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Exploring Children's Self-Regulation for Learning within a Mindfulness-Based Social and Emotional Learning Program

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Abstract

A mixed-method, repeated measures research design was employed to explore (a) the psychometric properties of a shortened version of the Self -Regulation in School Inventory (SRISI), (b) young children's development of SR/L within MindUP™, and the demographic and teacher factors implicated in opportunities provided for children to engage in SR/L. Data were gathered from 15 kindergarten teachers and eight ECEs (0 male) who provided teacher reports of children's SR/L (N = 222 children, boys = 108, Junior Kindergarten = 109, *Mean* age = 4.57, *SD* = .57), and their teacher efficacy, burnout, and behavior attributions at Time A and Time B. Also, educators responded to focus group and short answer questions related to perceived changes in classroom functioning (e.g., educators supporting SR/L, social SR/L behaviours, solo SR/L behaviours). Results demonstrated that (a) the shortened 9-item SRISI yielded reliable and valid reports of kindergarten children's social and solo SR/L, (b) children's social and solo SR/L increased over implementation of the MindUP™ program, (c), boys and junior kindergarten children received lower ratings of social and solo SR/L at Time A and Time B, and, d) educators' behavior attributions and feelings of personal accomplishment predicted children's social SR/L at Time A and Time B, respectively. Finally, educators' attributed changes to classroom functioning, and changes in children's SR/L to the implementation of the MindUP program ^{TM}. Findings are interpreted as providing preliminary evidence that teachers can provide psychometrically sound ratings of kindergarten children's SR/L using the SRISI. Also, that MindUP^{TM} may support children's social and solo SR/L in kindergarten classrooms. Overall, findings from this study highlight the need for teacher training geared towards teaching towards SR/L and supporting teachers' efficacy.

Keywords

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Chapter 1

1   Introduction

First, this chapter begins by defining self-regulation (SR) and self-regulation for learning (SR/L) in classrooms through both developmental and educational psychology lenses. Also, an overview of current one, two, and three factor models of SR/L is provided. Second, a review of the literature is presented describing how demographic and teacher factors may be linked to children's development of SR/L in school. Third, this chapter describes some of the challenges researchers have faced measuring SR/L in very young children. Fourth, research investigating the mindfulness-based social and emotional learning program, MindUP^{TM} is presented. Finally, this chapter closes by presenting the study purpose, and the research questions and hypotheses that were explored.

1.1   Self-Regulation and Self-Regulation for Learning

Self-regulation (SR) describes how individuals apply cognition and behavior to respond to environmental demands and achieve goals (Zimmerman, 2003). SR has been found to predict positive life outcomes, including good physical health (e.g., healthy body weight), higher levels of education and income, and better psychological well-being (e.g., lower risk for depression and substance abuse; Moffitt et al., 2011). In the developmental psychology literature, studies about SR have focused on understanding children's maturation of executive functions —working memory (e.g., remembering a set of directions to complete a learning task), focused attention, and behavior inhibition (e.g., waiting for a turn to speak instead of talking out in class) — and how these are linked to their development of emotional and/or behavior control during the preschool and early school years (Diamond, 2016, Diamond & Lee, 2011). As children enter school, they begin to rely on their executive functions to learn and achieve in classrooms at school (Borella, Carretti, & Pelegrina, 2010; Diamond, 2014; 2016).

Research has demonstrated that children's maturation of executive functions reflects the interaction of biological (e.g., temperament) and environmental factors (e.g., affluence and poverty). For example, Rothbart (2007) used a sample of 45 children (age 18 to 21

months; 29 male) and their families to investigate the relationships among executive functioning, parenting quality, and the presence of a DRD4 7-repeated allele (implicated in the development of processes involved in executive functions). Results indicated children with the 7-repeat allele were influenced by parenting quality, with lower quality parenting associated with lower behavior inhibition; children without the 7-repeat allele were uninfluenced by parenting quality. Findings from this study demonstrate that there is an epigenetic component to the development of children`s executive functions (i.e., an interaction between genetics and environment). Executive functions are important because they undergird the processes implicated in children's self-regulation of/for learning (SR/L; Bryce & Whitebread, 2012; Perry, Hutchinson, Yee, & Määtä, 2017)

 In the educational psychology literature, SR is often described as a unidimensional construct referred to as self-regulation of/for learning (SR/L). SR/L refers to individuals', including children's engagement in adaptive and effective patterns of learning using metacognition, motivation for learning, and strategic action (Hutchinson, 2013; Perry & Winne, 2013). Metacognition describes the ways learners appraise their cognition, emotions, and behaviours. Children are metacognitive when they analyze their strategy use during an activity, e.g., "I did X last time and Y happened, so maybe I can try Z this time to be successful" (Tuysuzoglu & Greene, 2015). Motivated learners are willing to approach and persevere in the face of demanding or difficult tasks (Williamson, 2015). Children are motivated when they intentionally choose to a read a challenging rather than easy book, with the goal to improve their skills. Children can apply their metacognition and motivation to behave in ways that reflect strategic action. Children exhibit strategic action when they evaluate their learning environment and choose to move to a quiet space in their classroom to complete their work (Hutchinson, 2013).

According to Zimmerman and Schunk (1997), learner's development of SR/L happens through a series of phases. The *forethought phase* takes place before learning begins, and involves task analysis (e.g., goal setting) and self-motivation (e.g., children's beliefs about their learning capabilities: "with time and effort, I can improve"), which influence how a learner approaches a task. Then, learners engage in the *performance phase*. This phase is comprised of self-control (i.e., attention focusing) and self-observation (e.g.,

self-monitoring during learning) when attempting to carry out the task. The third stage is described as the *self-reflection phase,* and includes self-judgment, whereby the individual rate their own performance as related to another person's performance, a standard outcome, or beliefs about ones causes of success, and self-reaction (the experienced affect towards personal outcomes on a task. Learners engage in a cyclical feedback loop, involving each phase, to facilitate increasingly improved regulation over time and with experience (Zimmerman, 2002).

Also, Schunk and Zimmerman have described that individuals' development of SR/L is embedded within social cognitive processes (Schunk & Zimmerman, 1997). First through observation, children observe a behavior and/or strategy, which is modeled by parents, teachers and peers. Second, children practice the behavior (e.g., to improve their management of emotions, behaviours, and cognitions) through imitation. Over time and with support, children learn to use the strategies that have been modeled and found to be effective. In the final stage, children's learning of the behavior and/or strategy becomes increasingly automated until it becomes internalized and accessible across contexts.

More recent research has focused on understanding young children's SR/L in solo and social forms (Hutchinson et al, 2015; Malmberg, Järvela, & Järvenoja, 2017; McCaslin, 2011; Whitebread et al., 2007). Solo SR/L describes children's willingness to persist when faced with challenge, reflect on behaviours, and employ strategies independently to achieve classroom goals (Perry et al., 2017). Generally, social SR/L describes young children's skills for initiating, engaging with, and responding to, others in a socially adaptive way to achieve goals in classrooms (Hutchinson, 2013, Whitebread et al, 2007).

Within descriptions of SR/L, researchers have indicated that co- and shared-regulation are aspects of social SR/L. Co-regulation involves the transition to increasingly self-regulated behaviours with the assistance of a more knowledgeable other (e.g., teacher or peer) possessing the knowledge and skills needed to complete a task successfully (Fernández, Wegerif, Mercer, & Rojas-Drummond, 2015; Malmberg et al., 2017). Through modeling and feedback, the teachers and/or peers scaffold learning to support a child's increasingly independent learning (e.g., a teacher shows children how to sound

out a word when they encounter a challenging one). Shared-regulation describes how learners pool regulatory resources (i.e., metacognition, motivation for learning and strategic action) on tasks that require interpersonal interactions, such as cooperative and collaborative forms of learning. Children engage in shared-regulation when they work together to determine task goals, and pool their knowledge, resources, and strategies to collectively monitor and complete a task (Malmberg et al., 2017). For example, children may engage in shared-regulation when they work with peers to complete a puzzle or build a sandcastle (Hutchinson, 2013; Perry et al., 2017). Beyond theory, empirical research has demonstrated that even very young children engage in social and solo aspects of SR/L (Hutchinson et al., 2015; Malmberg et al., 2017; Whitbread et al., 2007).

For example, Whitebread et al. (2007) explored young children's ($N = 1440$, age range = 3-5 years) development of skills involved in SR/L (e.g., metacognition). Results indicated that the children in his sample were observed engaging in distinctly social (e.g., suggesting strategies to accomplish a task with peers and able to refer to others' cognitive abilities) and solo (ability to refer to own cognitive abilities, able to set personal parameters or task demands for an activity) forms of SR/L within a play-based classroom context (Whitebread et al., 2009). Findings provide empirical support for young children's engagement in social and solo forms of SR/L. Taken together, theoretical and empirical research demonstrated that children engage in both solo and social forms of SR/L at a very young age.

Recently, a third model has been developed and explored, which focuses on investigating how three targets of SR/L – emotional regulation (ER), self-regulated learning (SRL), and socially responsible self-regulated learning (SRSR) contribute to young children's engagement in SR/L in school (Hutchinson, 2013). ER describes children's ability to control emotions by employing metacognition, motivation for learning, and strategic action in classrooms to achieve goals (Pears et al., 2015). Academic self-regulation, or SRL denotes children's engagement in adaptive and autonomous behaviours for learning using higher order processes (Perry et al., 2017). Children's engagement in collaborative and prosocial behaviours with others using metacognition, motivation and strategic behaviours to regulate learning is SRSR (Hutchinson, 2013). This model specifies these

targets of SR/L and how they may have distinct developmental trajectories over time (Hutchinson, 2013, Hutchinson and Perry 2012; Hutchinson et al., 2015).

To date, very few studies have investigated how SR/L develops during the early school years (Bryce & Whitebread, 2012). To add, even less research has explored the distinct aspects of SR/L (unidimensional, solo/social, ER/SRL/SRSR) that may emerge during the early school years. This study addresses this gap by considering one, two and three factor models of SR/L in kindergarten classrooms.

 Research supports the relationship among young children's SR/L in the early years with adaptive and effective patterns of learning, motivation, and emotion over the long-term (Daniel, Wang, & Berthelsen, 2016; Moffitt, 2011; Perry, 1998; Yeager et al., 2014). Children who can adaptively and effectively regulate their cognition, affect, and social behaviours are more likely to achieve higher grades, have more positive relationships with peers and teachers, engage in effective goal-setting, and show a higher level of motivation to learn (Birgisdóttir, Gestsdóttir & Thorsdóttir, 2015; Paulus, Licata, Kristen, Thoermer, Woodward & Sodian, 2015; Perry, 1998; Yeager & Dweck, 2012).

For example, Birgisdóttir et al. (2015), investigated the effect of children's behavioural SR in preschool on later literacy skill development. Results indicated that children with higher measures of behavioral SR in preschool demonstrated better reading skills and comprehension in grade 1. In her observational study, Perry (1998) examined how SR/L contributes to children's success in the classroom. Perry observed a sample of high and low achieving students engage in writing tasks and assessed their engagement of behaviors associated with SR/L. High-achieving students engaged in more meaningful SR/L behaviours compared to low-achieving students. For example, when high-achieving students encountered problems in the writing process, they were aware of, and able to, think about the cause of their challenges (i.e., evidence of metacognition). In contrast, children with lower levels of SR were more likely to experience less favorable academic outcomes (Perry, 1998).

SR/L stands in contrast to what are referred to as self-handicapping, defensive and/or maladaptive patterns of academic learning (e.g., procrastination, impulsive and avoidance

behaviours; De Witt Huberts, Evers, & De Ridder, 2014; Kim & Seo, 2015). These patterns of learning have been associated with less favorable educational outcomes (e.g., lower grades, reduced academic self-concept, fixed-learning mindset, and less self-efficacy; De Witt Huberts, et al., 2014; Huang et al., 2015; Strunk & Steele, 2011).

For example, Perry and VanDeKamp's (2000) investigated SR/L promoting classroom contexts and children's SR/L within five elementary classrooms (kindergarten – grade 3; $N = 113$; *Mean* Age = approximately 7.5 years old). Observations and student interviews revealed that children who struggled to manage their affect (when receiving feedback about their writing from a teacher) were more likely to believe that their ability was fixed and were less likely to revise their work after feedback had been provided. In contrast, children who took the feedback and changed their story, reported being much more satisfied with their success. Findings demonstrate that students with lower SR/L tend to experience reduced self-efficacy and engage in more maladaptive learning behaviours, and that maladaptive learning patterns can be observed at a very early age.

Taken together, research demonstrates that children's SR/L is associated with children's adjustment to school. However, studies are needed to understand how children's SR/L develops over time, especially among young children. The majority of studies about SR/L have tended to focus on learners at the middle and higher levels of education, rather than young elementary school children (Perry, Phillips, & Hutchinson, 2006; Perry, Yee, Mazabel, Lisaingo & Määttä, 2017). Furthermore, more information is needed to understand how SR/L can be supported in early elementary years classrooms (Perry et al., 2017). Therefore, the present study investigates SR/L development within junior and senior kindergarten classrooms.

1.2   Factors Associated with Self-Regulation for Learning

A review of the literature has demonstrated that student demographic variables (e.g., sex and age) are related to young children's development of executive functions and SR/L (Diamond & Lee, 2011; Hutchinson, 2013; Matthews et al., 2009). Hutchinson (2013) found that girls received higher ratings of SR/L from their teachers, compared to boys. In addition, Matthews et al. (2009), gathered teacher reports and direct measures of

Kindergarten children's SR in the fall and spring terms. They found that boys began the school year with significantly lower levels of SR compared to girls, and that boys' improvements in their SR still lagged behind girls' SR by the end of the school year. Similarly, Diamond and Lee (2011) found that boys tended to display lower levels of executive functions – particularly their ability to inhibit behavior, compared to girls. Researchers have proposed several explanations for these perceived differences (Macdonald, Beauchamp, Crigan & Anderson, 2014; Matthews et al., 2009). One explanation is that girls' ability to regulate their behaviours may tend to mature earlier than boys (Macdonald et al., 2014). Another explanation may be that there is potential bias in teacher ratings of girls' and boys' SR and SR/L; whereby girls' behavior is judged more favorably compared to boys (Koch, 2003). To date, the cause of these differences is not known but evidence suggests that boys' and girls' development of SR and SR/L unfolds at different rates (e.g., Duckworth & Seligman, 2006). The present study examined the demographic variables of grade and sex, and their relationship with young children's development of SR/L.

In addition, research indicates that children's SR/L develops when teachers provide opportunities and support for children's engagement in it (DiBacco, 2015; Hutchinson, 2013). Hutchinson (2013) confirmed over 15 years of Perry's descriptive research program and found a statistically significant and positive hierarchical relationship between features of classroom contexts (i.e., the opportunities children had to participate in SR/L; $N = 19$ kindergarten, grade one, and grade two classrooms) and teachers' ratings of children's engagement in SR/L ($N = 208$ children, *Mean* age = 6.31, $SD = .84$, number of boys = 106). Also, results of her study indicated a statistically significant relationship between age and the SR/L variable, indicating that older children received higher ratings of SR/L compared to younger children. This research provides evidence that teachers tend to provide higher rating of SR/L in classrooms that provide more SR/L-supportive contexts, and to older children compared to younger (Hutchinson 2013). To date, it is uncertain how children's age and experience in school (JK versus SK) influence their development of SR/L.

A growing body of literature has begun to examine how classroom factors (e.g., types of classroom tasks) and teacher factors (e.g., teachers' self-efficacy) influence opportunities for young children's participation in SR/L. Research has demonstrated that teaching towards SR/L is demanding because of the high level of instructional skill required to incorporate opportunities for it into classrooms (Ciga, García, Rueda, Tillema, & Sánchez, 2015; Perry, Hutchinson, & Thauberger, 2008; Salminen, Pakarinen, Poikkeus, & Lerkkanen, 2017). That is, teachers need to be deeply knowledgeable about their students' individual and group learning, and they need knowledge of and access to more advanced and creative teaching strategies; including autonomy supportive teaching practices and engaging children in complex tasks (see Hutchinson 2013; Perry 1998; Perry et al., 2008). Also, studies have linked teacher efficacy and teacher stress to teachers' self-reported use of SR/L promoting practices (Serratore & Hutchinson, 2014).

Teacher efficacy refers to teachers' confidence in their abilities to reach all students (e.g., they are able to make a difference in children's learning outcomes) and competence (Bandura, 1993; Skaalvik & Skaalvik 2010; Schunk & DiBenedetto, 2016). High levels of teacher efficacy have been associated with the kinds of autonomy supportive instructional practices associated with SR/L. For example, Woolfolk and Hoy (1990) examined the relationships between teachers' ($N = 191$; 171 female) self-efficacy and their control-centered versus autonomy supportive teaching practices. Results of the study revealed that teacher-efficacy was a negatively and statistically significantly correlated with control-based teaching practices. These results indicate that teachers who reported higher feelings of teacher-efficacy were more likely to employ autonomy-supportive practices in their classroom teaching. In contrast, teachers with low efficacy tended to indicate more reliance on student control and extrinsic motivators to support students' completion of tasks. Research has indicated that teachers with strong beliefs in their instructional efficacy had students who were motivated to learn, had greater satisfaction with their learning, and showed higher levels of academic achievement compared to students who had teachers with lower levels of instructional efficacy (Bandura, 1993; Zee & Koomen, 2016).

Teacher burnout describes the negative outcomes associated with high levels of occupational stress over time. Teacher burnout is a multi-faceted construct and includes: emotional exhaustion, depersonalization, and decreased personal accomplishment (Maslach & Jackson, 1981; Skaalvik & Skaalvik 2010; Skinner & Beers, 2016). High levels of teacher burnout have been shown to have a negative relationship with teacher-efficacy and practices associated with SR/L. For example, Serratore and Hutchinson (2014) explored how teacher stress and self-efficacy were associated with teachers' self-reported implementation of practices associated with SR/L. Results indicated a positive relationship between teacher self-efficacy and SR/L practices, and a negative correlation between teacher stress with self-efficacy and SR/L.

Previous research has indicated that teachers' perceptions of students are associated with their experiences of efficacy, stress, and student outcomes (Collie, Shapka, & Perry, 2012; Deci et al., 1991; Dweck et al., 1978). Growth mindset is a motivation orientation, which tends to reflect a mastery goal orientation (e.g., learning and development as a process versus fixed or innate), which has been linked to children's motivations for learning (e.g., more intrinsic learning values), as well as more adaptive help seeking, positive affect towards learning, and more willingness to persist when challenged, all with SR/L (Dweck, 2015; Linnenbrick, 2005; O'Rourke, Haimovitz, Ballweber, Dweck, & Popović, 2014). However, a meta-analysis by Sisk et al. (2017) has indicated that growth mindset interventions for children garner weak effect-sizes at post-implementation, except in children who are considered at-risk. Although, research investigating mindset as a teacher factor demonstrates that teachers' mindsets orientations influence the extent to which children adopt a growth mindset in their classrooms (Cheser, Cox, & Detwiler, 2015; Schmidt, Shumow, & Kackar-Cam, 2015). In particular, research has demonstrated that teachers who viewed their students as motivated, capable learners, tended to adopt more growth oriented and malleable views of student learning and behaviour compared to teachers who adopted more fixed beliefs about their students' classroom learning and behaviour (Collie et al., 2012; Dweck et al., 1978; Dweck & Leggett, 1988). When teachers' attitudes towards students learning aligns with a growth mindset, they are more likely to report greater feelings of efficacy, decreased levels of teaching stress, and a willingness to foster children's motivation for learning (Collie et al,

2012; Deci et al., 1991; Dweck et al., 1978: Serratore & Hutchinson, 2014; Upadyaya & Eccles, 2014).

In their study, Collie et al. (2012), examined school climate as a hierarchical predictor of teacher commitment to their profession ($N = 664$ elementary and secondary school teachers; 532 = female). Teachers completed a questionnaire that included items measuring teacher-efficacy, stress, job satisfaction, perceptions of students' motivation and behaviour and commitment to the profession. Results from their study indicated that teacher perceptions of student behavior and motivation (e.g., "Most students are motivated to learn") were the most powerful predictor of general professional commitment and future commitment to the profession. Collie et al. (2012) describe that these teachers may be more committed to the profession because they experience greater well-being and a greater feeling of efficacy in their teaching, resulting in increased commitment to their profession.

Altogether, results of these studies highlight how teacher level factors influence the extent to which they are likely to employ SR/L promoting practices in their classrooms. Specifically, teacher efficacy appears instrumental to teacher's willingness to employ classroom tasks and practices that support children's SR/L. In addition, research indicates that when teachers experience a high level of occupational stress, this is likely to have a negative impact on their efficacy and employment of SR/L promoting practices. Currently, there is a gap in the research examining the association between teacher factors in SR/L. The present study addresses this issue.

Recently, schools have adopted social and emotional learning (SEL), and mindfulness frameworks in an effort to support and increase children's development of SR (Payton, et al., 2008). However, studies have not investigated whether and how these programs may also support children's engagement in SR/L. Therefore, the purpose of this study is to investigate the mindfulness-based social and emotional learning program, MindUP™ (The Hawn Foundation, 2011), and how it may support young children's SR/L.

1.3   Measuring Young Children's Self-Regulation for Learning

Over two decades of research has demonstrated that young children can engage in the higher order processes involved in SR/L (e.g., motivation, metacognition, strategic action; Hutchinson, 2013; Perry, 1998; Whitebread et al., 2007; 2009; Bryce & Whitebread, 2012). However, there are currently very few measurement tools designed to assess children's SR/L. Further, existing measures (e.g., self-reports) are not suitable for gathering reliable and valid assessments of very young children's metacognition, motivation of learning, and strategic action in classrooms (Hutchinson, 2013; Lipsey et al., 2017).

Although self-reports provide rich content from respondents (Sturgess, Rodger & Ozanne, 2002), very young children may struggle to respond to questions on a self-report survey in reliable or valid ways for several reasons. First, because of their emergent literacy skills, second, due to their understanding of how to correctly respond to questions using a scale (Maurulis et al., 2016; Whitebread et al, 2009). Further, quantitative self-reports require children to be able to read and interpret the question posed, enlist their working memory to store, interpret, and generate an answer informed by experience or perception, and then select the appropriate answer using the scale provided (Karabenik et al., 2007). This is cognitively demanding for very young children whose literacy, executive functions, and cognitive processes are in development (Hutchinson, 2013; Whitebread et al., 2009). As a result, it is necessary to employ alternative measures of SRL in young populations.

Previous SR research has evaluated the utility of teacher ratings of children's behaviours associated with SR/L in classrooms (Hutchinson, 2013; McClelland et al., 2018; Perry & Meisels, 1996). For example, compared to direct assessments, teacher-reports allow for researchers to gather data on large populations of children more efficiently. Additionally, previous research has accumulated indicating that that teachers are able to provide reliable reports of children's SR/L when measures include items that describe behaviours that are easily and typically observed in classrooms (Hutchinson & Perry, 2012; McClelland et al., 2018; Whitebread et al., 2009).

However, teacher report measures also have limitations. Concerns include character generalization or attribution biases (i.e., horn or halo effects; Mujis, 2010) that may occur when teachers provide ratings of children's behaviours across classrooms. Attribution biases occur when teachers provide generalized assessments of children grounded in individual positive or negative characteristics (e.g., a "good" or "bad" kid; Muijs, 2011). Attribution biases remain a concern when employing teacher-reports of children's SR/L, although researchers can employ methodological (e.g., multi-informant and/or mixed method design) and statistical considerations to check for this type of bias in data. Increasingly, SR/L research about young children has introduced additional data collection methods to triangulate with teacher reports (Hutchinson, 2013).

For the present study, the Self-Regulation in School Inventory (SRISI; Hutchinson, 2013) – a teacher-report measure designed to capture behaviours associated with SR/L – has been selected to measure and test the psychometric reliability and validity of educator reports of kindergarten children's SR/L. To date, the SRISI's (Hutchinson, 2013) measurement of SR/L has been examined for concurrent validity - how well a measure/scale measures what it is intending to measure (Muijs, 2011) - with three subscales from the well-established Early Development Instrument (EDI; Janus & Duku, 2007) and has been used in combination with classroom observations (Hutchinson, 2013; Hutchinson et al, 2015). There are several types of construct validity that can be used in tandem with other previously established tools to investigate a scale's construct validity (Mujis, 2011). Concurrent validity is a statistical method used to defend or strengthen a scale's measurement validity. It is often employed to investigate the extent to which a measure is associated with a previously established and validated measurement of the same, or theoretically similar construct (Muijs, 2011). In addition, convergent and discriminant validity examine the magnitude of similarity and distinctness, respectively, between constructs (Johnson et al., 2014).

To date, SRISI has not been examined for concurrent and/or discriminant/divergent validity with an established *clinical* measure designed to measure and assess constructs indicative of young children's adaptive functioning. Therefore, the present study employed a clinical measure of children's executive functioning, social skills, and

emotional regulation to investigate the concurrent and divergent validity for a shortened version of the SRISI (Hutchinson, 2013).

1.4 Social and Emotional Learning

SEL describes the process of obtaining the knowledge and skills necessary to make and maintain positive relationships, set and achieve goals, develop adaptive decision making-skills, and manage affect (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Collaborative for Academic Social and Emotional Learning (CASEL) aims to promote interpersonal, intra-personal, and cognitive skills for success in life using their comprehensive SEL framework. The framework is comprised of five core competencies nested within three interrelated contexts where children's SEL is fostered. The first competency is self-management, or the ability to regulate one's emotions, behaviours, and cognitions. In the classroom, children who can self-manage are able to address stress and effectively set and work towards academic goals. Second, self-awareness refers to awareness of one's cognition, emotions, and behavior. This includes when an individual's focus on learning processes versus outcomes or can assess strengths and limitations. Third, social awareness describes skills of perspective taking and empathy. Fourth, relationship skills describe the ability to make and maintain positive relationships through effective communication, cooperation, support, and conflict-resolution. Finally, responsible decision-making is one's capacity to make adaptive choices concerning behavior that is informed by social concerns (e.g., norms, values, safety; CASEL, 2013).

Research from the developmental and educational psychology literatures indicates that teachers can support children's adoption of adaptive social, emotional and cognitive skills when they use a SEL framework in their classrooms (Durlak et al, 2011; Greenberg et al., 2003). For example, Payton et al. (2008), conducted a systematic review of 180 studies that utilized a universally implemented, classroom-based SEL program (k-12). Results revealed that students who participated in SEL programs demonstrated increased social and emotional skills, more positive attitudes in the classroom, and improved academic performance post-intervention, compared to controls.

In addition, Durlak's (2011) meta-analysis (*N* = 213 studies) indicated that children involved in classroom-based SEL interventions displayed better academic adjustment (i.e., higher levels of motivation and academic achievement) compared to children who did not receive a SEL intervention. Also, a later meta-analysis conducted by Taylor, Oberle, Durlak and Weissberg (2018) indicated that follow-up program outcomes (collected from 6 months to 18 years post-implementation) demonstrated that children involved in SEL programming experienced continues positive outcomes (e.g., well-being, positive attitudes and social and emotional competences) compared to controls over time. Results support the use of classroom-based SEL interventions as an effective framework to support children's social and emotional learning. In addition, they provide evidence that SEL programs can support young children's academic learning and performance in the classroom, with gains in children's motivation for learning (a hallmark of SR/L) over the long-term. Studies are needed to explore how SEL programs may also foster opportunities and support for young children's development of SR/L. This study addresses this issue.

1.5   Mindfulness-Based SEL Interventions

Within the last fifteen years, secular mindfulness has received increased attention from developmental and educational researchers (Diamond & Lee, 2011; Schonert-Reichl et al., 2015). Mindfulness refers to a process of focusing one's conscious attention on the present moment, without judgment (Brown & Ryan 2003; Kabat-Zinn, 2003), and can take on many forms, including mindful-breathing, walking meditation, yoga, and/or focusing on bodily sensations (Brown & Ryan 2003; Schonert-Reichl & Lawlor, 2010). Mindfulness has been positively linked to children's well-being, such as more positive attitudes and optimism, and their adjustment to school, and to lower levels of anxiety and depression in children (Burke, 2009; Harnett & Dawe, 2014). Moreover, mindfulness programs have been found to enhance young children's cognitive control (Tang, Yang, Leve, & Harold, 2012) and executive functions (Razza, Bergen-Cico, & Raymond, 2015) that have been associated with SR/L.

Emerging research supports the integration of mindfulness and SEL frameworks (Greenberg, 2014; Lawlor, 2016). For example, Schonert-Reichl et al. (2015),

investigated the implementation of a mindfulness-based SEL program, MindUP^{TM}, in fourth- and fifth-grade classrooms (4 classrooms, $N = 99$ children). Two classrooms were randomly assigned to receive MindUP^{TM}, and two classrooms received a regular SEL program based on social responsibility as the control condition. Compared to children in the regular SEL program, children in MindUP^{TM} demonstrated improvements in their executive functioning skills (e.g., attention focusing and inhibition), school self-concept, and emotional-regulation, and earned higher grades in math (Schonert-Reichl, et al. 2015). Also, Carvalho, Pinto, & Marôco (2016), employed a quasi-experimental, pre-test/post-test design with a waitlist control to evaluate the MindUP^{TM} program. Included were data from a sample of 20 grade three and four classrooms ($N = 454$ students). In addition, the study explored the possible benefits to teachers when implementing the MindUP^{TM} program. Findings demonstrated that children who participated in MindUP^{TM} experienced improvements in suppression, an aspect of emotional control, and to perspectives on personal shortcomings (e.g., children learned to recognize that everyone encounters challenges and makes errors). Teachers who implemented the program reported increased personal accomplishment compared to teachers in the control condition.

In sum, research supports the mindfulness-based SEL program, MindUP^{TM}, as beneficial to children's social, emotional, and academic adjustment. Also, that mindfulness-based SEL interventions aid the development of skills associated with children's SR/L, including: executive functions, emotional-regulation, and positive attitudes towards school (e.g., academic self-concept; Schonert-Reichl, et al. 2015). However, although initial reports from these studies support the framework as an effective support to children, at least two limitations in the research currently exist. First, existing research about MindUP^{TM} has been conducted in the middle elementary grades (i.e., grades 3-5). Second, research has not investigated the potential teacher-level factors that may influence the implementation of a mindfulness-based SEL intervention in classrooms. The present study investigates MindUP^{TM} in Kindergarten classrooms, and how teacher level factors may affect children's development of SR/L.

1.6   The Present Study

Research indicates that SR/L plays a vital role in young children's adjustment to school (Birgisdóttir et al., 2015; Moffitt et al., 2011; Perry et al., 2017). Therefore, it is imperative that children be provided the opportunity to develop skills associated with it at an early age. However, measuring SR/L in young children can be difficult. Previous research investigating the psychometric properties of the 22-item SRISI (Hutchinson, 2013)– a measure of children's SR in classrooms – has produced psychometrically reliable and valid measurements of young children's SR/L (Hutchinson & Perry, 2012). To date, the psychometrics of a shortened version of the SRISI has not been evaluated. In addition, the SRISI has not been tested for construct validity with a clinical assessment of young children's adaptive functioning. The present study examines the psychometric properties of a shortened nine-item version of the SRISI.

In addition, studies demonstrate that children's demographic variables (e.g., sex and age) and teacher factors such as teacher stress, efficacy, and behavior attributions influence young children's SR/L (Dibacco, 2016; Serratore & Hutchinson 2014; Woolfolk & Hoy, 1990). Evidence is accumulating indicating that MindUP ^{TM} shows promise as an effective program for enhancing children's social and emotional learning and executive functioning (Carvalho et al., 2016; Schonert-Reichl et al., 2015). However, research has not explicitly studied how mindfulness or SEL frameworks may also support young children's development of SR/L. In addition, few studies have examined the association between teacher factors and children's development of SR/L in classrooms. Therefore, the present study was designed to explore (1) the psychometric properties of a shortened version of the SRISI for kindergarten-aged children, (2) how kindergarten children develop SR/L within a mindfulness-based SEL framework (MindUP™), and the demographic and teacher factors are associated with the development of SR/L.

Chapter 2

2 Methodology

2.1 Design

A mixed method, repeated measures (pre-test/post-test) research design was employed to investigate the psychometric properties of a shortened version of the Self -Regulation in School Inventory (SRISI; Hutchinson & Perry, 2012; Hutchinson, 2013) – a measure of young children's SR/L, including examining construct validity with the Behaviour Assessment System for Children (BASC-3), which is a clinical measure of young children's adaptive functioning – including executive functioning, social skills, and emotional control (Reynolds & Kamphaus, 2015). Also, young children's development of SR/L within a mindfulness-based SEL framework (MindUP™) was explored using teacher reports of children's SR/L, as well as measures of their feelings of burnout, self-efficacy, and behavior attribution. In addition, educators had the opportunity provide qualitative feedback in the form of two focus group questions or short answer survey questions. The present study was part of a larger pilot project examining whether and how a trauma informed framework and mindfulness-based SEL program could support the development of attention, resiliency, and well-being in a sample of at-risk Kindergarten children. The research questions and hypotheses posed in this study are stated below.

Research Question 1: Does a shortened version the SRISI yield reliable and valid ratings of kindergarten children's SR/L?

Hypothesis 1: Based on previous research, it was hypothesized that the SRISI would (a) have good internal reliability, (b) produce a 1, 2, or 3 factor model, and (c) produce a positive and statistically significant relationship between teachers' ratings of children's SR/L using the SRISI (Hutchinson, 2013), and the Social Skills subscale from the BASC-3 (Reynolds & Kamphaus, 2015). In addition, it was expected that a negative and statistically significant relationship would be observed between children's SR/L as measured by the SRISI and (a) the Executive Functioning subscale, and (b) Emotional

Control subscale from the BASC-3 (Reynolds & Kamphaus, 2015) at pre-test (Time A) and post-test (Time B).

Research Question 2: What are the observed changes in children's SR/L over the course of program implementation?

Hypothesis 2: It was anticipated that teachers and Early Childhood Educators (ECEs) would report a positive and statistically significant increase in kindergarten children's SR/L from Time A to Time B.

Research Question 3: How are demographic variables related to teachers' ratings of Kindergarten children's SR/L at pre- and post-implementation?

Hypothesis 3: It was predicted that (a) senior kindergarten (SK) children would receive higher ratings of SR/L compared to junior kindergarten (JK) children, and (b) girls would receive higher ratings of SR/L compared to boys, at Time A and Time B.

Research Question 4: How do teacher factors predict young children's SR/L over program implementation?

Hypothesis 4: It was hypothesized that teachers' perceptions of burnout, efficacy, and, behaviour attributions would predict children's SR/L. That is, it was expected that teachers who reported lower levels of burnout, would report higher levels of teacher efficacy and fewer fixed- behaviour attributions, would report statistically significantly higher levels of children's SR/L in their classrooms.

Research Question 5: Did educators experience any changes to their teaching and/or classroom related to SR/L, as a result of implementing MindUP^{TM}?

This last question was exploratory in nature and did not include specific hypotheses.

2.2 Participants

Data were collected from 15 kindergarten classrooms (15 Kindergarten teachers, 8 Early Childhood Educators; 0 males) in eight elementary schools. Fourteen teachers and eight

of the ECEs completed the Teacher Demographic Questionnaire. Twenty-two of the educators identified their race and ethnicity as Caucasian. One educator identified their race and ethnicity as Latin American. Twelve teachers reported that they had completed a Bachelor of Education (B.Ed.), one teacher (7.5%) indicated they had completed a Bachelor's Degree (B.A. or B.Sc.), and one teacher (7.5%) had completed a Master of Education Degree (M.Ed.). Seven of the ECEs indicated they had completed a college diploma, and one completed a completed a Bachelor's Degree (B.A. or B.Sc.). Thirteen teachers reported that their annual income ranged from $80,000 to $100,000; one teacher reported an annual income of $100,000-$120,000. Six of the ECEs reported an annual income ranging from $20,000-$40,000, and one indicated earning an annual income ranging from $40,000-$120,000.

In the current study, educators provided reports of 222 JK and SK children (number of boys = 108; number of JK children = 109). The average age of JK and SK children at the beginning of the study was 4.05 years old (SD = .21 years) and 5.08 years old (SD = .27 years), respectively. Teachers indicated that 151 children (68.01%) were from a Caucasian race and ethnic background, 31 (14%) children were identified as "other", 11 children (5%) were identified as being from a Latin American background, ten children (4.5 %) were identified as being from a South Asian background, two children (.9 *%*) were identified as being from an Aboriginal/First Nation/Métis/Inuit ethnic background, two children (.9%) were identified as Chinese, two (.9%) Black, two (.9%) as Arab, two (.9%) as Southeast Asian, and one (.4%) Filipino (Missing = 7). The mode class size was 15 children, and class sizes ranged from 13 to 27 kindergarten children (see Table 2.1). The average participation rate across classrooms was 80% (range = 60% to 100%).

2.3 Measures

2.3.1   Demographic Information Form for Teachers (Appendix A).

The Demographic Information Form for Teachers (Appendix A) contains 10 items. It asked participating educators to provide information about their: gender, race/ethnicity, educational background (i.e., highest level of education completed), income level, job role (teacher, ECE, principal, other), and prior experience or training they received in the

MindUP™ program (e.g., "Have you had any previous MindUP™ training - if yes - what type of training in MindUP™ have you received?").

Table 2.1

Educator and Classroom Demographics of the Participating Classrooms

Classroom	Teachers	ECE	JK		SK	
			Boy	Girl	Boy	Girl
1	1	0	3	6	2	4
2	1	0	2	9	2	4
3	1	0	6	3	2	2
4	1	1	5	4	7	6
5	1	1	7	3	3	6
6	1	0	4	4	2	4
7	1	1	4	5	3	2
8	1	1	2	5	5	2
9	1	0	0	0	5	6
10	1	1	2	4	2	4
11	1	0	4	1	1	3
12	1	1	2	8	2	6
13	1	0	3	1	3	6
14	1	0	3	2	5	4
15	1	1	5	3	4	4

2.3.2   Student Demographic Form (Appendix B).

The Student Demographic Form asked teachers to report on participating children's sex (boy or girl), birth month and year, and race and ethnic background (Appendix B).

2.3.3   Attitudes Related to Trauma-Informed Care – 45 Item for Education.

The Attitudes Related to Trauma-Informed Care- 45 for Education (ARTIC; Baker, Brown, Wilcox, Overstreet, & Aurora, 2016) is comprised of 45 items measuring teacher attitudes related to the provision of trauma-informed care in schools. Seven subscales measure teachers' understandings of biological, psychological, and social consequences of trauma. These include, Underlying Causes of Problem Behaviours, Responses to Problem Behaviours, On-The-Job Behaviour, Self-Efficacy at Work, Reactions to the Work, Personal Support of TIC and System-Wide Support to TIC. Teachers reported on their attitudes towards trauma informed care on the ARTIC items using a 7-point Likert scale (1 = TIS-favourable attitudes, 7 = TIS-non-favourable attitudes, and 8 = not applicable).

2.3.3.1   ARTIC-45 Self-Efficacy at Work Subscale.

In the present study, the 7-item Self-Efficacy at Work subscale was used to measure teachers' efficacy for meeting the demands of providing trauma-informed systems to children in their classroom (e.g., "I don't have what it takes to help my students (1)" versus "I have what it takes to help my students (7)"). Item responses to the Self-Efficacy at Work subscale were used to compute an average score of teachers' and ECEs' feelings of efficacy. The Self-Efficacy at Work subscale yielded Cronbach's alphas of .79 (95% CI = .61 - .90) at Time A, and .67 (95% CI = .40 - .85) at Time B, indicating good internal consistency.

2.3.3.2   ARTIC-45 Underlying Causes of Problem Behavior and Symptoms Subscale.

The 7-item Underlying Causes of Problem Behavior and Symptoms subscale was used to measure teacher's behavior attributions towards children (i.e., internal and fixed versus external and malleable; "Students' learning and behavior problems are rooted in their behavioral or mental condition (1)" versus, "students' learning and behavior problems are rooted in their history of difficult life events (7)". A score of teacher attribution attitudes was computed by averaging the item responses on the Underlying Causes of Problem

Behavior and Symptoms scale. The Underlying Causes subscale yielded a Cronbach's alpha of .76 (95% CI = .56 - .89) at Time A, and .77 (95% CI = .58 - .89) at Time B, indicating an acceptable level of internal validity amongst the item scores at both time points. An average score for each of the two subscales were calculated to obtain an overall indicator of teachers' behaviour attribution of underlying causes to problem behaviours and feelings of self-efficacy at work at Time A and Time B.

2.3.4   Maslach Burnout Inventory.

The Maslach Burnout Inventory (MBI) is a 22-item measure designed to assess educators' consistent exposure to high levels of toxic stress associated with teacher burnout (Maslach & Jackson, 1981). The inventory measures three aspects of teacher burnout: emotional exhaustion, depersonalization, and personal accomplishment. For the present study, 17 items from an adapted version of the Emotional Exhaustion and Personal Accomplishments subscales were employed to measure teacher burnout. Nine-items measured teacher's emotional exhaustion (e.g., "I feel used up at the end of the workday"), and eight-items were employed to measure personal accomplishment (e.g., "I have accomplished many worthwhile things in my job"). Teachers responded to the items using a six-point Likert scale with endpoints ranging from 0 (never) to 6 (almost always). Cronbach's alpha of internal consistency was computed at .93 (95% CI = .87 -.97) at Time A, and .90 (95% CI = .81 - .95) at Time B for the Emotional Exhaustion Subscale. In addition, the Personal Accomplishment scale yielded an alpha of .56 (95% CI = .21 - .80) at Time A, and .73 (95% CI = .51-.87) at Time B. Average scores of the two subscales were calculated to obtain an overall indicator of teachers' feelings of depersonalization and accomplishment at work at Time A and Time B.

2.3.5   Self-Regulation In School Inventory.

 The Self-Regulation In School Inventory (SRISI; Hutchinson & Perry, 2012) is a 27-item teacher-report measure designed to provide an indirect assessment of typically developing children's academic achievement and behaviors associated with three aspects of SR/L- ER, SRL, and SRSR - in the early elementary school years.

Nine items provided a measure of children's regulation of learning (SRL; e.g., "Understands what is required to "meet expectations" for academic tasks"; item 14). Six items measured children's socially responsible self-regulation (SRSR), described as, children's awareness of themselves and social others to cooperate in the classroom and achieve goals (e.g., "Appears genuinely interested in and committed to include other children in learning activities"; item 8). Teachers responded to the items using a 7- point Likert Scale with endpoints ranging from: (1) = Never true and (7) = Always true.

To date, Hutchinson and Perry have used the SRISI to gather data from young children in Kindergarten through Grade 2 ($N > 600$; Hutchinson, 2013; Hutchinson & Perry, 2012; Hutchinson & Perry, in preparation). They have identified both one and two factor models of SR/L, which have demonstrated an acceptable data- model fit (e.g., root mean square error of approximation was computed for a two-factor model at 0.08). Cronbach's alpha for their total scores of SR/L have ranged from .87 to .97; and for scores of Solo and Social SR/L have ranged from .85 (95% CI = .81 - .88) to .90 (95% CI = .89 -.93). SRISI scores have been positively and statistically significantly correlated with three subscales (Approaches to Learning, $r = .87$; Responsibility and Respect, $r = .74$, and Readiness to Explore New Things, $r = .59$; Hutchinson, 2013) from the widely used and validated Early Development Instrument (Janus & Duku, 2007). In this study, scores on the 22-item SRISI were employed to investigate the reliability and validity of a shortened version of the SRISI for use in Ontario kindergarten classrooms.

2.3.6 Behaviour Assessment System for Children 3 – Teacher Report Survey – Preschool.

The BASC-3 contains three sections, includes 114-items, and is appropriate for children ages 2 to 5 years (Reynolds & Kamphaus, 2015). Section one asked teachers to report the duration of time they have known the child being rated. Section two required teachers to respond to the items using a four-point scale (endpoints range from 0 = never to 3 = almost always). The final section provides space for teachers to include comments concerning their perceptions of individual children's emotional/behavioral strengths and challenges.

In the present study, three of the BASC- 3 TRS Preschool subscales (Reynolds & Kamphaus, 2015) were employed. The Social Skills subscale (e.g., "Congratulates others when good things happen to them") was comprised of 6 items. Seventeen items measured children's Executive Functioning (e.g., "Speaks out of turn during class"). The Emotional Control scale consisted of 14 items (e.g., "Controls emotions"). Higher scores on the BASC's Social Skills scale indicate higher psychological functioning, whereas higher scores on the Emotional Control and Executive Functioning scales indicate lower levels of psychological functioning in these areas (Reynolds & Kamphaus, 2015).

These subscales were used as a measure of construct validity for the SRISI and were included for three reasons. First, the items reflect behaviors that are consistent with young children's self-regulation in classrooms (e.g., executive functioning). Second, the BASC-3 subscales have demonstrated high internal consistency with Cronbach's alphas ranging from .88 to .90. Third, the BASC-3 subscales were designed to assess these behaviors in children ranging from 2-5 years of age; making this measure developmentally appropriate for the present sample. These were important considerations for ensuring that the ratings of children's SR/L were reliable and valid assessments.

In the present study, the Executive Functioning subscale yielded an alpha of .74 (95% CI = .68 - .79) at Time A and .80 (95% CI = .75 - .84) at Time B. The Emotional Control subscale produced an alpha of .80 (95% CI = .75 - .84) at Time A, and .84 (95% CI = .80 -.87) at Time B. Cronbach's alphas for the Social Skills subscale at Time A and Time B were computed as .86 (95% CI = .83 - .89) and .92 (95% CI = .91 - .94), respectively. Altogether, the results indicated good internal consistency for the BASC-3 subscales at Time A and Time B.

2.3.7 Short Answer Questions (Appendix C).

Teachers and ECEs responded to two short answer questions investigating their perceptions of changes in their teaching and/or classroom as a result of implementing the program. Questions included: (1) "Have you noticed any changes in your teaching as a result of implementing the MindUP[TM] program", and (2) "Have you noticed any changes in your students/classroom as a result of implementing the MindUP[TM] program".

2.3.8 Focus Group Sessions (Appendix D).

Nine semi-structured interview questions were developed for the focus group (Appendix D). The first three questions pertained to teachers' and ECEs' roles, how they organized the MindUP™ program, and, they asked teachers to identify strengths and/or limitations they experienced when implementing the program in their classrooms. Questions four through six ask educators to discuss possible changes they noticed in their classrooms, teaching, and views/ideas about the children in their class as a result of their training in and implementation of, MindUP™. The remaining questions asked teachers to provide advice they would give when implementing MindUP™ for the first time, recommendations to improve the program, and general feedback pertaining to the program implementation.

In the present study, responses to two of the focus group questions (e.g., "Have you noticed any changes in your teaching as a result of implementing the MindUP^{TM} program" and "Have you noticed any changes in your students/classroom as a result of implementing the MindUP^{TM} program") were reviewed to guide the process of qualitative thematic analysis of the teachers' responses pertaining to contexts and behaviours associated with young children's SR/L in classrooms (Attride-Stirling, 2011).

2.4   Procedures

2.4.1   Recruitment and consent.

The eight participating schools along with the participating teachers, ECEs, and children were from a large Catholic school district in Southwestern Ontario. Schools in this study were selected for participation based on the school board's appraisal of their district's Social Risk Index (SRI; Janus & Offord, 2007). The Social Risk Index is a neighborhood-level assessment of factors associated with lower levels of school readiness (Janus & Offord, 2007). Schools selected for participation in the present study served families with increased instances of poverty, single parent families, low levels of parent educational, high mobility, and a higher concentration of children from families who recently immigrated to Canada. The school board also took into consideration whether school

personnel had expressed interest in the MindUP™ program, and the presence of other research projects in the schools.

In the fall of 2016, consent forms were distributed to teachers and ECEs. Teachers and ECEs who enrolled in the study were asked to complete a Teacher Demographic Form, and to send home a parent consent form with each child in their classroom.

2.4.2   MindUP™ training, implementation, and follow-up.

In November 2016 the initial sample of teachers and ECEs, followed by the additional three classrooms in February 2017, attended a full day of Mind-Up™ training led by a Hawn Foundation facilitator. In the training, teachers and ECEs learned about the theory and research that guides the program, discussed children's social and emotional learning, and participated in activities designed to help them deliver the program in ways that fit their classrooms.

During implementation, teachers and ECEs were asked to lead 15 manual-led lessons to their classrooms, informed by developmental neuroscience, SEL, mindfulness and positive psychology (Maloney, Lawlor, Schonert-Reichl, & Whitehead, 2016). In addition to the lessons, teachers were encouraged to incorporate mindfulness into their daily classroom schedule (e.g., three-minute practice focused on children's breathing and attendance).

In March (2017), teachers and ECEs participated in a follow-up MindUP™ workshop. This follow-up session provided kindergarten educators with an opportunity to receive support from a Hawn Foundation Facilitator (e.g., teachers had the opportunities to ask question about how they could best adapt lessons for their classrooms) and converse with teachers implementing the program in kindergarten classrooms at other schools.

2.4.3   Data collection.

Data collection began after the initial MindUP™ training session. At Time A (Fall 2016/Winter 2017), educators accessed the internet to complete the ARTIC (Baker et al., 2016) and MBI (Maslach & Jackson, 1981) surveys using the electronic survey tool, Qualtrics. In addition, teachers and ECEs completed an electronic questionnaire

containing the SRISI (Hutchinson, 2013) and BASC-3 (Reynolds & Kamphaus, 2015) items for each child from their classroom who participated in the study. Most teachers completed the BASC-3 (Reynolds & Kamphaus, 2015) and SRISI surveys. However, in classrooms where ECEs were present, they completed the SRISI (Hutchinson, 2013) items for participating children.

Then, at Time B (Spring 2017), following implementation of the MindUP™ program, teachers and ECEs completed the electronic survey consisting of the ARTIC (Baker et al., 2016) and MBI (Maslach & Jackson, 1981) items. At this time, educators had the opportunity to submit their responses to the two short answer questions and completed the Teacher Demographic Form. In addition, educators completed the SRISI (Hutchinson, 2013) and BASC-3 (Reynolds & Kamphaus, 2015) items a second time. The Time B BASC-3 survey asked teachers to respond to the items on the Student Demographic Form.

Once post-implementation data collection was complete, teachers and ECEs had the opportunity to participate in a one-hour focus group session. These focus groups were audio-recorded. Audio recording from the sessions were then transcribed. Following collection, all data were organized and analyzed.

2.4.4   Remuneration.

Teachers and ECEs that completed the Demographic Information Form, MBI (Maslach & Jackson, 1981), and ARTIC (Baker et al., 2016) received a $30.00 gift card. Teachers and ECE's were also contracted separately as research assistants for their role in completing the BASC-3 and SRISI ratings for children in their classes.

Chapter 3

3 Results

3.1 Overview

The purpose of this study was twofold. The first goal was to examine the psychometric properties of a shortened version of the SRISI (Hutchinson, 2013) as an indirect assessment of kindergarten children's SR/L. The second goal of this study was to examine how kindergarten children's SR/L changed over the implementation of the MindUP™ program, and whether teacher variables of burnout, efficacy, and behaviour attributions predicted changes in young children's SR/L. Quantitative data from the SRISI (Hutchinson, 2013), BASC-3 (Reynolds & Kamphaus, 2015), MBI (Maslach & Jackson, 1981), and ARTIC (Baker et al., 2016) were employed to address the first three research questions and hypotheses. Also, educators' responses to questions posed on electronic survey and during a focus group provided qualitative data to address the final research question in this study.

In the sections below, I describe the results of the present study. First, the missing data in this sample are examined. Second, the processes and criteria involved in reducing the pool of SRISI items are described. Third, the psychometric properties of the 9-item version of the SRISI, and fourth, its criterion validity with the BASC-3's adaptive behaviours subscales are examined (Reynolds & Kamphaus, 2015). Fifth, preliminary analyses were conducted to determine the suitability of the data for linear analysis. Sixth, teacher reports of kindergarten children's SR/L were examined for evidence of change over program implementation, and seventh, the demographic variables of sex and grade were examined for their relation to ratings of children's SR/L. Eighth, the teacher factors of burnout, efficacy, and behaviour attributions were examined in relation to children's SR/L. Finally, teachers' qualitative responses were coded for evidence of children's engagement in behaviours associated with SR/L.

3.2 Missing Data

Missing data are frequently encountered when working with quantitative data sets (Cox, McIntosh, Reason & Terenzini, 2014). Missing values can occur due to participant attrition, data entry error, or when participants omit responses. When data are missing from several items/variables on a measure (Cox et al., 2014), they can have implications for data analysis. Missing data are typically categorized in three ways: data that are missing completely at random (MCAR), data that are covariate dependent dropout (CDD), or data that are missing at random (MAR; Little & Rubin, 1987). Newman (2014) indicated that missing data should not exceed 10% for construct-level analysis and 30% for person-level analysis. One commonly used method to replace missing data in psychological research is person mean substitution (PMS), which involves calculating the mean score of a case's or participant's overall score(s) on a measure and substituting that mean value at each missing data point. The section below describes how missing data were examined and replaced in this study.

3.2.1 Missing data in the sample.

Participants' data were examined to determine how much data were missing from the SPSS files for the sample. Initial analyses of the cases indicated that 7.8% ($n = 19$) of the cases had at least one missing data point at Time A, with 3.3% ($n = 8$) of the cases missing at least one data point at Time B ($n = 243$). Analysis of the pre-implementation SRISI (Hutchinson, 2013) item responses revealed that two of the 22-items had more missing data compared to the other items. These included item 1, "Offers to refer a peer to information/books that assist that peer with a project of task" (3.6%, $n = 8$), and item 20, "Has something positive to say about his/her learning even when s/he is disappointed" (5.4%, $n = 12$). At post-implementation, item 18 ("Can manage a set of directions to complete tasks independently") had more cases with missing data (1.8%, $n = 4$). As the percentage of missing data was below 10% for each of the items in question, and in consultation with measure author, the decision was made to retain the items for further analysis. In addition, the item response frequency was examined for each question on the SRISI (Hutchinson, 2013) at pre- and post- implementation. Frequency analyses indicated that teachers' responses to the items were both varied and stratified.

In addition, items on the SRISI (Hutchinson, 2013) were analyzed to examine the frequency of minimum and maximum scale scores to the data at Time A and B. Two questions had higher frequencies of minimum score responses. On item 7 ("Takes responsibility for learning success and failures by attributing them to factors s/he can control"), 13% ($n = 32$) of the sample of students received the minimum scale score – a score of 1, and 4.6% ($n = 11$) of the sample received the maximum scale score – a score of 7 at Time A. At Time B, 15% ($n = 34$) of the sample of students received the minimum score of 1 on item one ("Offers to refer a peer to information/books that assist that peer with a project of task"), and 6% ($n = 15$) received the maximum score of 7. Frequency analyses indicated that educators appeared to provide ratings based on their perceptions of each child's performance on an item, rather than generalizing responses across items for individual children or groups of children in their classroom. These results suggest the absence of attribution biases (i.e., horn or halo effects; Mujis, 2010), where teachers generalize their assessments based on students' personal characteristics (e.g., a "good" or "bad" kid; Muijs, 2011).

3.2.2   Missing data by grade level.

Finally, missing data were examined by grade. A frequency analysis revealed that at pre-implementation, there were more missing values for JK children (8.2%; $n = 9$) compared to SK children (7.2%; $n = 8$). Conversely, an investigation of the SRISI (Hutchinson, 2013) ratings at post-implementation revealed that SK children (4.5%; $n = 5$) had more missing data compared to JK children (2.7%; $n = 3$).

3.2.3   Missing data replacement strategy.

Little's MCAR test was computed to examine the possibility that the missing data at each time point could be categorized in this way. Results of the MCAR test generated a value of .05 at Time A and Time B, indicating that the data from each time point could be classified as MCAR. Downey and King (2010) suggest that PMS is an appropriate method for addressing missing data in cases where less than 50% of the data are missing. PMS uses the average scores that have been reported for an individual case (i.e., a student in this study), which are regarded as more precise estimates of teachers' ratings of

individual students. In the current study, PMS was employed to estimate missing data on the SRISI (Hutchinson, 2013) and BASC-3 (Reynolds & Kamphaus, 2015).

3.3 Research Question 1: Does a Shortened Version the SRISI Yield Reliable and Valid Ratings of Kindergarten Children's SR/L?

Theoretical and statistical criteria were examined in order to reduce the SRISI (Hutchinson, 2013) item pool.

3.3.1 Reducing the item pool: theoretical considerations.

To answer research question 1, a subset of items were selected from the 22-item the SRISI (Hutchinson, 2013). SR/L theory (Hutchinson, 2013; Perry 1998) informed item selection. Two goals of reducing the item pool were to maintain the (a) theoretical framework and (b) content validity, of the 22-item SRISI, as a measure of young children's SR/L (Hutchinson, 2013). To achieve these goals, the existing 22-items were divided into Hutchinson's (2013) behavior content matrix (see Table 3.1) which maps the higher order processes (metacognition, motivation, strategic action) onto three aspects of SR/L — emotional regulation (ER; children's ability to adaptively manage affect within the classroom), academic self-regulation (SRL; children's participation in independent and effective approaches to learning), and socially responsible self-regulation (SRSR; children's self-engagement in self-awareness and social competence to regulate learning in prosocial and responsible ways). This resulted in nine categories with which to select items that provided coverage of *both* the aspects and processes involved in SR/L.

3.3.2 Reducing the item pool: statistical considerations.

Next, the 22-items from the SRISI (Hutchinson, 2013) data at Time A and Time B were employed to conduct a series of maximum likelihood (ML) exploratory factor analyses (EFAs) using MPlus (version 7.11; L.K. Muthén & B.O. Muthén, 2012). One goal of these analyses was to evaluate items for response variance to avoid producing a measure with items prone to extreme values.

Theoretical and statistical considerations resulted in testing several combinations of 9 items with MLEFAs. This process resulted in a 9-item shortened version of the SRISI (Hutchinson, 2013) that satisfied the theoretical and statistical assumptions of the data.

Table 3.1

Hutchinson's (2013) Behaviour Content Matrix

Higher-Order Processes	**Aspects of SR/L**		
	Emotion Regulation	Self-Regulated Learning	Socially-Responsible Self-Regulation
Metacognition	"Can express/communicate needs and desires."	"Understands what is required to "meet expectations" for academic tasks."	"Communicates an accurate understanding of others' ideas and perspectives when discussing a group project/task."
Motivation	"Has something positive to say about his/her learning, even when s/he is disappointed because s/he does not do well on an assignment."	"Is willing to try challenging tasks."	"Appears genuinely interested in and committed to including other children in learning activities."
Strategic Action	"Negotiates task parameters (e.g., picking a familiar top to research), when tasks are difficult rather than becoming frustrated or overwhelmed."	"Can manage a set of directions to complete tasks independently."	"Offers instrumental support to peers who are struggling with academic tasks (e.g., takes on another peer's classroom responsibilities when that peer needs more time to catch up on academic tasks)."

3.3.3 Exploratory factor analysis: criteria for extraction.

Data from the 9-item SRISI (Hutchinson, 2013) were employed to determine the suitability of a one, two, and three factor model. Five extraction criteria were considered when evaluating the number of factors to retain from the shortened version of the SRISI. First, a visual examination of the scree plots generated by the one, two, and three factor models were conducted to judge the number of factors present in the data. Second, the eigenvalues of the factors were compared to those generated from a parallel analysis. Parallel analysis (PA) is a statistical technique designed to generate random permutations of data based on the same number of observations and variables present in an original dataset (Dinno, 2014). When eigenvalues from an original dataset are larger than the randomly generated values, they are considered appropriate for retention in the model, as they fit the data better than a randomly generated statistic (Dinno, 2014; Hayton, Allen, & Scarpello, 2004).

Third, the one, two, and three factor models were evaluated on their composition of simple structure —items had to display loadings of at least .4 on each factor, with few cross-loadings. Fourth, the total amount of variance explained by the model was examined. A higher percentage of variance explained by the model indicates a better fit to the data (Muijs, 2011). In the current study, a cutoff value of at least 60% of the total variance explained was deemed acceptable for the current analysis (Muijs, 2011). Finally, the Comparative Fit Index (CFI) and the Root Mean Square Error of Approximation (RMSEA) were examined to evaluate the fit between the data and the model. Hu and Bentler, recommend using CFI values of .95 or greater, and RMSEA values of .06 or less (or smaller values indicating better fit) for the model to be considered a 'good fit' to the data (Hu & Bentler, 1999).

Results of the MLEFAs and parallel analysis indicated that the two-factor model satisfied the theoretical and statistical criteria for model fit (Table 3.2). Below, the results of the two-factor, 9-item version of the SRISI at Time A and Time B are discussed. The descriptive statistics for Time A and B are presented in Table 3.3. Also, results of the parallel analysis at Time A and Time B are reported in Table 3.4.

Table 3.2

Statistics from the 1, 2, and 3 Model Exploratory Factor Analyses of the 9-item SRISI

	Model	Eigenvalues			CFI	RMSEA
		Factor 1	Factor 2	Factor 3		
Time A	1 - factor model	5.62			.93	.12
	2 - factor model	5.62	.75		.97	.09
	3 - factor model	5.62	.75	.61	.91	.07
Time B	1 - factor model	5.62			.91	.14
	2 - factor model	5.62	.75		.97	.10
	3 - factor model	5.62	.75	.61	.99	.06

Table 3.3

Means and Standard Deviations for the 9-Item SRISI at Time A and Time B

Item #	SRISI Item	Time A M (SD)	Time B M (SD)
5	Is willing to try challenging tasks.	4.92 (1.40)	5.37 (1.99)
6	*Communicates an accurate understanding of others' ideas and perspectives when discussing a group project/task.	4.05 (1.55)	4.56 (1.43)
8	*Appears genuinely interested in and committed to including other children in learning activities.	4.59 (1.33)	4.92 (1.27)
10	Can express/communicate needs and desires.	5.01 (1.34)	5.35 (1.13)
12	*Offers instrumental support to peers who are struggling with academic tasks (e.g., takes on another peer's classroom responsibilities when that peer needs more time to catch up on academic tasks).	3.76 (1.67)	4.26 (1.49)
14	Understands what is required to "meet expectations" for academic tasks.	4.59 (1.35)	4.96 (1.19)
15	Negotiates task parameters (e.g., picking a familiar topic to research), when tasks are difficult rather than becoming frustrated or overwhelmed.	4.88 (1.59)	4.48 (1.48)
18	Can manage a set of directions to complete tasks independently.	5.13 (1.41)	5.13 (1.41)
20	Has something positive to say about his/her learning, even when s/he is disappointed because s/he does not do well on an assignment.	4.84 (1.27)	4.84 (1.27)

Note. Items with a * indicate that they are part of the Social SR/L factor.

Table 3.4

Parallel Analysis Table for Time A and Time B

Factor	PA eigenvalue	Time A eigenvalues	Time B eigenvalues
1	.37	5.62	5.76
2	.25	.75	.77

3.3.4   Factor structure of the 9-item two factor SRISI at Time A.

Factor loadings for the two-factor model at Time A are presented in Table 3.5. The first factor "Social SR/L" was comprised of three items (6, 8, and 12). These questions asked educators to report on young children's ability to initiate, engage with, and respond to others in positive, collaborative, and socially adaptive ways using metacognition, motivation, and strategic action. The second factor "Solo SR/L" consisted of six items (5, 10, 14, 15, 18, and 20). These items asked educators to appraise children's individual adaptive and effective patterns of classroom functioning involving their own metacognition, motivation for learning, and strategic action.

The "Social SR/L" factor yielded an eigenvalue of 5.62, and the "Solo SR/L" factor had an eigenvalue of .75. The eigenvalues obtained from the EFA were greater than those generated during the parallel analysis (Table 3.4). These results indicate that the Social SR/L and Solo SR/L factors should be retained for the model. In addition, visual inspection of the scree plot supported a model consisting of one or two factors (Figure 3.1). Furthermore, the two-factor model accounted for 72.82% of the variance in the model, and yielded a CFI of .97, indicating that a good data-model fit.

The two-factor model met the criteria for simple structure, whereby the items on each of the two factors had loadings of at least .4 or greater. At Time A, loadings ranged from .42 to .91, with few cross-loadings. One item (20; "Has something positive to say about his or her learning"), had loadings that were close together, however theoretically this was not surprising, as the item involves assessing the child's ability to communicate (social process) about their learning (solo process).

Cronbach's alpha was used to compute the internal consistency of the shortened SRISI. For Time A, Cronbach's alphas for Social, Solo SR/L and Unidimensional SR/L were computed as .85 (95% CI = .81 - .88), .90 (95% CI = .88 - .92), and .92 (95% CI = .91 - .94) respectively, indicating strong estimates of internal consistency for each of the SR/L scales at Time A.

Table 3.5

Factor Loadings for the 9-Item SRISI at Time A

Item #	SRISI Item	Social	Solo
12	Offers instrumental support to peers who are struggling with academic tasks (e.g., takes on another peer's classroom responsibilities when that peer needs more time to catch up on academic tasks).	**.91***	-.08
6	Communicates an accurate understanding of others' ideas and perspectives when discussing a group project/task.	**.86***	.03
8	Appears genuinely interested in and committed to including other children in learning activities.	**.70***	.01
18	Can manage a set of directions to complete tasks independently.	-.01	**.87***
10	Can express/communicate needs and desires.	-.01	**.79***
14	Understands what is required to "meet expectations" for academic tasks.	.15	**.67***
5	Is willing to try challenging tasks.	.24	**.62***
15	Negotiates task parameters (e.g., picking a familiar topic to research), when tasks are difficult rather than becoming frustrated or overwhelmed.	.15	**.56***
20	Has something positive to say about his/her learning, even when s/he is disappointed because s/he does not do well on an assignment.	.33	**.42***

Note. Loading values in bold denote that the item is associated with that factor.
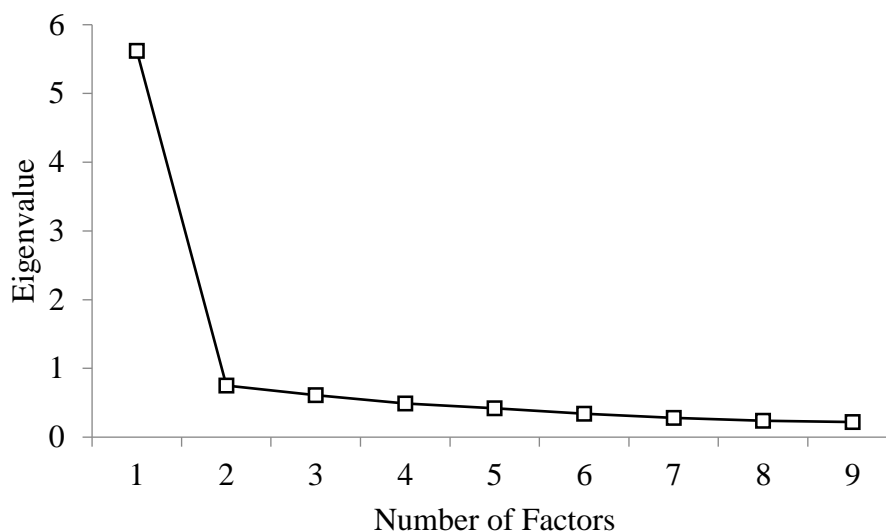
Figure 3.1. Scree plot for the Two-Factor Model at Time A.

3.3.5   Factor structure of the 9-item two factor SRISI at Time B.

 The factor loadings for the 9-item SRISI at Time B are presented in Table 3.6. Examination of the statistical output supported the retention of two factors, namely Solo SR/L (items 5, 10, 14, 15, 18, 20) and Social SR/L (items 6, 8, and 12; Table 3.6). Visual inspection of the scree plot supported a model consisting of one or two factors (Figure 3.2). The solo and social factors at Time B, generated eigenvalues greater than the ones computed in the parallel analysis, at 5.76 and .77, respectively (see Table 3.4). Findings indicated that both the Solo SR/L and Social SR/L factors were appropriate for retention in the model.

In addition, statistical output indicated that the factors accounted for 73.20% of the variance among the variables, and produced a CFI of .97, indicating the good model-data fit (Hu & Bentler, 1999). Also, the model met the criteria for simple structure, having no item with factor loadings less than .4 (loadings ranged from .53 to .92), and had no large cross-loadings. Solo and Social factor loadings were consistent from Time A to Time B. That is, the same items that loaded significantly onto the solo factor at Time A and the social factor at Time A, loaded significantly onto the Social and Solo factors at Time B. The factor loadings switched from Time 1 to Time 2, whereby at post-implementation, Solo regulation accounted for the majority of the variance. Also, results indicated that the proximal loading on item 20, which occurred at Time A, did not occur at Time B.

Finally, internal consistency for the nine-item unidimensional measure of SR/L was computed at .91 (95% CI = .90 - .93). In addition, the Social SR/L and Solo SR/L scales yielded alphas of .88 (95% CI = .86 - .91), and .90 (95% CI = .89 -.93), respectively, indicating strong estimates of internal consistency.

Table 3.6

Factor Loadings for the 9-Item SRISI at Time B

Item #	SRISI Item	Social	Solo
12	*Offers instrumental support to peers who are struggling with academic tasks (e.g., takes on another peer's classroom responsibilities when that peer needs more time to catch up on academic tasks).	**.92***	-.01
8	*Appears genuinely interested in and committed to including other children in learning activities.	**.74***	.04
6	*Communicates an accurate understanding of others' ideas and perspectives when discussing a group project/task.	**.65***	.24
14	Understands what is required to "meet expectations" for academic tasks.	-.01	**.87***
18	Can manage a set of directions to complete tasks independently.	-.07	**.83***
10	Can express/communicate needs and desires.	.07	**.73***
15	Negotiates task parameters (e.g., picking a familiar topic to research), when tasks are difficult rather than becoming frustrated or overwhelmed.	.17	**.61***
18	Is willing to try challenging tasks.	.24	**.59***
20	Has something positive to say about his/her learning, even when s/he is disappointed because s/he does not do well on an assignment.	.27	**.53***

*Note.* Loading values in bold denote that the item is associated with that factor.
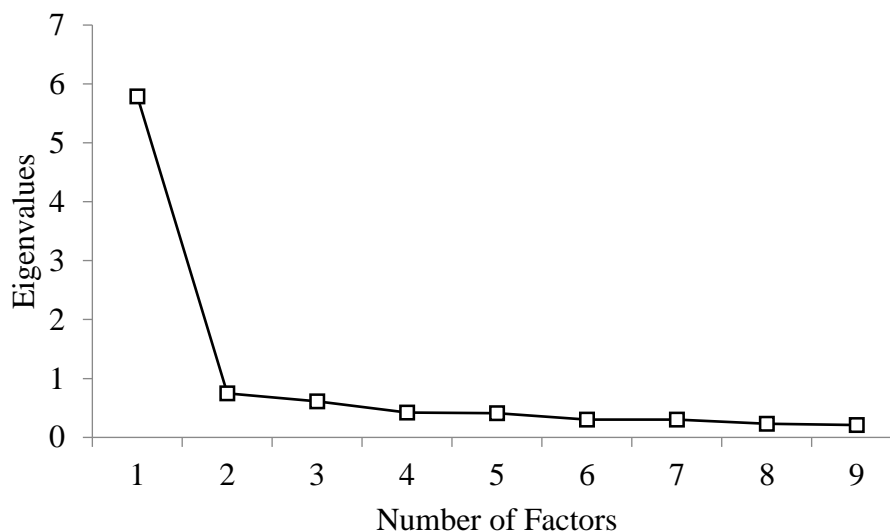
Figure 3.2. Scree plot for the Two-factor model at Time B

3.3.6 Intercorrelations among the Solo and Social Time A and Time B.

Table 3.7 displays the means and standard deviations of the 9-item SRISI (Hutchinson, 2013) and BASC-3's Social Skills, Executive Functioning and Emotional Control subscales using a subsample of children whom met the age parameters for use of the BASC-3 PS (2-5 years old; N = 158; Reynolds & Kamphaus, 2015). A series of Pearson product-moment correlations were computed to examine relationships between the SRISI variables (SR/L, Solo SR/L, and Social SR/L) and the BASC-3 (Reynolds & Kamphaus, 2015) subscales (as measures of construct validity) at Time A and B (See Table 3.8).

Results demonstrated that a positive and statistically significant relationship was observed between Social SR/L at Time A and Solo SR/L at Time A, $r = .76$, $p < .01$, indicating a large effect size (Kirk, 1996). Similarly, Social SR/L at Time B was positively and statistically significantly associated with Solo SR/L at Time B, $r = .86$, $p < .01$, indicating a large effect size (Kirk, 1996). Results of the correlations also indicated that Social SR/L was positively and statistically significantly related at Time A and Time B, $r = .63$ $p < .01$, representing a large effect size. In addition, Solo SR/L at Time A was positively and statistically significantly correlated with Solo SR/L at Time B, $r = .73$ $p < .01$, corresponding to a large effect size. Together, these results suggest that teachers'

ratings distinguished solo and social factors as distinct aspects of SR/L at Time A and B. In addition, teacher reports of social and solo regulation were positively associated at Time A and Time B.

Table 3.7

Descriptive Statistics for the SRISI and BASC-3 Variables at Time A and Time B.

Scale	*M*	*SD*
SR/L A	4.19	1.21
Social A	3.86	1.36
Solo A	4.35	1.25
Executive Functioning A	16.83	6.15
Social Skills A	8.26	3.63
Emotional Control A	11.55	5.74
SR/L B	4.46	1.38
Social B	4.16	1.45
Solo B	4.62	1.40
Executive Functioning B	16.37	6.15
Social Skills B	10.11	4.04
Emotional Control B	10.67	5.67

3.3.7 Construct validity assessment between the SRISI and the BASC-3 subscales.

A series of Pearson product-moment correlations were computed using the SPSS version 22 (IBM, 2012) to investigate the associations between the unidimensional measure of SR/L, and the Social and Solo SR/L scales with the BASC-3 (Reynolds & Kamphaus, 2015) variables (Social Skills, Emotional Control and Executive Functioning) at Time A and Time B. Recall that higher scores on the Emotional Control and Executive Functioning subscales of the BASC-3 indicate lower levels of psychological functioning in these areas. Descriptive statistics for the variables are presented in Table 3.7.

Table 3.8

Intercorrelations Between the SRISI's SR/L variables with the BASC-3's Executive Functioning (EF). Social Skills (SS), and Emotional Control (EC) at Time A and Time B

	1	2	3	4	5	6	7	8	9	10	11	12
1. SR/L A	1	.90*	.97*	-.45*	.41*	-.41*	.61*	.59*	.60*	-.33*	.42*	-.28*
2. Social A		1	.76*	-.42*	.37*	-.37*	.56*	.63*	.49*	-.37*	.46*	-.27*
3. Solo A			1	-.42*	.39*	-.39*	.59*	.51*	.60*	-.28*	.36*	-.26*
4. EF A				1	-.28*	.81*	.27*	.27*	.25*	-.22*	-.33*	.67*
5. SS A					1	-.27*	.27*	.27*	.25*	-.22*	.59*	-.23*
6. EC A						1	-.28*	-.26*	-.29*	.64*	-.33*	.75*
7. SR/L B							1	.94*	.98*	-.30*	.40*	-.25*
8. Social B								1	.86*	-.35*	.48*	-.27*
9. Solo B									1	-.25*	.33*	-.23*
10. EF B										1	.64*	.84*
11. SS B											1	-.33*
12. EC B												1

Note. ** $p < .01$. Correlations should be interpreted using the following effect size guidelines whereby: 0.1 (small effect), 0.3 (medium effect), 0.5 (large effect).

As hypothesized, the Social Skills subscale was positively and statistically significantly related to the unidimensional SR/L variable ($r = .41$, $p < .01$, representing a medium effect size; Kirk, 1996), the Social SR/L variable ($r = .37$, $p < .01$, representing a medium effect size), and Solo SR/L variable ($r = .39$, $p < .01$, representing a medium effect size) at Time A. In addition, a negative and statistically significant relationship was observed between the Executive Functioning subscale and SR/L ($r = -.45$, $p < .01$, representing a medium effect size), Social SR/L ($r = -.42$, $p < .01$, representing a medium effect size) and Solo SR/L ($r = -.42$, $p < .01$, representing a medium effect size) at Time A. Finally, the BASC-3's Emotional Control subscale was negatively and statistically significantly related to SR/L ($r = -.41$, $p < .01$, representing a medium effect size), Social SR/L ($r = -.37$, $p < .01$, representing a medium effect size), and Solo SR/L ($r = -.39$, $p < .01$, representing a medium effect size) subscales at Time A, respectively. Correlations between the variables were of the same magnitude at Time A and Time B (Table 3.8).

Altogether, findings support the hypothesis that statistically significant relationships would emerge between teachers' ratings of children's SR/L using the SRISI (Hutchinson, 2013), and the Social Skills, Executive Functioning, and Emotional Control subscales from the BASC-3 (Reynolds & Kamphaus, 2015) at Time A and Time B. Also, these findings demonstrate that the SRISI (Hutchinson, 2013) and BASC-3 (Reynolds & Kamphaus, 2015) measure distinct developmental constructs in Kindergarten children consistently, over time.

3.4   Preliminary Analysis of the Nine-Item SRISI

Preliminary analyses were conducted on the data at the individual and classroom level to examine the suitability of the data for linear analyses. To meet the conditions for linear analysis at each level, the assumptions of linearity, normality, independent errors and equality of error variance, were examined.

Linearity was tested by constructing and inspecting scatterplots using the residual versus predicted values of the social and solo SR/L scales at Time A and B. The condition of linearity is satisfied if the plots reveal a non-curved, linear pattern in the data. Normality was tested at Time A and Time B through visual examination of histograms and the

Shapiro-Wilks statistic. The assumption of normality is met when the *p*-value is greater than .05 (Nimon, 2012). Equality of error variance was analyzed using Levenes's test for equality of variances to determine the amount of variability among the data. This assumption is met when the statistic exceeds a *p* value of .05 (Mujis, 2011). The assumption is met when the statistical value obtained is between 1.5 - 2.5 (Jarque & Bera, 1980). Independence of the statistical error was investigated by computing the Durbin-Watson statistic. This statistic is used to determine the existence of significant auto correlations between model variables, with statistics of approximately 2 ($1.5 < d < 2.5$) indicating no substantial autocorrelation (Ostrom, 1990).

3.4.1   Individual level data.

Preliminary analyses were conducted to examine the suitability of the data for linear analyses of the Social and Solo SR/L variables. Boxplots were created in SPSS Version 22 (IBM, 2012) to examine extreme values present on the Solo and Social SR/L scales at Time A and B. The boxplots revealed no leverage points in the Solo and Social SR/L data at Time A and Time B.

To test the assumption of linearity, I constructed a series of scatterplots using the dependent variables of Social and Solo SR/L at Time A and Time B. The plots revealed a non-curved, linear pattern in the data, satisfying the assumption. Visual inspection of the histograms revealed that the data were distributed approximately normally, although the Shapiro-Wilks statistic indicated that this assumption was statistically violated on the Time B Solo data ($< .001$) and for the Social variable at Time A (.001) and Time B (.001). Levene's test was greater than .05 for all four of the scales, indicating the presence of heteroscedasticity.

3.4.2   Classroom level data.

To begin examining the suitability of the classroom level data for linear regression, the average Social and Solo SR/L variable scores were computed for each classroom. The Social and Solo SR/L variables were employed as the dependent variables at Time A and Time B with the predictor variables of educator burnout (Personal Accomplishment and Emotional Exhaustion), Self- Efficacy, and Behaviour Attributions. Examination of the

box-plots indicated that there were no extreme values leveraging the data within the Social or Solo SR/L models at Time A or B. Shapiro-Wilks for the Social SR/L scales at Time A and B was computed at .35 and .07, and visual inspection of the histograms indicated the assumption of normality was met at both time points. Computation of the Shapiro-Wilks statistic, and visual inspection of histograms, revealed that the dependent variables Solo SR/L at Time A and B were distributed approximately normally (Shapiro-Wilks = .01 and .042). Visual inspection of the scatter plots for the Social SR/L variable at Time A and Time B indicated that the data was approximately linear. Similarly, scatterplots for the Solo SR/L variables revealed that the data was approximately linear at Time A and Time B. The Durbin-Watson statistic was computed at 1.46 and 1.85 for Social SR/L at Time A and B, meeting the assumption for independence of statistical error. Similarly, Durbin-Watson for the Solo SR/L variable was computed as 1.04 at Time A and 1.5 at Time B, indicating the absence of any significant autocorrelation between the Solo SR/L variables. Finally, homoscedasticity was assessed through visual examination of the scatterplots depicting the standardized residuals and the standardized predicated values for the Social and Solo SR/L variables at Time A and Time B. Inspection revealed that heteroscedasticity was present at both time points, and the assumption was violated.

3.5 Research Question 2: What are the Observed Changes in Children's Social and Solo SR/L Over the Course of Program Implementation?

To answer the second research question, two repeated measures ANOVAs were computed to examine whether children's average social and solo SR/L scores changed over the implementation of the mindfulness-based SEL program. Results indicated that there was a statistically significant effect of time on children's SR/L, $F(1, 218) = 9.99$, $p =.002$, $\eta 2 = .04$, indicating a small to medium effect size, Wilk's Lambda = .95, $p = .002$ (Kirk, 1996). That is, children's social SR/L showed a statistically significant increase from Time A ($M = 4.14$, $SD = 1.34$) to Time B ($M = 4.56$, $SD = 1.30$). Similarly, a statistically significant effect of time on children' solo SR/L was observed, $F(1, 218) = 16.64$, $p < .001$, $\eta 2 = .07$, indicating a medium effect size, Wilk's Lambda = .93, $p <$

.001 (Kirk, 1996). Children's solo SR/L increased from Time A ($M = 4.58$, $SD = 1.19$) to Time B ($M = 5.00$, $SD = 1.11$). Together, findings demonstrate that teachers and ECEs perceived a statistically significant increase in young children's social and solo SR/L over program implementation. In particular, children's abilities to engage with, and respond to, social others in collaborative ways, as well as their own individual adaptive patterns of classroom functioning involving metacognition, motivation, and strategic action, over time.

3.6 Research Question 3: How are Demographic Variables Related to Teacher's Ratings of Kindergarten Children's Solo and Social Ratings of SR/L at Pre- and Post-Implementation?

To address the third research question, two, three-way 2 X 2 X 2 mixed ANOVAs with repeated measures were computed to explore the effects of the demographic variables (i.e., grade and sex) on children's development of social and solo forms of SR/L over the implementation of the mindfulness program. Results indicated that the demographic variable, grade had a statistically significant between-subject effect on children's social SR/L (F (1, 218) = 15.38, $p < .001$, $\eta^2 = .06$ indicating a medium effect size; Kirk, 1996), whereby children in SK received higher ratings for social SR/L at Time A ($M = 4.43$, $SD = 1.27$) and Time B ($M = 4.89$, $SD = 1.33$) compared to children in JK at Time A ($M = 3.84$, $SD = 1.34$) and Time B ($M = 4.22$, $SD = 1.17$). Also, grade had a statistically significant between-subject effect on children's solo SR/L (F (1, 218) = 8.59, $p = .004$, $\eta^2 = .04$ indicating a small to medium effect size; Kirk, 1996) from Time A to Time B, with children in SK receiving higher ratings of solo SR/L at Time A ($M = 4.80$, $SD = 1.19$) and Time B ($M = 5.20$, $SD = 1.20$) compared to children in JK at Time A ($M = 4.36$, $SD = 1.15$) and Time B ($M = 4.79$, $SD = .97$). Further, results indicated that over program implementation, teacher ratings of JK children's social and solo SR/L ended where the SK students started.

Findings demonstrated that the demographic variable, sex had a statistically significant effect on young children's social SR/L (F (1, 218) = 13.69, $p < .001$, $\eta^2 = .06$, corresponding to a medium effect; Kirk, 1996). In this study, educators provided

statistically significantly lower ratings of social SR/L to boys at Time A (M = 3.81, SD = 1.41) and Time B (M = 4.22, SD = 1.26) compared to girls at Time A (M = 4.40, SD = 1.22) and Time B (M = 4.8, SD = 1.27). Similarly, the variable sex had a statistically significant effect on educator's ratings of young children's solo SR/L, F (1, 218) = 13.32, p < .001, η^2 = .06 indicating a medium effect size (Kirk, 1996) at Time A and Time B. Educators in this study provided lower ratings of solo SR/L to boys at Time A (M = 4.31, SD = 1.30) and Time B (M = 4.71, SD = 1.10) compared to girls at Time A (M = 4.81, SD = 1.03) and Time B (M = 5.24, SD = 1.05). Together, results of this study indicate that the demographic variables of sex and grade had a statistically significant effect on educators' ratings of children's social and solo SR/L over program implementation. Children in JK and boys received lower ratings of social and solo SR/L at Time A to Time B. Furthermore, even though educator's ratings of boys' and JK students' solo and social forms of SR/L increased from Time A and B, their ratings did not catch up to the SK children and girls in this study.

3.7 Research Question 4: How Do Teacher Factors Predict Kindergarten Children's Solo and Social SR/L at Pre- and Post-Implementation?

Means and standard deviations for the classroom-level data can be found in Table 3.9. Table 3.10 displays the correlations between the teacher factors at Time A and Time B. Findings indicate that at Time A and Time B, educators' feelings of Emotional Exhaustion were negatively and statistically significantly related to their experiences of Personal Accomplishment and Self-Efficacy. In addition, educator's Self-Efficacy were statistically and significantly associated with teachers' feelings of Personal Accomplishment and Emotional Exhaustion at Time A and Time B. Finally, educators' Behaviour Attributions were positively and statistically significantly correlated with their ratings of Self-Efficacy at Time B. Emotional exhaustion was positively and statistically significantly correlated from Time A to Time B. Similarly, educators' behavior attributions were positively and statistically significantly correlated from Time A to Time B.

Hierarchical Linear Modeling (HLM) was not employed in this study to examine teacher effect on nested student-level SR/L, due to the small sample size at the teacher-level data. HLM requires enough cases at the highest level (i.e., teacher-level) to garner enough statistical power to support the analysis (Maas & Hox, 2005). Specifically, Kreft and De Leeuw (1998) argue that 30 is the smallest acceptable second-level sample number for educational research. Therefore, to answer research question 4, a series of four linear regressions were computed to explore whether the teacher factors of Burnout (Personal Accomplishment and Emotional Exhaustion; Maslach & Jackson, 1981), Self-Efficacy (Baker, et al., 2016), and Underlying Causes of Behaviours (Behaviour Attributions; Baker, et al., 2016) predicted kindergarten children's SR/L at Time A and Time B.

Table 3.9

Means and Standard Deviations for Classroom SR/L and Teacher-Level Factors of Burnout (Emotional Exhaustion and Personal Accomplishment), Efficacy, and Behaviour Attributions

Variables	*Mean*	*SD*
Social SR/L A	4.07	.66
Solo SR/L A	4.48	.56
Emotional Exhaustion A	2.52	.75
Personal Accomplishment A	3.84	.31
Self Efficacy A	5.52	.93
Underlying Causes A	5.35	.80
Social SR/L B	4.48	.51
Solo SR/L B	4.96	.31
Emotional Exhaustion B	2.22	.56
Personal Accomplishment B	3.99	.40
Self Efficacy B	5.95	.60
Underlying Causes B	5.44	.76

Table 3.10

Intercorrelations Among the Teacher Factors at Time A and Time B

	1	2	3	4	5	6	7	8
1 Emotional exhaustion A	1							
2. Personal accomplishment A	-.67*	1						
3. Self-efficacy A	-.50*	.52*	1					
4. Underlying causes A	-.30	.35	.33	1				
5. Emotional exhaustion B	.83*	-.67*	-.56*	-.26	1			
6. Personal accomplishment B	-.20	.32	-.15	.20	-.50*	1		
7. Self-efficacy B	-.41	.29	.38	.40	-.61*	.64*	1	
8. Underlying causes B	.01	.07	-.04	.82*	-.05	.34	.49*	1

Note. * indicates a predictor with a *p*-value <= .05. Correlations should be interpreted using the following effect size guidelines whereby: 0.1 (small effect), 0.3 (medium effect), 0.5 (large effect).

As illustrated in Table 3.11, a significant regression model for the Social SR/L at Time A, $F(4, 16) = 3.29$, $p = .04$, $r = .68$, corresponding to a large effect size (Kirk, 1996). In the model, Behaviour Attributions (Underlying Causes; Baker et al., 2016) was a positive and statistically significant predictor of children's Social SR/L at Time A ($\beta = .61$, $p = .01$). In addition, a statistically significant regression model was found for Social SR/L at Time B, $F(4, 16) = 6.26$, $p = .003$, $r = .78$, corresponding to a large effect size (Kirk, 1996). Personal Accomplishment was a positive and statistically significant predictor of kindergarten children's Social SR/L ($\beta = .63$, $p = .008$) in this model. The teacher factors of Self-Efficacy and Emotional Exhaustion at Time A and Time B did not predict children's Social or Solo SR/L during implementation of the mindfulness-based SEL program.

Together, results indicate that teachers' perceptions of students' behaviours and their feelings of burnout are associated with their experiences of efficacy. In addition, educators' attributions towards kindergarten children's problematic behaviours prior to program implementation, and their feelings of personal accomplishment at the

completion of the program were statistically significantly related to children's Social forms of SR/L at Time A and Time B, respectively.

Table 3.11

Standardized Betas from The Series of Teacher-Factor Block Regression Models

	Model	Standardized Beta	*p*- value
1	Social SR/L A		
	Emotional Exhaustion A	.08	
	Personal Accomplishment A	.05	.04
	Self Efficacy A	.18	
	Underlying Causes A	.61**	
2	Solo SR/L A		
	Emotional Exhaustion A	.02	
	Personal Accomplishment A	.32	.60
	Self Efficacy A	-.05	
	Underlying Causes A	.19	
3	Social SR/L B		
	Emotional Exhaustion B	.01	
	Personal Accomplishment B	.63**	.003
	Self Efficacy B	.01	
	Underlying Causes B	.28	
4	Solo SR/L B		
	Emotional Exhaustion B	.08	
	Personal Accomplishment B	.02	.97
	Self Efficacy B	.07	
	Underlying Causes B	.12	

Note. ** indicates a predictor with a *p*-value <= .05.

3.8 Research Question 5: Did Educators Experience Any Changes to their Teaching and/or Classroom Related to SR/L, as a Result of Implementing MindUP™?

Qualitative data were comprised of responses to two questions administered to explore teachers' perceptions of changes in their teaching and classroom over program implementation. Data were analyzed using thematic analysis, a systematic framework employed to organize and extract salient themes from qualitative data (e.g., teacher feedback; Astride-Sterling, 2001; Saldana, 2013). The process involves: (a) The reduction or synthesis of the text, (b) the iterative exploration of the text, and (c) the integration of the text into the themes (Astride-Sterling, 2001).

3.8.1   Coding and extraction process.

Step one involved a first-cycle organization of educators' responses (Saldana, 2013). This process resulted in the development of an initial coding framework informed by the same SR theory and research outlined in the introduction of this study. Using the qualitative research software, Dedoose (Version 7.0.23; 2016), individual text segments were extracted using the coding framework. To ensure the first two steps were completed rigorously, codes were explicitly defined to reduce redundancy.

After the first round of codes was generated, the themes were re-examined and additional codes were created (Astride-Sterling, 2001). This step was carried out iteratively to ensure each code group being used would extract significant and salient themes. Finally, the themes and text segments were used to develop a detailed description of the chosen themes, and their relation to children's SR/L. Table 3.12 presents the themes extracted from the data.

3.8.2   Themes extracted from thematic network process.

Qualitative analysis of educators' responses indicated that the program provided them with the knowledge and activities to create a classroom context where children were prepared to engage in learning (e.g., "Helping children self-regulate and giving them options like breathing have become part of the way to teach children now"). Specifically teachers used these self-regulatory methods to scaffold their emotional and behaviour regulation (e.g., "We find [the exercises] settle the class, calm them [the students] and they are more ready to learn").

In addition, the educators described an increase in children using the program knowledge/strategies to engage in behaviours associated with social and solo forms of SR/L. For example, one educator noted "Students support each other [to use the] calming strategies— getting the glitter bottle, giving a breathing buddy, or using brain language in context - both in the classroom and at school". Educators' comments reveal that they

perceived that the mindfulness-based SEL program supported children's engagement in solo and social forms of SR/L. For example, children recognized when and how peers

Table 3.12

Coding Framework, Excerpts, and Themes extracted from the Teacher and ECE Qualitative Responses

Themes	Excerpts
Educators supporting SR/L	"Helping children self-regulate and give them options like breathing have become part of the way to teach children now"
	"Brain breaks have also been a positive change. After we have had one the children are often settled and calm and ready to learn."
	"We begin every day with a brain break of various kinds - we find it settles the class, calms them and they are more ready to learn"
Social Regulation: A child's initiation and engagement in socially adaptive behaviors that reflect prosocial, collaborative, and socially adaptive ways of learning.	"Children have become more aware the feelings of others around them."
	"Students support each other with calming strategies, i.e., getting the glitter bottle, giving a breathing buddy [Hoberman Sphere], or using brain language in context - in the classroom and at school"
Solo Regulation: Adaptive and effective patterns of behavior that support independent ways of learning.	"Children have become more aware of their feelings."
	"Children are taking initiative to use strategies to calm their fired-up amygdala"
	"I have noticed some of the children using the breathing on their own when trying to self-regulate."
	"They can say, "No I can't sit today, I'm too fidgety," or whatever and they go to the table and stay there while we have a mind break and that's okay too"
General Outcomes	"The students are more self regulated overall"
	"The children are more creative in their play."
	"The children solve problems much more independently."

needed support, were interested in assisting their peers, and were able to provide support to other children in the classroom.

In addition, educators' responses provided evidence that the program supported children's engagement in solo SR/L. Educators indicated that children appeared to reflect on and regulate affect to behave in adaptive ways. One educator noted that children were motivated and able to apply the skills taught during MindUPTM lessons independently (e.g., "I have noticed some of the children using the breathing on their own when trying to self-regulate". Another educator described that children were better able to communicate their needs within the program context (e.g., "They can say, "No I can't sit today, I'm too fidgety," or whatever and they go to the table and stay there while we have a mind break and that's okay too").

Finally, educators described positive outcomes associated with kindergarten children's development of SR/L as a result of implementing the MindUP^TM program in their classrooms. Specifically, educators reported a general increase in children's development of and engagement in SR/L. Educators report that children were better at "solving problems independently" and engaging in "more creative play" while learning. Taken together, evidence from the qualitative comments indicates that educators perceived improvements in the classroom learning environment and children's SR/L as a result of program implementation.

Chapter 4

4   Discussion

4.1   Overview

The present study utilized a mixed method, repeated measures research design to explore children's development of SR/L alongside the implementation of a mindfulness-based SEL program. Specifically, the present study examined whether a shortened version of the SRISI (Hutchinson, 2013; Hutchinson & Perry, 2012) could provide reliable and valid ratings of kindergarten children's SR/L. Also, this study examined children's development of social and solo SR/L and how demographic and teacher factors were associated with them. This chapter presents a discussion of the study findings in order of the research questions posed at outset of the study. Then, a general discussion of the study limitations, directions for future research, and implications, are presented.

4.2   Research Question 1: Does a Shortened Version the SRISI Yield Reliable and Valid Ratings of Kindergarten Children's SR/L?

Results of this study indicate that a shortened, 9-item version of the SRISI (Hutchinson, 2013), provided reliable and valid teacher-reports of children's social and solo SR/L. Educator's responses to the 9-item SRISI (Hutchinson & Perry, 2012) demonstrated discriminant validity with the Social Skills, Executive Functioning, and Emotional Control subscales, from the BASC-3 (Kramphus & Reynolds, 2015). Also, findings from this study indicated that the factor structure of the 9-item SRISI shifted over the course of the school year, and as the mindfulness-based SEL program was implemented in classrooms. Taken together, findings from this study confirm and extend previous research about the importance and practicality of measuring young children's SR/L (Bryce, et al., 2015; Hutchinson & Perry, 2012; Hutchinson et al., 2015 McClelland & Cameron, 2012).

Measuring young learners' SR/L has been challenging researchers interested in this area of study (McClelland & Cameron, 2012; Perry et al., 2017; Whitebread et al., 2007).

First, there are very few measurement tools that provide an indirect assessment of young learners' SR/L. In fact, most self-reports of SR/L have been designed to measure metacognition, motivation for learning and strategic action in older students (Karabenick et al., 2007; Koskey et al., 2010; Whitebread et al., 2007). As such, self-reports of SR/L require learners to have the cognitive, literacy, and communicative skills to understand and interpret measurement instructions and items, so that they can provide accurate reports of their behavior over time and across contexts and distinguish their goals/intentions from their actual behavior (Hutchinson, 2013). Often young children are developing these skills, so these types of measures are not suited to obtaining reliable and valid assessments of their SR/L (Perry et al., 2017; Whitebread et al., 2007; 2009). Furthermore, SR/L self-report measures consider SR/L a largely solo process. However, findings from this study indicate that both social and solo forms of SR/L are central to young children's classroom learning. The SRISI contains items that capture both solo and social SR/L processes that are likely to transpire in young children's classrooms (Lipsey et al, 2017; Whitebread et al., 2009).

Like the original version of the SRISI, the shortened, 9-item version (Hutchinson, 2013) addresses some of these challenges researchers face obtaining reliable and valid assessments of young children's SR/L (Lipsey at al, 2017; Whitebread et al., 2009). Both versions ask teachers to provide ratings of individual children's classroom behaviours and reflect the ways that children's solo and social SR/L manifests in the everyday events and activities that transpire in classroom contexts (Hutchinson & Perry, 2012). Hence, the SRISI is an efficient method for gathering large quantities of data for researchers interested in this area of study.

Findings from this study indicate that educators' ratings distinguish between young children's solo and social SR/L, and additional constructs measuring adaptive functioning (e.g., social skills, executive functioning, and emotional control; Bryce & Whitebread, 2012; Hutchinson, 2013; Kramphus & Reynolds, 2015; Perry & Hutchinson, 2014). Evidence from this study demonstrates that educators perceive that learners' SR/L is distinguishable from other developmental processes. Findings are also interpreted as indicating that young learners' development of SR/L aligns with theoretical models

describing how classroom contexts can offer support for young learners' to gradually internalize the thoughts, emotions, and behaviors associated with social and solo aspects of SR/L (Hutchinson, 2013; Hutchinson et al., 2015; McCaslin, 2009; Whitebread et al., 2007, 2009; Zimmerman, 2001).

However, these findings need to be interpreted with the following limitations in mind. First, these findings may reflect this particular sample of kindergarten teachers who provided ratings of children's SR/L in classrooms. Second, educators implementing the mindfulness-based SEL program may have focused on social behaviours associated with the program, and overtime, shifted their focus to more autonomous classroom behaviours associated with solo SR/L in classrooms. As a result, more psychometric evaluations are required to determine if the two-factor model of children's social and solo SR/L generalizes to other samples, or if more discrete forms of SRL emerge throughout children's development in school.

4.3 Research Question 2: What are the Observed Changes in Children's Social and Solo SR/L Over Program Implementation?

Consistent with previous research, findings from this study demonstrate that kindergarten children's social and solo SR/L showed a statistically significant increase over the school year (DiBacco, 2016; Perry, 2017), while the MindUP™ program was being implemented. These findings are the first to provide evidence indicating that kindergarten children's SR/L develops along-side MindUP^{TM}.

However, the absence of a comparison group or waitlist-control, make it difficult to separate 'program results' from children's maturation. That is, social and solo SR/L may improve as a result of children's development that occurs at exceptional rates in early childhood, and/or as a result of increased experience in classrooms (Diamond & Lee 2011; Rimm-Kaufmann et al., 2009; Perry, 1998). Alternatively, improvements in children's social and solo SR/L may be an outcome of the MindUP^{TM} program, which has not been explicitly addressed or measured by the program or this study (e.g., mindful awareness; Lawlor, 2007; Maloney et al., 2016; O'Toole, et al, 2017; Schonert-Richl et

al., 2017; Willis & Dinehart, 2014).

Findings from this study highlight the need for studies involving waitlist-controls or comparison groups in their designs to better understand whether and how implementing a mindfulness-based SEL program (MindUP^{TM}) may support young children's development of social and solo SR/L. In addition, prospective studies should investigate the active developmental mechanisms (e.g., mindful awareness, attention focusing) that may be involved in children's development of social and solo SR/L when participating in MindUP^{TM}.

4.4 Research Question 3: How are Demographic Variables Related to Teachers' Ratings of Kindergarten Children's Social and Solo SR/L at Pre- and Post-Implementation?

Results of this study demonstrated that children's demographic variables were related to teacher's ratings of kindergarteners' SR/L over program implementation. In particular, findings from the current study confirm research indicating, that older students received statistically significantly higher teacher-ratings of solo and social SR/L compared to younger students at Time A and Time B (Diamond, 2016; Perry, 1998; Perry et al., 2017). In addition, teacher-ratings of social and solo SR/L indicated that children in JK finished the program where the SKs had started.

Similar to Rimm-Kaufmann et al. (2009) and Hutchinson et al. (2015), findings from this study suggest that children's age and early school experiences (e.g., experience attending preschool, kindergarten classroom quality, and tasks and practices employed by teachers) may influence their development of SR/L during the school year, and across the early school years. Unfortunately, research investigating how young children's age and experience in school influences their development of SR/L remains an understudied aspect of SR/L research (Bryce & Whitebread, 2012; Perry et al., 2017). Longitudinal studies, such as those conducted by Perry (1998), indicate that classroom contexts (e.g., tasks and practices implemented; see Hutchinson, 2013 or Perry, 1998) can provide differential opportunities for children to engage in SR/L over the school year. Further, that children in "high-SR/L" classrooms (characterized as autonomy supportive and

collaborative with effective use of SR/L promoting practices) tend to engage in more effective SR/L behaviours over time. More studies examining classrooms contexts are necessary to understand children' transition into kindergarten, and how educators can support young children's SR/L, especially within mindfulness-based SEL programs.

In addition, JK children's growth in social and solo SR/L from Time A to Time B in relation to their SK peers deserves some consideration in terms of program effect. These findings are interpreted as indicating that both JK and SK children's SR/L developed over implementation, however results could be interpreted that children would make these improvements regardless of the mindfulness-based program. Studies are needed to investigate this possibility.

Evidence from this study demonstrates that educators provided statistically significantly lower ratings of social and solo SR/L to boys compared to girls. This finding aligns with previous research indicating that boys' executive functions appear to mature at a different rate compared to girls (Berlin & Bohlin, 2002; Carlson & Moses, 2001; Diamond; 2011; 2016; Walker & Berthelsen, 2017). Also, these results pose questions surrounding existing research on social and solo SR/L and gender in education, including how researchers measure SR/L in young children, and how effective teaching practices (Perry, 1998) can support SR/L development in all learners regardless of sex.

Research suggests that current measures and teaching practices may not acknowledge the kinds of activities where young boys can showcase their social and solo SR/L (Blair et al., 2011; Hutchinson, 2013; Hutchinson et al., 2015). Furthermore, that classroom practices may perpetuate gender-stereotypes whereby behaviours more typical of girls set the standard for classroom behaviour (Koch, 2003). For example, girls are rated by teachers as higher on adaptive classrooms behaviours (e.g., the ability to follow classrooms procedures and general compliance), versus boys who are rated as higher on time spent off task and engage in more disruptive behaviours in classrooms (Rimm-Kaufman et al., 2009). It may be necessary to consider the extent to which current measures, curriculum, and classroom tasks and activities support children to individualize their learning in ways that support their development of executive functions,

metacognition, motivation, and strategic action for learning in school (Hutchinson 2013; Perry at el., 2016). In addition, future research should continue to investigate the developmental trajectories of SR/L for boys and girls – looking at similarities, differences, and, individual variation, in relation to classroom contexts.

4.5   Research Question 4: How Do Teacher Factors Predict Children's Social and Solo SR/L at Pre- and Post-Implementation?

Findings from this study demonstrate that educators who held beliefs indicating that children's behaviours can change and that they are based on environment (versus fixed – e.g., "this child is bad"), significantly predicted increased social SR/L in their classrooms prior to implementing MindUP™. In addition, educators' feelings of personal accomplishment (e.g., feelings of competence and performance at work) at Time B, predicted higher levels of social SR/L in classrooms at Time B. These results confirm and extend Collie et al.'s (2012) research, indicating that teacher's behaviour attributions (growth versus fixed; Dweck et al., 1978; Upadyaya & Eccles, 2014) and experiences of burnout are associated with educators feelings of efficacy, and are the first to connect these factors with opportunities that teachers provide for young children to engage in SR/L (Collie, Shapka, & Perry, 2012; Deci et al., 1991; Dweck et al., 1978; Upadyaya & Eccles, 2014). In addition, findings add to previous research examining teacher factors within MindUP™ (e.g., Carvalho et al., 2017); indicating that teacher's sense of personal accomplishment predicts children's social SR/L over time, and alongside the MindUP™ program.

However, these findings beg the question, "Why were teacher factors predictive of young children's social SR/L and not their solo SR/L"? This finding may indicate MindUP™ training and implementation provides opportunities geared towards social SR/L in kindergarten classrooms (Neitzel & Connor, 2017; Rimm-Kaufman et al., 2000). However, these findings could be interpreted as suggesting educators who experience greater feelings of personal accomplishment at the end of the program utilize instructional practices (e.g., providing opportunities for collaboration and promote explicit peer support; Hutchinson, 2013; Perry, 1998) associated with social versus solo

forms of SR/L within their classrooms (Hutchinson 2013; Perry & VandeKamp, 2000). Again, further large-scale mixed-methods research, including classroom observations and, are needed to understand: (a) The teacher factors implicated in young children's development of social and solo SR/L, and (b) whether and how mindfulness-based SEL training and implementation may support teachers to provide opportunities for social and solo SR/L in their students.

4.6 Research Question 5: Did Educators Experience Any Changes to their Teaching and/or Classroom Related to SR/L, as a Result of Implementing MindUP™?

Qualitative analysis from this study indicated that educators did perceive changes related to SR/L in their classrooms as a result of implementing the MindUP™ program. In particular, teacher and ECE responses indicate that the MindUP™ program provided educators with the knowledge and activities to create a classroom context where children were prepared to engage in learning. In addition, that educators observed children using the program knowledge/strategies to engage in behaviours associated with social and solo forms of SR/L in classrooms. Finally, that they perceived improved outcomes associated with children's learning over the implementation of the MindUP™ program related to children's academic outcomes in kindergarten (e.g., creative play, problem-solving). These findings are the first to explore educators' qualitative assessments of changes to their classrooms and students as a result of implementing the MindUP™ program to SR/L.

Teacher's perceptions are consistent with this study's findings, confirming that young children engage in behaviours associated with solo and social SR/L during MindUP™ implementation. Further, educators' comments are interpreted as providing initial insights into the types of SR/L skills/behaviours children engage in while participating in MindUP™. For example, being able to identify when peers needs support regulating their emotions or behaviours, being motivated to assist or manage emotion and behaviours, and able to engage independently and collaboratively in program taught behaviours (e.g., utilizing a brain/breathing break). Together, results indicate that mindfulness-based SEL curriculum, MindUP™ may create contexts, and support knowledge and skills that afford

children opportunities to engage in SR/L. However, without data describing what transpires within MindUP™ lessons, it is hard to draw definitive conclusions about how the MindUP™ curriculum may (or may not) provide such opportunities.

Perry's (1998) and Hutchinson et al.'s (2015), research describes *how* the types of tasks and practices employed in classrooms afford or constrain opportunities for young children's social and solo SR/L (e.g., complex tasks, choice/control over challenge, instrumental support, non-threatening evaluations; see Hutchinson, 2013; Perry, 1998). To add to these findings, future studies could consider employing similar classroom observations during MindUP™ lessons to gain rich qualitative data (e.g., record what transpires within lessons), and code for opportunities for social and solo SR/L within the program (Perry, 1998; Perry & VandeKamp, 2000).

4.7 General Discussion

To close this thesis, some general limitations, and final conclusions including, directions for future research and implications for educators and policymakers are discussed.

4.7.1 Limitations and directions for future research.

In addition to the limitations already mentioned, some general limitations should be considered when interpreting results of this study. A first limitation of this study was the participant selection method used. Teachers in this study were self-selected, and then accepted for participation by the school board's administration on a needs-basis using a social risk index (e.g., indicating increased levels of poverty, recent immigrants, low parental education; Janus & Offord, 2007). This could indicate that teachers in the study were increasingly interested in the implementation of a mindfulness-based SEL program and children's SR/L. In addition, because all the schools and classrooms selected for participation in this pilot were categorized as "high-risk", the sample may not be representative of other regions of Ontario or Canada. Future research should implement the 9-item SRISI to test if the results are replicable and generalizable beyond the current sample.

A second limitation of this study is that teachers and ECEs both completed the SRISI

(Hutchinson & Perry, 2012). The original version of the SRISI (Hutchinson & Perry, 2012) was created for *teachers* to provide ratings of the behaviours associated with young children's SR/L. In addition, teachers in previous studies implementing the SRISI were actively involved in professional development series designed to support their knowledge and understanding of young children's SR/L in the early years (Hutchinson, 2013; Hutchinson, et al., 2015; Perry et al., 2010). Educators in the current study did not participate in any SR/L training or professional development. As a result, their understanding of the types of behaviours associated with SR/L compared to educators in previous studies using the SRISI may have been limited. Moving forward, research employing the SRISI should consider providing educators with professional development to support their professional understanding of young children's SR/L in early years classrooms.

Third, when interpreting the results of this this pilot study, readers should be aware of the absence of a comparison group or waitlist-control treatment. Without the presence of a comparison group, it is difficult to tease apart possible maturational changes from observed 'program effects'. However, results provide a supportive-foundation for further investigation into children's development of SR/L within a mindfulness-based SEL program. Future research should employ a waitlist control or comparison group to allow for research to better make this distinction.

Fourth, future research should expand on the findings that teacher factors may predict classroom-level SR/L. Prospective studies should consider using teacher report measures that may be more sensitive to typical levels of teacher stress (versus burnout), teacher efficacy, and behaviour attributions. This research would afford insights into how professional teacher preparation, and MindUP[TM] training and program implication, may influence teacher factors associated with children's SR/L in classrooms.

Finally, qualitative results of this study indicated that classroom contexts and children's social and solo SR/L behaviours improved over program implementation. However, it remains unclear as to what transpired within the MindUp[TM] lessons; specifically, whether and how particular program activities may have provided opportunities for young

children's engagement in metacognition, motivation, and strategic action for SR/L (Hutchinson, 2013; Perry, 1998). Therefore, future research should consider incorporating coded classroom observations to provide rich contextual descriptions pertaining to how mindfulness-based SEL programming may encourage young children's uptake of social and solo SR/L.

4.7.2   Final conclusions.

Results of the current study are important because they demonstrate that educators can provide valid and reliable ratings of young children's social and solo SR/L. In addition, these findings are the first to suggest that very young children's social and solo SR/L develops within a mindfulness-based SEL program in kindergarten classrooms. Findings corroborate previous research demonstrating that children's demographic and teacher factors are implicated in children's social and solo SR/L. Together, findings demonstrate that further investigation of children's development of SR/L within the context of the mindfulness-based SEL program, MindUP^{TM}, through large-scale studies are justified. Three unique contributions of the research, and their implications are discussed below.

First, this study's findings indicate that the 9-item SRISI can provide reliable and valid teacher-reports of kindergarten children's behaviours associated with solo and social SR/L. Not only do findings from this study address some of the limitations associated with many measures of SR/L (e.g., the utility of teacher-reports for young children), they also confirm previous research indicating that young children engage in the processes involved in social and solo SR/L, and that these processes are distinct and measurable (Bryce & Whitebread, 2012; Hutchinson, 2013; Perry & Hutchinson, 2014). Future research should continue psychometric testing to investigate the validity and reliability of the 9-item SRISI (Hutchinson, 2013) beyond the current sample, and the distinct aspects of SR/L that emerge in the early school years.

Second, results related to children's development of SR/L during program implementation provide support for greater investigation of the impact of mindfulness-based SEL programs on children's development of SR/L. Researchers should consider that participating in mindfulness-based SEL programming may effect young children's

behaviours associated with SR/L and their engagement in mindful awareness. Also, kindergarten educators should be aware of the role that experience may play in children's development of solo and social SR/L; especially for children who may be entering school without experience in a preschool or daycare setting. In addition, teachers may benefit from education involving the ways that young boys and girls may differ in their development of SR/L. This awareness could lead to teachers' and ECEs' better understanding of the tasks and practices involved in supporting all children's SR/L within classrooms.

Third, findings from this study suggest that teacher factors (e.g., behaviour attributions, feelings of accomplishment) are implicated in children's development of social and solo SR/L within the context of a mindfulness-based SEL program. Results highlight the need for quality teacher training and professional development directed towards: the benefits of teaching towards SR/L (Hutchinson, 2013; Perry and VandeKamp, 2000), how children's experiences and demographic characteristics may interact with their growth trajectories and SR/L profiles (DiBacco, 2016), and supporting teachers' efficacy to deliver tasks and activities that support young children's SR/L in classrooms (Perry, 1998). More research and professional development on these topics could allow researchers, and educators to understand how all learners social and solo SR/L may be supported within classrooms, and in the context of mindfulness-based SEL programming (MindUP$^{TM)}$.

Overall, findings from this pilot study are interpreted as providing preliminary evidence that mindfulness-based SEL may support children's social and solo SR/L in kindergarten classrooms. Together, results highlight the need for larger-scaled studies involving comparison groups or waitlist controls in their design. Such research could provide evidence to assist researchers, educators, and policy makers alike to better understand how very young children's SR/L may be supported within the context of mindfulness-based programming. In particular, research could help policy makers to appraise the strengths and weaknesses of incorporating mindfulness-based SEL programs into educational activities, especially when considering how to responsibly allocate resources

and fulfill their mandates surrounding 21st century learning and self-regulation in classrooms (Ministry of Ontario, 2017).

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Appendices

Appendix A: Demographic Information Form for Teachers.

1. What is your gender? ___Male   ___Female   ___Both

2. What is your race/ethnic background (check all that apply)?
   ___ White
   ___ Aboriginal/First Nations/Métis
   ___ Chinese
   ___ South Asian
   ___ Black
   ___ Filipino
   ___ Latin American
   ___ Southeast Asian
   ___ Arab
   ___ West Asian
   ___ Japanese
   ___ Korean
   ___ Pacific Islander
   ___ Other (PLEASE SPECIFY)

   _____

3. What is your highest level of education (circle one)?

   ___Completed high school or GED

   ___Completed a college diploma (program/specialization)
   _____

   ___Completed a Bachelor's Degree (B.A. or B.Sc.) with a specialization in
   _____

   ___Completed a Bachelor of Education degree (B.Ed.) with a specialization in
   _____

   ___Completed a Master of Education Degree (M.Ed.)

   ___Completed a Master of Arts Degree (M.A.)

   ___Completed a Master of Science Degree (M.Sc.)

   ___Completed a Doctor of Education Degree (Ed.D.)

___Completed a Doctor of Philosophy Degree (Ph.D.)

___Completed Other (list) _____

4. What is your approximate annual income before taxes (circle one)?

___Less than $20,000

___$20,000–$40,000

___$40,000–$60,000

___$60,000–$80,000

___$80,000–$100,000

___$100,000–$120,000

___Greater than $120,000

5. What is your job role (circle one)?

___Kindergarten Teacher

___Early Childhood Educator

___Principal

___Other_____

6. Approximately how many years have you been in your current job role/position?

7. Approximately how many years have you worked for your current organization?

8. Approximately how many years have you been in the field of teaching and education?

9. Have you had any previous MindUP™ training?

___Yes - if yes - what type of training in MindUP™ have you received?

___No

10. Have you had any previous Trauma Informed Care training?

___Yes - if yes - what type of Trauma Informed Training have you received?

___No

Appendix B: Student Demographic Form.

Principal Investigator:
Claire Crooks, Ph.D., C. Psych
Associate Professor
Director, Centre for School Mental Health
Faculty of Education Western University
1137 Western Road
London, ON CANADA N6G 1G7

My child's name is (print):_____

My child is a BOY or GIRL (circle one)

Her/his birth month is (print) : _____

Her/his birth year is (print): _____

My child's ethnic/cultural background is (check all that apply):
___ White
___ Aboriginal/First Nations/Métis/Inuit
___ Chinese
___ South Asian
___ Black
___ Filipino
___ Latin American
___ Southeast Asian
___ Arab
___ West Asian
___ Japanese
___ Korean
___ Pacific Islander
__Other (PLEASE SPECIFY) _____

Thank-you.

Appendix C: Focus Group Questions.

1. What roles did teachers and ECEs have in classrooms?

2. How did teachers and ECEs organize delivery of the MindUP™ program in the classroom?

3. What were the strengths/limitations of implementing the MindUP™ program in your classroom?

4. Have you noticed any changes in your teaching as a result of implementing the MindUP™ program?

5. Have you noticed any changes in your classroom as a result of the MindUP™ program?

6. How have your views/ideas concerning young children changed as a result of the MindUP™ and/or Trauma Informed Training?

7. What advice would you give someone implementing the MindUP™ program for the first time?

8. What recommendations would you have to modify/change the MindUP™ program in the future?

9. Would you like to share any comments/feedback about the MindUP™ program?

Appendix D: Short Answer Questions.

1. Have you noticed any changes in your teaching as a result of implementing the MindUP™ program?

2. Have you noticed any changes in your classroom as a result of the MindUP™ program?

Curriculum Vitae

Name: Devon Marcia Trower

Post-secondary Education and Degrees:
Western University
London, Ontario, Canada
2011-2015 B.A.

The University of Western Ontario
London, Ontario, Canada
2016-2018 M.A. Ed (*in progress*)

Honors and Awards:

Social Science and Humanities Research Council (SSHRC)
Joseph-Armand Bombardier Canada Graduate Scholarship (CGSM)
2016-2017

Entrance scholarship
Western University
2016

Dean's Honor List 2015, 2014, 2013
King's University College

Entrance Scholarship
King's University College
2011

Related Work Experience
Teaching Assistant
The University of Western Ontario
2015-present

Research Assistant
The University of Western Ontario
2015-present

Research Assistant at CSMH,
Western University,
2016- 2017

Publications:

Hutchinson, L.R., & Trower, D. M. *Describing features of instruction that provide opportunities for self-regulation in sports*. Submitted for publication.

Presentations:

Hutchinson, L.R., **Trower, D. M**., & Perry, N.E. *Teachers' implementation of SRL promoting tasks and practices during the school year*. Poster presented at the 2016 American Psychological Association, Denver, Colorado.

Johnson, T. C., Hutchinson, L.R., & **Trower, D.M**. *Features of Classroom Contexts and Children's Self-Regulated Learning in the Elementary and Middle Grades.* Poster presented at the 2016 Association for Psychological Science Convention, Chicago, Illinois.

Losseno, K. M., Hutchinson, L.R., & **Trower, D.M**. *Changes in Teachers' Perceptions of Elementary Aged Students' Self-Regulated Learning During the School Year.* Poster presented at the 2016 Association for Psychological Science Convention, Chicago, Illinois.

Trower, D. M. & Hutchinson, L.R. (2015, July). *Young children's self-regulation for learning in classrooms: A mixed method case study design*. Poster presented at the annual meeting of the International Society for the Study of Individual Differences, London, Canada.

Trower, D. M., Hutchinson, L.R., & Crooks, C. (2018, April). *Exploring children's self-regulation for learning within a mindfulness-based social and emotional learning program.* Poster to be presented at the annual meeting of the American Educational Research Association, New York, USA.

Trower, D. M., Hutchinson, L.R., & Crooks, C. (2018, August). *Teacher's self- efficacy and children's self- regulation for learning within MindUP*. Poster to be presented at the annual meeting of the American Psychological Association, San Francisco, USA.