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Taylor Johnston
King's University College, tjohns86@uwo.ca

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Elementary School Students' Self-Regulated Learning and Features of Classroom Contexts

By

Taylor Johnston

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Department of Psychology

King's University College at Western University

London, Canada

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Thesis Advisor: Lynda R. Hutchinson, Ph.D.

Abstract

Self-regulation (SR) describes how individuals control cognition and behaviour to adapt to environmental demands and achieve goals. The present study was part of a larger research project examining how SR promoting practices are linked to elementary school students' SR for learning in school. Three research questions were addressed: (1) Does children's SRL predict their academic achievement? (2) Do learners engage in higher levels of SRL in the primary grades (kindergarten to grade 3) compared to the middle grades (e.g. grades 4 through 6)? and (3) What are the relationships between features of classroom instruction and children's SRL? Participants were 11 elementary school teachers (kindergarten through grade 6; 2 males) and their students (128 students; 66 boys, Mean Age = 7.65 years, SD = 2.44 years). Teachers rated children's SRL and academic achievement using 10 items from the Self-Regulation In School Inventory (SRISI). In addition, classroom observations were conducted in each of the participating classroom to examine the extent to which eight SRL promoting practices were implemented in classrooms. Results demonstrated that elementary school students' SRL was a positive and statistically significant predictor of children's academic achievement. Findings indicated that students' grade level did not have a statistically significant effect on learners' engagement in SRL. Finally, the eight features of classroom instruction were not found to be statistically significant hierarchical predictors of children's SRL. These findings are anchored within a larger discussion concerning SRL and its implications for teaching and learning.

Elementary School Students' Self-Regulated Learning and Features of Classroom Contexts

Self-regulation (SR) describes how individuals control thoughts and actions to respond to environmental demands and attain goals (Perry et al., 2015; Zimmerman, 2008). Successfully self-regulating individuals employ executive functions (i.e., working memory, attention focusing, and behaviour inhibition; Diamond, 2016) plus higher order processes (metacognition, motivation for learning, and strategic action) to adapt their behaviour in a given environment to meet goals (Winne & Perry, 2000; Zimmerman & Schunk, 2011). SR in educational psychology is studied as self-regulated learning (SRL), which refers to adaptive and effective approaches to learning involving metacognition, motivation for learning, and strategic action (Perry, 2013). Metacognition describes how learners use knowledge of their academic strengths and weaknesses to regulate their engagement on tasks and increase their chances of academic success (Perry, 1998; Perry, 2013). Motivation is enacted when learners persist during difficult or challenging tasks by focusing on their personal growth and progress rather than competing with others (Hutchinson, 2013). Strategic action is the behavioural manifestation of metacognition and motivation. Learners engage in strategic action when they select from a repertoire of academic strategies and apply them effectively and adaptively to meet academic goals (Perry, 1998).

SRL has been associated with a wide range of positive academic outcomes for students. These learners tend to adopt a growth mindset so they are likely to view errors as opportunities to learn (Dweck, 2008; Hutchinson, 2013; Perry, 1998). Also, self-regulating learners often value personal learning progress and have a high efficacy for learning (Perry & VandeKamp, 2000). Children who engage in SRL tend to adopt an internal locus of control, meaning that they are likely to attribute personal success (e.g., doing well on a test) to circumstances within their

control (e.g., the amount of time they studied; Perry, 1998; Perry & VandeKamp, 2000). Finally, self-regulating learners experience high levels of academic achievement (Blair & Razza, 2007; Zimmerman & Bandura, 1994). For example, Perry and VandeKamp (2000) investigated (a) how features of teaching and learning contexts promote or curtail SRL, (b) how to instruct teachers to design lessons that promote SRL, and (c) student outcomes when engaged in SRL practices. Perry and VandeKamp administered a semi-structured interview that asked 31 young children (kindergarten to grade 3) to report whether they thought that an imaginary boy named Peter, who was struggling with writing, would always have difficulty with writing. Perry and VandeKamp (2000) found that only 9% of the high-achieving, self-regulating learners believed Peter would always have difficulty writing compared to 50% of the low-achieving students. These findings demonstrate that high-achieving, self-regulating learners are more likely to believe that SRL is a malleable rather than fixed quality.

SRL is contrasted with maladaptive or defensive patterns of learning (Paris & Paris, 2001; Perry, et al., 2006). These learners tend to have low efficacy for learning, procrastinate, and avoid work or failure by choosing easy tasks (Perry, 1998; Perry et al., 2006). For example in her seminal research study, Perry (1998) examined literacy and writing activities in grade 2 and 3 classrooms over the span of six months. Data consisted of classroom observations where she focused on the effects of complex literacy tasks, authority structures, and portfolio evaluations on children's (a) perceptions of control and support, (b) beliefs, values, and expectations concerning writing, and (c) their regulation of writing behaviours. In the two classrooms she characterized as low-SRL, Perry observed many of the students engaging in maladaptive or defensive learning strategies where children would hide their work, focused more

on the extrinsic value of their work and effort (e.g., getting a good mark), and had perceptions of low ability (e.g., one child told the researcher, "I'm not very good at writing").

Features of Classroom Contexts

Studies have demonstrated that children's engagement in SRL is associated with the types of academic tasks and teaching practices employed in classroom contexts (Hutchinson, 2013; Perry, 2013; Turner, 1995). Research has identified at least eight practices that provide opportunities and support for learners' SRL. These include: complex tasks, autonomy (e.g., choices, control over challenge, self-evaluation), support (instrumental forms of teacher and peer support), non-threatening evaluations, plus participation in a community of learners. These are discussed in turn, below.

Complex academic tasks have been associated with opportunities to engage in SRL (Hutchinson, 2013; Perry, 2013; Perry et al., 2006). Complex tasks are described as academic activities that address multiple learning goals, involve large chunks of meaning, and extend over long periods of time (Perry et al., 2006). Complex tasks also enable students to engage in a variety of processes and create a wide range of products (Perry, 1998). In their chapter, Perry, Brenner, and MacPherson (2015) described how teachers could be supported to employ SRL promoting tasks (i.e., complex tasks) and practices in their classrooms through the formatting of teacher learning teams. One of the teachers, Liz, designed a complex task which involved teaching her students how to recognize and apply reading strategies in her classroom (e.g., using sticky notes, re-reading, and Bloom's Taxonomy). The children in her class were taught the strategies and asked to apply them. In addition, Liz facilitated classroom discussions so that children could discuss the pros and cons of a particular strategy, whether they believed it improved their reading, and whether they would use it again. Children were also asked to

continue the use of a strategy over the course of a couple assignments in order to fine tune its use. Therefore, Liz designed a valuable complex task because not only did it involve multiple learning goals which included the practice of writing skills in a persuasive argument and the engagement in collaborative discussion, it extended the learning of a particular strategy over a long period of time.

Autonomy supportive classrooms have been associated with children's metacognition, motivation, and strategic action for SRL (Perry, 2013; Stefanou et al., 2004). In particular, researchers have identified that meaningful choices such as: what to work on, where to work, and who to work with can provide opportunities for children's SRL (Stefanou et al., 2004). By providing students with these types of choices, it promotes metacognition and opportunities to engage in strategic action. Learners may engage in metacognition to identify strategies for completing a task (e.g., working independently or collaboratively with a peer).

Research has demonstrated that children's engagement in self-evaluations can provide opportunities for SRL (Perry, 2013). Self-evaluation techniques are those in which students have opportunities to assess their engagement in learning including their learning processes and their products. Examples of self-evaluation techniques include evaluation journals, and the use of self-assessment checklists such as rubrics (Perry, 2013; Perry et al., 2006). Research has suggested these types of evaluative tools should be embedded in day-to-day activities (Perry & VandeKamp, 2000). Self-evaluations should also celebrate progress and help children interpret errors as opportunities to learn (Perry, 1998). These techniques are seen as such as critical features because they can promote metacognition by having students reflect on their work (Perry & VandeKamp, 2000). In addition, the use of self-evaluative techniques can promote confidence and an internal locus of control for children, as well as impact a student's view of learning in

school. For example, when investigating the relationship between students' social perceptions and their positive and negative affect in school, Anderman (1999) found grade 5 and 6 students in classrooms that utilized self-evaluations rated school as more enjoyable and felt less anxious than students in classrooms that did not use self-evaluation techniques.

In addition, instrumental forms of support such as teacher support and peer support are important features of classrooms that promote SRL (Hutchinson, 2013; Perry, 1998). Instrumental forms of teacher support include: instruction in which students have opportunities to acquire domain knowledge and strategies to complete tasks independently. Teachers can provide instrumental support to learners using elaborative questioning techniques, prompts, cues, and metacognitive modelling (Perry et al., 2006). In addition, instrumental support from teachers also includes the scaffolding and support offered to individual students based on their zone of proximal development (ZPD; McCaslin & Hickey, 2001; Perry & VandeKamp, 2000; Vygotsky, 1978). The ZPD was proposed by Vygotsky (1978) and refers to the area between an individual's ability to perform a task independently and their ability to perform a task with assistance (McCaslin & Hickey, 2001). As a result, instrumental support from teachers provides scaffolding for children to complete tasks more independently and can support them to think critically when dealing with learning challenges. Additionally, students come to view teachers as collaborators rather than the managers of their learning, and do not rely on teachers as the ultimate source of knowledge (Perry & VandeKamp, 2000). Instrumental forms of peer support are also recognized as critical to supporting children's SRL. Peer support can be provided when children are encouraged to work collaboratively with their peers and are given explicit guidance about effective strategies for doing so (Perry, 1998; Perry et al., 2006). Peers can support children's SRL through co-regulation, where one learner with more expertise on a task guides

another, more novice learner (Hadwin & Oshige, 2011), and also shared regulation, which refers to the pooling of metacognitive, motivational and strategic action resources among individuals that serve to support regulation of learning among a group learners with equal expertise (Grau & Whitebread, 2012).When opportunities for instrumental support are provided in classrooms, it may promote a sense of community and less peer comparison, which has been shown to result in a sense of school belonging and positive affect (Anderman, 1999).

Non-threatening evaluations have also been linked to opportunities for children's participation in SRL. Non-threatening evaluations are those which: focus on constructive feedback, view errors as opportunities to learn, and promote personal progress without concern for social comparison (Perry et al., 2006; Perry & VandeKamp, 2000).

Finally, communities of learners are described as groups in which all students are celebrated for their individual ways of learning and the knowledge that they bring with them into the classroom (Fisher & Pribesh, 2012). Within these communities, individuals are encouraged to share their individual expertise with other members in order to support individual and collective learning (Fisher & Pribesh, 2012). Often, these communities are known to promote a sense of acceptance and social support. In addition, by being a part of a community of learners, research has found that individuals have reported improved academic performance and an enhanced academic experience (Moser et al., 2015).

Research indicates that the extent to which SRL promoting practices (e.g., complex tasks, choices, control over challenge) are employed in classrooms vary considerably from teacher to teacher (Perry, 1998; Perry et al., 2006; Perry & VandeKamp, 2000). For example, in some classrooms, much of the instruction is based on procedural aspects of a task, and do not extend to other lessons or over time (Perry et al., 2006). In addition, students are offered limited

opportunities for autonomy (e.g., making meaningful choices or controlling challenge) and self-evaluations are rarely utilized (Perry, 1998). Finally, many of the evaluations are chosen by the teacher and are the same for all students in the class, making social comparisons more salient and promoting a competitive learning environment (Perry, 1998; Perry & VandeKamp, 2000). Studies (Perry, 1998; Perry et al., 2006; Perry & VandeKamp, 2000) have suggested these kinds of teaching practices may curtail learners' development of and engagement in SRL.

In addition, SRL promoting practices tend to become much less prevalent when children transition from the early elementary grades to the middle elementary grades. Studies have demonstrated that as children move from the early elementary to the middle grades of school, teachers reduce opportunities for learners' autonomy, non-threatening forms of evaluation, and the development of a community of learners (Eccles et al., 1993; Eccles & Midgley, 1990; Midgley et al., 1998). As a result, the transition from primary to middle school has been linked with declines in children's academic motivation and achievement (Anderman, 1999). Achievement Goal Theory and Stage Environment Fit are two theories that have been used to explain observed declines in learners' motivation and achievement in the early and middle grades of school.

Achievement Goal Theory, or Goal Orientation Theory, is associated with motivation research and looks at the motivation an individual has for completing a task, as well as how they evaluate themselves, the task, and their performance (Boekaerts et al., 2000; Midgley et al., 1998). Achievement Goal Theory can attribute this decline in motivation and performance to differences in classroom instruction between elementary school classrooms and middle school classrooms, and describes these differences as changes in the focus of the classroom on a specific goal, or goal orientation (Anderman & Anderman, 1999; Boekaerts et al., 2000).

The two goal orientations that are the focus of Achievement Goal Theory are on the promotion of mastery and performance goals. Mastery goal orientation, also known as task goal orientation, is focused on the development of knowledge and skill. It is measured in individual self-progress (Boekaerts et al., 2000; Midgley et al., 1998). Performance goal orientation, also called ability goals in motivation research, addresses the desire to demonstrate competency to others, and to avoid unfavourable judgments by others (Boekaerts et al., 2000; Midgley et al., 1998).

Mastery goals are more correlated with positive affect, a sense of school belonging (Anderman, 1999), confidence during challenging questions, academic efficacy, a higher use of metacognition, and more effort in work (Midgley et al., 1998). In turn, performance orientation is positively correlated with maladaptive learning strategies, negative affect, stress and anxiety, poor sense of school belonging (Anderman, 1999), low efficacy, and poor confidence when facing challenges (Midgley et al., 1998).

Research on Achievement Goal Theory and goal orientation has found students are likely to adopt the goal orientation of their classroom. Thus, if a teacher employs more SRL promoting practices – students are more likely to adopt mastery goal orientations (Anderman & Anderman, 1999). If teachers promote the correctness of answers and peer competition, students will most likely adopt an ability goal orientation. Therefore when examining the transition from elementary school to middle school, researchers have found classrooms in middle school are more likely to promote performance goals compared to elementary schools where the focus is more on mastery goals (Anderman, 1999; Anderman & Anderman, 1999; Boekaerts et al., 2000; Midgley et al., 1998).

Stage Environment Fit is another theory that has been used to explain potential declines in learners' motivation and academic achievement during the upper elementary grades. Stage Environment Fit theory describes the relationship between characteristics of individuals and the characteristics of their social environments (Booth & Gerard, 2014; Eccles et al., 1993; Eccles & Midgley, 1990). In a learning context, this theory examines the fit between the individuals' developmental needs to optimize their learning and the demands or opportunities provided to them by their classroom environment. If there is a lack of fit between these two, there can be negative consequences for students including a decrease in self-confidence and efficacy in school, and an increase in problem behaviours (Eccles et al., 1993; Zimmer-Gembeck et al., 2006). Thus, a poor fit could explain the decline in motivation and academic achievement after the transition from elementary school to middle school.

In fact, a meta-analysis of Stage Environment Fit research by Eccles and colleagues (1993) supports this conclusion. They find the differences in classroom instruction and demands on students from elementary school to middle school could result in developmentally inappropriate learning environments for middle school students. For example, when compared to elementary school classrooms, middle school classrooms are less autonomy supportive (e.g., giving fewer meaningful choices to students), and use more threatening forms of evaluation (e.g., peer comparisons; Eccles et al., 1993). However, there has been very little research examining differences between early elementary and middle school classrooms' use of SRL promoting practices, and whether differences exist between early elementary and middle school children's engagement in SRL.

Therefore, the purpose of the present study was to extend previous literature by examining whether and how early elementary and middle elementary classrooms differ in their

use of SRL promoting practices. Also, this study examined whether classroom level differences in SRL promoting practices resulted in lower levels of children's engagement in SRL and academic achievement.

Summary and Research Questions

The present study employed a multi-level research design to examine relationships among children's SRL, academic achievement, grade level, and features of classroom contexts. Three main research questions were posed. First, "Does children's SRL predict academic achievement?" Based on previous research (Blair & Razza, 2007; Perry & VandeKamp, 2000; Zimmerman & Schunk, 2011), it was hypothesized that SRL would be a statistically significant and positive predictor of academic achievement.

The second research question was: "Do learners engage in higher levels of SRL in the primary grades (kindergarten to grade 3) compared to the middle grades (e.g. grades 4 through 6)?" In accordance with previous literature (Anderman, 1999; Anderman & Anderman, 1998; Boekaerts et al., 2000; Midgley et al., 1998), it was expected that the grade level will influence the relationship between SR and academic achievement. Specifically, it was expected that students in the primary grades would engage in statistically significantly higher levels of SRL compared to students in the middle grades.

The third research question was: "What are the relationships between features of classroom instruction and children's SRL?" Previous research has demonstrated that the presence or absence of SRL promoting practices (e.g., choices, control over challenge) influence children's engagement in SRL (Perry, 1998; Perry et al., 2006; Perry & VandeKamp, 2000). It was expected that the SRL promoting features would be statistically significant hierarchical predictors of learners' SRL.

Methods

Design

   The present study employed a multi-level research design to investigate associations among elementary students' SRL, academic achievement, and, SR promoting tasks and practices.

Participants

   Participants included 11 elementary school teachers (kindergarten through grade 6; 2 males) and 128 students (66 boys; Mean Age = 7.65 years, SD = 2.44 years). The demographic variables for participating classrooms and children appear in Tables 1 and 2, respectively.

Table 1

Demographic Characteristics of Participating Teachers' Classrooms (N= 11 Classrooms)

Teacher Name	Grade	Total children per class	Total participating children per class	Children with a special needs designation	Children who have an ESL designation	Children from visible minority backgrounds	Classroom SES
Marie	K	15	11	0	0	1	Low-middle
Mattias	3/4	20	17	2	1	5	Low-middle
Rowan	1/2	20	7	3	0	2	Low-middle
Karina	2/3	17	7	4	0		Low-middle
Braeden	5/6	28	9	4	0	2	Low-middle
Danika	K	21	7	1	2	2	Low
Heather	2/3	19	12	4	0	1	Low-middle
Olivia	K	29	7	1	0	1	Low
Cindy	K	29	14	-	-	-	Not reported
Stephanie	K	29	16	0	2	0	Middle-high
Chloe	5/6	24	21	8	0	1	Low

Note. All teacher names are pseudonyms.

Table 2

Demographic Characteristics of Participating Children

Grade	N	Sex		Age	
		Boys	Girls	*M*	*SD*
Junior kindergarten	27	14	13	4.83	.50
Senior kindergarten	28	18	10	5.64	.36
Grade 1	3	2	1	6.62	.49
Grade 2	17	9	8	7.73	.30
Grade 3	12	6	6	8.62	.36
Grade 4	10	5	5	9.64	.29
Grade 5	15	8	7	10.59	.23
Grade 6	16	4	12	11.31	1.01

Measures

Classroom demographic form. Classroom demographic information was collected on a paper and pencil form. Teachers were asked to indicate the number of children in their classroom, and the number of children who were learning English as a second language or who had a special education designation. In addition, teachers were asked to indicate the number of children from visible minority backgrounds and their classroom's socioeconomic status.

Self-Regulation In School Inventory. The Self-Regulation In School Inventory (SRISI; Hutchinson & Perry, under review) is a 27-item teacher-report measure that provides an indirect assessment of students' academic achievement (5 items) and three aspects of SR including emotional regulation (ER; 6 items), SRL (9 items), and socially responsible self-regulation (SRSR; 6 items).

Academic achievement. In this study, teachers provided an overall rating of students' academic achievement using a seven-point Likert scale that corresponded to the Ontario Ministry of Education's achievement benchmarks for the elementary grades.

Self-regulated learning. Also, teachers provided ratings of students' SRL using the nine SRISI items (e.g., "Makes realistic evaluations of his/her performance on a task"). Cronbach's

alpha for the SRL items was computed at .96 (95% CI .95-.97), indicating a high level of internal consistency among the item scores. An average total score of students' SRL was computed by aggregating the nine item scores, and dividing by the number of items.

Classroom Observation Instrument. The Classroom Observation Instrument employed in this study was adapted from Perry (1998) and contains three sections. The first section contains information on the classroom being observed including the date and time of the observation, teacher's name, and the type of activity occurring in the classroom e.g. a writing activity. The second section provides space for the observer to keep a running record of what occurs in the classroom, including teacher and student verbatim speech that occurs during teacher-student and student-student interactions. The third section of the instrument lists examples of how the eight features of classroom contexts identified in previous literature could be employed to support students' SRL. Two researchers reviewed the running records and rated the extent to which each of the eight features of classrooms promoting practices were implemented during lessons to support students' SRL. The researchers employed a three point scale to indicate which ranged from 0 (no evidence of the feature) to 2 (evidence of the feature in providing opportunities and support for SRL). Total scores for the features of contexts ratings could range from 0 (no features of contexts present to support students' SRL) to 16 (all features of contexts present and implemented in ways that support students' SRL). Inter-rater agreement for the observation was computed at 90%, Kappa was .71 ($p < .01$), indicating substantial agreement between raters. An average features of classroom contexts score was computed for each classroom by aggregating the ratings from each classroom observation and dividing by the number of observations.

Procedures

Teacher report and classroom observation data were gathered over the span of approximately two-weeks during February 2015. Demographic information was gathered from participating classroom teachers using a paper and pencil form that was distributed to teachers prior to the classroom observations. My supervisor provided participating teachers with a URL and password to complete an electronic version of the SRISI to measure students' SRL and academic achievement. Participating teachers completed one set of SRISI items for each of the participating students from their classroom.

Results

Results are presented in order of the research questions posed at the outset of the study.

Research question 1: Does children's engagement in SRL predict academic achievement?

The descriptive statistics for the main study variables are presented in Table 3. A multiple regression analysis was employed to examine whether SRL predicted academic achievement while controlling for the statistical effects of the sex variable. As predicted, SRL was a statistically significant and positive predictor of students' academic achievement, $F (2, 125) = 114.1$, $p < .001$, adjusted $R^2 = .64$, corresponding to a very large effect size. Approximately 64% of the variance was accounted for by SRL and sex. This finding is consistent with previous research (Hutchinson, 2013; Perry & VandeKamp, 2000) indicating that SRL predicts students' academic achievement.

Table 3
Descriptive Statistics for the SRL and Academic Achievement Variables (N = 128)

Variable	Mean (*SD*)
SRL	4.55 (1.36)
Academic achievement	4.3 (1.58)

Research question 2: Do learners engage in higher levels of SRL in the primary grades (kindergarten to grade 3) compared to the middle grades (e.g. grades 4 through 6)?

To examine the effect of grade on students' SRL, a new categorical variable called "grade level" was created. Students were designated as being in the "primary grade" category if they were enrolled in either junior kindergarten, senior kindergarten, grade 1, grade 2, or grade 3. Students were designated as being in the "middle grade" category if they were enrolled in either grade 4, grade 5, or grade 6. Results of a one-way ANOVA demonstrated that grade level did not have a statistically significant effect on the SRL variable, F (1, 126) = 0.42, ns. Specifically, students in the primary grades (M = 4.61, SD = 1.26) did not have statistically significant higher ratings of SRL compared to students in the middle grades (M = 4.44, SD = 1.58). However, although it did not reach significance, there was a difference observed between ratings of SRL between students in the primary grades and students in the middle grades. Possible reasons why this trend did not reach significance can be found in the discussion section, under the limitations subsection.

Research question 3: What are the relationships between features of classroom instruction and children's SRL?

For this study, two-levels of data were collected so it was deemed appropriate to use multi-level-modelling (MLM) to analyze the third research question "What are the relationships between features of classroom instruction and children's SRL?" which examined the relationship between students' SRL (level 1) and features of classroom contexts (level 2). In this study a series of three MLMs were constructed to examine the relationships between the level 2 variable- SRL promoting practices (i.e., complex tasks, choices, control over challenge, self-evaluation, teacher support, peer support, communities of learners) and the level-1 outcome variable students' SRL as well as the level 1 variable, grade. For the grade variable, the primary grades

(i.e., junior kindergarten, senior kindergarten, grade 1, grade 2, and grade 3) were coded as the reference group (0).The results of the analyses appear below.

Model 1 was the base model which was constructed to decompose the variation in the level 1 outcome variable – students' SRL. To deconstruct the variation in the model, the intraclass correlation coefficient was computed using the following equation: ICC $= \tau_{00} / (\tau_{00} + \sigma^2) = 0.03 / (0.03 + 1.84) = .02$, indicating that for this sample, only 2% of variability in students' SRL is at the classroom level and 98% was at the individual level. Results of model 1 indicated statistically significant variability in the means of SRL across classrooms, $\chi^2 = 12.99$, $df = 10$, $p < .001$. Model 2 was constructed to determine whether classroom level SRL promoting practices (grand mean centered) predicted the outcome variable, students' SRL. Results demonstrated that the model was not statistically significant, $\chi^2 =$, $df = 10$, ns, indicating that the level 2 predictor of SRL promoting practices were not statistically significant predictors of students' SRL. Model 3 was constructed to determine whether the level 1 variable grade (grand mean centered) could predict students' SRL. Results demonstrated that model 3 was not statistically significant, $\chi^2 = 12.84$, $df = 10$, ns. In other words, the SRL promoting practices were not statistically significant hierarchical predictors of the level 1 variable, students' SRL even when controlling for the statistical effects of the level 1 variable grade.

Discussion

The purpose of the present study was to examine the relationships between teachers' implementation of SRL promoting practices and elementary school students' SRL and academic achievement. In general, the findings of the current study indicate that children's SRL is a statistically significant predictor of their academic achievement. However, significant differences

between primary and middle grade students' SRL, and hierarchical relationships between the learners' SRL and features of classroom contexts, were not supported.

The first research question "Does children's engagement in SRL predict academic achievement?" demonstrated that SRL predicted academic achievement, and supported the hypothesis that students' SRL is a statistically reliable predictor of learners' academic achievement. These findings corroborate previous research indicating that learners' engagement in metacognition, motivation for learning, and strategic action is associated with higher levels of academic engagement and academic achievement (Howse et al., 2003; Zimmerman & Schunk, 2011).

These findings have implications for teachers and students. Teachers who design lessons to target students' engagement in metacognition, motivation for learning, and strategic action can support learners' development of and engagement in adaptive and effective patterns of learning in school. This seems especially important for learners who may be "at-risk" in their development of SRL. Teachers may target these processes by employing features of classroom instruction that can provide opportunities to increase these students' SRL and in turn their academic achievement (Diamond & Lee, 2011; Woolfolk & Perry, 2013). Furthermore, students who realize the benefits of SRL, especially concerning their grades, may be willing to learn some strategic forms of learning, or reflect metacognitively on their SRL (e.g. their strengths and weaknesses as learners). In addition to academic achievement, self-regulating learners tend to experience other academic benefits including the development of an internal locus of control (Paris & Newman, 1990; Perry & VandeKamp, 2000), an incremental view of ability – believing that errors are an inherent part of the learning process (Dweck, 2008; Hutchinson, 2013), and have a higher efficacy for learning (Perry & VandeKamp, 2000).

The second research question was "Do learners engage in higher levels of SRL in the primary grades (kindergarten to grade 3) compared to the middle grades (e.g. grades 4 through 6)?" These findings did not confirm the hypothesis that SRL would be higher during the primary grades compared to the middle grades. A possible explanation for this finding is the difference in the number of students in the "primary grade" category compared to the students in the "middle grade" category. Due the large difference between these two groups, it is possible that the analysis did not achieve adequate power in order to find a statistically significant difference in SRL between students in the primary grades compared to students in the middle grades. Based on research on Achievement Goal Theory (Anderman & Anderman, 1999; Boekaerts et al., 2000; Midgley et al., 1998) and Stage Environment Fit theory (Booth & Gerard, 2014; Eccles et al., 1993; Zimmer-Gembeck et al., 2006), it was expected that students' motivation and academic achievement would be higher in the early elementary grades compared to the middle elementary grades. Theories and research have provided support demonstrating that when students transition from the early elementary to middle grades of school, features of classroom contexts change such that there is a decrease in the frequency of instrumental teacher support and autonomy provided to students during the middle years (Anderman, 1999; Midgley et al., 1998). Although the findings of this study could not confirm this relationship, it is critical that studies continue to document declines in learners' SRL and its association with features of classroom contexts.

The third research question was "What are the relationships between features of classroom instruction and children's SRL?" In addition, the third hypothesis that the eight features of classroom instruction were hierarchical predictors of children's SRL did not receive support. This finding is inconsistent with previous research by Hutchinson (2013), who studied three conceptually distinct aspects of SR, including ER, SRL, and SRSR and found that the

features of classroom contexts, particularly complex tasks, teacher support and participation in a

community of learners were statistically significant hierarchical predictors of students' SR. An

explanation for the findings in the current study is that of the sample size and sample

characteristics. In particular, the number of participating classrooms limited the power available

to examine these hierarchical relationships. Hutchinson's (2013) study included 20 classrooms

and 208 students with a narrower grade range from kindergarten to grade 2. Perhaps due to the

large grade range of the present study (e.g., kindergarten through grade 6) and the lower number

of students and classrooms, the third hypothesis failed to reach statistical significance.

Implications

Results of this study have implications for educators, policy makers, and researchers. The

findings reported in this study demonstrate the need for educators to have education and support

in promoting SRL in their classrooms. Teacher education and professional development should

focus on understanding how teachers can use academic tasks and instructional practices known

to support students' SRL. For example, this could include the incorporation of SRL promoting

practices into the curriculum for student-teachers, or SRL workshops and learning teams for

practicing teachers (Perry et al., 2006; Perry et al., 2015).

In addition, more educational policies need to be created to support teachers to integrate

these SRL promoting practices into their teaching repertoire. For example, policy makers could

provide funding to support teachers' ongoing development of SRL promoting practices. Finally,

the results of the present study demonstrate the importance of continued research into SR and

SRL.

Limitations and Directions for Future Research

In addition to the limitations mentioned previously three more should be acknowledged, particularly the sample size and sample characteristics of the present study. First, the sample size of the present study could have been greater. In total there were 128 students, however with the second hypothesis in mind, it would have been beneficial for a larger sample size to account for such a diverse age range. To elaborate, classrooms in the present study consisted of students from junior kindergarten through grade 6 and the sample size for the primary grades ($n = 87$) and middle grades ($n = 41$) was unequal. This means approximately 70% of our participants were allocated to the primary category, which may have impacted the results. In addition to the number of students, it is possible that the grade range of students in the present study could be considered a limitation as well.

Previous research by Midgley and colleagues (1998) examined the differences in goal achievement between students in grade 6 and 8, where they considered the grade 6 students as their elementary school sample and their grade 8 students to representative of middle school students. In examining the grade level differences in Stage Environment Fit theory, Booth and Gerard (2014) grouped their sample of grades 7 and 8 to represent an elementary school sample and considered responses from students in grades 9 to 10 to be representative of middle school students. Other researchers (Gutman & Eccles, 2007; Zimmer-Gembeck et al., 2006) had greater age ranges, including high school students and post graduate students into their research about grade level differences. Therefore, based on this previous research, it is reasonable to conclude that if there had been a larger sample size and grade range with an equal number students grouped into the "primary grade" and "middle grade" categories, the second hypothesis that students in the primary grade level are higher in SRL than middle grade students would have been supported.

A second limitation of the current study was the number of classrooms that were available to examine the hierarchical relationships between students' SRL and the features of classroom contexts. Previous research has found that complex tasks, teacher support, and participation in a community of learners are hierarchical predictors of students' SRL. However, Hutchinson (2013) had 19 classrooms in her study compared to the 11 classrooms in the present study. Perhaps if the present study had collected data in additional classrooms on educators' teaching practices, the third hypothesis would have received support.

A third limitation of the current study is the sociodemographic characteristics of the sample. In particular, student participants were predominantly Caucasian with few visible minorities. Findings from this study may not generalize to students and teachers in other regions of Canada with greater multicultural diversity.

With these limitations in mind, the suggestion for future research, specifically surrounding the relationship between grade level and contexts to promote SRL, is to examine a greater age range. Previous literature has indicated that, particularly in college and university age students (Cohen, 2012), there does not seem to be an age limit in which SRL cannot be practiced or improved. Although it is better to target SRL training to younger populations, it may be beneficial to do more research on high school students, university or college students, or even how to promote SRL development in our work force. In addition, another suggestion for future research is to expand study techniques to include multiple data sources to corroborate findings (e.g., observations, longitudinal methods). It is worthwhile to consider the use of multiple methods to provide a holistic view of students' learning.

Conclusions

In sum, the current study sought to replicate findings of previous research and contribute to psychology research by supporting Hutchinson (2013)'s findings that specific teaching practices are hierarchical predictors of students' SRL. However, the current study has brought to light the importance of a larger sample size with a greater number of students and participating classrooms. In addition, an important contribution of the present study was confirming that learners' engagement in SRL supports learning and success in school.

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