / F **Child Age:** _____ **Rater:** _____ **Date:** _____ **Activity Rated:** M CB

Observer notes: For each item, please rate the degree to which the child engages in the described behaviour in the activity (circle one rating for each item):

1.	**Did the child sustain *attention,* and resist *distraction,* throughout the instructions and activity?**	1	2	3	4	5	6	7

This item focuses on the child paying attention throughout the activity: during the facilitator's instructions, during their turn and during others' turns. Internal or external occurrences, sounds or objects rarely distract their attention. To rate this item, you have to pay attention to where children are looking throughout the game or activity. *At a score of 1*, a child pays virtually no attention to any aspects of the instructions or game. *At a score of 7*, a child has virtually no lapses in attention and pays careful attention at all times.

2.	**Was the child *engaged* in the activity throughout its duration?**	1	2	3	4	5	6	7

This item focuses on engagement, which is related to their involvement and investment in the activity. A child can be paying attention (as in Item 1), but showing little active investment in the activity. Behaviours such as reacting (e.g., to someone else getting a pair), responding (e.g., to words or actions of others), asking and answering questions (e.g., responding to questions of 'What do you think is in the box?'), and/or following requests (e.g., not shaking the box before permitted) would all be indicators of engagement. *At a score of 1*, a child is barely engaged in the activity. They may often look at the facilitator and aspects of the activity, but their involvement is entirely passive and reactionary (or non-existent). *At a score of 7*, a child is reacting to the things that happen in the activity, such as responding to and asking questions and following requests. They are constantly active participants for the duration of the activity.

3.	**Was the child *thoughtful* and *planful* before acting?**	1	2	3	4	5	6	7

This item focuses on the child's mental effort put toward the activity. Evidence of being thoughtful includes pauses to think and consider, revision of initial responses (e.g., revises guess of what's in the box based on new information) and not perseverating on the same mistakes (e.g., keeps flipping the same two cards). *At a score of 1*, a child is responding quickly (almost reflexively) and repeating the same mistakes in their responses or actions. *At a score of 7*, a child is taking time and effort to think, remember and avoid repeating mistakes. They may also revise initial responses (e.g., start to reach for a card but, adopting a better strategy, stops and selects another).

4.	**Was the child *self-directed*, engaging in the activity with little prompting?**	1	2	3	4	5	6	7

This item focuses on whether the child is able to internalise the sequence and requirements of the activity, and independently enact this. This includes not only knowing when it is their turn and/or what to do next, but enacting this with little to no prompting. *At a score of 1*, a child is highly other-regulated. Even if they appear to know what the next step/requirement is, they consistently require prompting and affirmation from the facilitator to do this (e.g., 'Yes, it's your turn', 'Now you can shake the box'). *At a score of 7*, after some initial time to familiarise with the activity, the child does not require reminders, prompts or affirmations to continue the activity (e.g., if a child finds a pair, they independently commence their second turn).

5.	**Did the child *control their behaviours* and stay within the rules of the activity?**	1	2	3	4	5	6	7

This item focuses on the extent to which children resist behavioural impulses. This could include skipping turns or steps (e.g., skipping the requirement to gently lift), breaking rules of the game or activity or, in more extreme cases, being physically or verbally aggressive. *At a score of 1*, a child is showing complete disregard for the rules of the game, has engaged in serious physical or verbal aggression towards others and/or is highly disruptive of the game (e.g., wiping cards off the table, immediately lifting the lid of the box). *At a score of 7*, a child remains within the rules of the activity, is calm and controlled, and has not given in to negative impulses.

6. Did the child *remain in their seat* and *rarely fidget*?	1	2	3	4	5	6	7
This item focuses on whether the child is able to remain reasonably still. Fidgeting with their hands, legs, feet, body, or leaving their chair entirely (other than briefly, to reach something required for the activity) apply to this item. *At a score of 1*, a child is almost always fidgeting and/or leaving their chair. *At a score of 7*, a child is rarely fidgeting and does not leave their chair for reasons unrelated to the activity's requirements.							
7. Did the child follow *social conventions* of the situation?	1	2	3	4	5	6	7
This item focuses on whether a child adheres to the general social requirements of the situation. This includes things like waiting their turn, not beginning the activity before instructions are complete, being considerate to others (e.g., not talking over others), acknowledging others' successes and responding to questions. *At a score of 1*, a child is consistently lacking consideration for others or is being actively inconsiderate (e.g., not waiting their turn, actively ignoring). If there are some positive and negative social behaviours, consider the frequency and gravity of these to decide a rating. *At a score of 7*, a child is consistently considerate of others' turns and speech, is responsive to and considerate of others, and celebrates others' successes.							
8. *Memory game only:* Did the child take opportunities to be *helpful* and supportive to the adult or other children?	1	2	3	4	5	6	7
This item focuses on whether, in a social situation like a group memory card game, a child takes opportunities to be helpful to others. Opportunities to help are prevalent – answering questions that are posed, helping a child that is unclear about next steps or is struggling with an action, providing honest guidance, and giving support. *At a score of 1*, a child engages in no instances of helping behaviour. *At a score of 7*, although some potential opportunities for help may be missed, a child generally and frequently offers help. For a score of 7, you should feel that the child has a general disposition toward helping, and routinely acts upon this.							
9. *Curiosity boxes only:* Was the child willing to *risk* being wrong when uncertain?	1	2	3	4	5	6	7
This item focuses on whether, under conditions of uncertainty, a child is willing to engage with a problem, challenge or activity despite the risk of being wrong. For instance, despite having little information from which to guess an item that is inside a box, will they engage in the challenge of guessing? *At a score of 1*, a child does not make any guesses while the boxes are closed, and quickly peeks once feeling the object in their hand. *At a score of 7*, a child will almost invariably guess what is in the boxes, regardless of the level of uncertainty.							