ABSTRACT

PATTERSON, ASHLEY S. Monitoring of Text Comprehension within a Self-Regulation Framework: The Effects of Goal Setting. (Under the direction of John Nietfeld).

The current investigation serves as a bridge between previous work in the area of monitoring text comprehension and the more recent emphasis on self-regulated learning (SRL). This study focused on the effects of a self-set achievement goal on sixth grade students' monitoring accuracy. In addition, academic self-efficacy, self-efficacy for reading, and goal orientation were investigated as potential moderators of the relationship between goal setting and monitoring accuracy. Over the course of six weeks, the 100 students in the study completed weekly passage protocols, which included reading a passage on one day and, on the following day, completing multiple choice questions, making confidence judgments, and answering survey questions about self-perceived academic self-efficacy, self-efficacy for reading, and goal orientation. Results of the study supported the non-compensatory achievement goals hypothesis, which suggested that students' abilities to monitor their comprehension of text would be too deficient to be affected by goal setting. Furthermore, neither academic self-efficacy, self-efficacy for reading, nor any goal orientation variable moderated the relationship between goal setting and monitoring accuracy. Implications for this study as well as suggestions for future research are also discussed.

Monitoring of Text Comprehension within a Self-Regulation Framework:
The Effects of Goal Setting

by
Ashley Seaton Patterson

A dissertation submitted to the Graduate Faculty of
North Carolina State University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

Curriculum and Instruction

Raleigh, North Carolina

2008

APPROVED BY:

_____   _____
John Nietfeld, Ph.D.   Hiller Spires, Ph.D.
Chair of Advisory Committee

_____   _____
Lynne Baker-Ward, Ph.D.   Jason Allaire, Ph.D.

Biography

Ashley Seaton Patterson grew up in Richmond, Virginia and, in 2001 graduated from the Governor's School for Government and International Studies. She then attended the University of Virginia and graduated with distinction in 2003 with a Bachelor of Arts in Government. The following fall, she enrolled in graduate school at North Carolina State University where she completed a Master of Liberal Studies degree with an educational policy emphasis in 2005. While taking courses for her masters degree, she discovered her interest in educational psychology, so upon completion of that degree, she immediately began working toward a Ph.D. in Curriculum and Instruction with a concentration in educational psychology.

Table of Contents

List of Tables

List of Figures

Introduction

As Butler and Winne (1995) so succinctly state, "Self-regulated learning (SRL) is a pivot upon which students' achievement turns" (p. 245), and as such, self-regulated learning and self-regulated studying have been clearly articulated as functions of the most efficient and successful learners (Butler & Winne, 1995). While SRL is important to learning in general, a self-regulated approach to reading comprehension is especially necessary as students progress through their formal education and their subsequent careers. Throughout much of formal education and beyond, it is expected that individuals will be able to learn a great deal of new information through reading texts and integrating that with their prior knowledge and experiences. With such expectations, students must be able to actively engage in the reading process and monitor their understanding of the material, a key part of the self-regulated studying process. Simply engaging in the surface level act of reading words on a page is not a sufficient condition for actually learning the material. In many cases, a higher level of interaction with the text is also needed. Therefore, it is important that students are able to monitor the degree to which they comprehend the text through interpreting various sources of internal feedback, and then determine if they are on track to reach the desired comprehension goal or if additional work or adjustments are needed. This reciprocal process is extremely important to successful learning, but it occurs all too infrequently (Borkowski & Thorpe, 1994; Zimmerman, 1998; Miller & Byrnes, 2001).

Although there is an existing body of research investigating monitoring of comprehension (Baker, 1984, 1985; Baker & Brown, 1984; Eme, Puustinen, & Coutelet,

2006; Kinnunen & Vauras, 1995), further work is needed to examine this process within the framework for SRL. An important part of self-regulated learning and self-regulated comprehension is monitoring progress toward self-set goal, and working through a discrepancy reduction process until that goal is achieved. Joseph (2005) notes that this goal setting process is what gives monitoring its meaning and purpose, so students need to actually engage in setting goals for themselves. However, in much of the work that has been conducted emphasis on the initial setting of a goal has often been absent. Calibration studies have looked at the accuracy of perceived comprehension or predicted comprehension scores and have often found far from desirable levels. Nevertheless, it would be useful to examine how calibrated students are when monitoring of their comprehension when they are working toward a self-set goal. As Zimmerman (1994) notes this control on the part of the student is an essential part of the self-regulation equation. It is possible that students will monitor more accurately when they are working toward their own goal because this could also lead to greater motivation on the part of the student, another important attribute of a self-regulated student (Zimmerman, 1994; Zimmerman, 2001). At the same time, the motivation and added buy-in that may result from self-set goals, although important, would not be able to fully compensate for deficient metacognitive awareness, so monitoring may still be poor.

Therefore, the purpose of this study is to examine the effects of self-set goals for comprehension on sixth grade students' ability to monitor their comprehension as evidenced by how calibrated their judgments of their comprehension are. However, before the specifics of the study are presented, a review of background literature will be presented including

theoretical models of SRL, empirical studies of self-efficacy, goals, and monitoring. This overview is followed by an outline of the research questions and hypotheses of this study as well as its methodology.

Review of Literature

Self-Regulated Learning

In recent years, SRL has become prominent research topic in both education and psychology especially since it is often viewed as the ideal standard for how successful learning occurs (Butler & Winne, 1995, Boekaerts, 1997). Although SRL has become a common subject of research, it is also a subject that is very complicated including complex models and an extensive mix of constructs (Boekaerts, 1999). In a very basic description, SRL has been defined as processes through which individuals control their thoughts, feelings, and behaviors toward the achievement of goals set by the individual (Zimmerman, 2001). In his overview of SRL, Zimmerman (1990) summarized self-regulated students as "metacognitively, motivationally, and behaviorally active participants in their own learning" (p.4). As this multi-dimensional conception of a self-regulated learner suggests, SRL involves the synthesis of several significant bodies of research, which makes it difficult to develop a completely well defined description of a self-regulated learner. Nevertheless, Zimmerman's summary of the key facets of a self-regulated learner points to the conclusion that such a person has developed and functions as a learner well beyond the level of most students. Many researchers agree that SRL represents a sort of pinnacle of a learner's development and something toward which all learners should strive (Zimmerman, 1990; Butler & Winne, 1995; Boekaerts, 1999). However, as most researchers are quick to point out, SRL is something that is very late developing in students, and its display varies by

domain (Pressley, 1995; Zimmerman, 1990, Schunk, 2001). In many cases, SRL may only be apparent among domain experts (Pressley, 1995).

What Processes are Involved in SRL?

Despite the great complexity of SRL including the intricate interactions among its component parts, some specific features emerge as absolutely central to SRL (Pressley, 1995; Zimmerman & Schunk, 2001). At a very basic level SRL involves the student setting learning or achievement goals, selecting and utilizing appropriate strategies, and then using internal feedback to assess progress toward the desired goal. Beyond this basic description, several theoretical models have been developed to explain SRL. Although the core definitional components underlie many of these models, each model emphasizes specific facets to varying degrees in addition to providing various explanations for the mechanisms behind SRL (Zimmerman, 2001). Two common conceptions of SRL include information processing and social cognitive models. These two models both contribute to an understanding of this complex process and present valuable considerations for future research despite some important distinctions between them.

Information Processing and Social Cognitive Models of SRL

Social cognitive models of SRL have received significant attention in the research literature and can be traced to contemporary interpretations of Bandura's reciprocal determinism and triadic relationships (see Fig.1). Accordingly, personal, behavioral, and environmental factors are considered as interdependent influences on SRL (Zimmerman,

1989; Zimmerman, 2001; Schunk, 2001). Furthermore, in distinguishing SRL, Zimmerman (1989) notes the importance of a learning strategies, self-efficacy, and goal direction. Each of these elements is influenced by environmental and personal sources before being exhibited in behavior and are incorporated into the three proposed sub-processes of SRL: self-observation, self-judgment, and self-reaction (Zimmerman, 1989; Schunk, 2001). In following these sub-processes, a student would monitor his or her progress, evaluate this progress, and then react based on the evaluation. Overlaid upon that reciprocal relationship is another reciprocal relationship whereby, a student sets goals, evaluates progress towards them, and then reacts in the form of adjusting self-efficacy (Eccles & Wigfield, 2002).
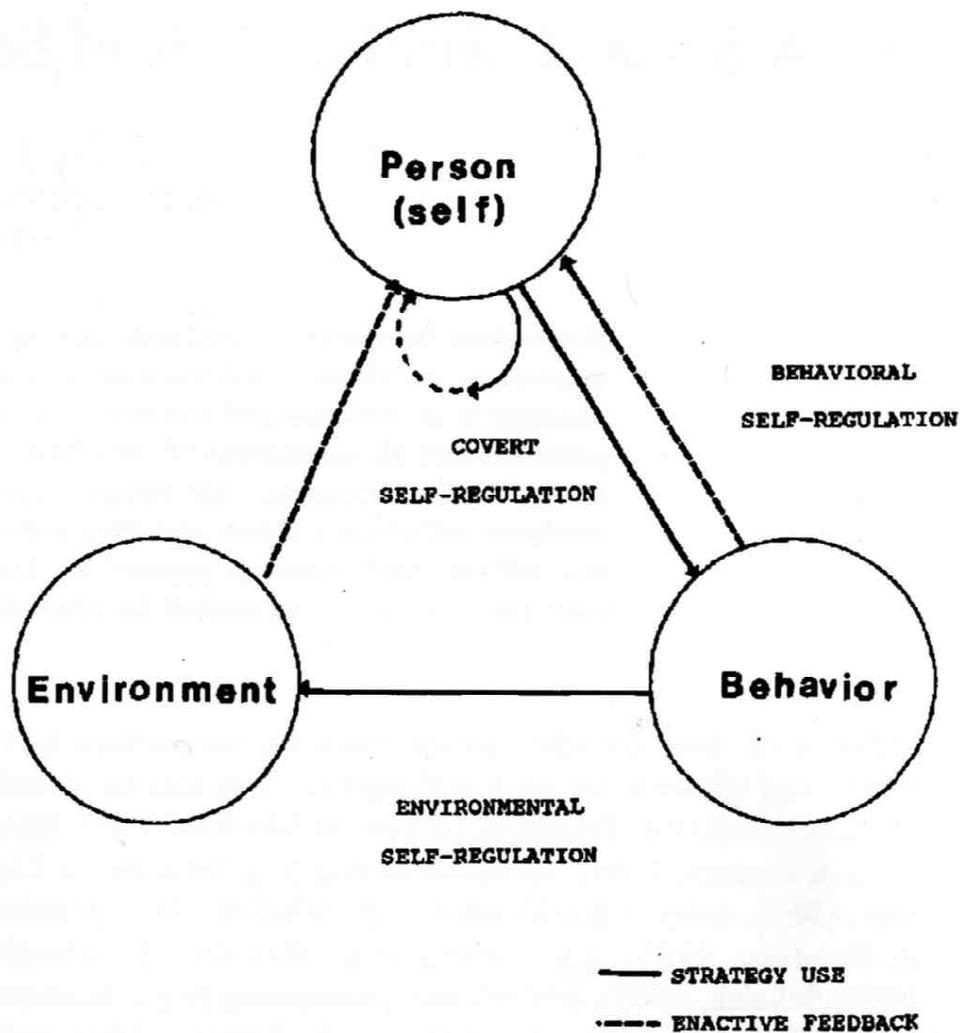
Figure 1. Triadic Model of SRL (Zimmerman, 1989)

The social cognitive perspective of SRL works to provide a holistic presentation of student influences in a real-world classroom setting. However, as an alternative model, information processing perspectives present a more narrow and detailed view of a self-regulated individual's management of learning while de-emphasizing motivational and

environmental factors. Information processing models stem from earlier work that related learning processes to those of computing; therefore, the focus is placed on the storage and transformation of knowledge (Zimmerman, 2001). A depiction of a model of SRL from an information processing perspective is presented in Figure 2. While the model includes motivational variables, historically, aspects of motivation have not been emphasized by information processing, something that has previously drawn criticism (Zimmerman, 2001). Instead, monitoring progress and producing and using feedback are the central aspects of SRL in this perspective (Winne, 2001; Butler & Winne, 1995). The central portion of this model is highly recursive and involves continuous adjustments in learning strategies and plans as well as constant monitoring until the initial goal is reached (Winne, 2001; Butler & Winne, 1995). Although not stressed to the same degree, subscribers of other models including social cognitive conceptions also place monitoring and feedback within their explanations. As a social cognitive theorist, Zimmerman (1990) incorporates the "self-oriented feedback loop," which centers on monitoring, as a defining feature of SRL. Furthermore, other researchers also suggest, it is this continuous effective monitoring of the degree to which the actions and strategies that are being employed are leading to the desired outcome that is the most central component of SRL (Pressley & Ghatala, 1990).
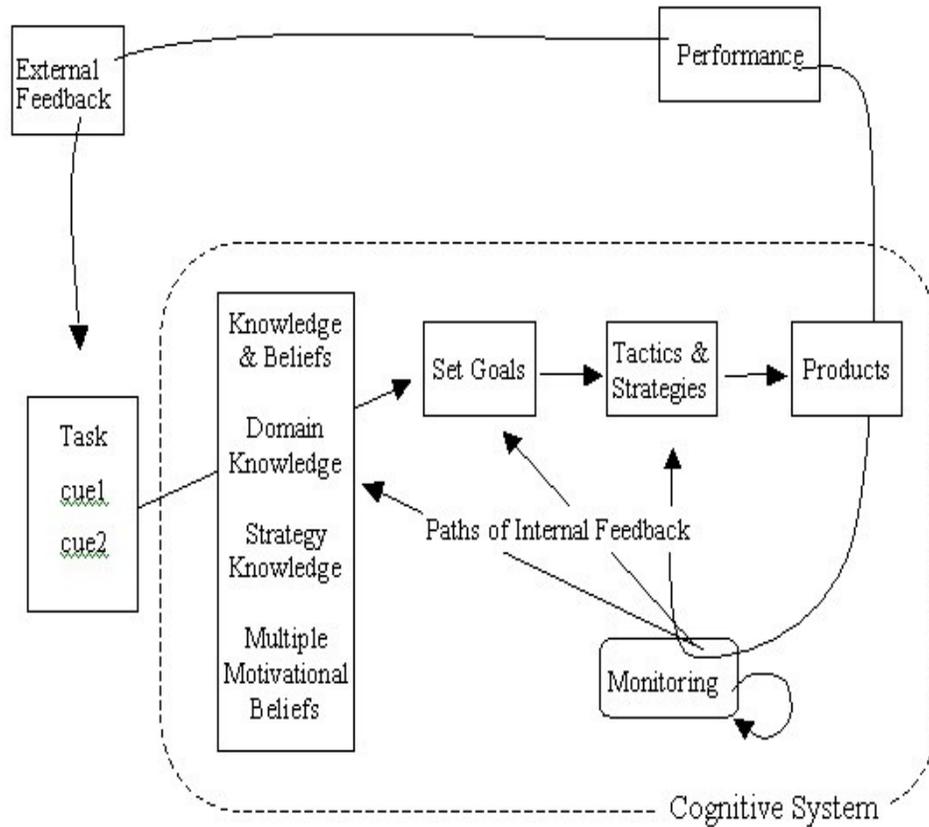
Figure 2. Information Processing Model of SRL (Butler & Winne, 1995)

Conceptualizing Feedback Loops

While monitoring and feedback are included as elements of social cognitive models of SRL, feedback loops within social cognitive views are thought to function in both negative and positive manners (Zimmerman & Schunk, 2001a). In an attempt to improve upon the information processing model, Zimmerman and Schunk (2001a) suggest that the models should embrace both positive and negative control from feedback. This helps to further explain the variance in reactions that individuals may have as a result of feedback.

According to the more traditional understanding, the feedback loops function in a negative discrepancy reduction manner whereby, an individual continuously cycles through the monitoring and evaluation process until the discrepancy between actual performance or achievement and the desired level is eliminated (Butler & Winne, 1995; Thiede, Anderson, & Therriault, 2003; Thiede & Anderson, 2003). This negative control perception presents a useful explanation of a mechanism within SRL because it is the evaluations and comparisons to set standards that help to guide the regulation of the learning process (Winne, 2001). However, as Bandura and Locke (2003) note, negative control does not explain the entire picture because it does not explain the motivation within individuals to continue to create discrepancies by setting higher and higher goals. Therefore, it is important to acknowledge the presence of feedback loops that function in a positive discrepancy production manner, which recognizes that goal achievement leads to increased self-efficacy and pursuit of higher standards. Although the traditional conception of feedback loops plays an extremely important role within each exhibition of SRL, the motivation resulting from the understanding of a positive feedback loop serves as a driving force in the continued pursuit of SRL (Bandura & Locke, 2003).

A Framework for Research

As a more general definition of self-regulated students, they are individuals who, "self-generate thoughts, feelings, and actions to attain their learning goals" (Zimmerman, 2001, p. 5). It is a powerful and complex profile for a student to be able to engage in, and as indicated by the previous discussion, there are differing theories as to exactly what SRL

encompasses including the volitional theory that emphasizes controlling attention and the phenomenological view that emphasizes individuals' self-perceptions (Corno, 2001; McCombs, 2001). However, borrowing aspects from both social cognitive and information processing models provides a useful framework for further investigation of SRL in context. In merging aspects of these two perspectives together, a basic picture of a model of SRL emerges whereby the metacognitive, motivational, and behavioral components are all highly intertwined. First, the initial goal setting process that begins the model involves a completely integrated understanding of all three components because in order to set a goal, a student must possess enough cognitive strategies and knowledge to even approach the task and then must be metacognitively aware of the availability of these cognitive resources. Finally, the learner must be motivated and self-efficacious enough to carry out the task in order for progress to be made (Zimmerman, 1990; Boekaerts, 1999). Once this initial goal setting phase is in place, the presence of the cognitive or behavioral resources as well as the motivation to continue remain important parts of the SRL equation since continued engagement in SRL hinges upon this (Zimmerman, 1990). Nevertheless, assuming the requisite conditions are in place, it is the more metacognitive process of monitoring feedback to assess progress toward the goal that takes center stage after that goal is set (Butler & Winne, 1995; Pressley & Ghatala, 1990; Zimmerman, 1990). The following sections will discuss in much greater detail goal setting and monitoring, three of the major components in SRL especially as it is applied to reading.

Motivation, Goal Setting, and Self-Efficacy

Motivation is absolutely essential for SRL. The processes involved in SRL are effortful and require persistence on the part of the student. Therefore, without the motivation to carry out the other processes involved, even a very capable student may not engage in self-regulation (Boekaerts, 1999; Meece, 1994). In the social cognitive view of SRL, students' motivation and learning are interconnected and should not be examined in isolation (Zimmerman, 1990; Eccles & Wigfield, 2002). As Pintrich and DeGroot (1990) note, cognitive and metacognitive strategies alone will not lead to achievement, so they need to be integrated with motivation constructs in order to understand situations that promote achievement. An important part of the motivation for SRL, as mentioned previously, is the positive feedback control loop, which is comprised primarily of the relationship between self-efficacy and goals (Bandura & Locke, 2003). In the following sections, the relationship between self-efficacy and goals will be elaborated upon and a discussion of additional characteristics of goals and their influence on SRL will be presented.

Self-Efficacy and Goals: Bi-Directional Influences

Although many components are involved in motivation including attributions, expectancy-value, interest, and self-concept (Schunk, Pintrich, & Meece, 2008), self-efficacy and its relationship with goals are particularly important to self-regulation (Zimmerman, 1990). Self-regulation is goal-directed, so setting goals plays a central role in the process (Zimmerman, 2001). At the same time, however, self-efficacy, an individual's perceived ability to learn or perform a specific task, is also considered to be a critical part of SRL and

the fundamental source of motivation to engage in SRL (Zimmerman, 1989, 1990). These two aspects of SRL are decidedly linked. Self-efficacy drives the goal setting process, but in turn, self-efficacy is driven by the outcomes of the pursuit of those goals (Zimmerman, 1990; Schunk, 1991). According to self-efficacy theory, self-efficacy influences the types and difficulty level of goals that students set. Then as students work to achieve those goals they produce more information upon which to base self-efficacy judgments, so if goals are being reached, self-efficacy will increase (Schunk, 1991). Empirical studies have substantiated this theoretical bi-directional relationship between self-efficacy and goals. Zimmerman, Bandura, and Martinez-Pons (1992) found using a ninth and tenth grade sample that academic self-efficacy influenced the grade goals that students set. In a study of elementary school students identified by teachers and standardized tests as deficient in their math skills, Bandura and Schunk (1981) observed that students with proximal goals experienced a significant increase in their perceived self-efficacy when compared to all other groups including a no treatment control.

Goals and Goal Setting

As previously discussed, goals are the directing force in SRL. They serve as the standards for evaluating progress and performance (Zimmerman, 2001). For purposes of this study, a goal is operationalized as, "what an individual is consciously trying to accomplish" (Schunk, 1990, pp. 71-72). While goals play a key role in SRL, as Bandura and Schunk (1981) assert, goals do not inevitably lead to improved engagement in evaluation. On the contrary, the properties of goals along several dimensions influence whether or not they

encourage SRL (Schunk, 1990). For example, much of the earlier work on the effectiveness of goals was concerned with variations in goal specificity, proximity, and difficulty (Schunk, 1990; Locke, Shaw, Saari, & Latham, 1981).

Generally, there is consensus that effective goals are those that are specific, proximal, and of reasonable difficulty (Schunk, 1990; Locke et al., 1981). Bandura and Schunk's (1981) work with elementary schools students deficient in math skills provides evidence for the need for both specific and proximal goals. In work with subtraction skills, students were randomly assigned to one of four groups, proximal goals, distal goals, no goals, or no treatment. The proximal goals group set a goal for each session while the distal goals group set a goal for the end of all sessions. Although the no goals group did not set a goal for the number of pages to complete, the group was told generally to complete as many pages as possible. At the conclusion of the sessions, the proximal goals group, which had set specific goals, exhibited significantly greater efficacy and performance. Furthermore, in an investigation of the effects of goal difficulty on students' work with long division skills, students with difficult goals displayed greater motivation than those with easier goals, and when the difficult goals were combined with positive comments about ability, students exhibited the highest level of skill among all groups (Schunk, 1983).

As another dimension of importance for goals, the source of the goal can also play a defining role in the outcomes that are produced (Schunk, 1990). This aspect is particularly noteworthy considering the centrality within self-regulation frameworks of individuals setting their own goals (Zimmerman, 1990). In a study of the effects of goal setting

conditions, Schunk (1985) investigated the relationship between participation in the goal setting process, self-efficacy, and subtraction task performance. Working with sixth-grade students identified as learning disabled on the basis of standardized test scores, students either set their own goals for the number of pages to complete, were assigned a goal equal to the average of the self-set goals, or worked without any goal. Conclusions of the study showed significantly better results for the self-set goals group in self-efficacy, subtraction skill, and expectation of goal achievement. Although the assigned goals group had higher self-efficacy than the control group, the self-set goals group produced much more positive results than each of the other groups. However, it was noted that in an effort to prevent students from setting unreasonably high or low goals, especially considering the population in the study, students setting their own goals were given upper and lower limits for the goals that they could set. These findings present some evidence for the importance of participation in goal setting; however, more work needs to be done to investigate these effects within classroom contexts while engaged in other tasks such as text-based comprehension.

Just as goals are often intertwined with other motivational variables, in many studies, an investigation of the effects of goals is often coupled with the presence of external feedback. In the previous study, Schunk (1985) worked to untangle the effects of goals and feedback by allowing feedback in all conditions including the control. However, in a prior study, Bandura and Cervone (1983) specifically focused on this relationship between goals and feedback. In comparing a feedback and goal condition to separate feedback and goal conditions as well as a control group, on an ergometer task, the combined condition produced

the greatest positive affects on motivation. The results suggested the importance of being able to compare a goal standard to the provided performance feedback. This finding suggests that when the discrepancy between a goal and actual performance is made explicit through external feedback there is more motivation to continue to push performance. At least in part, it is the presence and awareness of the discrepancy with a set goal that is the motivating factor (Locke & Latham, 2002). In the study, it was noted that having a specific quantitative rather than qualitative goal in combination with feedback led to greater motivational benefits as the quantitative goal provides a more explicit standard to measure a performance discrepancy against (Bandura & Cervone, 1983). Furthermore, in merging findings from both goal setting and results feedback research, Locke et al. (1981) noted that neither goal setting nor results feedback alone is sufficient.

Goal Orientations

A significant body of research related to goals has focused on the goal orientations that individuals hold. As goal orientation research has proliferated, the categorization of goals has grown to encompass distinctions in mastery (learning) and performance as well as approach and avoid dimensions (Schunk et al., 2008; Eccles & Wigfield, 2002; Elliot & McGregor, 2001). Mastery goals are those that are concerned with learning or developing skills based on a self-defined standard while performance goals are those that are concerned with normative standards and being perceived as competent (Schunk et al., 2008; Elliot & McGregor, 2001). The mastery-performance dimension was one of the original distinctions made between goal types. Under this initial distinction, a mastery orientation has been

associated with adaptive outcomes including increased effort, strategy use, and acceptance of challenges while a performance orientation has been associated with maladaptive outcomes including learned-helplessness and anxiety (Meece, 1994; Elliot & Dweck, 1988; Ames & Archer, 1988). However, when self-evaluation of progress is included as a treatment manipulation, Schunk (1996) found that individuals with a performance goal combined with the self-evaluation condition did not differ significantly in self-efficacy or skill from individuals with learning goals regardless of self-evaluation.

More recent research has begun to investigate the complexity associated with goal orientations by introducing an additional dimension in the form of an approach and avoidance distinction (Schunk et al., 2008; Eccles & Wigfield, 2002). Under this distinction, individuals can either engage in activities that lead to learning or a display of competence, or they can avoid activities that may lead to failure or the appearance of incompetence (Schunk et al., 2008). This additional dimension reveals a more intricate relationship between goal orientations and outcomes. In a study with middle school students, Pajares, Britner, and Valiante (2000) observed that in regards to writing and science domains, task or mastery goals were positively related with the most adaptive or positive outcomes including self-efficacy, self-concept, and self-efficacy for self-regulation. However, at the same time, performance goals were not revealed to be entirely maladaptive. Performance avoid goals showed a negative relationship with self-efficacy for self-regulation and self-concept and a positive relationship with anxiety or apprehension. In contrast, performance approach goals were positively related to self-efficacy and self-concept. Pajares et al. (2000) did make note

of a possible developmental trend in the relationship between goal orientation and outcomes as more positive relationships for performance approach goals were observed for seventh and eighth grade students than for sixth graders.

Monitoring and Self-Regulated Comprehension

While goals and self-efficacy play a key role in SRL especially in social cognitive models (Zimmerman, 1989, 2001), monitoring is also a central component of SRL in general and particularly within information processing conceptions (Winne, 2001, Butler & Winne, 1995). As part of the feedback loop, monitoring is essential in all learning situations; however, one specific application of its functioning is observed with regard to reading comprehension. Research investigating students' abilities to monitor their comprehension has been conducted for decades. Throughout this time, monitoring has been regarded as an important process for students to be able to engage in order to improve their overall comprehension of text. In this section, monitoring as it specifically relates to comprehension will be defined in greater detail. Then some of the earlier studies of monitoring will be reviewed followed by a review of more recent work. The earlier work will show where research on this topic began and how far it has come. Then more contemporary studies will begin to show an attempt to incorporate this work with an overall shift toward a self-regulation focus in education research. Following those discussions, there will be a presentation of ideas as to where this current trend needs to continue to move.

Defining Monitoring within Text Comprehension

Previously in this work, monitoring was defined in terms of its place within the model of SRL, but for the following discussion, a more in-depth definition especially in relation to reading comprehension is warranted. Pressley and Ghatala (1990) define metacognitive monitoring as an executive process undertaking the "evaluation of whether cognitive actions now being executed are permitting progress with respect to the current goals" (p. 20). The processes involved in monitoring occur at a metacognitive level above more cognitive acts such as implementing ground level task strategies, so it is superordinate to cognitive functions (Wagoner, 1983). Flavell (1979), in some of the earliest research on metacognition, recognized how intertwined this level of monitoring is with effective reading. He referred to monitoring as a "metacognitive experience" occurring before, during, and after reading whereby a failure to comprehend the material being read or studied becomes evident to the individual. Monitoring from Flavell's perspective entails the reader engaging in an online process of determining if the reading strategies being used are leading to the desired level of comprehension or if adjustments or changes to those strategies are needed.

Whereas Flavell (1979) referred to monitoring of comprehension as a "metacognitive experience," other terms such as comprehension monitoring and metacomprehension are also used to refer to the same phenomenon. Despite a difference in the terminology used, the monitoring referred to here is that which is truly metacognitive in that it embodies the "thinking about thinking" that defines metacognition (McCormick, 2003). Lin and Zabrucky (1998) note that when metacognition is applied to monitoring, it involves both the evaluation

and regulation of comprehension. As such, the full process of monitoring involves both the evaluation of how text comprehension is progressing and the subsequent regulation processes that either maintain or adjust the strategies and techniques being employed (Lin & Zabrucky, 1998). Baker and Brown (1984) assert that it is important for researchers to recognize that monitoring comprehension involves both dimensions, and along with this recognition, they should make explicit how they are operationalizing monitoring in their work.

Although the two-dimension definition of monitoring put forth by Baker and Brown (1984) characterizes the processes in a very metacognitive sense, it is important to refrain from confusing this definition with other work that makes monitoring more of a cognitive process. Markman (1979) proposed the idea of readers using different standards against which to measure their comprehension levels. Baker (1984, 1985) later reasserted the importance of recognizing that monitoring can involve employing several different layers of comprehension standards and worked to more carefully categorize the most commonly used standards. The basic set of standards against which comprehension can be measured include lexical (word level), syntactic (grammar level), and semantic (meaning level) (McCormick, 2003). Although Baker's work did show that students use these different standards, in terms of definition, a distinction between the standards should be made as far as which involve a metacognitive evaluation and which involve a cognitive evaluation. This is especially true given that some research on monitoring (Dole, Duffy, Roehler, & Pearson, 1991; Baker, 2002) defined it as a unitary comprehension strategy on the level of other individual comprehension strategies rather than a process encompassing many strategies. Such a

definition may be more appropriate if a reader is employing a lexical standard for monitoring comprehension. However, if the reader is using a standard of comprehension that involves more of a high level interaction with the text and a search for meaning, then referring to monitoring comprehension as a single strategy may be unwarranted.

The monitoring of interest here is that which fits within the larger self-regulated studying framework. As the earlier discussion of the model for SRL indicated, the monitoring portion makes up a significant and very involved part of the process. Much more is occurring than simply determining that a word does not make sense. Readers have to monitor all of the many subcategories that Baker (1985) outlined as fitting under the semantic standard of comprehension monitoring. To employ effective *metacognitive* monitoring of comprehension, readers must engage in an ongoing process of evaluating if what is being read fits with their prior knowledge and expectation and whether the information is being taken in well enough to allow for an integration of the ideas for later use. Hacker (1998) notes that skilled readers must be capable of employing all levels of comprehension standards when they are appropriate; however, this means that readers must be able to use employ even the more integrative semantic standards requiring a coherent understanding of the text (August, Flavell, & Clift, 1984). As such, monitoring as it is situated within SRL should not be interpreted as a single strategy because readers are engaging in the process that functions at a superordinate level to any single strategy (Wagoner, 1983).

Measuring Monitoring of Text Comprehension

Much of the research on monitoring has used two methods of measurement, error detection and calibration studies. The earliest work on the topic largely employed the error detection technique in which texts are manipulated to include errors or inconsistencies through either the use of nonsense words or conflicting statements (Baker, 1984; Lin & Zabrucky, 1998; McCormick, 2003). According to this paradigm, readers' ability to detect the errors indicates the degree to which they are monitoring their comprehension (McCormick, 2003). Furthermore, the technique was also intended to allow for the assessment along both of the dimensions of monitoring set forth earlier, the evaluation and regulation of comprehension (Lin & Zabrucky, 1998). Not only does it allow for the assessment of readers' detection of errors but also their ability to correct or debug those errors (Lin & Zabrucky, 1998).

Whereas this research paradigm has helped to advance the field's knowledge and understanding of the topic, it has received criticism on several fronts even by those employing the method (Baker, 2002). As several researchers have noted, a failure to detect the inserted error may not represent a complete failure by the reader to monitor, and instead it may result from the reader employing a different standard for monitoring comprehension than the one intended by the researcher in the form of the included errors (Baker & Brown, 1984; Garner, 1987; Baker, 2002; McCormick, 2003). For example, a truly skilled reader may be able to skim a text and still be able to understand the material. In that case, the reader would be using a higher-level standard of overall cohesive meaning of the text as the

standard for assessing comprehension; therefore, that reader might fail to detect simpler errors such as the inclusion of nonsense words. Another reader might detect all of the included lexical level errors but at the same time fail to understand the meaning of the text. Also, for various reasons, the reader may notice the error but not report it (Baker, 2002; McCormick, 2003). Yet another issue with this research paradigm is that it does not provide a highly ecologically valid situation especially for a school setting because students would not generally be given a text with errors as contrived as those produced for the sake of this type of work (Garner, 1987; Dole et al., 1991).

With the criticisms that have been waged against error detection, researchers have attempted to find other ways of measuring monitoring of comprehension, especially in an actual metacognitive context. As Lin and Zabrucky (1998) note, one method that has gained in popularity as an alternative to the error detection paradigm is a focus on calibration of comprehension. Under this alternative paradigm, the purpose is to look at the accuracy of readers' rating of their comprehension level or judgment of learning after reading. Here, the focus is on the evaluation of the comprehension dimension of the monitoring process (Lin & Zabrucky, 1998). An important part of this method is ensuring that multiple questions are used in order to test comprehension and provide useful measures of the accuracy of predicted comprehension levels (Weaver, 1990; Maki, 1998; Lin & Zabrucky, 1998). Furthermore, as a slight variation of the basic calibration methods, it has been suggested that a better means of assessing the monitoring of comprehension for later recall, it is better to correlate readers' predictions of their future performance on a later test and their actual performance on a

comprehension than to correlate a rating of the perceived level or ease of comprehension with test performance (Maki, Foley, Kajer, Thompson, & Willert, 1990; Maki & Serra, 1992).

The calibration of comprehension paradigm may be viewed as an improved methodology over that of the error detection paradigm; however, it too is far from a perfect measure of comprehension monitoring. It allows for a more ecologically valid methodology especially in a school setting or when trying to situate monitoring within self-regulated studying (McCormick, 2003). Yet, because the technique does not necessarily capture online assessments or evaluations of the progression of comprehension, the calibration procedures potentially miss out on an important part of the monitoring process. However, calibration protocols can be made to measure more online assessments by using local, question level judgments in addition to more global, text level judgments (Schraw, 1994). As another criticism of the method, researchers have suggested that readers may rely more heavily on other evaluations such as the evaluation of domain familiarity or experiences rather than focusing more on that reading experience when rating comprehension levels or predicting future performance. Although there is some evidence for the use of domain familiarity in making predictions of performance (Glenberg, Sanocki, Epstein, & Morris, 1987; Maki & Serra, 1992), based on her work Maki (1998) concludes that predictions are not based solely on those judgments and instead involve at least some consideration for what was learned from the text in question. Nevertheless, the calibration of comprehension paradigm does

seem to present more promise for future research than the previously dominate method of error detection.

Monitoring Text Comprehension

Although readers may have the reading skills necessary for monitoring their comprehension around the time they are in the third or fourth grade, many studies have shown that readers do not engage in monitoring or do so very poorly at that time and even much later (Pressley & Ghatala, 1990). A variety of reasons beyond a lack of requisite reading skills have been proposed as potential factors in the lack of engagement in monitoring, but a commonly described reason is the lack of comprehension skills. About the time children gain the ability to decode words proficiently, they begin to transition to the period where they are expected to read for comprehension (Indrisano & Chall, 1995). This period results in the shift of responsibility from the teacher to the student for learning from text. However, that transition does not occur immediately, as students often remain unsure of the purposes for reading and the need to go beyond the literal text (Eme, Puustinen, & Coutelet, 2006), which Walczyk (1990) suggests is a deciding factor in whether or not monitoring will occur. In order to successfully attempt to comprehend a text and thus have an understanding of the to-be-monitored process, a student must begin to realize the necessity of taking an active role in the reading process and understand the dynamic interplay between what is written in the text and his or her prior knowledge (Trabasso & Bouchard, 2002).

Work with upper elementary and even middle school students has shown that they are often uncertain about the purpose of reading to learn and as such they do not engage in active

text comprehension or monitoring comprehension. According to the work of Eme et al. (2006), fifth grade students who were classified as more skilled comprehenders based on their performance on a standardized comprehension test were unable to successfully gauge their comprehension levels of different texts. The study noted that even these students did not utilize text look-backs to clarify question answers that they were unsure of, and this led researchers to suggest that the main purpose of reading for comprehension was lost to these students. They had not yet reached the point where they approach texts with the intention of engaging in the reading process to learn new information and as such employ necessary comprehension strategies. Likewise, in the much earlier work of Di Vesta, Hayward, and Orlando (1979) investigated aspects of comprehension and monitoring among sixth through eighth grade students, who were categorized into comprehension levels on the basis of standardized comprehension test scores. They found that students categorized as poor comprehenders employed an integrative strategy of seeking clarification for comprehension confusions in subsequent portions of the text much less often than more skilled comprehenders. These findings led Di Vesta et al. (1979) to suggest that comprehension and the related monitoring process is still hindered among some students in that age range by a still immature view of reading that does not involve the understanding of the need for the reader to interact with the text. Furthermore, it was also suggested that an important transition for the ability of readers to monitor their comprehension may occur after the development of a more mature understanding of reading that allows for employing strategies such as rereading previous text instead of reading straight through a text.

Nevertheless, even if students do view comprehension as a purpose for reading, useful monitoring of comprehension may not occur because of other monitoring related deficiencies, which are often thought to be linked to working memory. For example, issues that appear to be working memory problems may lead to processing problems and an inability to comprehend and monitor the text beyond a sentence level. Several studies have found that while readers may be able to detect inconsistencies in text by integrating adjacent sentences, they are often unable to integrate information from more distant parts of a text (Di Vesta et al., 1979; Cain, Oakhill, & Bryant, 2004). Although not explicitly tested in these studies, such a finding may indicate possible working memory problems. However, Cain et al. (2004) discovered that both working memory performance and monitoring performance contribute uniquely to the prediction of comprehension performance, suggesting that it is not a working memory problem that is leading to the monitoring problem. In another error detection study, Oakhill, Hartt, and Samols (2005), based on their work with nine and ten year olds, suggest that while working memory may seem to be a clear suspect in comprehension and monitoring problems, it is most likely not the underlying problem. They proposed that the greater issue, while still related to working memory, was more likely a problem with being able to develop an accurate model of the text as a whole, since poor comprehenders even had difficulty identifying problems within a text when the direct demands on working memory were low. This suggestion falls in line with the repeated finding by Kintsch and his colleagues about the importance for comprehension of the formation of an appropriate model (Kintsch, 1986; Kintsch, 1988; Singer & Kintsch, 2001).

While the authors of the previously discussed line of studies see underlying issues other than working memory deficits as the possible root of a lack of monitoring activities, other studies point to deficits in prior knowledge, an issue related in some cases to the capacity of working memory, as a key factor affecting monitoring. In studies reviewed by Wagoner (1983), the ability of readers to monitor their comprehension was found to decrease in situations where they had less prior knowledge of the topic. Furthermore, as Kinnunen and Vauras (1995) note, task and person variables including subject specific prior knowledge place limits on the degree to which monitoring is possible in a given situation. Even if an underlying ability to monitor comprehension exists, a task may be such that the reader is hindered in an attempt to accurately monitor. In such a situation, the reader may attempt to follow monitoring strategies, but the working memory demands of processing information that is relatively unfamiliar may prove too great to be able to function beyond a lower level of text processing (Kinnunen & Vauras, 1995).

Basic reading skills, an understanding of the purpose of reading for comprehension, and underlying cognitive deficits including background knowledge and working memory capacity may all affect a reader's ability to monitor, but comprehension abilities are also involved in the ability to monitor comprehension. As noted previously, Smolkin and Donovan (2002) suggested that monitoring becomes a possibility after a reader reaches the threshold in decoding abilities. In a sense, that is a logical statement because once decoding becomes an automatic process comprehension becomes more of the focus of reading; however, that is also working under the assumption that the development of comprehension

abilities is inevitable. Yet, as it is often noted, many students have problems with comprehension, so it is fair to question whether comprehension skills influence monitoring abilities although the answer seems largely intuitive. Comprehension skills generally follow a developmental trajectory, so middle school students are usually found to be better at monitoring their comprehension than elementary students (Markman, 1979; Baker, 1984; Kolic-Vehovec & Bajsanski, 2006). However, even in these situations, monitoring does not reach anywhere near ceiling effects for the studies. In addition to between grade level differences, when good and poor comprehenders in the same grade are compared, the better comprehenders have been observed to monitor better than their poorer comprehending cohort members (Oakhill et al., 2005). Therefore, there seems to be a clear indication that the development of effective comprehension skills is related to the presence of successful monitoring. This is an especially problematic situation since students with comprehension problems likely understand less of what they are reading, and without competent monitoring abilities, they may be completely unaware of the situation.

One other important aspect of a student's ability to monitor comprehension is the development of metacognitive awareness. The monitoring of concern here is the more involved, higher level monitoring of comprehension and how well a text as a whole is understood and integrated with prior knowledge; therefore, it is necessary that students have some sense of metacognitive awareness. Students must be developing their knowledge of cognition such as their understanding of their knowledge base while also developing their strategies and skills for regulating their comprehension (Schraw & Moshman, 1995). These

are the two central components of metacognition and the two parts of the process of monitoring text comprehension (Baker & Brown, 1984). Developed metacognition and metastrategic knowledge are important in the monitoring process because they allow for the use of feedback to determine if desired reading goals are being met and the determination of what steps are necessary if the goals are not being met (Kuhn, 2000; Kolic-Vehovec & Bajsanski, 2006). Early developments in metacognition can be traced to around three or four years of age; however, while it continues to develop throughout the school years, even adults are often not adept in their metacognitive awareness and application of its components (Schraw & Moshman, 1995; Kuhn, 2000). A study investigating knowledge acquisition and strategy use among adults in community college and preadolescents found that while the adults generally improved in tested domains at a faster rate than the children, there was still considerable variability in the development of knowledge acquisition and strategy use (Kuhn, Garcia-Mila, Zohar, & Andersen, 1995). In another study comparing problem solving of preadolescents with that of adults from a community college, results indicated that the adults exhibited greater metacognitive activity in their reasoning (Kuhn & Pease, 2006). However, as with the previous study, there was great variability in this executive functioning among the adults.

Overall, research investigating children's ability to monitor their comprehension indicated that it is a complex process involving the development of several component parts. The previously discussed developments and factors represent components of effective monitoring that are indicated as necessary but not sufficient elements. These elements have

been shown to be at least in part developmental, and research on the topic has also suggested that there are several important transitions and developments that take place during the elementary and middle school years that help to make possible and improve student's abilities to monitor their reading comprehension. First, as indicated by the decoding threshold proposal of Smolkin and Donovan (2002), there is an important shift in the focus of reading from the decoding to comprehension around the third grade (Indrisano & Chall, 1995). Although that point indicates the beginning of a shift in the purpose for reading, there is a continued development and application of the understanding comprehension as a purpose for reading as students advance through Chall's remaining stages of reading development (Indrisano & Chall, 1995). As increased understanding and appreciation for purposeful reading is developed, there is more room for the development of monitoring abilities. However, these abilities are slow to develop even after decoding skills have been mastered. Eme et al. (2006) found that improvement in comprehension is slow between the third and fifth grades, and even the better comprehenders of these age groups are far from skilled in their monitoring abilities since they are unable to accurately judge their level of understanding. Similarly, research involving fifth through eighth graders has suggested that while comprehension abilities are improving during this time, improvements in monitoring as evidenced by performance on error detection and cloze tasks are also occurring but at a slower rate (Kolic-Vehovec & Bajsanski, 2006).

Moving Monitoring Research into a Self-regulation Framework

In the last decade, as education research has begun to focus more on self-regulation of learning processes, work involving monitoring of text comprehension has begun to fold into the self-regulation work. As seen in Figure 3, Hacker (1998) presents a clear illustration of these attempts in an explication of his model of self-regulated comprehension. The specific aim of the work is to provide standardized terminology to use in monitoring research to describe the processes within a self-regulation model.
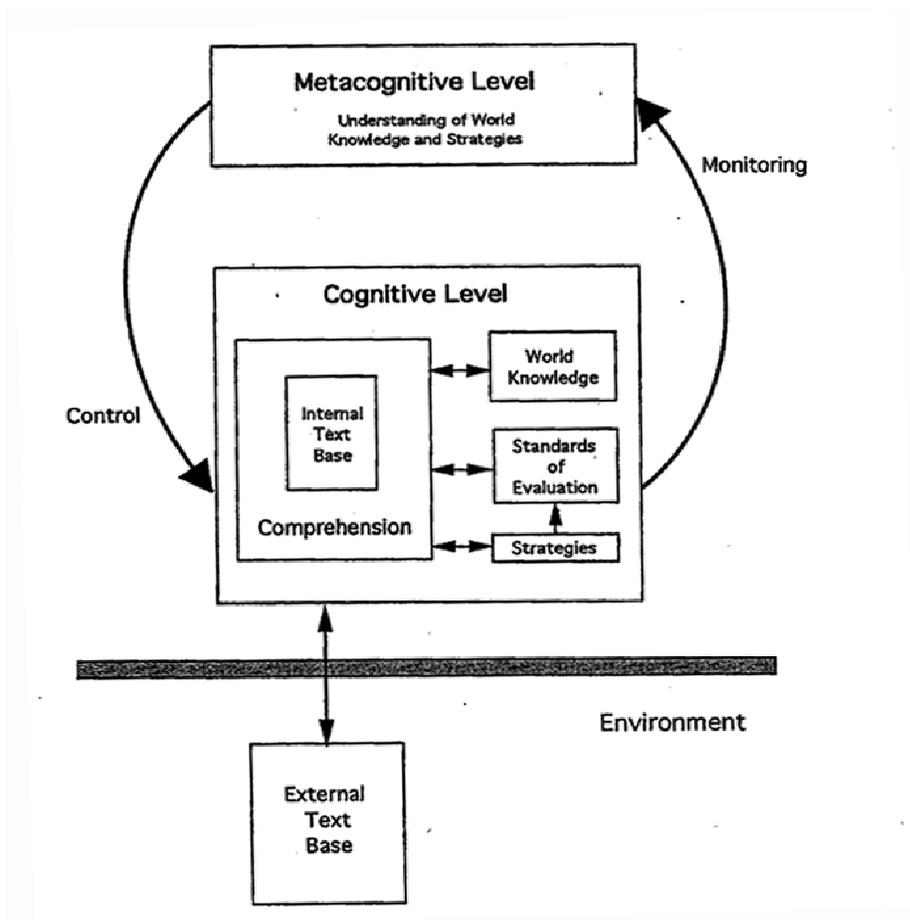
Figure 3. Model of Self-Regulated Comprehension (Hacker, 1998)

Hacker's (1998) model of self-regulated comprehension presents a valuable illustration of monitoring within a self-regulation framework, and it provides a new lens for reading previous research on monitoring comprehension. However, in this straightforward model and in existing research on the topic, some defining features of SRL are not emphasized enough or are completely missing. Following largely in the information processing view of SRL, monitoring is the focal point; however, some of the aspects that receive greater attention within social cognitive views need to be integrated into this model of self-regulated comprehension. As Zimmerman (1990) describes in his overview of SRL, goal setting plays an extremely integral role in SRL. The initial goal that a learner sets is what subsequent work including monitoring is directed toward and it is what establishes meaning for those activities (Schunk, 1990; Joseph, 2005). Goal setting is a central feature of self-regulation, and it has important motivational outcomes that may play an influential role in monitoring and its achievement outcomes. However, in the research on monitoring comprehension that has been conducted to date including the more recent work, goal setting has been absent. Especially with the overall push in education research toward following a self-regulation framework, including goal setting in future research is a significant issue to address in future research. Some of the existing work involving goal setting and its effects will be discussed in the following section.

SRL Applied to Studying

SRL can occur in a variety of contexts from engaged, hands-on problem solving to active reading. However, as Zimmerman (1998) suggests, the application of research in SRL

to work on academic studying is both an important endeavor and one that converges quite well with the study of SRL in general. Since a great onus for individuals' learning is placed on their own shoulders throughout much of their formal schooling as well as their careers, it is very important that students are able to engage in self-regulated studying on a regular basis. Such an ability allows students to take charge of their own learning as a more unified whole (Rohwer, 1984; Zimmerman, 1998). The concept of self-regulated studying represents a meaningful and practical synthesis of the components of SRL discussed here: self-efficacy, goals, monitoring comprehension, and strategy use. Studying is the means through which a significant amount of learning occurs (Rohwer, 1984), and a significant part of the studying processes involves self-guided reading.

Research investigating effective monitoring of comprehension within a larger framework of SRL can contribute to an overall understanding of self-regulated studying. The importance of being able to engage in the type of effective process embodied by self-regulated studying is evident at the level of each individual instance of studying, which is often represented by the self-regulated comprehension model. However, the necessity of self-regulation is also evident at a much broader level, when self-regulated studying is engaged in as part of a regular routine. Being able to assess whether or not a desired learning goal has been reached is an important outcome for each individual instance of studying because it means that the student has engaged in a very efficient and effective studying experience with that material, but ultimately, the individual instances need to be integrated

into an overall approach to learning. Work investigating self-regulated comprehension will help to serve as part of the foundation for that later integration.

Overview of Current Study

This study was intended as a bridge between previous work in the area of monitoring and the more recent emphasis on SRL frameworks. Therefore, this study revisited topics that have been researched in earlier work; however, the current study shed new light on the previous studies by situating the current study within a more recent research framework that introduces additional motivational variables. Work took place with sixth grade students because they represent an important population that is involved in a critical period for gaining comprehension skills (Indrisano & Chall, 1995). Furthermore, sixth graders are also a population in which there is little empirical evidence of how the developing metacognitive, comprehension, and motivational variables work together. In the following section, the specific research questions that will be examined are described.

Research Questions and Hypotheses

1. Do students monitor their comprehension more accurately when they have an achievement goal? Do students change at different rates in their monitoring accuracy based on whether they have an achievement goal?

    Based on the previous research of students' monitoring abilities, it is hypothesized that in general students across conditions will not be very accurate in their monitoring (Pressley & Ghatala, 1990; Eme et al., 2006; Di Vesta et al., 1979). However, the presence of goals has been shown to increase self-efficacy (Bandura & Schunk, 1981; & Schunk,

1991), which could lead to greater commitment to the task since working toward a goal is a key factor in students' engagement in SRL (Zimmerman, 1989, 1990). This increased task engagement could, in turn, lead to more accurate monitoring. Therefore, there are two opposing hypotheses for the first part of this question. According to the achievement goal non-compensatory hypothesis, it is predicted that monitoring accuracy will not differ across goal conditions because students are too deficient in their monitoring abilities (Pressley & Ghatala, 1990; Eme et al., 2006; Di Vesta et al., 1979). In contrast, according to the achievement goal compensatory hypothesis, students in conditions with goals will display increased motivation for the task, which will help to compensate for some skill deficiencies as well as engagement issues (Bandura & Schunk, 1981; & Schunk, 1991; Zimmerman, 1989, 1990). Therefore, it is predicted that students with goals will be more accurate in their monitoring than students without goals for the task.

In regards to the question of improvement over time, it is hypothesized that students across goal conditions will show improvement in their monitoring accuracy because of practice and experience gained in participating in the earlier passage protocols. If the non-compensatory hypothesis holds, then there should not be a significant difference in the degree of improvement between students in the different goal conditions. However, if the compensatory hypothesis holds, then students in conditions with goals should experience significantly greater growth in their monitoring accuracy than students in the no goal condition.

2. Does academic self-efficacy or self-efficacy for reading moderate the relationship between goal conditions and monitoring accuracy?

As Zimmerman (1989) notes, self-efficacy has been related to not only increased task motivation but also skill use and acquisition as well as achievement. Furthermore, self-efficacy has been shown to predict monitoring in other academically relevant areas such as work time (Bouffard-Bouchard, Parent, & Larivee, 1991) as well as the quality standards that are used to assess work (Zimmerman & Bandura, 1994). In addition, as previously noted, the presence of goals in academic situations has been related to increased self-efficacy (Bandura & Schunk, 1981; Schunk, 1991). Therefore, while goals may affect monitoring accuracy as suggested by the achievement goals compensatory hypothesis, it is hypothesized that both academic self-efficacy and self-efficacy for reading will be positively related to monitoring accuracy, and both self-efficacy variables will moderate the relationship between goal conditions and monitoring accuracy.

3. Does goal orientation moderate the relationship between goal condition and self-efficacy? Does goal orientation moderate the relationship between goal condition and monitoring accuracy?

Pajares et al. (2000) found that mastery goal orientations produced the most positive outcomes for self-efficacy and self-efficacy for self-regulation, but performance approach goal orientations were also related to positive outcomes as well. However, performance avoid orientations resulted in much more maladaptive outcomes. Furthermore, in investigating goal setting situations, Elliot and Harackiewicz (1994) found that an

individual's goal orientation led to differential outcomes of goal setting for motivation and involvement. Therefore, in this study, it is hypothesized that the effects of goals will differ depending on the students' goal orientation. In the goal setting condition, students with a mastery orientation will experience the greatest gains in academic self-efficacy and self-efficacy for reading and the most improvement in monitoring accuracy, and students with performance approach orientations will experience gains although of a smaller magnitude.

Method

Subjects

Students were recruited for study from three sixth grade teams, comprising six classes, whose teachers agreed to participate in the study. These classes were all part of an urban middle school in a southeastern state. The school level demographics, as reported by the North Carolina Report Cards, indicate that the student population is 53% White, 34% Black, 6% Hispanic, 2% Asian/Pacific Islander, and 4% Multi-racial. In addition, approximately 33% of the student population is classified as economically disadvantaged. A sample of 100 sixth-grade students, 56 males and 44 females, from the six classes participated in the study. Eight additional students also completed portions of the study; however, they were not included in analyses for this study because they either did not take part in the baseline testing or did not complete any of the passage protocols. Students were distributed across six mixed ability science classes. However, to determine the equity of the ability distributions across the classes, a standardized reading comprehension test was administered at the onset of the study. Each of the classes was randomly assigned to either the achievement goal condition or the no goal control condition.

Conditions

During this study, half of the students were assigned to either the self-set achievement goal or the no goal control condition.

Measures and Materials

Gates-MacGinitie Reading Test

This standardized reading test for level six includes 45 multiple choice vocabulary questions and 48 multiple-choice comprehension questions. The vocabulary questions present a word in context and ask students to select the word or words that most closely represent the vocabulary word. In the comprehension section, reading passages gathered from published texts are presented and students are asked to answer multiple-choice questions about each passage.

Achievement Goals Questionnaire (AGQ)

AGQ is a goal orientation self-report survey that is based on the two dimensions of goal orientations, mastery-performance and approach-avoid (Elliot & McGregor, 2001). The questionnaire is comprised of twelve items that ask students to rate the applicability of given statements to themselves. All responses are given along a seven-point ranging from 1, not at all true of me, to 7, very true of me. Each type of goal orientation is represented by three separate questions, so totals for responses to each orientation can range from 3 to 21. In previous studies, each of the goal orientations had an alpha ranging from .89 to .91 (Cury, Elliot, Da Fonseca, & Moller, 2006). Furthermore, in assessing the 2x2 framework for goal orientations used in this instrument, it was determined that each of the four orientations had different antecedents as well as outcomes (Elliot & McGregor, 2001). Although initially developed with college students, the questionnaire has been used with middle school students (Cury, Elliot, Da Fonseca, & Moller, 2006).

Motivated Strategies for Learning Questionnaire (MSLQ)

MSLQ is likert-scale self-report survey designed to measure motivation and learning strategies based on a social-cognitive perspective (Duncan & McKeachie, 2005). Although the survey was originally developed for college students, a version of the survey has also been developed for middle school aged students (Duncan & McKeachie, 2005; Pintrich & DeGroot, 1990). This "junior high school version" includes 56 items in two sections, motivational beliefs comprised of three scales and self-regulated learning strategies comprised of two scales with all scales having alphas ranging from .74 to .89 (Pintrich & DeGroot, 1990). All responses are given along a seven-point scale ranging from 1, not at all true of me, to 7, very true of me. The self-efficacy subscale, which is referred to in this study as the academic self-efficacy variable, is comprised of nine items, so totals for the variable can range from 9 (low efficacy) to 63 (high efficacy).

Motivation for Reading Questionnaire (MRQ)

MRQ is a likert-scale self-report survey designed to measure motivational dimensions related to reading (Baker & Wigfield, 1999; Wigfield & Guthrie, 1997). The revised version of the survey includes three categories, competence and efficacy beliefs, goals for reading, and social purposes for reading with a total of 54 items (Baker & Wigfield, 1999). For all but one of the subscales, alphas ranged from .66 to .76, and the one exception is the work avoidance subscale with an alpha of .55 (Baker & Wigfield, 1999). All responses are given along a four-point scale ranging from 1, very different from me, to 4, almost everyday. Of particular interest for this study is the self-efficacy for reading subscale comprised of four items, so totals can range from 4 (low efficacy) to 16 (high efficacy).

Patterns of Adaptive Learning Scales (PALS)

PALS is a likert-scale self-report survey designed to measure dimensions of goal orientation theory (Midgley et al., 2000). The full survey includes five scales; however, for the purpose of this study, only the perception of teacher's goals and perception of classroom goal structures scales will be used. These two scales include a total of 26 items with subscale alphas ranging from .70 to .83 (Midgley et al., 2000). All responses are given along a five-point scale ranging from 1, not true at all, to 5, strongly agree. The survey has undergone a series of validation studies and has been shown to be valid for students a wide range of student ages including middle schoolers (Midgley et al., 2000; Midgley, 1998).

Passages

The study used six passages selected to align with the standard course of study for sixth grade science in North Carolina. Passages were all selected from edhelper.com, a subscription based teacher resource website providing reading comprehension passages from several subject areas and on a variety of topics. Each passage was deemed to be at an appropriate reading level for sixth grade students. All the passages chosen were related to the topics of space and the solar system. These topics were chosen because they had not yet been discussed but were scheduled to be covered in the nine weeks following the study. Each passage was approximately two pages in length.

Comprehension Assessments

Each of the weekly comprehension assessments contained ten multiple-choice questions, which were a combination of researcher-developed questions and those included

with the passages, which were selected from edhelper.com. Questions represented a standard combination of questioning levels including inference, vocabulary, main idea, descriptive, and higher-level thought questions.

Confidence Ratings

After each comprehension question, there was a 100mm line representing 0% confidence on one end and 100% confidence on the other end (Schiffman, Reynolds, & Young, 1981; Schraw & Roedel, 1994). A dash placed on the line by students was used to indicate the level of perceived confidence for the accuracy of the question response.

Monitoring Accuracy

Absolute monitoring accuracy was calculated using the comprehension assessments and confidence judgments. The absolute difference between confidence rating and actual performance for each item was summed over all items and then averaged for each week's passage. For example, if a student's confidence rating for an item is 78 and he or she answered the item correctly, then that student's accuracy for the item would be .22 (1 - .78). Therefore, scores could range from 0 (perfect calibration) to 1 (no calibration) (Nietfeld, Cao, & Osborne, 2006; Nietfeld & Schraw, 2002).

<div align="center">*Procedures*</div>

During the preliminary portion of the investigation, all participants completed the Gates MacGinitie test, which was administered by the researcher as a baseline measure. Then students completed an initial packet of surveys including the AGQ, PALS, MSLQ, and MRQ. Upon completion of these surveys, the six classes were randomly assigned to the goal

and no goal conditions. All classes read a practice passage, and the researcher administered a practice set of ten multiple-choice questions. Following this initial phase, all students were told that the purpose of the study they were participating in was to see how well they were able to monitor their comprehension. They were told that how well they monitored would be determined by how close their prediction of how well did on the comprehension assessment was to how well they actually did.

Classes then began their separate condition procedures. After experiencing the practice passage and comprehension assessment, the researcher facilitated a goal setting session with the students in the goal condition. First, students were handed back their scored questions from the practice passage, and they were asked to look them over and determine if they had any questions about their scores. Students were then given the following instructions:

After reading the practice passage and answering the multiple choice questions, you have an idea of what you are going to be doing in this study for the next six weeks. Now that you have seen your scores from the practice questions, I am going to ask you to set a goal for the average score that you want to achieve on the six sets of multiple choice questions that you are going to complete over the next six weeks. How many of you have set a goal before? (Students raise their hands.) Well, since you have set goals before, you know that you do not want to set a goal that is going to be too easy because then you will have nothing to work toward. However, you also don't want to set a goal that is too hard either. I want you to keep in mind the score

that you received on your practice questions when you set your goal. Also, remember that you are setting a goal for the average score that you want to achieve over the next six weeks. How many of you know what an average is? (Students raise their hands.) Can anyone explain what an average is? (Students raise their hands and one student is selected to give an answer.) Lets work through an example of calculating an average. If I scored a 60, 70, 70, 60, 80, and 80 on my passage questions, my average score would be the total of all of those scores divided by six, the number of passage question sets. (The problem is worked out on the board.) That means my average score would be 70. So, since your goal is for the average score you want to achieve, that means that you might have a week where you get a score that is higher than your goal and then another week where it is lower, but you want your score to work out to your goal average. Are there any questions about setting your goal? Now, I am going to hand out a paper that has space for you to record your goal. Go ahead and take some time to think about what a good goal would be for you. Remember, this is your goal. Set a goal that you think you can work toward, and do not worry about the goal that the person next to you is setting.

Following these discussions, students in the goal condition set their goals individually. Meanwhile, students in the no goals group were simply informed that they would be asked to read a passage and complete a multiple choice assessment each week for six weeks.

Over the course of the following six weeks, each class completed six passage protocols including reading a passage, making a judgment of their predicted score on the assessment, and completing multiple choice assessments and confidence judgments. In addition, students were asked to complete the AGQ, the reading self-efficacy questions from the MRQ, and the self-efficacy questions from the MSLQ. Students read the passage in their classes on one day, and then on the following day, the researcher administered the multiple choice assessments and survey questions in each of the classes. After completing each weeks' protocol, the researcher scored the multiple choice questions, and each student was given time to review his or her score before the next passage protocol. An overview of these procedures is included in Appendix A.

Results

Prior to addressing the primary research questions, preliminary analyses were conducted to determine whether the goal group differed significantly from the no goal group on their comprehension sub-scores from the Gates-MacGinitie Reading Test. Therefore, an Analysis of Variance (ANOVA) test was conducted. Descriptive statistics for the sample are presented in Table 1.

Table 1. Descriptive Statistics for Gates-MacGinitie Comprehension Sub-scale

Condition	N	Mean	SD
No goal	47	33.43	9.27
Goal	53	34.53	8.41
Total	100	34.01	8.80

Note. Means are out of a maximum score of 48.

Results of this analysis indicated that students did not differ significantly based on their goal condition ($F(1, 98) = .39$, $\rho = .53$). Therefore, in subsequent analyses, initial comprehension score was not used as a covariate.

Additionally, descriptive statistics for students' scores on passage questions and monitoring accuracies were computed. These results are presented in Table 2.

Table 2. Descriptive Statistics for Passage Scores and Monitoring Accuracies

	No Goal		Goal		Total	
Percent Correct	N	Mean	N	Mean	N	Mean
Week 1	43	58.60 (20.65)	48	57.92 (17.98)	91	58.24 (19.18)
Week 2	41	50.00 (20.00)	45	54.22 (19.94)	86	52.21 (19.97)
Week 3	41	49.51 (24.39)	44	52.73 (24.34)	85	51.18 (24.27)
Week 4	39	52.31 (22.65)	47	55.11 (19.66)	86	53.84 (20.99)
Week 5	38	47.11 (21.92)	46	46.52 (22.53)	84	46.79 (22.13)
Week 6	37	56.76 (20.96)	46	48.04 (22.67)	83	51.93 (22.22)
Total	239	52.43 (21.96)	276	52.46 (21.43)	515	52.45 (21.66)
Monitoring Accuracy	N	Mean	N	Mean	N	Mean
Week 1	43	.41 (.12)	46	.41 (.13)	89	.41 (.12)
Week 2	35	.44 (.12)	41	.41 (.12)	76	.42 (.12)
Week 3	37	.43 (.16)	42	.41 (.14)	79	.42 (.15)
Week 4	36	.41 (.15)	39	.39 (.12)	75	.40 (.13)
Week 5	33	.44 (.15)	40	.43 (.13)	73	.44 (.14)
Week 6	34	.36 (.14)	41	.38 (.13)	75	.37 (.13)
Total	218	.42 (.14)	249	.41 (.13)	467	.41 (.13)

Note. Standard deviations are provided in parentheses.

As a final overview of the data, descriptive statistics were calculated for the goals set by the

students. Overall, goals ranged from 46 to 100 with the average goal being 88. Furthermore,

the absolute value of the difference between the goals set and the score on the practice

questions ranged between 0 and 80 with the mean difference being 24 with a standard

deviation of 19. In examining the correlation between some key variables in the goal setting,

a weak positive correlation ($r = .32$, $\rho < .05$) between the score on the practice questions and

the goal set and a strong negative correlation ($r = -.88$, $\rho < .01$) between the score on the

practice questions and the absolute value of the difference between the goals set and the

score on the practice questions.

Research questions in this study were addressed using multilevel modeling (MLM)

procedures. Using MLM allowed for the nested nature of the data to be accounted for since

MLM is based on a hierarchical modeling framework (Snijders & Bowskers, 1997;

Raudenbush & Bryk, 2002). This technique is particularly important for analyzing data from

school research where individual observations are interdependent due to nesting within

classrooms in addition to observations being nested within individuals (Hill & Rowe, 1996).

The hierarchical structure of this technique can be used to investigate both within and

between person variability or change over time. In addition to producing a better change

model for time points nested within students, this technique also allowed for analysis of the

complete data set even if students missed individual time points during the data collection

period.

Initial analyses were conducted to determine the appropriate number of levels to use for subsequent analyses as well as to determine whether or not there was significant variance at each of the levels (Raudenbush & Bryk, 2002). The first analysis was used to determine whether proceeding with a three-level model, time points nested within students nested within teachers, would be necessary for subsequent analyses. Therefore, a fully unconditional model with only the intercept term included at each level was run with monitoring accuracy as the outcome variable. Results of this analysis indicated that there was an absence of variance among teachers, which suggested that a less complex two-level model would be more appropriate for this data (Raudenbush & Bryk, 2002).

Given the results of the three-level fully unconditional model, a second fully unconditional model with two levels, time points nested within students, was conducted. Again, the only term entered into the model was the intercept term at each level. Results of this analysis indicated that 38% of the variability in monitoring accuracy was between students (τ_{00} = .0069, z = 4.94, ρ < .0001) and 62% was within students (σ^2 = .011, z = 13.49, ρ < .0001). Therefore, the model indicated there was enough variability attributable to both sources to allow for further analyses. The following sections will discuss the results of each of the research questions addressed in this study.

Results Addressing Primary Research Questions

Do students monitor their comprehension more accurately when they have an achievement goal? Do students change at different rates in their monitoring accuracy based on whether they have an achievement goal?

An intercepts and slopes as outcomes model was run using a sample of 100 students accounting for 467 observations to address the first research question. For this model, time was entered at level 1 and goal condition was entered at level 2 to form the following equations.

Level 1: MonitorAcc$_{it}$ = β_{0it} + β_{1it}(Time) + r$_{it}$

Level 2: β_{0i} = γ_{00} + γ_{01}(GoalCond) + u$_{0i}$

β_{1i} = γ_{10} + γ_{11}(GoalCond) + u$_{1i}$

The results of the analysis indicated that there was no significant relationship between time and students' monitoring accuracy (γ_{10} = -.0019, t = -.41, ρ = .68). There were also no significant differences in students' average monitoring accuracy based on whether or not the students set an achievement goal (γ_{01} = -.011, t = -.51, ρ = .61). Likewise, the interaction between time and goal condition was not significant (γ_{11} = -.0023, t = -.37, ρ = .71). This model accounted for 4% of the within-person variability (σ^2 = .011, z = 11.75, ρ < .0001) and 24% of the between-person variability (τ_{00} = .0052, z = 2.83, ρ =.0023).

Does academic self-efficacy or self-efficacy for reading moderate the relationship between goal conditions and monitoring accuracy?

      To address the second research question, another intercepts and slopes as outcomes model was run using a sample of 100 students accounting for 456 observations to address the second research question. In this model, time and reading self-efficacy were added as level 1, within-person, variables, and goal condition was added as a level 2, between-person variable. The Motivation for Reading Questionnaire (MRQ) from which the self-efficacy scale for reading score is derived used a 1 (very different from me) to 4 (a lot like me), so there was not a meaningful zero for that variable. Therefore, the self-efficacy for reading variable was grand mean centered before the model was run meaning that the results should be interpreted in terms of an individual with an average self-efficacy for reading score. Equations for the models were as follows.

Level 1: $\text{MonitorAcc}_{it} = \beta_{0it} + \beta_{1it}(\text{Time}) + \beta_{2it}(\text{Reading Efficacy}) + r_{it}$

Level 2: $\beta_{0i} = \gamma_{00} + \gamma_{01}(\text{GoalCond}) + u_{0i}$

$\qquad \beta_{1i} = \gamma_{10} + \gamma_{11}(\text{GoalCond}) + u_{1i}$

$\qquad \beta_{2i} = \gamma_{20} + \gamma_{21}(\text{GoalCond}) + u_{2i}$

      Results for the model could not be generated because of too many likelihood evaluations. Therefore, in an attempt to estimate the parameters for the model, the model was run again, but the slope for self-efficacy for reading was constrained, removing u_{2i} from the model. Results of this model indicated that neither time ($\gamma_{10} = -.0016$, $t = -.35$, $p = .73$), goal condition ($\gamma_{01} = -.0010$, $t = -.46$, $p = .66$), nor the interaction between time and goal

condition ($\gamma_{11} = -.0019$, $t = -.29$, $\rho = .77$) were significantly related to average monitoring

accuracy. Furthermore, the relationship between self-efficacy for reading and average

monitoring accuracy when controlling for time was not significant ($\gamma_{20} = -.028$, $t = -1.51$, $\rho =$

.13). Finally, results of the model indicated that the relationship between average monitoring

accuracy and goal condition did not depend on self-efficacy for reading ($\gamma_{21} = .011$, $t = .43$, ρ

$= .67$). Overall the model accounted for 33% of between- person variability ($\tau_{00} = .0046$, $z =$

2.54, $\rho = 0.006$) and 1% of within-person variability ($\sigma^2 = .011$, $z = 11.51$, $\rho < .0001$).

To further address this research question, another model was run using the academic

self-efficacy variable in place of the self-efficacy for reading variable. The academic self-

efficacy variable was derived from the Motivated Strategies for Learning Questionnaire

(MSLQ) using a scale from 1 (not at all true of me) to 7 (very true of me), so the variable did

not have a meaningful zero. Therefore, as with the self-efficacy for reading variable, the

academic self-efficacy variable was also grand mean centered to give it a meaningful zero.

Upon completion of this process, the model was run using a sample of 100 students and 465

observations. Equations for the models were as follows.

Level 1: MonitorAcc$_{it}$ = β_{0it} + β_{1it}(Time) + β_{2it}(Efficacy) + r$_{it}$

Level 2: β_{0i} = γ_{00} + γ_{01}(GoalCond) + u$_{0i}$

β_{1i} = γ_{10} + γ_{11}(GoalCond) + u$_{1i}$

β_{2i} = γ_{20} + γ_{21}(GoalCond) + u$_{2i}$

Results for the model closely mirrored those from the previous model using self-

efficacy for reading. As with that model, neither time ($\gamma_{10} = -.0012$, $t = -.26$, $\rho = .79$), goal

condition (γ_{01} = -.0098, t = -.43, ρ = .66) nor the interaction between time and goal condition (γ_{11} = -.0022, t = -.34, ρ = .73) were significantly related to average monitoring accuracy. Additionally, the relationship between academic self-efficacy and average monitoring accuracy when controlling for time was not significant (γ_{20} = -.011, t = -1.39, ρ = .16). Furthermore, results of the model indicated that the relationship between average monitoring accuracy and goal condition did not depend on academic self-efficacy (γ_{21} = .060, t = .54, ρ = .59). Overall this model accounted for 16% of between- person variability (τ_{00} = .0058, z = 3.00, ρ = 0.0014) and 5% of within-person variability (σ^2 = .011, z = 11.78, ρ < .0001).

Does goal orientation moderate the relationship between goal condition and self-efficacy?

Does goal orientation moderate the relationship between goal condition and monitoring accuracy?

For the first part of the third set of research questions, another fully unconditional model was run because a new dependent variable, reading self-efficacy, was introduced. Again, no term other than the intercept term was added to the model. Results of this analysis indicated that 69% of the variability in self-efficacy for reading was between individuals (τ_{00} = .26, z = 6.45, ρ < .0001) and 31% was within individuals (σ^2 = .11, z = 14.19, ρ < .0001). Therefore, the model indicated there was enough variability to continue to address the research question.

In subsequent analyses, additional intercepts and slopes as outcomes models were run with time and goal orientation variables added at level 1 and goal condition added at level 2. As with the self-efficacy for reading variable, because each of the goal orientation variables

were obtained from the Achievement Goals Questionnaire (AGQ), with answer options

ranging from 1 (not at all true of me) to 7 (very true of me), these variables did not have a

meaningful zero. Therefore, the performance approach, performance avoid, mastery

approach, and mastery avoid variable were each grand mean centered, so results involving

these variables should each be interpreted in terms of an individual with the average score for

each of the goal orientation variables. After centering each of these variables, a separate

model was run for each of the goal orientation variables. Each of these models followed the

following equations.

Level 1: Reading Efficacy$_{it}$ = β_{0it} + β_{1it}(Time) + β_{2it}(GoalOrient) + r_{it}

Level 2: β_{0i} = γ_{00} + γ_{01}(GoalCond) + u_{0i}

$\quad$ β_{1i} = γ_{10} + γ_{11}(GoalCond) + u_{1i}

$\quad$ β_{2i} = γ_{20} + γ_{21}(GoalCond) + u_{2i}

$\quad$ Each model was run using a sample of 100 students, and with the exception of the

model with the performance avoid variable, which used 489 observations, each model used

490 observations. A summary of the results of the four models in addition to the fully

unconditional model is presented in Table 3.

Table 3. Results of Multilevel Models Fixed and Random Effects

Fixed Effects	Fully Uncond.	Mastery Approach	Mastery Avoid	Performance Approach	Performance Avoid
Self-efficacy for reading rating, β_0					
Intercept, γ_{00}	3.16^{***} (.053)	3.08^{***} (.076)	3.09^{***} (.078)	3.10^{***} (.078)	3.10^{***} (.080)
Goal condition, γ_{01}		.022 (.11)	.00065 (.11)	-.00055 (.11)	-.0011 (.11)
Time slope, β_1					
Intercept, γ_{10}		$.033^{*}$ (.016)	.026 (.015)	.028 (.015)	$.031^{*}$ (.016)
Goal condition, γ_{11}		-.0056 (.021)	-.0032 (.021)	-.0056 (.020)	-.0088 (.021)
Goal orientation slope, β_2					
Intercept, γ_{20}		$.057^{*}$ (.027)	.016 (.017)	.026(.022)	-.0035 (.025)
Goal condition, γ_{21}		.029 (.038)	-.017 (.027)	.029 (.032)	.012 (.037)
Random Effects					
Self-efficacy for reading rating (τ_{00})	$.26^{***}$ (.040)	$.21^{***}$ (.041)	$.23^{***}$ (.041)	$.22^{***}$ (.043)	$.23^{***}$ (.044)
Time slope (τ_{11})		$.0034^{*}$ (.0018)	$.0033^{*}$ (.0017)	$.0029^{*}$ (.0017)	$.0037^{*}$ (.0017)
Goal orientation slope (τ_{22})		.0045 (.0045)	___	.0026 (.0033)	.0044 (.0037)
Within-person fluctuation (σ^2)	$.11^{***}$ (.0079)	$.096^{***}$ (.0084)	$.10^{***}$ (.0083)	$.098^{***}$ (.0084)	$.094^{***}$ (.0084)

Note: $^{*}\rho < 0.05$, $^{**}\rho < 0.01$, $^{***}\rho < 0.001$ Standard errors are provided in parentheses.

As the table indicates, there were few significant relationships among the variables in each of the four goal orientation models. In the models with the mastery approach and performance avoid goal orientations, time was shown to be positively related to self-efficacy for reading, so when controlling for the mastery approach orientation, students' self-efficacy for reading increased as the study continued. Additionally, in the model with the mastery approach goal orientation, an increase in such an orientation was related to an increase in self-efficacy for reading. However, the relationship between goal condition and self-efficacy for reading did not depend on any of the four goal orientations.

After the running the previous set of models, the process was repeated using academic self-efficacy, computed from the MLSQ, as the dependent variable instead of the self-efficacy for reading variable. Again, prior to running the models with time, goal condition, and goal orientation variables, a fully unconditional model was run. Results of this analysis indicated that 65% of the variability in academic self-efficacy was between individuals (τ_{00} = .96, z = 6.32, ρ < .0001) and 35% was within individuals (σ^2 = .52, z = 14.34, ρ < .0001). Therefore, in subsequent analyses, four separate models were run using each of the goal orientation variables in the following equations.

Level 1: $\text{Efficacy}_{it} = \beta_{0it} + \beta_{1it}(\text{Time}) + \beta_{2it}(\text{GoalOrient}) + r_{it}$

Level 2: $\beta_{0i} = \gamma_{00} + \gamma_{01}(\text{GoalCond}) + u_{0i}$

$\beta_{1i} = \gamma_{10} + \gamma_{11}(\text{GoalCond}) + u_{1i}$

$\beta_{2i} = \gamma_{20} + \gamma_{21}(\text{GoalCond}) + u_{2i}$

As with the previous set of models, each model was run using a sample of 100 students, and with the exception of the model with the performance avoid variable, which used 489 observations, each model used 490 observations. Results of these models are presented in Table 4.

Table 4. Results of Multilevel Models Fixed and Random Effects

Fixed Effects	Fully Uncond.	Mastery Approach	Mastery Avoid	Performance Approach	Performance Avoid
Academic self-efficacy rating, β_0					
Intercept, γ_{00}	5.19^{***} (.10)	5.13^{***} (.13)	5.27^{***} (.15)	5.20^{***} (.13)	5.19^{***} (.15)
Goal condition, γ_{01}		.076 (.18)	-.054 (.21)	.052 (.18)	-.031 (.21)
Time slope, β_1					
Intercept, γ_{10}		.0096 (.034)	-.030 (.030)	-.014 (.031)	-.0038 (.031)
Goal condition, γ_{11}		.00062 (.046)	.012 (.042)	-.00041 (.043)	.0071 (.042)
Goal orientation slope, β_2					
Intercept, γ_{20}		$.36^{***}$ (.066)	.058 (.047)	$.19^{***}$ (.055)	$.15^{*}$ (.062)
Goal condition, γ_{21}		.024 (.092)	.082 (.069)	.050 (.077)	.027 (.091)
Random Effects					
Academic self-efficacy rating (τ_{00})	$.96^{***}$ (.15)	$.48^{***}$ (.11)	$.69^{***}$ (.16)	$.43^{***}$ (.13)	$.69^{***}$ (.16)
Time slope (τ_{11})		$.0025^{**}$ (.0085)	.0066 (.0069)	.011 (.0067)	$.012^{*}$ (.0066)
Goal orientation slope (τ_{22})		$.072^{**}$ (.026)	.027 (.014)	$.048^{**}$ (.0021)	$.071^{**}$ (.026)
Within-person fluctuation (σ^2)	$.52^{***}$ (.036)	$.33^{***}$ (.030)	$.47^{***}$ (.039)	$.44^{***}$ (.038)	$.40^{***}$ (.036)

Note: $^{*}\rho < 0.05$, $^{**}\rho < 0.01$, $^{***}\rho < 0.001$ Standard errors are provided in parentheses.

As the table indicates, results from the models using academic self-efficacy as the dependent variable a different pattern of results emerged from those using self-efficacy for reading as the dependent variable. While most of the results were non-significant, in the models with mastery approach, performance approach, and performance avoid goal orientations, each of those variables was shown to be positively related to academic self-efficacy.

To address the second part of this set of research questions, four more intercepts and slopes as outcomes models were run with time, goal condition, and goal orientation variables entered as predictors of average monitoring accuracy scores. The centered goal orientation variables were again used for these models. For these models, the following set of equations was used.

Level 1: $\text{MonitorAcc}_{it} = \beta_{0it} + \beta_{1it}(\text{Time}) + \beta_{2it}(\text{GoalOrient}) + r_{it}$

Level 2: $\beta_{0i} = \gamma_{00} + \gamma_{01}(\text{GoalCond}) + u_{0i}$

$\beta_{1i} = \gamma_{10} + \gamma_{11}(\text{GoalCond}) + u_{1i}$

$\beta_{2i} = \gamma_{20} + \gamma_{21}(\text{GoalCond}) + u_{2i}$

Each of the models used a sample of 100 participants accounting for 457 observations. In the case of the model with the performance approach goal orientation variable, the slope for that variable had to be constrained because when the slope was allowed to vary parameter estimates for the model could not be estimated due to too many likelihood evaluations. Results of each on the four models are presented in Table 5.

Table 5. Results of Multilevel Models Fixed and Random Effects

Fixed Effects	Fully Uncond.	Mastery Approach	Mastery Avoid	Performance Approach	Performance Avoid
Monitoring accuracy, β_0					
Intercept, γ_{00}	.41*** (.010)	.42*** (.017)	.43*** (.016)	.43*** (.017)	.43*** (.080)
Goal condition, γ_{01}		-.0023 (.023)	-.011(.023)	-.0082 (.023)	-.013 (.022)
Time slope, β_1					
Intercept, γ_{10}		-.0013 (.0048)	-.0031 (.0046)	-.0025 (.0046)	.0018 (.0050)
Goal condition, γ_{11}		-.0039 (.0065)	-.0024 (.0063)	-.0027 (.0062)	-.0054 (.0069)
Goal orientation slope, β_2					
Intercept, γ_{20}		-.00025 (.0064)	.0088 (.0055)	.0030 (.0053)	.0079 (.0055)
Goal condition, γ_{21}		-.048 (.0090)	-.0029 (.0083)	-.0090 (.0079)	.0082 (.0084)
Random Effects					
Monitoring accuracy (τ_{00})	.0069*** (.0014)	.0062*** (.0020)	.0053** (.0020)	.0061*** (.0020)	.0063*** (.0020)
Time slope (τ_{11})		.00022 (.00017)	.00013 (.00015)	.00013 (.00014)	.00036* (.00020)
Goal orientation slope (τ_{22})		.0000047 (.00021)	.00015 (.00025)	NA	0 (--)
Within-person fluctuation (σ^2)	.11*** (.00085)	.010*** (.00090)	.010*** (.00092)	.010*** (.00091)	.010*** (.00086)

Note: $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$ Standard errors are provided in parentheses.

As the table indicates, there were no significant results attributable to the variables included in these models. Furthermore, in addressing the research question, none of the four goal orientation variables were shown to significantly affect the relationship between goal conditions and average monitoring accuracy.

Further Analyses Addressing Primary Research Questions

After running analyses directly addressing the primary research questions, additional models were run to investigate the results in greater detail. First the research questions were readdressed using a data set in which all instances where students scored below chance, twenty-five percent, on the multiple choice assessments were eliminated from the data set. Results of these models directly mirrored the results that the full data set produced.

The primary research questions were again reinvestigated with the addition of ability as a predictor variable. An ability variable was created using even thirds splits of baseline Gates MacGinitie comprehension scores for both goal and no goal conditions. Overall, these models produced the same results in specifically addressing the research questions as the original models. In all models predicting monitoring accuracy, there was a negative relationship between ability and monitoring accuracy. However, because monitoring accuracy was measured on a scale where 0 means that a student's monitoring was perfectly calibrated and accurate while a 1 means that a student's monitoring was not at all accurate, a negative relationship between ability and monitoring accuracy means that as ability level increases students are more accurate in their monitoring. In the model addressing the first research question, which included time and goal condition, produced the following results for

ability (γ_{02} = -.043, t = -3.35, p = .0011). When academic self-efficacy and self-efficacy for

reading were added to separate models to test their potential as moderators, ability was again

found to be negatively related to monitoring accuracy producing the following results from

the respective models (γ_{02} = -.039, t = -2.91, p = .0045) and (γ_{02} = -.041, t = -3.06, p = .0028).

Furthermore, in the models testing the moderating affects of mastery avoid, mastery

approach, performance avoid, and performance approach goal orientations, ability was

negatively related to monitoring accuracy in each case with the following results from the

respective models (γ_{02} = -.048, t = -3.59, p = .0005), (γ_{02} = -.049, t = -3.65, p = .0004), (γ_{02} = -

.038, t = -2.79, p = .0063), and (γ_{02} = -.053, t = -3.97, p = .0001). The models addressing the

question of whether or not any of the goal orientations moderated the relationship between

goal condition and either self-efficacy for reading or academic self-efficacy also produced

many of the same results as the original models addressing the question. Two differences

although, not directly related to the actual research questions did emerge in these models,

including non-significance of the mastery approach orientation (γ_{20} = .016, t = .30, p = .76)

and the significant finding for the mastery avoid orientation (γ_{20} = .068, t = 2.07, p = .039) in

the models predicting self-efficacy for reading. Additionally, in the models including each of

the goal orientations, mastery avoid, mastery approach, performance avoid, and performance

approach, ability was found to be positively related to self-efficacy for reading with the

following results from the respective models (γ_{02} = .27, t = 4.32, p <.0001), (γ_{02} = .27, t

=4.59, p <.0001), (γ_{02} = .28, t = -4.40, p <.0001), and (γ_{02} = .29, t = 4.91, p < .0001).

Furthermore, in the models predicting academic self-efficacy, when the performance

approach orientation was included in the model ability was found to be positively related to

academic self-efficacy ($\gamma_{02} = .23$, $t = 2.07$, $\rho = .041$) and when the performance avoid

orientation was included in the model the interaction between that orientation and ability was

found to be significant ($\gamma_{22} = -.16$, $t = -2.96$, $\rho = .0033$).

　　　　While the lack of students with complete data over the course of the six weeks of the

study did not allow for analysis of the data using Repeated Measures Analysis of Variance to

look for non-linear change, mean monitoring accuracies were plotted to look for trends.

Means at each time point for the three ability levels in the goal and no goal groups are

represented in Figure 4.
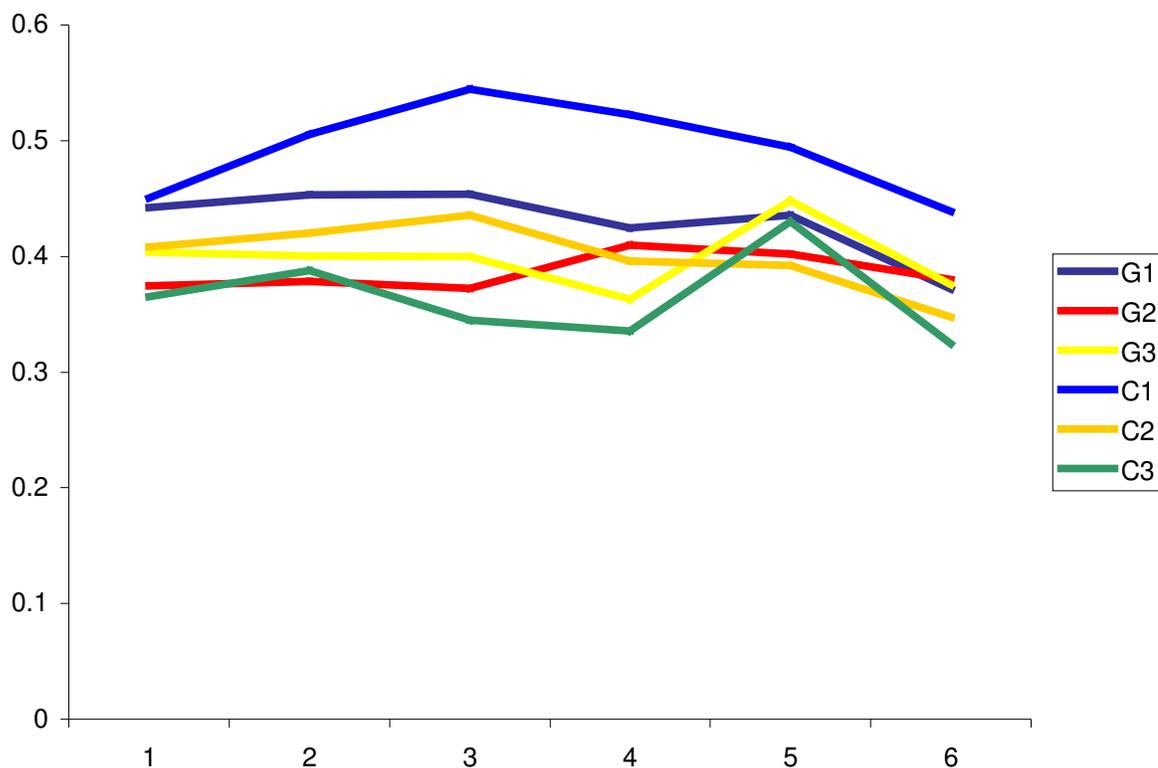
Figure 4. Group-Ability Average Monitoring Accuracies Across Time

As Figure 4 indicates, with the exception of the lowest ability no gal control group, most of the groups' means centered around a monitoring accuracy of .4. Although the groups did show fluctuations in their average monitoring accuracies across time, these fluctuations did not appear to occur in any predictable pattern.

Additional Results

Although not included as part of the primary research questions for this study, one other important question to investigate was whether or not students' performance on the passage questions improved over time and whether there were differences in performance

based on goal condition. Therefore, an additional set of models was run to answer these questions. First, because a new dependent variable was introduced for these analyses, percent correct on passage questions, another fully unconditional model was run to determine whether or not there was sufficient variance to allow for subsequent MLM analyses using that variable. Results of this model indicated that 44% of the variance in passage scores was between students (τ_{00} = 209.29, z = 5.56, p < .0001) and 56% was within students (σ^2 = 264.37, z = 14.40, p < .0001). These results indicated that there was sufficient variance to run further models.

A slopes and intercepts as outcomes models with time and goal condition added as predictor variables was run to address the additional question posed. The equations used for the model were as follows.

Level 1: PassageScore$_{it}$ = β_{0it} + β_{1it}(Time) + r_{it}

Level 2: β_{0i} = γ_{00} + γ_{01}(GoalCond) + u_{0i}

β_{1i} = γ_{10} + γ_{11}(GoalCond) + u_{1i}

 Results of the model indicate that neither time (γ_{10} = -.90, t = -1.40, p = .16) nor goal condition (γ_{01} = 2.74, t = .72, p = .47) was significantly related to scores on the passage questions. Furthermore, the interaction between time and goal condition (γ_{11} = -.97, t = -1.11, p = .27) was also not significantly related to passage scores. Overall, the model accounted for 2% of between student variance (τ_{00} = 205.68, z = 3.93, p < .0001) and 5% of within student variance (σ^2 = 251.89, z = 19.88, p < .0001).

Discussion

Overview of Findings

This study investigated the effects of goal setting on students' ability to accurately monitor their comprehension of texts in classroom-based exercises. In order to do this, half of the students in the study set an achievement goal for the average score they wanted to achieve over six comprehension assessments. Then over the course of six weeks, all students participated in weekly protocols, which encompassed reading a science related text on one day, and then, on the following day, answering a series of ten multiple choice questions and rating the accuracy of those responses. In addition, using subscales from the Motivated Strategies for Learning Questionnaire and the Motivation for Reading Questionnaire, data were gathered weekly on students' academic self-efficacy and self-efficacy for reading to examine those variables as potential moderators of the relationship between goal setting and monitoring accuracy. Using the Achievement Goals Questionnaire, weekly data were also gathered on students' goal orientations, which were examined as potential moderators of the relationship between goal setting and monitoring accuracy and the relationship between goal setting and each of the self-efficacy variables.

Results of the study were consistent with the non-compensatory achievement goals hypothesis, which suggested that students' abilities to monitor their comprehension of text would be too deficient to be affected by goal setting. Analyses addressing each of the primary research questions revealed non-significant findings for each of the questions. The non-significant finding for the research questions also held when students scoring below

chance on the passage questions were excluded from analyses as well as when ability was

included as an additional predictor in the analyses. Goal setting did not affect monitoring

accuracy averages, and neither academic self-efficacy, self-efficacy for reading, nor any of

the four goal orientation variables moderated the relationship between goal setting and

monitoring accuracy. Furthermore, goal orientation had no moderating affect on the

relationship between goal setting and academic self-efficacy or self-efficacy for reading. The

following sections will discuss in more detail how these findings fit with findings from prior

research and implications for future research.

Monitoring Accuracy and Goals

Many prior studies have found that typical students, especially in their upper

elementary to early middle school years but even college students, are deficient in their

abilities to monitor their comprehension of text (Pressley& Ghatala, 1990; Eme et al., 2006;

Di Vesta et al., 1979; Cain et al., 2004).   In line with those findings, students in this study

displayed inaccurate monitoring ratings with overall monitoring accuracies of .41 and .40 for

the goal and no goal groups respectively, and those inaccurate monitoring results were

pervasive throughout the study showing no significant change over time. Therefore, while it

is disconcerting to find that students' monitoring accuracies were poor and did not improve

over time, such findings do fit those of other studies. As suggested by the non-compensatory

achievement goals hypothesis, students' monitoring abilities were too deficient to be affected

by the presence of an achievement goal (Pressley & Ghatala, 1990; Eme et al., 2006; Di

Vesta et al., 1979). While the primary cause of the non-significant findings was likely a lack

of monitoring abilities in general, another important contributing factor could have been the difficulty level of the passage questions used in the protocol. Students in this study, across conditions and time, had relatively low average scores on the weekly passage questions with overall averages of around 52%. The baseline comprehension test indicated that overall the students possessed at least average comprehension abilities for their grade level; therefore, the averages on the weekly passage questions indicate that the questions were difficult for the students, which similar to the findings of Schraw and Roedel (1994) may have resulted in less accurate monitoring than questions of a more moderate difficulty level. However, if students had been made specifically aware of the difficulty level of the questions or had received calibration training with targeted monitoring accuracy feedback, they might have been able to adjust their confidence judgments in accordance with the item difficulty (Nietfeld, Cao, Osborne, 2006).

Goal setting was presented as a possible means for improving monitoring accuracy and increasing motivation for and engagement with text comprehension. As Eme et al. (2006) suggested, a lack of engagement with the text could be considered at least a partial explanation for poor monitoring of comprehension; therefore, setting an achievement goal could possibly lead to an increase in motivation and engagement and thus more accurate monitoring. While both theoretical work and empirical studies had suggested a link between goal setting and increased motivation (Schunk, 1985; Bandura & Cervone, 1983; Locke & Latham, 2002), the relationship between those variables and monitoring accuracy had not been specifically investigated. Here, goal setting, in and of itself, was not found to be

significantly related to monitoring accuracy or any changes in monitoring accuracy over time.

While these results are consistent the hypothesis that students' monitoring was too deficient to benefit from any increase in motivation resulting from setting an achievement goal, other factors could have contributed to the lack of significant relationships. These other factors may have included a lack of familiarity with setting and working toward goals in an academic setting, a need for more scaffolding in the goal setting process, and a need for even more proximal goals. The potency of a goal setting intervention may be increased if students have more practice with setting a goal in collaboration with a teacher and then are gradually given more independence in the classroom goal setting process. As evidenced by the larger differences between students' scores on the practice questions and the goals that they set, with the average difference being 24 percentage points and 35% of the students setting goals 30 percentage points higher than their practice scores, many students were not able to or did not set vary effective goals and instead inflated their goals. Therefore, scaffolding could be very beneficial for getting students to set more realistic goals. Furthermore, goal setting may also produce more significant findings if students are given multiple opportunities to set and work towards more proximal goals during the intervention period. This would allow students more opportunities to reflect on the process and detect relationships between goal setting and academic outcomes.

Monitoring Accuracy, Goals, and Self-Efficacy

As part of the overall self-regulated learning process, self-efficacy and goals are highly intertwined with each affecting the other (Zimmerman, 1990; Schunk, 1991). Therefore, it was hypothesized that academic self-efficacy, as measured by the MSLQ, and self-efficacy for reading, as measured by the MRQ, could have moderated the relationship between goal setting and monitoring accuracy. However, since setting an achievement goal was not effective in spurring greater self-regulated behavior as evidenced by the lack of significant differences in monitoring accuracy, it is fitting that both of the self-efficacy variables also produced non-significant main effects as well as non-significant interactions with goal setting. Here, a lack of change over time in self-efficacy as well as a lack of differences based on goal condition indicated that the motivational component of SRL embodied by self-efficacy was largely absent in the students' behavior in this study.

It was thought that academic self-efficacy and self-efficacy for reading would act as potential moderators of the relationship between goal setting and monitoring accuracy. The findings of close ties between goals and self-efficacy (Bandura & Schunk, 1981; Schunk, 1991; Schunk, 1985) and the bi-directional relationship between the two variables (Zimmerman, 1990; Schunk, 1991) suggested that the affect on monitoring accuracy might be seen through an interaction between those two variables. However, again, results were consistent with the achievement goals non-compensatory hypothesis, students' monitoring accuracy skills and abilities may have been too deficient to benefit from any potential affect of goal setting and self-efficacy gains.

Self-Efficacy, Goals, and Goal Orientations

Given the complex relationships among motivation variables, further investigations of the relationship between goal setting and self-efficacy with the four goal orientation variables as moderators were also conducted. It was hypothesized, based on findings from previous studies (Pajares et al., 2000; Elliot & Harackiewicz, 1994), that there would be differential effects of goal setting on self-efficacy based on specific goal orientations. However, none of the goal orientation variables moderated the relationship between goal setting and self-efficacy for reading, but a positive relationship was found between the mastery approach goal orientation and self-efficacy for reading. Such a result was consistent with the finding by Pajares et al. (2000) that mastery goal orientations were related to the most positive outcomes for self-efficacy. Additionally, none of the goal orientation variables moderated the relationship between goal setting and academic self-efficacy; nevertheless, positive relationships were found between three of the goal orientations, mastery approach, performance approach, and performance avoid, and academic self-efficacy. While the findings for the mastery approach and performance approach goal orientations fit with those of Pajares et al. (2000), the positive finding for the performance avoid orientation runs counter to findings from the previously mentioned study as well as the more general finding that performance orientations are related to maladaptive outcomes (Meece, 1994; Elliot & Dweck, 1988; Ames &Archer, 1988). One possible explanation for this finding is that because responses to questions for each of the goal orientations on the Achievement Goals Questionnaire were not mutually exclusive and instead produced more of a goal orientation

profile, students responded with high ratings to more than one orientation. Therefore, the

positive relationship between the performance avoid goal orientation and academic self-

efficacy could be due more to the overall goal orientation profile than the single orientation.

Monitoring Accuracy, Goals, and Goal Orientations

Similar to the self-efficacy variables it was hypothesized that there would be

differential affects of goal setting on monitoring accuracy based on goal orientation.

However, there were no significant findings in the results of the analysis addressing this

question. This finding was also consistent with the non-compensatory hypothesis.

Implications

This study attempted to take the next step with research investigating students'

abilities to monitor their comprehension of text. As educational research continues to

emphasize SRL as the ideal for student learning behavior, it is important to reexamine

previously researched topics including monitoring within the broader SRL framework.

Although monitoring plays a very central role in SRL especially within information

processing conceptions of the phenomena (Winne, 2001; Butler& Winne, 1995), few studies

have combined an investigation of monitoring with motivational variables that factor into

SRL. Findings from this study present a starting point for more investigations of and

interventions to improve self-regulated comprehension.

Prior research has shown that students are often unable to monitor how well they have

comprehended what they have read (Pressley& Ghatala, 1990; Eme et al., 2006; Di Vesta et

al., 1979). This in and of itself is an important finding to understand and work to improve

upon. However, it is also important to understand monitoring abilities within a larger framework and determine the interplay between students' abilities to monitor their comprehension and other variables that contribute to SRL. Sixth grade students represent a population undergoing a significant transition with regard to the development of their comprehension abilities. If the ultimate goal of education is to develop students who are capable of directing and regulating their own learning (Zimmerman, 1990; Butler & Winne, 1995; Boekaerts, 1999), then it is valuable to understand the degree to which a sample of sixth grade students is exhibiting several key aspects of SRL.

Results of this study suggest that this sample of sixth graders was not displaying sophisticated self-regulated behavior in their comprehension of text. Among mature learners, goal setting begins the self-regulation process and provides meaning to subsequent learning activities, including monitoring (Joseph, 2005). Although it was not expected that sixth grade students would display the characteristics of a fully self-regulated learner (Pressley, 1995; Zimmerman, 1990; Schunk, 2001), it was important to undertake an investigation of the degree to which they were exhibiting self-regulated behavior in relationship to the variables include in this study. However, at least to the degree that this study generalizes, simple goal setting by students does not produce significant differences in monitoring accuracy, and results of this study suggest that goal setting may not spur enough of a motivational increase to compensate for deficient monitoring abilities. Nevertheless, additional investigations should be undertaken to determine if similar results would be found with comprehension of a more moderate difficulty level. Eventually, students need to

become much more accurate in their ability to monitor their comprehension, and they need to be able to undertake this monitoring toward the achievement of self-set goals. This study indicates that sixth grade students need more scaffolding and integrated instruction with both monitoring their comprehension as well as setting goals for their comprehension. Because of the many intertwined and bi-directional relationships among components of SRL, it is important to take an integrated approach with educational interventions.

Finally, as an additional implication of this study, it represented an attempt to conduct ecologically valid research that as closely as possible mirrored actual classroom practice. Given the importance of SRL success of learners in the classroom, studies investigating aspects of SRL should not be conducted in a setting far removed from classroom. Therefore, it was important for this study to take place in a real classroom setting during the course of the school day. Additionally, the materials used for the passages were specifically chosen to align with the sixth grade science curriculum and were all topics related to the science objectives for the subsequent grading period. As mentioned previously, this study represents a starting point for bringing monitoring research into the SRL framework, while further investigations are needed, they too should also seek to be as ecologically valid as possible.

Limitations of the Current Study

While the findings of this study add to the knowledge base concerning monitoring comprehension and relationships within SRL, the results presented here should be viewed with some consideration to the potential limitations. Although conducting the study within the everyday schedule of a school helped to increase the ecological validity of the findings,

doing so also presented some limitations to the study that should be considered. One such

limitation was that there was less control over special school events that interrupted the

normal schedule for the school day and the study protocol, so there were a few occasions

where the study protocol for each of the classes had to be moved to a different part of the day

or where some students had to complete the protocol at a different time from the rest of the

class. While moving the protocol to a different part of the day did not necessarily affect the

data collected, different scheduling interruptions may have affected how focused the students

were on the task. Another limitation was that, there was slightly less control over the

behavior problems that arise in a typical school setting than there might have otherwise been

in a laboratory setting. For example, some classroom seating arrangements placed students

in situations where they were more likely to be distracted or to become a distraction, and

some behavior issues carried over from earlier classroom issues. These types of changes and

fluctuations in the "normal" school day occur in most schools; however, the particular pattern

of interruptions that occurred and any affects that they may have had on the students during

the current study may have affected the findings in a unique manner.

Another limitation of the current study involves the choice of some of the study

materials including the passage questions and the self-report surveys. First, the passage

questions were not pilot tested and ended up being more difficult than expected. Therefore,

the difficulty level of the passage questions should be considered when viewing the results of

this study. The higher difficulty level of questions as represented by the low overall average

score on the passage questions, 52.45%, may have produced less accurate monitoring than

questions of a more moderate difficulty as suggested by Schunk and Roedel (1994). In addition to the limitations presented by the passage questions, the use of self-report surveys present some limitations that should also be considered. Although the surveys used for the current study were all reliable and valid instruments, there is always a concern for bias or false report when self-report instruments. First, there was the possibility of a social desirability bias where students may have reported exhibiting behavior perceived as more desirable. However, there was also a possibility that students were simply not very self-reflective when they were completing their surveys, so they did not provide the most accurate response. Despite these issues, the use of the self-report surveys did provide the best means for measuring the variables of interest in this study.

A final limitation of this study, and the limitation that potentially had the greatest impact on the results obtained, was that students' performance on the weekly passage questions had no bearing on the students' classroom grades. Although care was taken to make the study as ecologically valid as possible, in order to secure participation at both the school and student level, actual grade weight could not be assigned to the results of the passage questions. As such, there was no extrinsic incentive for the students to try their best on each of the protocols. Although the researcher and classroom teachers explained to the students that their participation in the study was extremely important and students were repeatedly reminded to try their hardest each week, there was no added incentive for students to actually follow through. Therefore, it was likely, especially given the length of the study, that at least some of the students were not motivated to display their best efforts in the study.

Recommendations for Future Research

The late elementary and early middle school years represent an important population for research on self-regulated behavior and especially self-regulated comprehension. Because this population is undergoing a transition in their comprehension abilities as they begin to take on the responsibility for comprehending what they read (Indrisano & Chall, 1995), students in this period also present an important population to study to understand the trajectory that they follow toward self-regulated comprehension and any interventions that may improve that trajectory. Although there are numerous factors that contribute to self-regulated comprehension and SRL in general, there are two suggestions for future research that extend specifically from this study. First, the design of this study should be expanded upon to include a comprehension strategy intervention in combination with goal setting. Second, a further investigation of goal setting should be undertaken including additional manipulations such as incorporating scaffolded goal setting and more proximal goals.

In the first suggestion, a comprehension strategy intervention could provide a needed link between goal setting and monitoring comprehension. Since goal setting alone was not enough to improve monitoring accuracy, instruction in appropriate strategy use, another key to SRL (Zimmerman, 2001), may be what is needed to give students appropriate tactics to monitor their comprehension goals. Strategy interventions have been successful in improving comprehension and monitoring (Baker, 2002); however, such interventions have not considered the relationship between goal setting and monitoring accuracy. Given the importance of all three factors within self-regulated learning and comprehension,

investigating them in tandem would provide a useful addition to the findings from this study. Furthermore, components of SRL should be emphasized together to help set students on the path toward becoming mature self-regulated learners.

       The second suggestion for future research involves conducting further examinations of goal setting manipulations in combination with studies of students' abilities to monitor their comprehension. As stated in the purpose for the current study, goal setting is something that is often discussed as of great importance to SRL (Zimmerman, 2001; Zimmerman & Schunk, 2001; Pressley, 1995); however, there is limited research investigating goal setting as part of the larger framework of SRL. This study presented an important first step investigating the effects of goal setting on aspects of SRL. Given that no significant effects were shown for the population in this study, more work should be done to determine if there are conditions under which there is an effect of goals. For example, the effects of goal source including student, teacher, or collaboratively set goals should be examined to determine if the additional scaffolding and accountability provided by collaboratively set goals leads to a positive relationship with monitoring accuracy. In addition, because goal setting may be an otherwise under emphasized and utilized within a classroom setting, students may need to have even more practice with setting goals. Therefore, the effects of a successive set of even more proximal goals should also be investigated, which may lead to more reflection on the goal setting process and its relationship to academic outcomes.

References

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning

strategies and motivation processes. *Journal of Education Psychology*, 80(3), 260-

267.

August, D.L., Flavell, J.H., & Clift, R. (1984). Comparison of comprehension monitoring of

skilled and less skilled readers. *Reading Research Quarterly*, 20(1), 39-53.

Baker, L. (1984). Children's effective use of multiple standards for evaluating their

comprehension. *Journal of Educational Psychology*, 76(4), 588-597.

Baker, L. (1985). How do we know when we don't understand? Standards for evaluating

text comprehension. In D.L. Forrest-Pressley, G.E. MacKinnon, & T.G. Waller

(Eds.), *Metacognition, Cognition, and Human Performance*, (pp. 155-206). New

York: Academic Press.

Baker, L. (2002). Metacognition in comprehension instruction. In C.C. Collins & M.

Pressley (Eds.), *Comprehension Instruction* (pp. 77-95). New York: Guilford

Press.

Baker, L., & Brown, A.L. (1984). Metacognitive skills and reading. In P.D. Pearson, R.

Barr, M. Kamil, & P. Mosenthal (Eds.), *Handbook of Reading Research* (pp.353-

394). New York: Longmans.

Baker, L., & Wigfield, A. (1999). Dimensions of children's motivation for reading and their

relations to reading activity and reading achievement. *Reading Research Quarterly*,

34(4), 452-477.

Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing

the motivational effects of goal systems. *Journal of Personality and Social

Psychology*, 45(5), 11017-1028.

Bandura, A., & Schunk, D.H. (1981). Cultivating competence, self-efficacy, and intrinsic

interest through proximal self-motivation. *Journal of Personality and Social

Psychology*, 41(3), 586-598.

Boekaerts, M. (1997). Self-regulated learning: A new concept embraced by researchers,

policy makers, educators, teachers, and students. *Learning and Instruction*, 7(2),

161-186.

Boekaerts, M. (1999). Self-regulated learning: Where we are today. *International Journal of

Educational Research*, 31, 445-457.

Borkowski, J.G., & Thorpe, P.K. (1994). Self-regulation and motivation: A life-span

perspective on underachievement. In D.H. Schunk & B.J. Zimmerman (Eds.), *Self-

Regulation of Learning and Performance* (pp. 3-21). Hillsdale, N.J.: Lawrence

Erlbaum Associates.

Bouffard-Bouchard, T., Parent, S., & Larivee, S. (1991). Influence of self-efficacy on self-

regulation and performance among junior and senior high-school age students.

International Journal of Behavioral Development, 14, 153–164.

Butler, D.L., & Winne, P.H. (1995). Feedback and self-regulated learning: A theoretical

synthesis. *Review of Educational Research*, 65(3), 245-281.

Cain, K., Oakhill, J., & Bryant, P. (2004). Children's reading comprehension ability:

Concurrent prediction by working memory, verbal ability, and component skills. Journal of Educational Psychology, 96(1), 31-42.

Corno, L. (2001). Volitional aspects of self-regulated learning. In B.J. Zimmerman & D.H. Schunk (Eds.), *Self-Regulated Learning and Academic Achievement: Theoretical Perspective* (2nd ed.) (pp.191-226). Mahwah, NJ: Lawrence Erlbaum Associates.

Cury, F., Elliot, A.J., Da Fonseca, D., & Moller, A. (2006). The social-cognitive model of achievement motivation and the 2 x 2 achievement goal framework. *Journal of Personality and Social Psychology*, 90(4), 666-679.

Di Vesta, F.J., Hayward, K.G., & Orlando, V.P. (1979). Developmental trends in monitoring text for comprehension. *Child Development*, 50(1), 97-105.

Dole, J.A., Duffy, G.G., Roehler, L.R., & Pearson, P.D. (1991). Moving from the old to the new: Research on reading comprehension. *Review of Educational Research*, 61(2), 239-264.

Duncan, T.G., & McKeachie, W.J. (2005). The making of the Motivated Strategies for Learning Questionnaire. *Educational Psychologist*, 40(2), 117-128.

Eccles, J.S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, 53, 109-132.

Elliot, A.J., & Dweck, C.S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, 54(1), 5-12.

Elliot, A. J., & Harackiewicz, J. M. (1994). Goal setting, achievement orientation, and intrinsic motivation: A mediational analysis. *Journal of Personality and Social*

Psychology, 66(5), 968-980.

Elliot, A.J., & McGregor, H.A. (2001). 2x2 achievement goal framework. *Journal of Personality and Social Psychology*, 80(3), 501-519.

Elliot, A. J., Shell, M. M., Bouas Henry, K., & Maier, M. A. (2005). Achievement goals, performance contingencies, and performance attainment: An experimental test. *Journal of Educational Psychology,* 97(4), 630–640.

Eme, E., Puustinen, M., & Coutelet, B. (2006). Individual and developmental differences in reading monitoring: When and how do children evaluate their comprehension? *European Journal of Psychology of Education*, 21(1), 91-115.

Flavell, J.H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34, 906-911.

Garner, R. (1987). *Metacognition and Reading Comprehension*. Norwood, NJ: Ablex Publishing Corp.

Glenberg, A.M., Sanocki, T., Epstein, W., & Morris, C. (1987). Enhancing calibration of comprehension. *Journal of Experimental Psychology: General* 116(2), 119-136.

Hacker, D.J. (1998). Self-regulated comprehension during normal reading. In D.J. Hacker, J. Dunlosky, & A.C. Graesser (Eds.), *Metacognition in Educational Theory and Practice*, (pp. 165-191). Mahwah, NJ: Lawrence Erlbaum Associates.

Hill, P.W., & Rowe, K.J. (1996). Multilevel modeling in school effectiveness research. *School Effectiveness and School Improvement*, 7(1), 1-34.

Indrisano, R., & Chall, J.S. (1995). Literacy development. *Journal of Education*, 177(1), 63-

83.

Joseph, L.M. (2005). The role of self-monitoring in literacy learning. In S.E. Israel, C.C.

    Block, K.L. Bauserman, & K. Kinnucan-Welsch (Eds.), *Metacognition in Literacy*

    Learning: Theory, Assessment, Instruction, ad Professional Development, (pp.199-

    214). Mahwah, NJ: Lawrence Erlbaum Associates.

King, A. (1992). Comparison of self-questioning, summarizing, and notetaking- review as

    strategies for learning from lectures. *American Educational Research Journal*, 29(2),

    303-323.

Kinnunen, R., & Vauras, M. (1995). Comprehension monitoring and the level of

    comprehension in high- and low- achieving primary school children's reading.

    Learning and Instruction, 5, 143-165.

Kintsch, W. (1986). Learning from text. *Cognition and Instruction*, 3(2), 87-108.

Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-

    integration model. *Psychological Review*, 95(2), 163-182.

Kolic-Vehovec, S., Bajsanski, I. (2006). Metacognitive strategies and reading

    comprehension in elementary-school students. *European Journal of Psychology of*

    Education, 21(4), 439-451.

Kuhn, D. (2000). Metacognitive development. *Current Directions in Psychological Science*,

    9(5), 178-181.

Kuhn, D., Garcia-Mila, M., Zohar, A., & Andersen, C. (1995). Strategies of knowledge

    acquisition. *Society for Research in Child Development Monographs*, *60*(4, Serial

No. 245).

Kuhn, D., & Pease, M. (2006). Do children and adults learn differently? *Journal of Cognition and Development*, 7(3), 279-293.

Lin, L.M., & Zabrucky, K.M. (1998). Calibration of comprehension: Research implication for education and instruction. *Contemporary Educational Psychology*, 23, 345-391.

Locke, E.A., &Latham, G.P. (2002). Building a practically useful theory of goal setting and task motivation. *American Psychologist*, 57(9), 705-717.

Locke, E.A., Shaw, K.N., Saari, L.M., & Latham, G.P. (1981). Goal setting and task performance: 1969-1980. *Psychological Bulletin*, 90(1), 125-152.

Maki, R.H. (1998). Test prediction over text material. In D.J. Hacker, J. Dunlosky, & A.C. Graesser (Eds.), *Metacognition in Educational Theory and Practice*, (pp. 117-144). Mahwah, NJ: Lawrence Erlbaum Associates.

Maki, R.H., Foley, J.M., Kajer, W.K., Thompson, R.C., & Willert, M.G. (1990). Increased processing enhances calibration of comprehension. *Journal of Experimental Psychology: Learning, Memory, and Cognition¸*16(4), 609-616.

Maki, R.H., & Serra, M. (1992). The basis of test predictions for text material. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 18(1), 116-126.

Markman, E.M. (1979). Realizing that you don't understand: Elementary school children's awareness of inconsistencies. *Child Development*, 50(3), 643-655.

McCombs, B.L. (2001). Self-regulated learning and academic achievement: A

phenomenological view. In B.J. Zimmerman & D.H. Schunk (Eds.), *Self-Regulated Learning and Academic Achievement: Theoretical Perspective* (2nd ed.) (pp.67-124). Mahwah, NJ: Lawrence Erlbaum Associates.

McCormick, C.B. (2003). Metacognition and learning. In W.M. Reynolds and G.E. Miller (Eds), *Handbook of Educational Psychology* (pp. 79-102). Volume 7 of the *Comprehensive Handbook of Psychology*, Editor-in-Chief: I.B. Weiner. New York: Wiley.

Meece, J.L. (1994). The role of motivation in self-regulated learning. In D.H. Schunk & B.J. Zimmerman (Eds.), *Self-Regualtion of Learning and Performance: Issues and Educational Applications* (pp. 25-44). Hillsdale, N.J.: Lawrence Erlbaum Associates.

Metcalfe, J., & Kornell, N. (2005). A region of proximal learning model of study time allocation. *Journal of Memory and Language*, 52(4), 463-477.

Midgley, C., Kaplan, A., Middleton, M., Maeher, M.L., Urdan, T., Anderman, L.H., Anderman, A., & Roeser, R. (1998). The development and validation of scales assessing students' achievement goal orientations. *Contemporary Educational Psychology*, 23, 113-131.

Midgley, C., Maehr, M. L., Hruda, L. Z., Anderman, E., Anderman, L., Freeman, K. E., Gheen, M., Kaplan, A., Kumar, R., Middleton, M. J., Nelson, J., Roeser, R., & Urdan, T., (2000). *Manual for the Patterns of Adaptive Learning Scales (PALS).* Ann Arbor, MI: University of Michigan.

Miller, D.C., & Byrnes, J.P. (2001). To achieve or not to achieve: A self-regulation

perspective on adolescents' academic decision making. *Journal of Educational* , 93(4), 677-685.

Nietfeld, J.L., Cao, L., & Osborne, J.W. (2006). The effect of distributed monitoring exercises and feedback on performance, monitoring accuracy, and self-efficacy. *Metacognition and Learning*, 1(2), 159-179.

Nietfeld, J.L., Schraw, G. (2002). The effect of knowledge and strategy training on monitoring accuracy. *Journal of Educational Research*, 95(3), 131-142.

Oakhill, J., Hartt, J., & Samols, D. (2005). Levels of comprehension monitoring and working memory in good and poor comprehenders. *Reading and Writing*, 18, 657-686.

Pajares, F., Britner, S.L., & Valiante, G. (2000). Relation between achievement goals and self-beliefs pf middle school students in writing and science. *Contemporary Educational Psychology*, 25, 406-422.

Pintrich, P.R., & DeGroot, E. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33-40.

Pressley, M. (1995). More about the development of self-regulation: Complex, long-term, and thoroughly social. *Educational Psychologist*, 30(4), 207-212.

Pressley, M., & Ghatala, E.S. (1990). Self-regulated learning: Monitoring learning from text. *Educational Psychologist*, 25(1), 19-33.

Raudenbush, S.W., & Bryk, A.S. (2002*). Hierarchical Linear Models: Applications and*

Data Analysis Models (Advanced Quantitative Techniques in the Social Sciences).

Thousand Oaks, California: Sage Publications.

Rohwer, W.D. (1984). An invitation to an educational psychology of studying. *Educational* Psychologist, 9, 1-14.

Schiffman, S.S., Reynolds, M.L., & Young, F.W. (1981). *Introduction to multidimensional scaling: Theory, methods, and applications*. New York: Academic Press.

Schraw, G. (1994). The effect of metacognitive knowledge on local and global monitoring. *Contemporary Educational Psychology*, 19, 143-154.

Schraw, G., & Moshman, D. (1995). Metacognitive theories. *Educational Psychology Review*, 7(4), 351-371.

Schraw, G., & Roedel, T.D. (1994). Test difficulty and judgment bias. *Memory and Cognition*, 22(1), 63-69.

Schunk, D.H. (1983). Goal difficulty and attainment information: Effects on children's achievement behaviors. *Human Learning*, 2, 107-117.

Schunk, D.H. (1985). Participation in goal setting: Effects on self-efficacy and skills of learning-disabled children. *Journal of Special Education*, 19(3), 307-317.

Schunk, D.H. (1990). Goal setting and self-efficacy during self-regulated learning. *Educational Psychologist*, 25(1), 71-86.

Schunk, D.H. (1991). Self-efficacy and academic motivation. *Educational Psychologist*, 26(3&4), 207-231.

Schunk, D.H. (1996). Goal and self-evaluative influences during children's cognitive skill

learning. *American Educational Research Journal*, 33(2), 359-382.

Schunk, D.H. (2001). Social cognitive theory and self-regulated learning. In B.J. Zimmerman & D.H. Schunk (Eds.), *Self-Regulated Learning and Academic Achievement: Theoretical Perspective* (2nd ed.) (pp.125-151). Mahwah, NJ: Lawrence Erlbaum Associates.

Schunk, D.H., Pintrich, P.R., & Meece, J. (2008). *Motivation in education: Theory, Research, and Applications* (3rd ed.). Upper Saddle River, NJ: Prentice Hall.

Singer, M., & Kintsch, W. (2002). Text retrieval: A theoretical exploration. *Discourse Processes*, 31(1), 27-59.

Smolkin, L.B., & Donovan, C.A. (2002). "Oh excellent, excellent question!": Developmental differences and comprehension acquisition. In C.C. Collins & M. Pressley (Eds.), *Comprehension Instruction* (pp. 140-157). New York: Guilford Press.

Snijders, T.A.B, & Bowskers, R.J. (1997). *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. Thousand Oaks, California: Sage Publications.

Thiede, K.W., & Anderson, M.C.M. (2003). Summarizing can improve metacomprehension accuracy. *Contemporary Educational Psychology*, 28, 129-160.

Thiede, K.W., Anderson, M.C.M., Therriault, D. (2003). Accuracy of metacognitive monitoring affects learning of texts. *Journal of Educational Psychology*, 95(1), 66-73.

Trabasso, T., & Bouchard, E. (2002). Teaching readers how to comprehend text strategically. In C.C. Collins & M. Pressley (Eds.), *Comprehension Instruction* (pp.

176-200). New York: Guilford Press.

Wagoner, S.A. (1983). Comprehension Monitoring: What it is and what we know about it. *Reading Research Quarterly*, 18(3), 328-346.

Walczyk, J.J. (1990). Relation among error detection, sentence verification, and low-level reading skills of fourth graders. *Journal of Educational Psychology*, 82(3), 491-497.

Wigfield, A., Guthrie, J.T. (1997). Relations of children's motivation for reading to the amount and breadth of their reading. *Journal of Educational Psychology*, 89(3), 420-432.

Winne, P.H. (2001). Self-regulated learning viewed from models of information processing. In B.J. Zimmerman & D.H. Schunk (Eds.), *Self-Regulated Learning and Academic Achievement: Theoretical Perspective* (2nd ed.) (pp.153-189). Mahwah, NJ: Lawrence Erlbaum Associates.

Zimmerman, B.J. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology*, 81(3), 329-339.

Zimmerman, B.J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist*, 25(1), 3-17.

Zimmerman, B.J. (1998). Academic studying and the development of personal skill: A self-regulatory perspective. *Educational Psychologist*, 33(2/3), 73-86.

Zimmerman, B.J. (2001). Theories of self-regulated learning and academic achievement: An overview and analysis. In B.J. Zimmerman & D.H. Schunk (Eds.), *Self-Regulated*

Learning and Academic Achievement: Theoretical Perspective (2nd ed.) (pp.1-37). Mahwah, NJ: Lawrence Erlbaum Associates.

Zimmerman, B. J., & Bandura, A. (1994). Impact of self-regulatory influences on writing course attainment. American Educational Research Journal, 31, 845–862.

Zimmerman, B.J., Bandura, A., & Martinez-Pons (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal*, 29(3), 663-676.

Zimmerman, B.J., & Schunk, D.H. (2001). Reflections on theories of self-regulated learning and academic achievement. In B.J. Zimmerman & D.H. Schunk (Eds.), *Self-Regulated Learning and Academic Achievement: Theoretical Perspective* (2nd ed.) (pp.289-307). Mahwah, NJ: Lawrence Erlbaum Associates.

Zimmerman, B.J., & Schunk, D.H. (Eds.). (2001). *Self-Regulated Learning and Academic Achievement: Theoretical Perspectives* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Appendices

Appendix A

Outline of Procedures

Baseline Testing and Pre-Surveys					
Practice Passage					
Self-Set Goal			No Goal		
Class 1	Class 2	Class 3	Class 4	Class 5	Class 6
		Passage 1*			
		Passage 2*			
		Passage 3*			
		Passage 4*			
		Passage 5*			
		Passage 6*			
Post-Surveys					

Note. * indicates that at this point in the study students read the passage, made a judgment about future performance, and completed the comprehension assessment and confidence ratings.

Appendix B

Instruments

Achievement Goals Questionnaire

This questionnaire aims to gain a better understanding of your goals for studying in **your science class**. Please indicate your opinion about each of the statements below in reference to your current science class.

The following statement is _____ of me.

1 = not at all true of me   2   3   4   5   6   7 = very true of me

_____ 1. It is important for me to do better than other students.

_____ 2. It is important for me to do well compared to others in this class.

_____ 3. My goal in this class is to get a better grade than most of the other students.

_____ 4. I worry that I may not learn all that I possibly could in this class.

_____ 5. Sometimes I'm afraid that I may not understand the content of this class as thoroughly as I'd like.

_____ 6. I am often concerned that I may not learn all that there is to learn in this class.

_____ 7. I want to learn as much as possible from this class.

_____ 8. It is important for me to understand the content of this course as thoroughly as possible.

_____ 9. I desire to completely master the material presented in this class.

_____ 10. I just want to avoid doing poorly in this class.

_____ 11. My goal in this class is to avoid performing poorly.

_____ 12. My fear of performing poorly in this class is often what motivates me.

Motivated Strategies for Learning Questionnaire

This questionnaire aims to gain a better understanding of how you learn in **your science class** including the strategies that you use to learn. Next to each statement below, please write a number from **1 to 7** corresponding to how true the statement is of you.

The following statement is _____ of me.

1 = not at all true of me   2   3   4   5   6   7 = very true of me

_____1. I prefer class work that is challenging, so I can learn new things.

_____2. Compared with other students in this class, I expect to do well.

_____3. I am so nervous during a test that I cannot remember facts I have learned.

_____4. It is important for me to learn what is being taught in this class.

_____5. I like what I am learning in this class.

_____6. I'm certain I can understand the ideas taught in this class.

_____7. I think I will be able to use what I learn in this class in other classes.

_____8. I expect to do very well in this class.

_____9. Compared with others in this class, I think I'm a good student.

_____10. I often choose paper topics I will learn something from even if they require more work.

_____11. I am sure I can do an excellent job on the problems and tasks assigned for this class.

_____12. I have an uneasy, upset feeling when I take a test.

_____13. I think I will receive a good grade in this class.

_____14. Even when I do poorly on a test I try to learn from my mistakes.

_____15. I think that what I am learning in this class is useful for me to know.

_____16. My study skills are excellent compared with others in this class.

_____17. I think that what we are learning in this class is interesting.

_____18. Compared with other students in this class I think I know a great deal about this subject.

_____19. I know that I will be able to learn the material for this class.

_____20. I worry a great deal about tests.

_____21. Understanding this subject is important to me.

_____22. When I take a test, I think about how poorly I am doing.

_____23. When I study for a test, I try to put together the information from class and from the book.

_____24. When I do homework, I try to remember what the teacher said in class, so I can answer the questions correctly.

_____25. I ask myself questions to make sure I know the material I have been studying.

_____26. It is hard for me to decide what the main ideas are in what I read.

_____27. When work is hard, I either give up or study only the easy parts.

_____28. When I study, I put important ideas into my own words.

_____29. I always try to understand what the teacher is saying even if it doesn't make sense.

_____30. When I study for a test, I try to remember as many facts as I can.

_____31. When studying, I copy my notes over to help me remember material.

_____32. I work on practice exercises and answer end of chapter questions even when I don't have to.

_____33. Even when study materials are dull and uninteresting, I keep working until I finish.

_____34. When I study for a test, I practice saying the important facts over and over to myself.

_____35. Before I begin studying, I think about the things I will need to do to learn.

_____36. I use what I have learned from old homework assignments and the textbook to do new assignments.

_____37. I often find that I have been reading for class but don't know what it is all about.

_____38. I find that when the teacher is talking I think of other things and don't really listen to what is being said.

_____39. When I am studying a topic, I try to make everything fit together.

_____40. When I'm reading I stop once in a while and go over what I have read.

_____41. When I read material for this class, I say the words over and over to myself to help
me remember.

_____42. I outline the chapters in my book to help me study.

_____43. I work hard to get a good grade even when I don't like a class.

_____44. When reading I try to connect the things I am reading about with what I already
know.

Motivation for Reading Questionnaire

This questionnaire aims to gain a better understanding of what you think about reading. Next to each statement below, please write a number from **1 to 4** corresponding to how true the statement is of you.

The following statement is _____ from me.

1 = very different from me   2 = a little different from me   3 = a little like me   4 = a lot like me

_____1. I visit the library often with my family

_____2. I like hard, challenging books

_____3. I know that I will do well in reading next year

_____4. I do as little schoolwork as possible in reading

_____5. If the teacher discusses something interesting I might read more about it

_____6. I read because I have to

_____7. I like it when the questions in books make me think

_____8. I read about my hobbies to learn more about them

_____9. I am a good reader

_____10. I read stories about fantasy and make-believe

_____11. I often read to my brother or my sister

_____12. I like being the only one who knows an answer in something we read

_____13. I read to learn new information about topics that interest me

_____14. My friends sometimes tell me I am a good reader

_____15. I learn more from reading than most students in the class

_____16. I like to read about new things

_____17. I like hearing the teacher say I read well

_____18. I like being the best at reading

_____19. I look forward to finding out my reading grade

_____20. I sometimes read to my parents

_____21. My friends and I like to trade things to read

_____22. It is important for me to see my name on a list of good readers

_____23. I don't like reading something when the words are too difficult

_____24. I make pictures in my mind when I read

_____25. I always do my reading work exactly as the teacher wants it

_____26. I usually learn difficult things by reading

_____27. I don't like vocabulary questions

_____28. Complicated stories are no fun to read

_____29. I am happy when someone recognizes my reading

_____30. I feel like I make friends with people in good books

_____31. My parents often tell me what a good job I am doing in reading

_____32. Finishing every reading assignment is very important to me

_____33. I like mysteries

_____34. I talk to my friends about what I am reading

_____35. If I am reading about an interesting topic I sometimes lose track of time

_____36. I like to get compliments for my reading

_____37. Grades are a good way to see how well you are doing in reading

_____38. I like to help my friends with their schoolwork in reading

_____39. I read to improve my grades

_____40. My parents ask me about my reading grade

_____41. I enjoy a long, involved story or fiction book

_____42. I like to tell my family about what I am reading

_____43. I try to get more answers right than my friends

_____44. If the project is interesting, I can read difficult material

_____45. I enjoy reading books about people in different countries

_____46. I read a lot of adventure stories

_____47. I always try to finish my reading on time

_____48. If a book is interesting I don't care how hard it is to read

_____49. I like to finish my reading before other students

_____50. In comparison to my other school subjects I am best at reading

_____51. I am willing to work hard to read better than my friends

_____52. I don't like it when there are too many people in the story

_____53. It is very important to me to be a good reader

_____54. In comparison to other activities I do, it is very important to me to be a good reader

Patterns of Adaptive Learning Scales

This questionnaire aims to gain a better understanding of what you think about the goals of **your science class** and **your science teacher**. Next to each statement below, please write a number from **1 to 5** corresponding to how true you think the statement is.

The following statement is _____ .

1 = "Not at all true"   2   3 = "Somewhat true"   4   5 = "Very true"

_____1. My teacher thinks mistakes are okay as long as we are learning.

_____2. My teacher points out those students who get good grades as an example to all of us.

_____3. My teacher wants us to understand our work, not just memorize it.

_____4. My teacher lets us know which students get the highest scores on a test.

_____5. My teacher tells us that it is important that we don't look stupid in class.

_____6. My teacher really wants us to enjoy learning new things.

_____7. My teacher tells us it's important to answer questions

_____8. My teacher tells us how we compare to other students.

_____9. My teacher recognizes us for trying hard.

_____10. My teacher says that showing others that we are not bad at class work should be our goal.

_____11. My teacher gives us time to really explore and understand new ideas.

_____12. My teacher tells us it's important to join in discussions and answer questions so it doesn't look like we can't do the work.

_____13. In our class, trying hard is very important.

_____14. In our class, showing others that you are not bad at class work is really important.

_____15. In our class, how much you improve is really important.

_____16. In our class, getting good grades is the main goal.

_____17. In our class, really understanding the material is the main goal.

_____18. In our class, getting right answers is very important.

_____19. In our class, it's important that you don't make mistakes in front of everyone.

_____20. In our class, it's important to understand the work, not just memorize it.

_____21. In our class, it's important not to do worse than other students.

_____22. In our class, learning new ideas and concepts is very important.

_____23. In our class, it's very important not to look dumb.

_____24. In our class, it's OK to make mistakes as long as you are learning.

_____25. In our class, it's important to get high scores on tests.

_____26. In our class, one of the main goals is to avoid looking like you can't do the work.