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The role of self-regulated strategies and goal orientation in predicting achievement of elementary school children

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Abstract

The present study examined the predictiveness of self-regulated learning strategies and goal orientation of elementary students' academic achievement. Eighty one (n = 81) fifth graders were asked to respond to two scales. It was hypothesized that student achievement would be predicted by prior achievement, use of self-regulation strategies, and goal orientation. Results showed that prior achievement and use of self-regulation strategies accounted for a significant amount of variance in students' academic achievement. Overall, goal orientation was not a significant predictor of students' outcomes measures across different subject areas. Areas for future research are explored and implications for school personnel are provided.

Keywords: Self Regulation, Motivation, Achievement, Elementary Students

Introduction

From a general perspective, metacognitive and self-regulatory strategies can have a major influence on a students' achievement. In fact, the role of

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self-regulation and goal orientation on elementary student achievement has been identified recently within the research literature in various subject areas (Fuchs, Fuchs, Prentice, Burch, Hamlett, Owen, & Schroeter, 2003; Glaser, & Brunstein, 2007; Howse, Lange, Farron, & Barron, 2003; Patrick, Ryan, & Kaplan, 2007; Pintrich, 2000; Torrance, Fidalgo, & Garcia 2007). Self-regulation refers to the degree to which students are metacognitively, motivationally, and behaviourally active participants in their own learning process (Zimmerman, 1989). Students who are self-regulated learners are partially distinguished from non-self-regulated learners because they set mastery oriented goals rather than performance goals and utilize and differentiate effective versus ineffective self-regulated learning strategies to accomplish these goals. A mastery goal focuses on learning a task, improvement, and increased understanding whereas a performance goal focuses on competence or ability and how it compares to the ability of others (Middleton & Midgley, 1997; Midgley & Urdan, 2001).

Both self-regulation and motivation are highly influenced by prior achievement experiences (Zimmerman & Schunk, 2008). For example, a student who has consistently done well in mathematics will more likely have more adaptive goal oriented cognitions and self-regulatory behaviours in the future than a student who has previously not done well in mathematics. However, relatively few studies have examined how prior achievement influences self-regulation and motivation in elementary-aged children (DiPerna, Volpe, & Elliott, 2005). Therefore, the scope of this study is to examine the extent to which prior achievement, mastery and performance goal orientation, and self-regulated learning strategies can predict academic performance of elementary students in language arts, math, science, and social studies in both the classroom (e.g., grade point average) and on a federally mandated standardized test.

Research on prior achievement (e.g., previous grade point average), with primarily high school and college students, shows that it is positively linked to student self-regulated learning strategy use and achievement in the classroom (DeBerard, Spielmans & Julka, 2004; Garavalia & Gredler, 2002; Kitsantas, 2002). However, there is a study with elementary students Kindergarten through sixth grade that tested a model of how different academic enablers such as prior achievement, motivation, and study skills influenced elementary student reading and language arts achievement (DiPerna et al., 2005). Elementary students were split into two groups for analysis: primary (grades K-2, n = 192) and intermediate (grades 3-6, n = 202) and then rated by their homeroom teachers based on the different academic enablers examined. Findings showed that prior achievement influenced a string of variables including motivation and study skills, which in turn influenced academic achievement.

Additionally, other research suggests that prior academic performance and having a mastery goal orientation is positively related to self-regulated learning strategies for elementary (DiPerna, Volpe, & Elliott, 2005; Meece

& Miller, 2001) high school (Sungur, 2007) and college students (Howell & Watson, 2007; Somuncuoglu & Yildirim, 1999). However, there is little empirical evidence documenting the relationship between how prior academic performance, goal orientation, and self-regulated learning strategies may be related to the current achievement across multiple academic domains in elementary school students. We believe studying these concepts in younger populations is critical to promoting effective learning and teaching self-regulated learning strategies earlier on that may increase the chances for positive beliefs and study habits in the future.

In addition to prior achievement, research shows that goal orientation also influences a student's use of self-regulated learning strategies, their ability to self-regulate their learning, and academic achievement (Alao & Guthrie, 1999; Somuncuoglu & Yildirim, 1999). More specifically, mastery goal-oriented students strive to gain understanding of a concept, whereas performance oriented students aim to outperform their peers and display their competence (Ames, 1992). Mastery oriented students have been found to exhibit higher levels of effort and persistence, are more likely to engage in challenging tasks, and use more effective cognitive and self-regulated learning strategies while performance orientated students are found to engage in less achievement-supporting behaviours and strategies (Middleton & Midgley, 1997; Zimmerman & Schunk, 2008). Further, mastery-oriented students are more likely to have adaptive attributions for academic successes and failures while performance orientated students are more likely to have less adaptive attributions that result in less adaptive behaviours such as learned helplessness (Pintrich & Schunk, 2002) and academic self-handicapping (Leondari & Gonida, 2007). In fact, Alao and Guthrie (1999) found that mastery goals accounted for 37% of the variance in learning strategy use for a sample of elementary students. This pattern is expected since students who truly want to learn are more likely to use self-regulated learning strategies to help them actually master the material, whereas students who want to display competence would use superficial learning strategies to achieve good grades. Overall, students who are mastery oriented are able to engage in more effective self-regulated learning strategies than students who are performance oriented (Linnenbrink, 2005; Somuncuoglu & Yildirim, 1999).

Furthermore, mastery goal orientation has more adaptive outcomes in terms of achievement, self-regulation, and motivation, while performance goal orientation is more associated with negative outcomes (Broussard & Garrison, 2004; Kaplan & Midgley, 1997). For example, Meece and Miller (2003) sought to examine how the goals of elementary school students changed over the course of two years (3rd to 5th grade). Specifically, Meece and Miller (2003) attempted to understand how different goals changed or remained stable over time in the domain of reading and writing and how these changes influenced their use of self-regulated learning strategies. The researchers found that student adoption of mastery and performance

goals had decreased over time and that changes in mastery goals had explained a significant portion of the changes in self-regulated learning strategies. In other words, adoption of mastery goals were positively related to more effective self-regulatory strategies and were negatively related to the less effective surface level strategies. Other researchers have discovered a higher level of mastery goal orientation is related to greater academic achievement in both younger and older students (Broussard & Garrison, 2004). Therefore, it is critical that students approach learning with a mastery goal orientation to be effectively engage in self-regulated learning.

Student's goal orientation also influences the types of self-regulated learning strategies they use which in turn influences outcomes. To illustrate, Pintrich (2000) explored the association of achievement goals (mastery and performance), various motivation variables (e.g., self-efficacy, task value), affect, and various adaptive and maladaptive self-regulated learning strategies (cognitive and metacognitive) in 150 middle school students. Using a series of scales administered at the beginning and end of their eighth grade, and the beginning of their ninth grade it was discovered that students who assumed more mastery goal orientations had the highest likelihood of using adaptive self-regulated learning strategies and reported higher levels of self-efficacy than performance oriented students. Similarly, Kaplan and Midgley (1997) attempted to examine the extent to which perceived competence impacted the relationship between goal orientation and patterns of adaptive and maladaptive behaviour in middle school students. Their results revealed that mastery goals were positively related to adaptive self-regulated learning strategies while performance goals were positively related to maladaptive self-regulated learning strategies.

A number of research studies also show that a significant link exists between self-regulated learning strategies and performance in elementary school aged children, however, research has yet to thoroughly examine this relationship partially because experts have questioned whether younger children are capable of discussing concepts such as learning or reflecting and reporting different self-regulated strategies (Moschner, Anschuetz, Wernke, & Wagener, 2008). Nevertheless, some studies show that the use of strategies can facilitate learning of academic tasks such as composition and writing (Glaser & Brunstein, 2007; Klein, 2000). For example, Klein (2000) sought to understand the different self-regulated learning strategies that children used when writing and which were most effective at helping students not only learn the material, but also to recall, critically analyze, and evaluate ideas. One conclusion drawn from this study was that the self-regulated learning strategies children use when writing to learn are most effective when they are diverse, moderately sophisticated, and domain-specific (Klein, 2000).

Overall, research evidence suggests that students' academic achievement is indeed related to goal orientation and strategy use

(Anderman, Anderman, & Griesinger, 1999; Broussard & Garrison, 2004; Patrick et al., 2007; Stipek & Gralinski, 1996) and self-regulated learning strategies (Fuchs et al, 2003; Glaser & Brunstein, 2007; Patrick et al., 2007; Pintrich, 2000; Torrance, Fidalgo, & Garcia 2007). In particular, mastery oriented students tend to achieve at higher levels academically than performance oriented students (Broussard & Garrison, 2004; Kaplan & Midgley, 1997) in both high school and elementary school settings (Broussard & Garrison, 2004). More research is needed however to: (a) examine the predictiveness of prior achievement, self-regulated learning strategies, and goal orientation across multiple subject domains in young elementary aged children; and to (b) examine these domains collectively instead of independently to gain a better understanding how socio-cognitive processes and achievement can differ across subjects.

The purpose of the current study is to examine how prior achievement and self-regulation processes contribute to fifth and third grade students' GPA and standardized test scores. It is hypothesized that student achievement would be significantly predicted by prior achievement, use of self-regulated strategies, and a mastery goal orientation. It is also expected that prior achievement, followed by use of self-regulatory strategies, and mastery goal orientation would explain a significant amount of variance in students' academic achievement in language arts, math, social studies, and science as well as a mandated standardized test. On the other hand, a performance goal orientation is not expected to significantly predict future achievement in any of the four subject areas or the standardize test.

Methods

Participants

Eighty-one (n = 81) fifth graders in a public elementary school participated in the study. The ethnic compositions of the participants were: 74% White, 8% African American, 8% Latino, 8% Asian, and 2% percent other. The students' ages ranged from nine to 11 years with a mean age of 10 years. There were 41 males and 40 females. The percentage of students who received free and reduced lunch was approximately 10%. The fifth graders were selected because SOL tests are a major focus in the curriculum (see definition below). All the fifth grade students enrolled in one elementary school were selected to participate.

Measures

Personal data questionnaire. This brief questionnaire was developed to obtain information regarding the participants' age, gender, grade in school and teachers' name.

The Motivated Strategies for Learning Questionnaire (MSLQ). The MSLQ is an 81-item, self-report measure that utilizes a 7-point Likert scale (1 "not at all true of me", and 7 "very true of me") to evaluate student motivation and application of self-regulated learning strategies by college students.

The MSLQ is comprised of two scales: the Motivation Scale and the Learning Strategy Scale. This study only utilized the second Learning Strategy Scale to examine the different learning strategies that students engaged in. The Learning Strategy Scale is comprised of 50 items. The subscale regarding students' use of cognitive and metacognitive strategies was used in this study. Sample items include: "I ask myself questions to make sure I understand the material, I have been studying in this class", and "During class time I often miss important points because I think of other things". The MSLQ is a reliable, valid, efficient, and convenient measure for various types of research (Duncan & McKeachie, 2005). Strong and significant coefficient alphas range from .62 to .93 for the first motivational scale and from .52 to .80 for the second learning strategy scale (Duncan & McKeachie, 2005). For the purposes of this study, we modified the language slightly on the MSLQ to be more appropriate for fifth graders. For instance, we substituted the word *class* for the word *course*. The reliability of the data for this specific sample indicated strong internal consistency with an α =.81.

*The Patterns for Adaptive Learning Scale (PALS).*The Patterns for Adaptive Learning Scale, developed by Midgley, Kaplan, Middleton, Maehr, Urdan, Anderman, Anderman, and Roeser (1998), assesses motivation by using achievement goal theory as a theoretical framework. The PALS scale includes both teacher and student measures and uses a five point Likert scale (1 "Not at all true," and 5 "Very true") to assess levels of mastery and performance goal orientations (Midgley et al., 1998). This study used the revised student scales that measure mastery and performance approach goal orientation. The mastery goal orientation measure is composed of five items (e.g. "It is important to me that I improve my skills this year") and the performance approach goal orientation measure is also composed of five items (e.g., "One of my goals is to show others that class work is easy for me.").

Various studies indicate that the PALS scale demonstrates high concurrent, construct, and discriminant validity (Midgley et al., 1998). Additionally, this scale is an effective tool for measuring across populations with different genders and ethnicities as well as a wide range of grade levels (Midgley et al., 1998). The significant coefficient alphas from this current sample are as follows: mastery goal orientation (k = 5, α = .79); performance-approach goal orientation (k = 5, α = .87); performance-avoidance goal orientation (k = 4, α = .70); academic self-efficacy (k = 5, α = .75); and academic self-handicapping (k = 6, α = .86).

Achievement. Achievement was assessed in three different ways. First, student grade point averages (GPA) in Language Arts, Math, Science, and Social Studies were extracted from their records. Second, student scores on the SOLs at the third grade level were collected to examine achievement. Finally, SOL scores were collected again at the student's fifth grade level to examine any changes or influences on longitudinal achievement.

The Standards of Learning (SOLs) for Virginia Public Schools were formed by the Virginia Department of Education (VDOE) to meet the mandate of the No Child Left Behind Act (NCLB). These standards describe the commonwealth's expectations for student learning and achievement in grades K-12 and represent a broad consensus of what parents, classroom teachers, school administrators, academics, business, and community leaders believe students should have mastered by their respective grade levels. A curriculum framework is provided to schools that details the specific knowledge and skills students must possess in order to meet the standards for these subjects. Then the SOLs are administered to all students across the state at grades three, five, and eight, and eleven to assess if schools have met the standards in the four core areas of language arts, mathematics, science, and history/social science (VDOE, n.d.). The school in the current study was above average in academic selectivity for all categories: the previous year's mandated standardized test scores SOL scores for fifth graders were: Language Arts 87.9%, Math 79.3%, Social Studies 91%, Science 91.2%, and Writing 100%.

Procedures

Four fifth grade classes from a public elementary school were asked to participate in the study. Eighty five (85%) of the students returned parental consents and therefore were permitted to take the surveys that assessed their goal orientation and learning strategies. All surveys were administered during class in two different sessions. One of the researchers collected the SOL scores from the participants' records across all the core subject areas at grade three and then later at grades five for analysis.

Results

Preliminary analyses using independent t-tests in regards to gender differences revealed that no significant differences in any of the variables included in this present study. The means and the standard deviations for all variables are presented in Table 1. Correlations are also presented in Table 2. Significant relationships emerged between the self-regulation and motivation variables and achievement measures. Specifically, self-regulated learning strategies and a mastery goal orientation were found to be moderately related to all the GPA measures (r = .29 - .43, p < .05), but not to prior or future SOL performance. In terms of fifth grade performance on the SOLs, self-regulated learning strategies and a mastery goal orientation were related to mathematics performance (r = .22 and .23 respectively, p < .05) and only self-regulated learning strategies were related to language arts (r = .22, p < .05) and science (r = .26, p < .05) performance. Third grade SOL scores were not related to the use of self-regulated learning strategies or mastery goal orientation. The only significant relationship that emerged was between performance goal orientation and third grade science SOL achievement (r = .37, p < .05).

Table 1. Descriptive statistics of all variables examined in this study

Variable	Mean	Standard Deviation
Age	10.5	.52
Self-Regulated Strategies	3.75	.74
Mastery Goal Orientation	4.23	.93
Performance Goal Orientation	2.82	1.12
GPA		
Language Arts	3.77	.42
Math	3.49	.62
Science	3.48	.65
Social Studies	3.70	.48
5th Grade SOL		
Math	482.67	58.79
Science	487.53	49.96
Social Studies	458.74	42.42
3rd Grade SOL		
Language Arts	458.70	47.75
Math	520.73	48.68
Science	481.32	55.13
Social Studies	467.70	51.18

Table 2. Correlations among MSLQ subscales, PALs subscales, GPA and SOLs

Variables	Self-Regulated Learning Strategies	Mastery goal Orientation	Performance Goal Orientation
GPA			
Language arts	.33**	.43***	.06
Math	.33**	.36***	-.09
Science	.31*	.40***	.04
Social Studies	.29*	.40***	-.04
5th Grade SOL			
Language Arts	.22*	.20	.15
Math	.22*	.23*	.15
Science	.26*	.10	.21
Social Studies	.11	.10	.16
3rd Grade SOL			
Language Arts	.21	.21	-.04
Math	.20	.06	-.01
Science	.11	.14	.37*
Social Studies	.01	.04	.19

* $p < .05$; ** $p < .01$; *** $p < .001$

In order to determine the effectiveness of the various measures in predicting academic performance, linear hierarchical regressions were employed to estimate how much of the students' GPA and SOL variance was accounted for by each of the clusters of variables separately and together. Four regression models were formulated predicting GPA and performance on state mandated tests for each of the four subject areas: language arts, math, science, and social studies. In the first model, students' third grade scores on a language arts state achievement test were entered first, followed by their goal orientations, then use of self-regulatory learning strategies to predict their fifth grade achievement in language arts, see Table 3.

The results revealed that students' prior academic performance accounted for 21% variance of student's GPA in language arts, R^2 = .21, $F(1, 35) = 9.23$, $p < .01$. When the mastery and performance-approach orientations were added to the model, a significant change was detected in the accounted variance R^2 = .27, $F(3, 33) = 4.06$, $p < .05$. The self-regulated learning strategies variable also significantly contributed to the accounted variance in students' GPA, R^2 = .45, $F(4, 32) = 6.40$, $p < .01$. Altogether, these variables explained 45% of the variance in students' GPA in language arts. Similar results were shown for students' achievement in math. Specifically, students' prior academic performance accounted for 27% (R^2 = .27, $F(1, 35) = 12.67$, $p < .001$) variance of student's GPA in math whereas goal orientations added an additional four percent (R^2 = .31, $F(3, 33) = 4.96$, $p < .01$) and self-regulated learning strategies added an additional 14% (R^2 = .45, $F(4, 32) = 6.63$, $p < .01$). In regards to social studies and science the results showed that the only significant predictor of students' performance in these areas was the use of self-regulated learning strategies which explained 43% and 36% of the variance in student's GPA, (R^2 = .43, $F(4, 32) = 6.06$, $p < .01$, R^2 = .36, $F(4, 32) = 4.53$, $p < .01$), respectively.

In terms of predicting student performance on the Standards of Learning (SOL) state mandated tests, regression models were assessed. Specifically, prior achievement was entered as the first step while goal orientation and self-regulated learning strategies were entered as the second and third step, respectively. This was done to take into account the theoretical notion that motivation and self-regulation are related in a cyclical manner, in that prior achievement experiences influence the type of goal orientation that students adopt which is turn is related to the type of self-regulated strategies that students engage in while learning.

The results revealed that students' prior academic performance as measured by third grade SOLs accounted for 27% variance of student's SOL scores in language arts, R^2 = .27, $F(1, 35) = 12.59$, $p < .001$. When the mastery and performance-approach variables were added to the model, a significant change was detected in the accounted variance R^2 = .41, $F(3, 33) = 7.73$, $p < .001$. The use of self-regulated learning strategies also

significantly contributed to the accounted variance by 5% (R^2 = .46, F = .68, p < .01).

Table 3. Hierarchical regression analyses predicting GPA in across subject areas

Variable	*SC*	*t*	*p*	R^2
Language Arts GPA				
A. 3rd Grade Language Arts SOL	.46	3.04	.004	.21**
B. Goal Orientation				.27*
Mastery Goal Orientation	.24	.155	.13	
Performance Goal Orientation	.09	.60	.55	
C. Self-Regulated Strategies	.46	3.18	.003	.45**
Math GPA				
A. 3rd Grade Math SOL	.51	3.56	.001	.27***
B. Goal Orientation				.31
Mastery Goal Orientation	.19	1.31	.20	
Performance Goal Orientation	-.09	-.64	.53	
C. Self-Regulated Strategies	.42	2.89	.007	.45**
Social Studies GPA				
A. 3rd Grade Social Studies SOL	.19	1.15	.26	.04
B. Goal Orientation				.20
Mastery Goal Orientation	.39	2.52	.02	
Performance Goal Orientation	-.10	-.63	.54	
C. Self-Regulated Strategies	.52	3.59	.001	.43***
Science GPA				
A. 3rd Grade Science SOL	.24	1.46	.15	.06
B. Goal Orientation				.21
Mastery Goal Orientation	.38	2.43	.02	
Performance Goal Orientation	.10	.61	.55	
C. Self-Regulated Strategies	.43	2.80	.009	.36**

* p < .05; ** p < .01; *** p < .001

Together, 46% of the variance in students' academic achievement was accounted for by the prior experience, goal orientations, and use of learning strategies variables. Similar results were shown for students' achievement on standardized testing in math and science. Specifically, students' prior academic performance accounted for 35% (R^2 = .35, F(1, 35) = 18.48, p < .001) variance of student's GPA in math whereas performance-approach and mastery goal orientations added an additional two percent (R^2 = .37, F(3, 33) = 6.39 p < .01) and use of self-regulated learning strategies added an additional five percent (R^2 = .42, F(4, 32) = 6.39 p < .01). For social studies the results showed that the only significant predictor of students' performance in these areas was students' prior performance, (R^2 = .29, F(1, 28) = 11.23, p < .01). Finally, with regards to science 36% (R^2 = .36, F(1, 35)

= 20.05, p <.001) of the variance of student's GPA was explained by prior performance on SOLs. A significance change was detected in the accounted variance when the performance-approach and mastery goal orientations variable was added to the model, R^2 = .40, $F(3, 33) = 7.46$ $p < .01$. Self-regulatory strategy use significantly added an additional nine percent, (R^2 = .49, $F(4, 32) = 7.54$ $p < .001$), see Table 4.

Table 4. Hierarchical regression analyses predicting standards of learning scores across subject areas

Variable	*SC*□	*t*	*p*	R^2
Language Arts SOL				
A. 3rd Grade Language Arts SOL	.51	3.55	.001	.27***
B. Goal Orientation				.41***
Mastery Goal Orientation	.23	1.61	.12	
Performance Goal Orientation	.32	2.42	.02	
C. Self-Regulated Strategies	.23	1.57	.13	.46
Math SOL				
A. 3rd Grade Math SOL	.59	4.30	.001	.35***
B. Goal Orientation				.37**
Mastery Goal Orientation	.10	.70	.49	
Performance Goal Orientation	.11	.82	.42	
C. Self-Regulated Strategies	.26	1.74	.09	.42
Social Studies SOL				
A. 3rd Grade Social Studies SOL	.54	3.35	.002	.29**
B. Goal Orientation				.30
Mastery Goal Orientation	.13	.79	.44	
Performance Goal Orientation	-.04	-.22	.83	
C. Self-Regulated Strategies	-.07	-.38	.71	.31
Science SOL				
A. 3rd Grade Science SOL	.60	4.48	.001	.36***
B. Goal Orientation				.40**
Mastery Goal Orientation	.17	1.23	.23	
Performance Goal Orientation	.13	.90	.37	
C. Self-Regulated Strategies	.31	2.25	.03	.49*

* p < .05; ** p < .01; *** p < .001

Discussion

In the present study it was expected that prior achievement, followed by use of self-regulatory strategies, and mastery goal orientation would explain a significant amount of variance in students' GPA and Standards of Learning in language arts, math, social studies, and science. To examine these hypotheses, hierarchical regressions were performed to identify how

prior performance (e.g., 3rd grade SOL performance), goal orientation (e.g., mastery and performance goal orientation), and self-regulation (e.g., learning strategies) could predict both student GPA and fifth grade SOL performance in the four main subject areas (e.g. language arts, mathematics, social studies, and science).

Overall, the results in this study revealed that prior achievement on the standardized tests along with self-regulatory strategies accounted for most of the variance in student GPA and current SOL scores in math, science, and language arts (with the exception of social studies). However, contrary to our hypotheses, mastery goal orientation did not significantly predict student achievement. In terms of GPA, goal orientation did not predict GPA in either language arts or mathematics, but it significantly predicted GPA in social studies and science. However, prior performance predicted GPA in language arts and mathematics, but not for social studies or science. The only variable that consistently predicted GPA across all subject areas was self-regulated strategies. This finding is consistent with previous research which has also found a similar relationship (Fuchs et al., 2003; Glaser & Brunstein, 2007; Torrence et al., 2007). This finding suggests that developing effective self-regulated strategies is important for students to be successful across all academic domains. However, the relationship is different when SOL test scores are examined. Specifically, strategies significantly predicted science and mathematics test scores, but not language arts and social studies. This may be due to the developmental nature of mathematics and language arts, where prior performance may significantly impact present and future performance. For example, reading requires a set of skills (e.g., pronunciation, word knowledge) that are developed from the previous level. However, knowledge of the American Indians learned in the third grade does not necessarily need to be used to learn about the Civil War in fifth grade.

Surprisingly, mastery goal orientation was not a significant predictor of SOL scores in any of the four subjects. In fact, contrary to hypotheses, performance goal orientation significantly predicted SOL performance in language arts. This may be a result of standardized testing, where the focus is more on the outcomes and performance rather than mastering the content. In terms of GPA, however, mastery goal orientation was significantly correlated to student GPA across all subject areas, but not with SOL scores with the exception of fifth grade math SOL scores. Additionally, the use of self-regulated strategies only significantly predicted student performance in the areas of mathematics and science. These results suggest that goal orientation and self-regulated strategies are better predictors for student GPA than SOL scores.

Prior achievement plays different roles across different subject areas when predicting student GPA. However, when predicting SOL test scores, prior performance becomes a more consistent predictor of achievement across different subject areas. This is an expected pattern because of the

identical instruments used to measure and predict achievement (e.g., past SOL test scores used to predict current SOL test scores). However, it is interesting that prior performance only contributes a significant amount of variance to language arts and mathematics, but not to social studies or science. This indicates that prior performance may be an important aspect for teachers to consider for particular subject areas. However, this may also be as a result of the No Child Left Behind Act, where there are serious consequences for schools if students do not reach a proficient level in the specific areas of language and mathematics. We suspect therefore, that the math and language arts curriculum may be more strictly aligned with the state mandated benchmarks, whereas the social studies and science curriculum are given more flexibility in terms of classroom teaching methods and the curriculum.

Research evidence in the current study did not support the hypothesis that mastery goal orientation would significantly predict student GPA and SOL performance. Specifically, in terms of GPA, mastery goal orientation did significantly predict both achievement in social studies and science, but not for language arts or mathematics. In fact, contrary to hypotheses, performance goal orientation significantly predicted SOL performance in language arts. Surprisingly, mastery goal orientation was not found to contribute a significant amount of variance to achievement in any of the SOL subject areas. This pattern is not very surprising considering the nature of the state mandated SOL test, which has been argued that it unintentionally promotes competition among schools and states to outperform each other (Hunter & Bartee, 2003). Furthermore, other researchers, Stipek and Gralinski (1996) have discovered that mastery goal orientation was not as influential in achievement outcomes such as GPA and standardized test scores as children's beliefs about intelligence and performance. We found similar results with Stipek and Gralinski's study. Mastery goal orientation did not predict achievement whereas prior achievement along with self-regulation predicted achievement over and above mastery goal orientation. The research linking mastery goal orientation with achievement is inconsistent (i.e. in some cases being associated with adaptive behaviours and in other cases correlating with maladaptive behaviours) (Kaplan & Midgley, 1997; Linnenbrink, 2005).

Overall, the findings of the present study compliment previous findings revealing the positive impact of self-regulation and goal orientation on elementary students' achievement (Fuchs et al., 2003; Glaser & Brunstein, 2007; Howse et al., 2003; Patrick et al., 2007; Pintrich, 2000; Torrance, Fidalgo, & Garcia 2007). In particular, research shows mastery goal orientations are related to more adaptive patterns of learning than are performance goal orientations (Anderman & Anderman, 1999; Ames, 1992; Kaplan & Midgley, 1997; Midgley & Urdan, 2001). Prior research with high school and college students indicates that when teachers focus on improvement, effort, and learning for intrinsic reasons,

students focus on mastery oriented goals. On the other hand, when teachers focus on grades, ability differences, and outperforming others, students are likely to focus on performance oriented goals. One of the unique characteristics of this study is that prior achievement, goal orientation, and self-regulated learning strategies were examined across the four main domains of school.

The limitations in the current study include the fact that all of the data were self reported. Additionally, the sample size was small and not ethnically or socio-economically diverse in that there was not much variation in the participant pool, with 74% of the students being White and less than 10% of the total participant pool receiving free and/or reduced lunch. Also, the school was above average in academic selectivity and the assumption is that these students overall are typically more academically inclined, despite the learning expectations. Therefore, based on the limited research with elementary students and self-regulation and goal orientation, future research could include more studies that examine the relationship between motivational and self-regulatory factors and elementary-aged student achievement. Furthermore, future inquiry could be conducted to explore and develop other more reliable measures of motivation and self-regulation.

Implications for School Personnel

There are important implications for teachers, school psychologists and administrators despite the mixed results in the current study. First, we suggest teachers make a concerted effort to lessen the competition of individuals in the classroom and provide more opportunities for students to approach their learning based on their individual skills. Achieving academic success through high GPA and standardized test scores is now as important in elementary school as it is in secondary and post secondary school. Recognizing the contribution that self regulation strategies and prior achievement have on both GPA and standardized test scores, it is beneficial for elementary school teachers to examine both of these variables either through journal publications or professional development workshops and then to include best practices in their pedagogy. For example, teachers can encourage elementary students to be meta-cognizant of their learning strategies and actively involved in identifying and improving their academic behaviour (Zimmerman, 1989) in the classroom.

Additionally, school psychologists can contribute to this mission by including concepts (e.g., self regulation) in psycho-educational interventions they provide for students in small or large group settings. For example, school psychologist often run small group counselling interventions consisting of six to eight students at a time. These group intervention topics vary, but provide adequate opportunity for students to discuss goal settings and successful learning behaviours that contribute to academic achievement. The students can be taught the differences between

mastery and performance goal orientations and encouraged to strive for goal mastery. Focusing these efforts on phenomenon that has been linked to increase overall academic achievement in school may prove to be beneficial.

In a similar vein, school administrators can build on these findings and help faculty and staff (e.g., teachers, school psychologists, teacher assistants) improve their direct instructional methods in the classroom as well as indirect interactions that occur in school by creating and supporting policies that establish a school wide (e.g., systemic) environment that is less focused on competition and more focused on mastery of learning material. In other words, school administrators can promote a learning environment that encourages students to be all that they can be with high expectations for each individual student based on where they are currently functioning.

In summary, the findings of the present study are useful in identifying areas to consider for future research. Furthermore, this line of inquiry may lead to more robust evidence that can be used to influence learning environments for elementary students. Although mastery goal orientation was not found to be predictive of standardized test scores, it was found to be significantly related to GPA. Therefore, teaching elementary students to adapt a mastery goal orientation and engage in self-regulation practice may be important because maladaptive learning strategies can be targeted as early as possible in order to establish a positive foundation for future academic development.

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