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Components of Self-Regulated Learning in High School Students with Learning Disabilities

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COMPONENTS OF SELF-REGULATED LEARNING IN HIGH SCHOOL STUDENTS WITH LEARNING DISABILITIES

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Title: Components of Self-Regulated Learning in High School Students with Learning Disabilities

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The fundamental purpose of this research project was to determine the interactions among components of self-regulated learning: self-efficacy, goal orientation, learning strategies; and the predictive effect of these, and grade level and sex, on academic achievement in a sample of high school students with learning disabilities. From the perspective of social-cognitive theory, self-regulated learning was defined as an active, constructive process whereby students incorporate feelings of competence acquired from previous performance, comparison with peers, and feedback from their learning environment to set goals for their learning while they monitor, direct, and control their knowledge acquisition. The sample for the study was 135 (87 male and 48 female) high school students with learning disabilities in grades nine through twelve enrolled in two suburban high schools in southern California. The students had been previously identified as eligible for Special Education services with a primary handicapping condition of specific learning disability. Participants in the research project were obtained from a convenience sample of seven Special Education English classrooms.

The students completed a 57-item questionnaire adapted from the Motivated Strategies Learning Questionnaire (MSLQ) and three goal orientation scales.

The results of the study indicated that components of self-regulated learning, sex, and grade level did not predict academic achievement. However, positive relationships were identified among the predictors. High school students with learning disabilities endorsed feelings of self-efficacy, use of varied and complex learning strategies, and a focus on learning for mastery, as well performance in comparison to their peers.

These findings suggest that components of self-regulated learning may operate differently in high school students with learning disabilities. These students may report self-efficacy beliefs as a protective factor to mitigate years of academic failure. Deficiencies in metacognition due to learning disabilities may impair their use of learning strategies consistently and/or effectively. Finally, environmental feedback may have an effect on the learning goals these students adopt. Further research is needed to clarify how self-regulated learning constructs operate in high school students with learning disabilities.

ACKNOWLEDGEMENTS

Many people contributed to the completion of this project. I extend thanks to the students who kindly participated in this study. I want to acknowledge the members of my dissertation committee. Dr. Rafoth's supportive hand guided me over the rough patches in the university's review process. Dr. Barker's cryptic comments confused, but ultimately encouraged me to trust my interpretation of the data. Dr. Damiani's critique on students with learning disabilities pushed me to produce better work. Dr.Leung's generous participation and thoughtful suggestions were also greatly appreciated. Thank you all. This project could not have been completed without the participation of Shanta Williams, digital media consultant, whose expertise and talent were unfailing. Thank you to Tao Sun, graduate student, with the IUP Applied Research Lab who provided data entry with SPSS v. 10. Your prompt e-mails and encouraging comments kept things rolling. Much love goes out to the Portobello Mushroom Gang: Maria Colon-Torres, Joanne Laverty, and Deborah Houck. Your loving friendship helped sustain me throughout the IUP experience. Finally, to my husband, for your patience, encouragement, and loving support, I can only say thank you again and again.

DEDICATION

This project is dedicated to Sri Satya Sai Baba, the inspiration for this journey; A. C. Swami Turiyasangitananda, my spiritual teacher; and all the absent players.

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CHAPTER I

INTRODUCTION

Thinking is creating (Turiyasangitananda, personal communication, 1990). We construct personal reality in the world from evidence we gather from past actions, feedback from significant others in our environment, as well as evaluations of our behavior. We use this information to think about and set future goals. What we tell ourselves about our actions plays a large part in determining our success or failure at achieving these (Bandura, 1986). Observations we gather from experiences support or disconfirm the beliefs we hold about ourselves and form the basis for evaluations about our actions. These evaluations, based on feedback from significant others in the environment, as well as analysis of our performance against personal standards, and in comparison to significant others, become the basis for future goals. Thinking is creating. The most important thoughts we have about present and future actions relate to our evaluations of competence (self-efficacy) based on past performance (Bandura, 1986).

In education, students judge their competence to perform academic tasks in the present based on previous academic success or failure (Schunk, 1991; Zimmerman, 2002). Students act to monitor and direct their learning, based on beliefs about their ability to accomplish academic tasks. They accomplish this by selecting and utilizing cognitive and behavioral learning strategies to acquire and retain information, while controlling and monitoring environmental influences. Continued use of these strategies depends on perceptions of effectiveness

toward accomplishing learning goals (Zimmerman, 1989a). Academic success is in large measure a result of utilizing self-regulated learning strategies. These include affirming positive beliefs about one's competence to learn based on previous academic performance and feedback from the learning environment, while adopting goals that support learning, using cognitive and metacognitive strategies to control and direct the learning process.

Nature of the Problem

On January 8, 2002 President Bush signed The Elementary and Secondary Education Act (ESEA) renamed "No Child Left Behind" Act mandating high standards and accountability for the academic success of all students regardless of ability or background (National Education Association, 2007). In an era of high-stakes testing as a key measure of academic achievement, students' ability to demonstrate mastery of curriculum has never been more emphasized (Connor, 2004). However, the goal of academic success can be particularly elusive for students with documented learning disabilities who struggle academically. If thoughts about past academic performance can mediate the learning goals and strategies these students apply to the acquisition of knowledge in the present; then educators need to help students' self-regulated strategies become automatic and habitual as soon as possible (Pajares, 2002).

Characteristics of Self-Regulated Learners

Self-regulated practices become automatic habits that continue into adulthood, thus exerting influence on the choices students make and on the success or failure they experience (Pajares, 2002). Early self-beliefs persist despite evidence to the contrary (Pajares, 2002). Students with high self-efficacy work harder, persist longer (Bandura, 1986), and seek help when faced with difficulties. Students with low self-efficacy, those who doubt their abilities to accomplish an academic task, may avoid it (Schunk, 1991), and in so doing may avoid participating in activities that could potentially increase their skill level and disconfirm their negative beliefs (Bandura, 1986).

Students who judge themselves as capable of performing well at an academic task based on estimations of their performance tend to be more successful at that task than individuals who judge themselves as less capable of performing well on an academic task (Bouffard & Couture, 2003; Caraway, Tucker, Reinke, & Hall, 2003; Pintrich & DeGroot, 1990; Wolters, Yu, & Pintrich, 1996; Zimmerman 1989b; Zimmerman & Martinez-Pons, 1990). Bandura (1986) suggested that self-efficacy beliefs influence the self-regulated learning strategies students use in school. Self-regulated learning strategies referred to active, constructive processes whereby students set goals for their learning and then attempted to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features in the environment (Pintrich, 2000).

Research has consistently indicated the positive correlation between beliefs about competence to accomplish an academic task and success at that task in students without learning disabilities. Self-efficacy beliefs positively affect the goal orientation and learning strategies that students adopt (Bouffard & Couture, 2003; Pintrich, Anderman, & Klobucar, 1994; Pintrich, Roeser, & DeGroot, 1994; Schunk, 2005; Wolters et al., 1996). Self-efficacy was defined as an individual's judgment of capability to organize and execute a course of action required to attain a designated performance (Bandura, 1986). Goal orientation referred to the reason an individual does a task (Pintrich, 2000). Learning strategies referred to a systematic plan that assists encoding of information and task performance (Weinstein & Mayer, 1986). These components of self-regulated learning have been positively correlated with academic achievement in the literature.

Purpose of the Study

The purpose of the study was to measure components of self-regulated learning: self-efficacy, goal orientation, and learning strategies in a sample of high school students with learning disabilities. These data were utilized to determine the associative and predictive relationship between these components and student grade level, sex, and quarter (10 week) grade in special education English class.

Significance of the Study

Results from this study have added to the body of literature regarding components of self-regulated learning in high school students with learning

disabilities. The documentation of information about how this student population approaches learning tasks is a necessary step toward developing interventions to increase their academic success.

Research Questions

1. Do grade level and sex (baseline model) provide statistically significant and/or meaning prediction of the quarter grade in English in a group of high school students with learning disabilities?

2. Does the addition of self-efficacy to the baseline model provide statistically significant and/or meaning prediction; and does the addition of the new variable improve prediction of the quarter grade in English in a group of high school students with learning disabilities?

3. Does the addition of rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation to the baseline model provide statistically significant and/or meaning prediction; and does the addition of the new variables improve prediction of the quarter grade in English in a group of high school students with learning disabilities?

4. Does the addition of mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation to the baseline model provide statistically significant and/or meaning prediction; and does the addition of the new variables improve prediction of the quarter grade in English in a group of high school students with learning disabilities?

5. Does the addition of self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal orientation, performance-

approach goal orientation, and performance-avoidance goal orientation to the baseline model provide statistically significant and/or meaning prediction; and does the addition of the new variables improve prediction of the quarter grade in English in a group of high school students with learning disabilities?

Hypotheses

1. Grade level and sex (base line model) would not predict quarter grade in English in a group of high school students with learning disabilities.
2. The addition of self-efficacy to the baseline model would not be statistically significant and/or provide meaning prediction of the quarter grade in English in a group of high school students with learning disabilities.
3. The addition of rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation to the baseline model would not be statistically significant and/or provide meaning prediction of the quarter grade in English in a group of high school students with learning disabilities.
4. The addition of mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation to the baseline model would not provide statistically significant and/or meaning prediction of the quarter grade in English in a group of high school students with learning disabilities.
5. The addition of self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation to the baseline model would not provide statistically significant and/or meaning

prediction of the quarter grade in English in a group of high school students with learning disabilities.

Definition of Terms

Critical thinking: refers to the student's application of previously learned information to solve problems and make evaluations (Pintrich, Smith, Garcia, & McKeachie, 1991).

Elaboration: includes strategies that help the student integrate and connect new information with prior knowledge such as paraphrasing, summarizing, creating analogies, and generative note-taking (Pintrich et al., 1991).

Goal orientation: refers to the reasons an individual does a task (Pintrich, 2000).

Information processing: how individuals encode, store, process, and retrieve information (Biehler & Snowman, 1986).

Learning: a change in behavior brought about by intervening experiences (Schunk, 1989).

Learning strategy: a systematic plan that assists encoding of information and task performance (Weinstein & Mayer, 1986).

Learning disability: a specific learning disability, as defined in paragraph (30) of Section 1401 of Title 20 of the United States Code, means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in the imperfect ability to

listen, think, speak, read, write, spell, or perform mathematical calculations. The term "specific learning disability" includes conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. That term does not include a learning problem that is primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage (California Department of Education, 2005).

Mastery goal orientation: a focus on thoroughly learning academic material or skills (Elliot & McGregor, 2001).

Metacognition: is the ability of the student to analyze, reflect on, and understand personal, cognitive, and learning processes (Connor, 2004).

Motivation: comprises the various situational reasons why students choose whether or not to engage in academic tasks (Lumsden, 1994; 1999) and incorporates characteristics of self-regulated learning (Pintrich et al., 1991).

Organization: includes ways to arrange information into meaningful groupings to enhance recall (Rafoth, Leal, & DeFabo, 1993; Weinstein & Macdonald, 1986).

Performance-approach goal orientation: a focus on demonstrating superior achievement in comparison to others (Middleton & Midgley, 1997).

Performance-avoidance goal orientation: a focus on avoiding the appearance of incompetence in comparison to others (Middleton & Midgley, 1997).

Rehearsal: involves repetition as a method for remembering information (Rafoth et al., 1993; Weinstein & Macdonald, 1986).

Retrieval: includes the application of general knowledge, logic, and inference to recall learned information (Rafoth et al., 1993; Weinstein & Macdonald, 1986).

Self-efficacy: an individual's judgments of their capabilities to organize and execute courses of action required to attain designated types of performance (Bandura, 1986).

Self- regulation: is the ability of the learner to control interest, attitude, and effort toward a task or a goal (Connor, 2004; Schunk, 2005; Zimmerman, 2000).

Self-regulated learning: an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features in the environment (Pintrich, 2000).

Assumptions

The high school students participating in this study have been identified with learning disabilities as defined by the California Education Code, (2005). These students were assumed to have average range intellectual ability (a minimum of 80 IQ) with a significant discrepancy between their measured cognitive ability and academic achievement due to a processing disorder as their primary handicapping condition. This term did not include a learning problem that was primarily the result of visual, hearing, or motor disabilities, of mental retardation,

of emotional disturbance, or of environmental, cultural, or economic disadvantage.

Limitations

Research has suggested a lack of consensus on the meaning of the construct self-regulated learning (Randi & Corno, 2000). In the present study, self-regulated learning was identified as the components of self-regulated learning: self-efficacy, goal orientation, and learning strategies indicated in the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1991) and goal orientation scales (Midgley, Middleton, Maehr, Urdan, & Anderman, 1998). The respective scale scores might more accurately represent components of self-regulated learning: self-efficacy, goal orientation, and learning strategies. The self-efficacy scale from the MSLQ represented the component of self-efficacy. The task (mastery) goal orientation, ability (performance) – approach goal orientation, and ability (performance) – avoidance goal orientation scales from Midgley et al. (1998) represented the component of goal orientation. The rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation scales from the MSLQ represented the component of learning strategies. These scale scores were used to answer the research questions in this study.

There was very little research literature focused on the relationships of components of self-regulated learning in high school students with learning disabilities (Alvarez & Adelman, 1986; Meltzer, Roditi, Houser, & Perlman, 1998; Pintrich, Roeser, &

DeGroot, 1994) . As such, directional hypotheses were not developed to explain these interactions in the current study.

Additionally, little research exists on causal relationships among components of self-regulated learning: self-efficacy, goal orientation, and learning strategies (Sperling, Staley, & DuBois, 2004). The results from this study cannot be used to identify a causal relationship among these components.

The results of this study were limited to the specific population described, and might not generalize to more linguistically, racially, or culturally diverse high school populations. Self-report was the primary method of data collection. As such, social desirability, the tendency to make positive reports about oneself in an effort to make a better presentation to others, might be a confounding variable in this study.

Finally, factors other than components of self-regulated learning might account for differences in the present study. Factors related to parental socioeconomic status, parental support and expectations for academic achievement, peer affiliations, students' perception of the academic climate, and school engagement as measured by attendance and participation in school activities might account for differences in the high school students with learning disabilities in the present study. It was beyond the scope of the present study to examine these additional factors.

CHAPTER II

LITERATURE REVIEW

Introduction

In this chapter I critically review contemporary literature regarding components of self-regulated learning. Initial sections provide an historical context for self-regulated learning and I discuss the theoretical framework for the study including a social cognitive theory of self-regulated learning. This is followed by a discussion of components of self-regulated learning: academic self-efficacy, achievement goal orientations, and learning strategies. Research on grade level, sex, and students with learning disabilities is also presented. The review concludes with a summary and critique of existing literature.

Historical Perspective

In the 1950's B.F. Skinner's theory of operant conditioning, that is voluntary response strengthened by reinforcement and programmed instruction, provided the foundation for understanding how learning occurred. Programmed instruction, the linear arrangement of information into small steps with reinforcement provided for correct response, was the dominant model in American education. Learning was understood to result from a series of observable interactions between teacher and student. The student was a passive recipient of information acquired through a process of behavioral

reinforcement for correct responses to teacher-generated lessons (Deno, 1990; Zimmerman, 1989b).

Ideas about the process of learning and the position of the student in that process began to change in the 1960's and 1970's. New research indicated that learning could occur by observation and imitation and without direct reinforcement (Bandura, Ross, & Ross, 1961). Simultaneously sociological forces in the United States celebrated the value of internal exploration toward the development of personal meaning. Ideas about the power of the individual to construct meaning influenced how educators began to think about student learning.

Student-centered approaches to teaching based on humanistic and cognitive principles flourished in the United States during the late 1960's and 1970's. Principles of Gestalt psychology viewed learning as influenced by individual perception. Cognitive theorists like Piaget and Bruner advocated that students be encouraged to make their own discoveries by interacting with one another and self-selecting learning materials in an open environment. Reinforcement was not needed as the student-centered approaches recognized the natural curiosity and problem-solving ability inherent in children.

However, the political climate in the country changed. Test results indicated that students were less well-educated compared to previous years (Biehler & Snowman, 1986; Zimmerman, 1989b), and as a result an emphasis on curriculum mastery returned to education. Simultaneously, the new and influential field of computer technology began to expand into education (Biehler &

Snowman, 1986). The information processing model emerged as a viable methodology to understand mental processes and products (Weinstein, et al., 2000) that focused on increasing the efficiency of students' participation in the learning process (Biehler & Snowman, 1986). In this model, the student was viewed as an active participant rather than a passive recipient in the process of acquiring information. This spotlight on the student as a dynamic contributor to the process of learning has yielded a body of research that identifies how and why students learn.

Model of Information Processing

A model explaining how information is processed is shown in Figure 1. Information that can be perceived (visual, auditory, tactile, kinesthetic, or olfactory stimuli) enters the receptive areas of the brain and registers briefly in the sensory register before it is transferred to short-term memory (Rafoth et al., 1993). The student's effective direction of control processes, including recognition and attention (Biehler & Snowman, 1986), alternately referred to as selective perception (Rafoth, 1993) facilitate the transfer of information from the sensory register to short-term memory. While the capacity of short-term memory is limited to approximately seven bits of information that can be held for about twenty seconds, information that is learned through encoding strategies such as rehearsal and elaboration, is transferred to long-term memory (Biehler & Snowman, 1986). Retention and retrieval in short-term and long-term memory increase developmentally and in relation to cognitive strategies applied to

learning (Biehler & Snowman, 1986; Flavell, 1979; Pintrich, 2000; Rafoth et al., 1993).

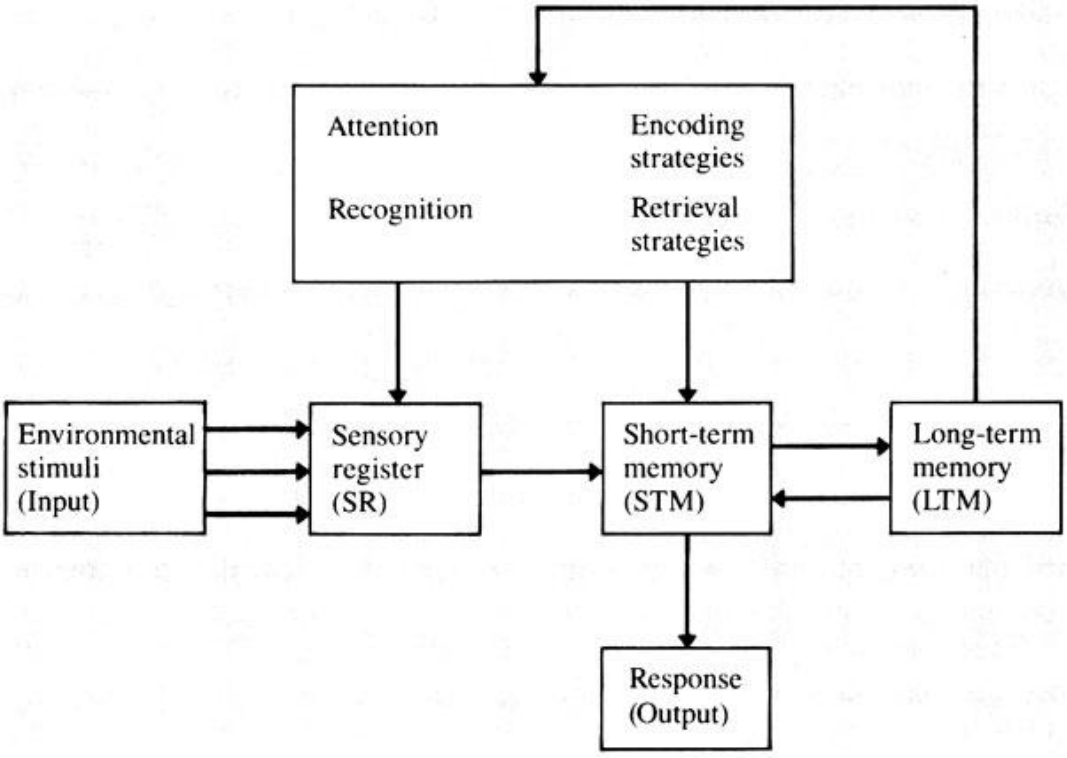


Figure 1. Model of Information Processing. Note. From *Psychology Applied to Teaching 5th Ed.* (p. 422), by R.F. Biehler and J. Snowman, 1986, Boston, MA: Houghton Mifflin. Copyright 1986 by Houghton Mifflin. Reprinted with permission.

The student's knowledge about how learning takes place (metacognition) and when to apply strategies to facilitate learning enhance the quality and quantity of learning (Flavell, 1979; Rafoth, et al. 1993). The active process of directing one's learning is referred to as self-regulated learning (Zimmerman, 1989b).

Self-Regulated Learning

A student is self-regulated to the extent that metacognitive, motivational, and behavioral processes are spontaneously activated while learning. Models of self-regulated learning have originated from four theoretical perspectives: cognitive, affective, behavioral, and social cognitive. These models of self-regulated learning share several assumptions:

1. Students intentionally use specific processes, strategies, or responses to improve their academic achievement. Specific language varies with theoretical perspective; that is, cognitive theorists refer to covert processes while behavioral theorists refer to overt processes (Zimmerman, 1989b).

2. A self-oriented feedback loop occurs during learning: the student monitors the effectiveness of learning strategies and adjusts behavior accordingly. Phenomenological researchers explain this feedback loop in terms like self-esteem, self-concept, and self-actualization. Behavioral theorists illustrate the process in observable terms like self-recording, self-reinforcement, and self-controlling actions (Zimmerman, 1989b).

3. Students' ability to choose to use self-regulated processes is implied in all models of self-regulated learning. These models seek to explain why students are motivated to use self-regulated learning processes, as well as why they choose not to use these strategies when they could.

4. A developmental progression in student ability to self-regulate is assumed in these models since theorists imply that very young children cannot self-regulate their behavior and learning in a formal way (Flavell, 1979). Vygotskian theorists

presume this is due to an inability for young children to use language effectively, while Piagetian theorists identify the limits of metacognitive functioning in young children as the cause for this inability to self-regulate.

Cognitive Models of Self-Regulated Learning

Zimmerman (1989b) identified several cognitive models of self-regulated learning: Vygotskian, Volitional, and Piagetian. These models emphasize the cognitive processes involved in learning, including self-directed inner speech, intention, and the development of schemas. Vygotsky proposed that children acquire information from the social environment through the development of self-directed inner language. While he provided little discussion of processes that motivate students to self-regulate, he theorized that this inner language included motivational and affective statements to improve self-control. Volitional theorists emphasized the control of cognitive processes through the exertion of will. These theorists hypothesized that training could increase the ability to exert volitional strategies in learning. Piagetian researchers stated that young children were too egocentric to integrate their perceptions of the world with those of others successfully, but the inherent motivation to create meaning from experience would lead them to develop strategies to regulate their learning. Cognitive researchers have suggested that students' positive self-statements, exertion of will, and need to make learning meaningful contribute to the development of self-regulated learning.

Affective Model of Self-Regulated Learning

Phenomenological theorists identified the importance of self-awareness in human functioning and emphasized self-monitoring and self-evaluative strategies to enhance learning (McCombs, 1989). Self-regulated learning develops as the result of affective reactions to occurrences in the environment. The objective environment is less important than the student's perception of it. These theorists (Bandura, 1977; McCombs, 1986; and Zimmerman & Martinez-Pons, 1986) hypothesized the need to teach students to monitor how they think and feel while learning "to increase their subjective awareness of their accomplishments" (Zimmerman, 1989b, p. 10).

Behavioral Model of Self-Regulated Learning

Proponents of operant theory (Epstein, 1984; Green & Snyderman, 1980; and Rachlin & Green, 1972), following the work of B.F. Skinner, suggested that the source of motivation to self-regulate exists in reinforcement from external stimuli. The process of recording positive responses to external stimuli developed and reinforced self-regulating behaviors. The relationship between the student and the learning environment was identified by observable student behavior rather than the student's perception of the environment or internal cognitive processes (Zimmerman, 1989b). Behavioral theorists postulated that the student's relationship to the learning environment is critical to the development of self-regulated learning.

Social Cognitive Model of Self-Regulated Learning

The interaction of personal, behavioral, and environmental processes distinguishes the social cognitive model of self-regulated learning. Students need more than will to control their learning, they must also possess the skill to know how and when to apply learning strategies (Zimmerman, 1990), while effectively monitoring internal (e.g., attention) and external (e.g., noise) factors (Zimmerman, 2000; Bandura, 1986). The interaction of these processes occurs in a reciprocal, though not symmetrical (Zimmerman, 1989b) feedback loop (Bandura, 1986). The reciprocal relationship between the learner, including self-efficacy beliefs, goals for learning, and knowledge of learning strategies; behavior, including application of self-efficacy beliefs, goals for learning, and learning strategies; and internal and environmental stimuli is referred to as academic self-regulation as shown in Figure 2. Self-regulated students take responsibility for their learning. These students believe they are capable, establish performance goals, and regulate internal and external factors. These students monitor performance and adjust the application of learning strategies to new or changing environmental conditions. Self-regulated learning involves efforts to seek out and profit from learning activities. Students are not only self-directed in a metacognitive sense, but are self-motivated as well.

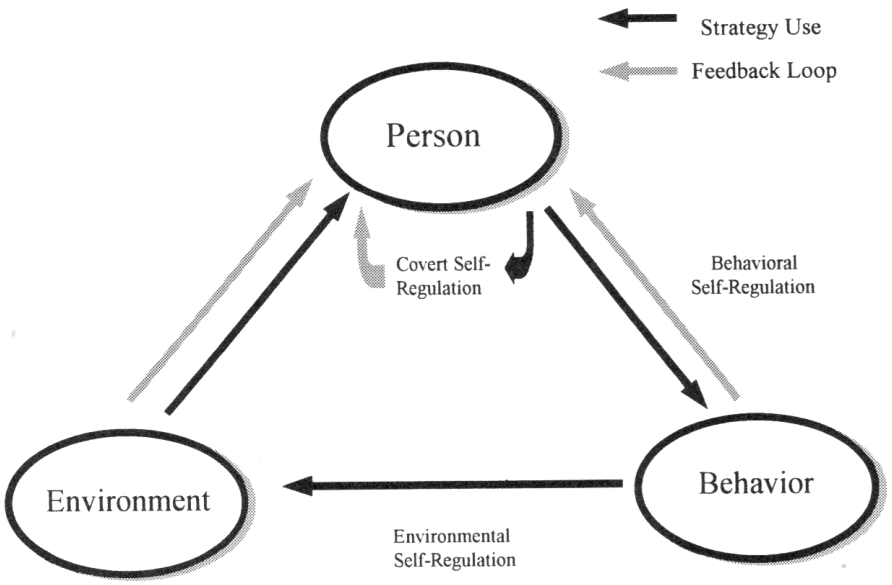


Figure 2. Triadic forms of self-regulation. Note. From Attaining Self-Regulation: A Social Cognitive Perspective, B.J. Zimmerman. In Boekaerts, M., Pintrich, P.R., & Zeidner, M. (Eds.), *Handbook of Self-Regulation* (p. 15), San Diego, CA: Academic Press. Copyright 2000 by B.J. Zimmerman. Reprinted with permission.

Their "skill and will" are integrated components of self-regulated learning (Zimmerman, 1990). Conversely, environmental influences such as temperature or noise level may overshadow a student's efforts to regulate behavior through the application of learning strategies to accomplish an academic task. Lack of knowledge about how to apply learning strategies to the process of acquiring and retaining information may adversely affect a student's performance on a learning task. Personal influences, including self-efficacy beliefs and goals for learning, may undermine efforts to regulate behavior through the application of learning strategies (Flavell, 1979; Vaidya, 1999). The proposed view of self-regulated

learning assumes a reciprocal relationship among personal, environmental, and behavioral processes.

Phases in the Process of Self-Regulated Learning

Zimmerman (2000) identifies three phases in the application of self-regulatory processes: forethought, performance or volitional control, and self-reflection (see Figure 3). Forethought refers to thoughts about the task to be accomplished, including setting goals and planning strategies; as well as self-efficacy beliefs, intrinsic interest, and the value ascribed to the task. The performance phase refers to self-control and self-observation activities including focusing attention and use of strategies. The self-reflection phase refers to self-evaluation and affective reaction to performance. Individuals evaluate their actions in relation to personal standards and the performance of others. When individuals do well in comparison to these persons they evaluate themselves positively. When individuals do poorly in relation to others of similar ability they tend to evaluate themselves negatively and often tend to ascribe less value to the activity (Bandura, 1986).

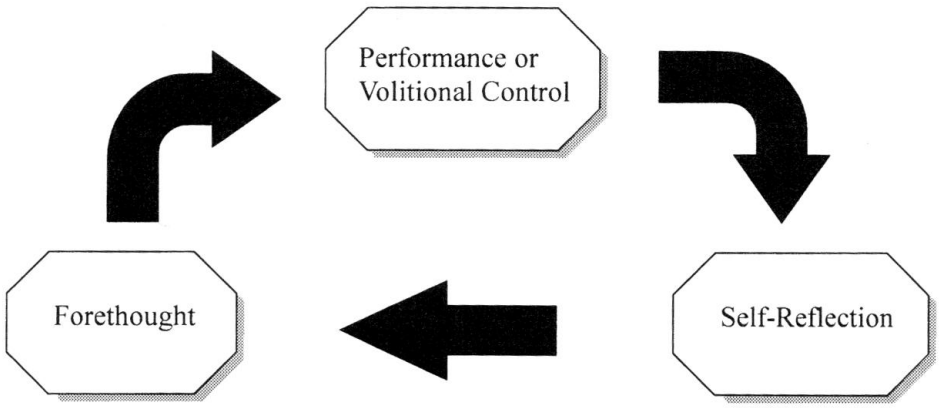


Figure 3. Cyclical phases of self-regulation. Note. From Attaining Self-Regulation: A Social Cognitive Perspective, (p.16), B.J. Zimmerman. In Boekaerts, M., Pintrich, P.R., & Zeidner, M. (Eds.), *Handbook of Self-Regulation*, San Diego, CA: Academic Press. Copyright 2000 by B.J. Zimmerman. Reprinted with permission.

Self-Efficacy

Self-efficacy beliefs are based largely on perceptions of competence supported by direct experience, social comparative information, and verbal persuasion. Twenty years of research findings (Bouffard & Couture, 2003; Bråten et al., 2004; Caraway et al., 2003; Pintrich et al., 1994; Pintrich, Roeser, & DeGroot, 1994; Pintrich & De Groot, 1990; Schunk, 2005; Shim & Ryan, 2005; Somuncuoglu & Ali, 1999; Wilke, 2003; Wolters, 2004; Wolters, 2003; Wolters et al., 1996; Wong et al., 1996; Zimmerman & Kitsantas, 1999; Zimmerman et al., 1992; Zimmerman & Martinez-Pons, 1990) confirm that students' academic self-efficacy beliefs influence their academic attainments and mediate the effects of skills or other self-beliefs on these attainments. Self-efficacy beliefs influence choices students make. Given a choice, students tend to engage in tasks about which they feel confident and avoid those about which they do not. Numerous

researchers have found that students' self-efficacy beliefs affect the learning goals they set for themselves, as well as the self-regulatory processes (learning strategies) they use to learn. Research suggests that students' perceptions about their academic competence (academic self-efficacy beliefs) is a strong predictor of academic achievement (Bouffard & Couture, 2003; Bråten et al., 2004; Caraway et al., 2003; Pintrich et al., 1994; Pintrich et al., 1994; Pintrich & De Groot, 1990; Schunk, 2005; Shim & Ryan, 2005; Somuncuoglu & Ali, 1999; Wilke, 2003; Wolters, 2004; Wolters, 2003; Wolters et al., 1996; Wong et al., 1996; Zimmerman & Kitsantas, 1999; Zimmerman et al., 1992; Zimmerman & Martinez-Pons, 1990).

Caraway et al. (2003) examined self-efficacy, goal orientation, and fear of failure as predictors of school engagement in high school students. The authors surveyed 123, 9th through 12th grade students on measures of general and social self-efficacy, goal orientation, test anxiety, fear of failure, social desirability, and school engagement. Student grade point average was computed from previous grades and indicated a measure of school engagement. Limitations of the study include the measures used to assess self-efficacy and goal orientation. The authors chose to measure generalized self-efficacy and social self-efficacy. Research has indicated that measures of self-efficacy are more reliable when students are asked to report on their confidence to complete a specific task or course (Bandura, 1986). The authors report a significant, albeit, modest correlation of .31 between grade point average and self-efficacy. The authors did

not differentiate between variables of generalized self-efficacy and social self-efficacy as measured by the Self-Efficacy Scale.

Additionally, the goal orientation scale used in this study measures the tendency to set goals and make plans in everyday life. An example of a test item is: "I often plan for the future." While strong internal consistency is reported, Cronbach's alpha=.81 and test-retest reliability =.82 are reported for the Goal Orientation Scale; the authors have not utilized an assessment tool based on an achievement theory model of goal orientation. Therefore, the modest correlation between grade point average and goal orientation (.17) is not surprising.

Pintrich, Roeser, and DeGroot (1994) investigated the relationship between self-efficacy and components of self-regulated learning. The results of their study suggested a strong positive correlation between academic self-efficacy beliefs and cognitive strategy use (.41 and .61, respectively) and self-efficacy beliefs and self-regulation (.50 and 67, respectively). The authors administered the Motivated Strategies for Learning Questionnaire (MSLQ) to a group of 100 7th grade students in the fall and spring of a school year. The MSLQ was authored by Paul R. Pintrich, David A.F. Smith, Teresa Garcia, and Wilbert J. McKeachie. The MSLQ was initially designed to measure components of student motivation and use of learning strategies at the college level. The MSLQ can be used in whole or part and has been used in research on students from elementary school through college (Duncan & McKeachie, 2005).

The MSLQ has 15 scales: 6 scales comprise the Motivation Section: Value Components: 1) Intrinsic Goal Orientation, 2) Extrinsic Goal Orientation, 3) Task

Value; Expectancy Components: 4) Control Beliefs, 5) Self Efficacy for Learning and Performance; Affective Components: 6) Test Anxiety; 9 scales comprise the Learning Strategies Section: Cognitive and Metacognitive Strategies: 7) Rehearsal, 8) Elaboration, 9) Organization, 10) Critical Thinking, 11) Metacognitive Self-Regulation; Resource Management Strategies: 12) Time and Study Environment, 13) Effort Regulation, 14) Peer Learning, and 15) Help Seeking. The Self-Efficacy subscale and the Learning Strategies scales were used to measure students' self-efficacy and use of learning strategies in the present study. Sample items included: "I believe I will receive an excellent grade in this class." "I expect to do well in this class." "I'm confident I can understand the basic concepts taught in this course." "When I study for this class, I practice saying the material to myself over and over." "I try to relate ideas in this subject to those in other courses whenever possible." "When I study for this course, I go through the readings and my class notes and try to find the most important ideas."

Higher levels of cognitive strategy use and self-regulation in the second administration of the MSLQ supported the position that self-efficacy beliefs are influenced by previous performance. Students who did well on reading performance tasks reported higher self-efficacy, greater mastery goal orientation, and less anxiety.

An unexpected result from the study indicated that students with a higher level of metacognitive knowledge reported a lower level of self-efficacy and a higher level of anxiety. This finding contradicts research (Bouffard & Couture,

2003; Caraway et al., 2003; Pintrich & DeGroot, 1990) indicating the positive relationship between mastery goal orientation, self-efficacy, and use of learning strategies. Pintrich et al., suggested that the positive relationship between mastery goal orientation, self-efficacy, and use of learning strategies may exist when students are engaged in a cognitively dynamic task, such as reading performance, rather than a more static task, requiring knowledge of metacognitive strategies. This research combines a focus on motivation and cognition in explaining the academic performance of students with learning disabilities. The authors point out the need for studies that combine this focus with this population.

An investigation conducted by Zimmerman and Martinez-Pons (1990) added empirical support to the theory that components of self-regulated learning are developmental in nature. The authors studied differences in self-efficacy and strategy use related to grade, sex, and giftedness in a sample of students selected from 5^{th} (30), 8^{th} (30), and 11^{th} grade (30). The Self-Regulated Learning Interview, a structured instrument developed by the authors, was administered to the participants to identify relationships between academic self-efficacy in reading comprehension and mathematical problem-solving, and student use of 14 classes of self-regulated learning strategies. The strategies were: self-evaluating; organizing and transforming; goal-setting and planning; seeking information; keeping records and monitoring; environmental structuring; self-consequating; rehearsing and memorizing; seeking peer, teacher, or adult assistance; and reviewing tests, notes, and texts. Each student was asked to

describe the methods they would use in eight different learning scenarios that were presented: in the classroom, when completing written language assignments, when completing mathematics assignments, when reviewing science or English assignments, while studying for a test, during a test taking session, during an unmotivated homework session, and while studying at home. The two efficacy measures were found to be correlated (r=.56, p<.01). Gifted students demonstrated greater self-efficacy in both academic areas than students of regular ability did. Older students demonstrated greater academic self-efficacy in both subjects than younger students did. Older students reported greater use of self-regulatory strategies than younger students. Researchers concluded that students show developmental increases in academic self-efficacy due to their growing academic knowledge. The authors identify social comparison, which is the tendency to compare one's performance to that of others, as a distinguishing factor between ratings of self-competence and estimates of self-efficacy and imply that older students are less concerned with viewing their performance in comparison to peers. This suggestion is somewhat unexpected since there are indications (Bandura, 1986; Zimmerman 1986 a, b) that self-efficacy beliefs develop partly through social comparison with the performance of peers.

Conversely, Bouffard and Couture's (2003) study of motivational profiles and academic achievement in a group of high school students provided evidence maintaining the significance of social comparison as an important element in self-efficacy. Subjects in the study were 226 high school students: 61 students with

learning disabilities, 60 high achieving students, and 105 average high school students. Motivational variables identified in this study were self-perceptions of competence, learning goals, and student judgments of the usefulness of a school subject. Academic achievement was measured by final grades in French and math. The authors point out that the constructs of self-perception of competence and self-efficacy have blurred in the research literature to the point that these are now used interchangeably. Results indicated that students in the three ability classifications had similar levels of perceived competence in French. Students in the high ability group reported higher perceived competence in math than in either of the other two ability classifications. When students with learning disabilities compared themselves to average peers, they rated themselves less competent. However, when they compared themselves to other peers with learning disabilities, their self-efficacy ratings were similar to those of average students. Academic self-efficacy was correlated with academic performances including grades, in-class assignments, essays, and reports. Performance goals were positively related to academic achievement in both school subjects in the general education and learning disabled groups. The authors report that results of the study support the central role of self-perceptions of competence to academic achievement.

Similarly Pintrich and DeGroot (1990) reported a strong relationship between self-efficacy, cognitive strategy use, self-regulation, and academic achievement. These researchers studied the motivational and self-regulated learning components of classroom academic performance in a group of 173 7th and 8th

grade students from science and English classes. The authors collected data on students' prior semester grades in science and English, administered the Motivated Strategies for Learning Questionnaire to students, and collected subsequent semester grades in those subjects. Results indicated that higher levels of self-efficacy correlated positively with cognitive strategy use (.63) and self-regulation (.73). Self-efficacy was positively correlated with prior (.34) and subsequent (.36) academic achievement.

In addition to social comparison, environmental support was identified by several researchers as a significant factor for increasing self-efficacy. Zimmerman and Kitsantas (1999) investigated the effects of environmental support (vicarious experience and modeling, constructive feedback, guided practice), self-regulatory goal setting, and writing strategy instruction on the self-efficacy beliefs of 84 9th, 10th, and 11th grade girls. Participants were assigned to one of six experimental conditions or a control group. All groups received teacher modeling of a three-step writing revision strategy, practice opportunities with corrective feedback, and verbal encouragement. Students were given differing goals and methods to use during additional practice periods according to their assigned experimental or control condition. Students who were instructed to monitor and direct their writing process reported higher self-efficacy than girls in other treatment conditions. Students assigned a process (mastery) goal reported higher self-efficacy than girls in the outcome (performance) goal condition.

Page-Voth and Graham (1999) discovered that previous performance and environmental supports (strategic instruction, constructive feedback, guided practice) had a positive effect on future performance. The authors examined the use of planning and elaboration strategies in essay writing in a group of 30 7th and 8th grade students with writing and learning disabilities. Students in two experimental groups used either a planning strategy or planning and elaboration strategies. All students participated in individual pre- and post-writing conferences. Results indicated that students in the experimental groups developed qualitatively better essays than did controls. Interestingly, self-efficacy for writing remained neutral across the three groups when pre- and post-test standard deviation scores were reported. Although the group size, *N*=10, was too small to identify significant group differences in self-efficacy, this finding is consistent with research literature (Bandura, 1986) suggesting that increases in environmental support can increase performance.

Wong et al., (1996) also found that environmental support increased student self-efficacy for writing tasks. The researchers divided a group of 38 8th and 9th grade students, 29 (76 %) identified with learning disabilities and 9 (24 %) identified as low achieving, into experimental and control group conditions. The experimental group received environmental support from teachers in the way of modeling and collaborative planning. Results indicated the experimental group produced better quality essays than the control group and reported higher self-efficacy for writing tasks in post-test compared to pre-test.

The literature reviewed consistently indicates that self-efficacy beliefs in students without learning disabilities develop as they mature based on their previous performance in comparison to peers, and with support provided in the learning environment. The self-efficacy beliefs students hold are positively correlated with goals for learning, use of learning strategies, and academic achievement. The present study examined self-efficacy beliefs in a group of high school students with learning disabilities. There is insufficient research on self-efficacy in this population to support directional hypotheses. However, students with learning disabilities might report at least average levels of self-efficacy; acquired directly, vicariously, and through social comparison with disabled peers; perhaps due to improved academic performance resulting from special education supports and services.

Goal Orientation

Goal orientation refers to the fundamental reasons for which students participate in a learning activity (Dweck & Legget, 1988). Early researchers demonstrated that student motivation developed from the interaction of rewards expected from a completed task and the value associated with the task, Expectancy X Value model of motivation (Ames, 1992; Dweck & Legget, 1998). Consistent with this hypothesis, research in self-regulated learning generally concluded that students worked to achieve either mastery of course material or high grades in a course, referred to as mastery goal orientation and performance goal orientation, respectively (Bouffard & Couture, 2003; Midgley et al., 2001; Schunk, 2005; Wolters, 2003).

However, investigations into the relationship between goal orientation and academic achievement have yielded revisions in thinking about the delineation of goal orientations. Work by Elliot and Covington (2001) outlined the distinction between approach and avoidance motivation in relation to achievement goals. Elliot and McGregor (2001) identified a 2 X 2 achievement goal orientation framework: mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance (see Figure 4). Recent work (Bouffard & Couture, 2003; Bråten et al., 2004; Pintrich, 1999; Schunk, 2005; Shim & Ryan, 2005; Wolters et al., 1996) has focused on three principal achievement goal orientations: mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation. For the purposes of this study, goal orientation referred to mastery, performance-approach, and performance-avoidance. These goal orientations were measured using three scales developed by Midgley, et al. (1998).

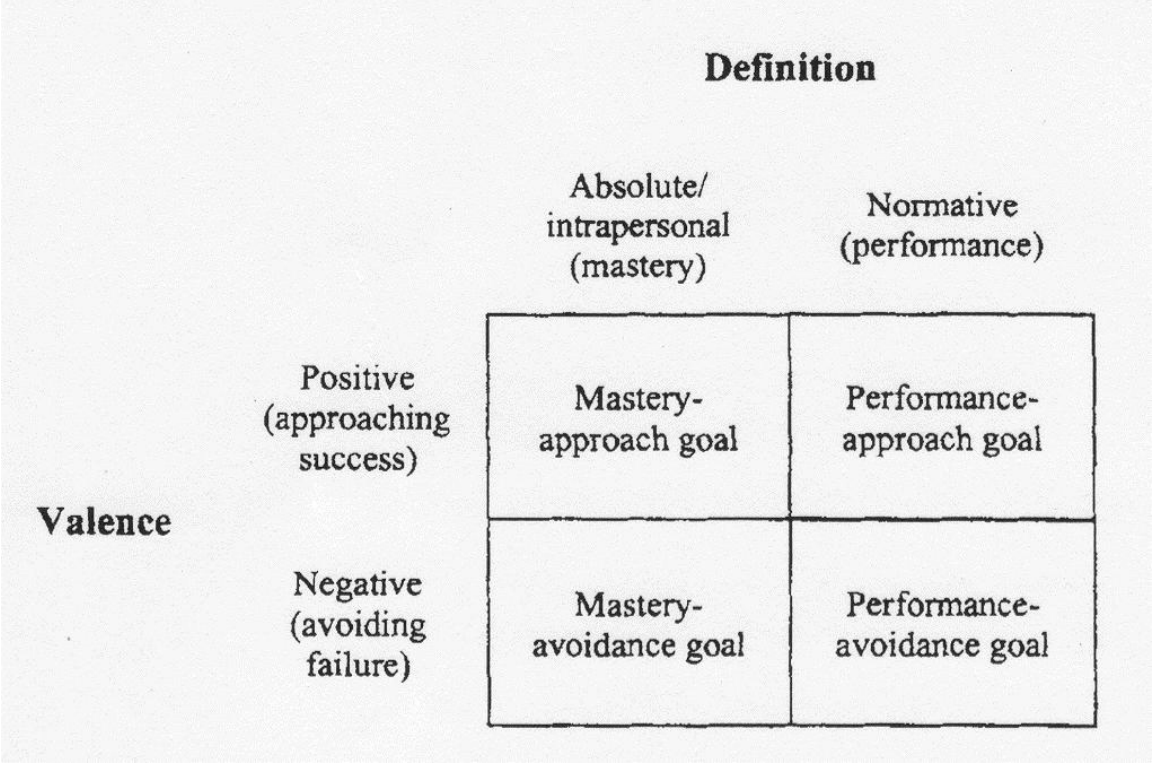


Figure 4. Achievement goal orientation framework. Note. From A 2X2 achievement goal framework. Elliott, A.J. & McGregor, H.A. (2001). *Journal of Personality and Social Psychology, 80*(3), p. 502. Reprinted with permission.

Students who adopt a mastery-approach orientation work to learn as much as possible and are focused on long-term understanding of course material. Students who adopt a mastery-approach goal orientation are concerned with thoroughly learning academic material or skills. These students want to learn for the sake of learning. Research suggests that students who adopt a mastery-approach goal orientation use more cognitive learning strategies, and demonstrate higher self-efficacy than those students who do not adopt this goal orientation (Bouffard & Couture, 2003; Bråten et al., 2004; Middleton & Midgley, 1997; Midgley et al., 2001; Schunk, 2005; Wolters & Rosenthal, 2000; Wolters et al., 1996). These students have high academic self-efficacy, which is reflected in their use of more metacognitive learning strategies and high academic

achievement (Linnenbrink & Pintrich, 2003). The mastery-avoidance goal orientation is not clearly defined in research literature (Elliot and McGregor (2001). Schunk (2005) suggests that students adopting a mastery-avoidance goal orientation may work to avoid the possibility of not meeting high standards.

Students with a performance goal orientation are focused on demonstrating ability or hiding lack of ability relative to others (Middleton & Midgley, 1997). These students are concerned with demonstrating superior achievement in comparison to others (performance-approach orientation) or avoiding the appearance of incompetence in comparison to others (performance-avoidance orientation). Students with a performance-approach goal orientation work to demonstrate their ability in comparison to others (Bouffard & Couture, 2003; Bråten et al., 2004; Elliot & McGregor, 2001; Pintrich, 1999; Schunk, 2005; Wolters & Rosenthal, 2000; Wolters et al., 1996). There is some inconsistency in the research literature regarding the effect of performance-approach goal orientation on components of self-regulated learning: self-efficacy and learning strategies, and academic achievement (Bouffard & Couture, 2003; Wolters, 2004; Wolters et al., 1996).

Students who adopt a performance-avoidance goal orientation work to avoid looking incompetent (Bouffard & Couture, 2003; Bråten et al., 2004; Caraway et al., 2003; Elliot & McGregor, 2001; Middleton & Midgley, 1997; Somuncuoglu & Yildirim, 1999; Wolters,2004). Studies have consistently indicated that performance-avoidance goal orientation is associated with lower academic achievement and use of “self-handicapping” (Midgley et al., 2001) strategies

including avoiding asking for needed help (Bouffard & Couture, 2003; Middleton & Midgley, 1997; Schunk, 2005; Wolters et al., 1996). Wolters (2004) reported that students who adopt a performance-avoidance goal orientation may lack the motivational willingness, but not necessarily the cognitive skills needed for academic success. Students who adopt a performance-avoidance goal orientation may not ask for needed assistance from teachers, as this can be perceived as indicating their lack of ability. Additionally, they may work to avoid the appearance of academic failure. Individuals who doubt their capabilities and experience high levels of fear of failure are less likely to set and work toward goals, giving them no opportunities to increase levels of self-efficacy.

Studies consistently provide empirical evidence that mastery goal orientation is associated with use of cognitive learning strategies and academic achievement (Bouffard & Couture, 2003; Bråten et al., 2004; Middleton & Midgley, 1997; Midgley et al., 2001; Schunk, 2005; Wolters & Rosenthal, 2000; Wolters et al., 1996). Conversely, performance-avoidance goal orientation is consistently correlated with less use of cognitive learning strategies and lower academic achievement (Bouffard & Couture, 2003; Bråten et al., 2004; Caraway et al., 2003; Elliot & McGregor, 2001; Middleton & Midgley, 1997; Somuncuoglu & Yildirim, 1999; Wolters, 2004). Additionally, some researchers have found a positive association between performance-approach goal orientation, academic achievement, and use of self-regulating learning strategies, while others report neutral or negative findings in this regard.

Kaplan and Midgley (1997) reported that perceptions of competence (self-efficacy) moderated the relationship between both learning (mastery) and performance goal orientation and adaptive and maladaptive strategy use in their study of 229 7th and 8th grade students. Perceived academic competence (self-efficacy) was positively correlated with learning (mastery) goal orientation in English (.48) and math (.43) while performance goal orientation was not correlated with either subject (.04 and -.15, respectively). Learning (mastery) goal orientation and perceived competence (self-efficacy) were both positive predictors of adaptive learning strategies. Learning (mastery) goals and perceived competence (self-efficacy) were significant negative predictors of maladaptive strategy use, while performance goal orientation was a significant positive predictor.

While Bouffard and Couture (2003) found students in an accelerated ability group reported higher perceived competence (self-efficacy) in math than in either of the other two ability classifications (regular, and students with learning disabilities); little difference in mastery goal orientation was identified between the three groups in French. The researchers discovered that students with learning disabilities reported the highest work-avoidance goals in French and mathematics when compared to the other two groups of students. Students with learning disabilities also reported less use of metacognitive strategies in both subjects.

Similarly, Middleton & Midgley (1997) found performance-approach goals did not significantly predict self-efficacy or use of self-regulated learning strategies in

a sample of 575 6th grade students. Results indicated that students with a lower grade point average tended to endorse performance goals more than mastery goals. The researchers discovered that students with lower prior achievement were more likely to adopt the performance-avoidance goal orientation. Task (mastery) goal orientation positively predicted academic self-efficacy (*r* =.43) and self-regulation (use of self-regulated learning strategies) (*r* =.62) and negatively predicted avoiding seeking help when needed (*r* =.-27). Performance-avoidance goal orientation was a moderate (*r* =.-13) negative predictor of self-efficacy and positive predictor of both avoiding help seeking (*r* =.33) and test anxiety in math (*r* =.32). There was a weak (*r* =.12) relationship between performance-approach goal orientation and test anxiety and no significant relationship (*r* =.09) with avoiding of help seeking. The authors noted that the performance-avoidance goal orientation was more strongly related to the dependent variables (self-efficacy, avoiding help seeking, and test anxiety) both positively and negatively than performance-approach goal orientation. They suggested some of the inconsistent research findings in the literature might be related to not distinguishing between performance-approach and performance-avoidance goal orientation.

Conversely, students who adopt mastery and performance-approach goal orientations may also use a variety of learning strategies to sustain their learning efforts. Wolters and Rosenthal (2000) found both learning (mastery) goal orientation and performance-approach goal orientation were associated with students' use of self-regulatory strategies in a sample of 114 eighth grade

students. Learning (mastery) goal orientation was the strongest predictor of motivational regulation strategies (learning strategy) use. The authors found strong positive relationships between self-talk related to earning good grades and learning (mastery) goal orientation (r=.33) and performance-approach goal orientation (r=.35). Students' use of motivational regulation strategies (learning strategies) including self-disciplining, environmental control, performance self-talk, mastery self-talk, and interest enhancement was also assessed. Additional findings indicated that self-efficacy beliefs were not related to use of learning strategies identified in the study. The authors reported that students might have held self-efficacy beliefs for learning strategies other than those identified in their study.

Somuncuoglu and Ali (1999) reported on the relationship between achievement goal orientations and use of learning strategies in a sample of 189 undergraduate college students in Turkey. Scales measuring goal orientation included three orientation subscales: mastery, ego-social (performance-approach), and work-avoidant (performance-avoidance). These scales were adapted by the authors from similar ones used by Garcia and Pintrich. Results indicated that the majority of students adopted a mastery goal orientation and used deep cognitive (metacognitive) strategies, including elaboration and organization more often than surface (learning) strategies such as rehearsal. The authors reported that they found that mastery goal orientation was positively correlated with use of deep and metacognitive learning strategies, and negatively correlated with surface learning strategies. Performance-approach goal

orientation was positively correlated with use of surface learning strategies and negatively correlated with use of either deep or metacognitive learning strategies. Performance-avoidance goal orientation was slightly correlated (.27) with the use of surface learning strategies and was negatively correlated with the use of both deep and metacognitive learning strategies.

Limitations of the study included the elimination of data from fifteen subjects by the authors because scores were inconsistent with the theoretical framework of the study. Additionally, since the authors reported high internal consistency for the three goal orientation subscales, .85 for mastery orientation, .83 for the performance-approach orientation, and .79 for the performance-avoidance orientation; results indicating a mixture of goal orientations (*n*=38 out of the total sample *N*= 174) were unclear.

Changes in self-efficacy and goal orientation in response to grades were investigated by Shim and Ryan (2005) in a sample of 361 college students. Data were first collected during the second week of the semester and again after grades were received by students on their first major exam or paper (about 3 to 5 weeks later). Self-efficacy and goal orientation: mastery, performance-approach, and performance-avoidance were measured using the Patterns of Adaptive Learning Survey (PALS, Midgley et al. 1997). Results indicated that grades moderated performance-approach goals for future performance, while mastery goal orientation was not affected by the course grade. As predicted performance-avoidance goals were associated with lower self-efficacy after the receipt of grades.

In his 2005 review of Paul Pintrich's educational legacy, Schunk reported that mastery achievement goal orientation was positively related to deeper cognitive processing, and was negatively related to surface cognitive processing. Mastery approach goals were positively related to self-efficacy, task value, and positive attributions and affect. The author stated that students who believed they were capable of learning were more likely to adopt mastery and performance-approach goal orientations. Conversely, he suggested that students who were not confident in their academic capabilities were more likely to adopt performance-avoidance goal orientation.

Wolters (2004) studied the relationships between mastery, performance-approach, and performance-avoidance goal orientations; motivational engagement; learning strategies; and academic achievement in a sample of 525 7^{th} and 8^{th} grade students enrolled in regular and advanced math classes. The author used goal orientation scales adapted from Midgley et al., (1998). Results indicated that students who reported a mastery goal orientation were less likely to procrastinate. Students who adopted a performance-avoidance goal orientation reported more disengagement from challenging academic tasks. These students were more likely to procrastinate or give up when work became challenging. Performance-approach goal orientation did not predict use of learning strategies. The author suggested that students concerned with appearing competent might overreport their use of learning strategies.

A relationship between goal orientation, self-efficacy, learning strategies, and academic achievement was identified in the preceding literature review. Mastery

goal orientation was positively correlated with self-efficacy, use of learning strategies, and academic achievement. Whereas, performance-avoidance orientation was negatively correlated with self-efficacy, and positively associated with lower academic achievement and use of more surface learning strategies.

The relationship between performance-approach goal orientation and variables of self-efficacy, use of learning strategies, and academic achievement was less consistent. Wolters (2004) indicated it was likely that students' perceptions of the classroom goal structure might have a strong influence on the goal orientations adopted. Moreover, Wolters (2004) and Midgley et al. (2001) proposed that performance-approach goal orientation in a competitive academic environment, where high achievement was emphasized, was a positive adaptation. When viewed within the framework of social cognitive theory, what students thought about their classroom environment and by extension their teachers' expectations for them, exerted a powerful influence on what they thought about their own performance and the goal orientation that they adopted.

The present study addressed goal orientations adopted by a group of students with learning disabilities. Since there is little research on goal orientations in this population, directional hypotheses could not be developed. A possible outcome could be that the use of mastery goal orientation would be consistent with the literature. Perhaps students with learning disabilities would report higher performance-approach goal orientation and lower performance-avoidance goal orientation. This difference might be the result of the additional

academic support and encouragement these students received in the special education program.

Learning Strategies

The self-regulated learning model presented in this study illustrates the student's active participation in processing, storing, and retrieving information. Students who are self-regulated learners use a variety of learning strategies in this process. These students take responsibility for their own learning by creating, implementing, and monitoring strategies that aid them in the process of learning (Weinstein & Macdonald, 1986).

Weinstein et al., (1989) presented a general definition of learning strategies as behaviors or thoughts that facilitate learning. Strategies involved in the process of knowledge acquisition (Weinstein & Macdonald, 1986) include rehearsal, elaboration, organization, and retrieval strategies (Rafoth et al., 1993; Weinstein & Macdonald, 1986).

Rehearsal strategies involve repetition as a method for remembering information. While these strategies are effective for short-term recall, they are essentially rote strategies and are effective for short-term retention of isolated bits of information, but do little to enhance conceptual understanding and promote long-term retention of information (Rafoth et al., 1993; Weinstein et al., 1989). Older students are less likely to report they use rehearsal as a study routine (Rafoth et al., 1993).

Organization strategies include ways to arrange information into meaningful groupings to enhance recall. This strategy is well-developed in children by age

10 (Rafoth et al., 1993). Elaboration strategies involve enhancing recall of new information by connection with meaningful information that has been previously learned (Weinstein & Macdonald, 1986; Rafoth et al., 1993). Retrieval strategies include application of general knowledge, logic, and inference to recall learned information. These strategies become more efficient as children grow older (Rafoth et al., 1993).

While Flavell (1979) suggests that metacognitive skills follow a developmental trajectory, metacognition may be poorly developed in students with learning disabilities (Vaidya, 1999). The executive functions related to the ability to focus and direct learning may be impaired in students with learning disabilities, and therefore these students may require direct instruction in learning strategies (Vaidya, 1999).

McKeachie et al., (1985) identifies two components of metacognition: knowledge of cognition that is how much students understand about their memories and how they learn; and regulation of cognition that is planning, selecting, monitoring, and evaluating learning tasks and learning strategies to accomplish these. The authors describe subcategories of cognitive knowledge: declarative knowledge - knowledge about one's ability to process information; procedural knowledge - knowledge about how to problem solve; and conditional knowledge - knowledge about when to use specific strategies. Conditional knowledge implies that students know how to use a learning strategy and hold positive beliefs about their competence to do so successfully.

Similarly Rafoth et al., (1993) and Flavell (1979) describe factors of metamemory, as knowledge about memory including person factors, such as knowledge about one's ability to process and recall information; task factors, including knowledge about how to solve a problem; and strategy factors, that is knowledge about when to use specific strategies.

Research using the Motivated Strategies for Learning Questionnaire (MSLQ) provides support for the interrelationship between cognitive and metacognitive strategy use, self-efficacy, goal orientation, and academic achievement. For the purposes of this study, cognitive and metacognitive strategies included rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation scales from the MSLQ. The MSLQ identifies rehearsal as a cognitive learning strategy, alternately referred to as surface learning strategy, involving reciting or naming items from a list to be learned (Pintrich et al., 1991). Metacognitive strategies, also identified as deep learning strategies, include elaboration, organization, critical thinking, and metacognitive self-regulation. Elaboration strategies such as paraphrasing, summarizing, creating analogies and generative note-taking help the student integrate and connect new information with prior knowledge. Organization strategies consist of clustering, outlining, and selecting the main idea in a reading passage. These strategies help the student build connections between what was known and new information learned. Critical thinking refers to the student's application of previously learned information to solve problems and make evaluations. Use of metacognitive self-regulation refers to the student's ability to plan, monitor, and regulate learning. Planning

activities incorporate goal setting and task analysis activities that promote organization and comprehension. Monitoring one's attention to task and progress in learning help the student evaluate the acquisition of new material while integrating it with prior knowledge. Regulation of learning refers to adjusting cognitive activities according to the demands of an academic task. The research literature on learning strategies reports the interaction between the learner, including goals for learning, level of cognitive ability, and developmental level; the material to be learned, including task difficulty and the learning environment; and the strategies used to learn. Self-regulated learners are knowledgeable of their ability to learn, and motivated to engage in the process of learning; are knowledgeable of a variety learning strategies; and can regulate the application of learning strategies as they monitor their learning.

Research using the MSLQ

The MSLQ has been used to investigate the relationships between cognitive and metacognitive learning strategies, self-efficacy, goal orientation, and academic achievement in numerous research studies with school age and college students across academic content areas. Sperling (2004) addressed the relationship between metacognition as measured by two instruments: the Metacognitive Awareness Inventory (MAI) and learning strategies using the learning strategy scale of the MSLQ, including cognitive and metacognitive strategies. Subjects were sophomore and junior college students. As expected a strong relationship was evident between knowledge and regulation of cognition as measured by the MAI (r=.68). A significant association between

metacognition as measured by the MAI and learning strategies as measured by the MSLQ was identified (r=.60). The self-efficacy scale on the MSLQ was significantly related to the regulation of cognition scale of the MAI (r=.36).

Research conducted by Pintrich et al. (1991) using the MSLQ suggested strong correlations between components of self-regulated learning including: intrinsic goal orientation and task value (.68), self-efficacy for learning and performance (.59), elaboration (.48), critical thinking (.58), metacognitive self-regulation (.50), and effort regulation (.43). Self-regulated learning was seen as a mechanism to help explain achievement differences among students as well as to improve achievement.

Wilke (2003) discovered that the MSLQ identified increases in self-efficacy in a group of college students. The author administered the MSLQ to 141 college students in a quasi-experimental design. The treatment group was taught using continuum-based, active learning strategies, while the control group was taught using traditional, didactic lecture methods. Results indicated that the treatment group reported significantly higher self-efficacy and acquired more content knowledge than the control group.

The positive relationship between mastery goal orientation, use of learning strategies, and self-efficacy has been identified by several authors including Bråten et al. (2004); Pintrich, Anderman, & Klobucar (1994); Pintrich, Roeser, & DeGroot (1994); Pintrich & DeGroot (1990); Wolters (2003); Wolters et al. (1996). Wolters (2003) reported that students with greater mastery goal orientation and greater perceived self-efficacy were less likely to procrastinate.

Students who reported more frequent procrastination reported using cognitive and metacognitive strategies less often. However, mastery and performance goal orientations failed to predict procrastination. The author administered portions of the MSLQ to study procrastination and undergraduate students' use of cognitive and metacognitive strategies. Findings suggested that procrastination was associated with expectations for success at a task and feelings of efficacy to complete a task rather than the value or benefits to be achieved by completing the task.

Wolters et al (1996) are frequently cited for an examination of the relationship between goal orientation and students' motivational beliefs for math, English, and social studies and self-regulated learning in 434 7^{th} and 8^{th} grade students at the fall and spring semesters. Students completed an adapted version of the MSLQ that addressed their motivational beliefs and self-regulated learning. Students' goal orientations were also assessed by using three different scales focused on learning goal (mastery) orientation, extrinsic (performance) goal orientation, and relative ability (performance-approach) goal orientation. These scales were adapted from the Patterns of Adaptive Learning Survey (PALS) (Midgley et al. 1996 in Wolters et al. 1996). Additionally, academic performance in math, English, and social studies was measured by collecting semester grades in each subject.

Results indicated that mastery and performance-approach goal orientations were always positively correlated; correlations ranged form .22 to .31. Mastery and extrinsic goal orientations were always negatively correlated, correlations

ranged from -.19 to -.30. Performance-approach and extrinsic goal orientations were always positively correlated with each other, correlations ranged form .18 to .23. Results suggested that the goal orientation students endorsed in the classroom had important implications for their motivational beliefs, self-regulation, and classroom performance. A mastery goal orientation was a positive predictor of task value, self-efficacy, and both cognitive and self-regulatory strategy use. A mastery goal orientation predicted academic performance in math and social studies in the spring semester. A limitation of this study was the lack of distinction between the extrinsic and relative ability (performance-approach) goal orientations.

Pintrich, Roeser, & DeGroot (1994) identified a strong positive correlation between academic self-efficacy beliefs and cognitive strategy use (.41 and .61, respectively) and self-efficacy beliefs and self-regulation (.50 and .67, respectively) in a group of 100 7th grade students. Students completed the MSLQ in the fall and following spring of the school year. Results indicating higher levels of cognitive strategy use and self-regulation in the second administration of the MSLQ supported the position that self-efficacy beliefs were influenced by previous performance.

Similarly, Pintrich and DeGroot (1990) reported on the motivational and self-regulated learning components of classroom academic performance in their study of 173 7th and 8th grade students from science and English classes. The authors collected data on students' prior semester grades in science and English, administered the MSLQ to students, and collected subsequent semester grades

in those subjects. Results indicated that higher levels of self-efficacy correlated positively with cognitive strategy use (.63) and self-regulation (.73). Self-efficacy was positively correlated with prior (.34) and subsequent (.36) academic achievement.

Bråten et al. (2004) investigated the moderating effects of self-efficacy beliefs on the relationship between performance goals and self-regulatory strategy use in two groups of Norwegian college students: 178 business students and 108 education students. Data were collected using 18 items adapted from Midgley et al. (1988) measuring mastery, performance-approach, and performance-avoidance goal orientations. Self-efficacy and self-regulatory strategies were measured using seven items from the MSLQ self-efficacy scale and six items from the MSLQ metacognition scale. Results of *t* tests indicated a positive correlation between self-efficacy and mastery goal orientation (.28) and self-efficacy and self-regulatory strategies (.25) for education students and a positive correlation between self-efficacy and performance-approach goal orientation (.40) and self-efficacy and self-regulatory strategies (.28) for business students. Mastery goal orientation predicted strategy use in both groups of students; while there was no significant interaction between self-efficacy and performance-approach goal orientation for self-regulatory strategies. An unexpected finding was that increases in performance-avoidance goal orientation were positively correlated to an increase in self-regulatory strategies for students with low self-efficacy.

Results from numerous studies have consistently identified a relationship between use of cognitive and metacognitive learning strategies, goal orientation, self-efficacy, and academic achievement. Students engaged in the process of making new information meaningful, as evidenced by their use of metacognitive learning strategies, endorsed a mastery goal orientation and high self-efficacy. However, use of surface learning strategies was related to endorsement of performance-avoidance goal orientation, and lower reported self-efficacy. Strategy use did not consistently identify differences in performance goal orientations or mastery and performance goal orientations. There is insufficient research on the use of learning strategies in the sample of the current study to support directional hypotheses. Perhaps high school students with learning disabilities make less use of learning strategies due to their learning disabilities.

Students with Learning Disabilities

Students with learning disabilities have by definition experienced repeated school failure (Renick & Harter, 1989). They may think that they cannot learn, be unwilling to engage in difficult tasks, use fewer learning strategies (Meltzer et al., 1998; Pintrich, Anderman, & Klobucar, 1994), and attribute their success to luck rather than their own efforts (Page-Voth & Graham, 1999; Pintrich et al. 1994; Pintrich & DeGroot, 1990; Renick & Harter, 1989; Shell, Colvin, & Bruning, 1995; Sideridis, Morgan, Botas, Padeliadu, and Fuchs, 2006; Tabassam & Grainger (2002); Vaidya, 1999.; Weist, Wong, Cervantes, Craik, and Kreil, 2001; Wong, Butler, Ficzere, and Kuperis, 1996)

An examination of the relationship between disability status, components of self-regulated learning, grade level, sex, and academic achievement has been studied with mixed results in the literature. Researchers generally agreed on the developmental nature of self-regulated learning components in this population. However, when students with learning disabilities have rated themselves on components of self-regulated learning, they have been reported to overestimate their abilities as a self-protective factor. Conversely results have indicated that students with learning disabilities rate themselves lower on components of self-regulated learning compared to non-disabled peers, while reporting comparable ratings to peers with learning disabilities.

Renick and Harter (1989) reported on the developmental nature of academic self-efficacy beliefs (scholastic competence) in their study of 86 children with learning disabilities in grades 3 through 8. Students completed the Perceived Competence Scale, an instrument developed by Harter. This instrument is a domain-specific measure of self-concept and includes four domains: scholastic competence, athletic competence, social acceptance, and global self-worth. Results indicated that as children with learning disabilities grew older they perceived themselves as less competent academically compared to non-disabled peers. However, students maintained high perceptions of competence when they compared themselves to other students with learning disabilities.

Similarly, research conducted by Shell et al. (1995) identified the developmental nature of self-efficacy beliefs and the positive relationship between these beliefs and academic achievement. The researchers studied self-

efficacy beliefs, attribution, and outcome expectancy in reading and writing achievement in a group of 105 4th grade, 111 7th grade, and 148 10th grade students. California Achievement Test scores were used as a measure of reading and writing achievement. Students were assigned membership in a high, average, or low achieving group based on these scores. Results indicated that students in the high and average achievement groups reported higher self-efficacy in reading and writing; and lower ratings of luck, task difficulty, and teacher help as a cause for success than students in the lower achievement group. Low achieving students expressed lower ratings of self-efficacy in reading and writing and higher causality for success to factors that were external or uncontrollable, that is luck, task difficulty, and teacher help. The self-efficacy ratings of high and average achieving students were more similar than the self-efficacy ratings of the low achieving group. Ratings of self-efficacy were positively related to differences in achievement level. Significant differences were found for grade and achievement, suggesting that differences exist between task-related self-efficacy beliefs at different grade levels. This finding provided further support to Bandura's (1986) assertion that self-efficacy beliefs continue to develop as cognitive and behavioral skills improve.

Bouffard and Couture (2003) reported that students with learning disabilities rated themselves lower than typical peers on components of self-regulated learning. However, when students with learning disabilities compare themselves to others peers with learning disabilities, their self-efficacy ratings were similar to those of average students.

Similarly, Tabassam and Grainger (2002) found students with learning disabilities had lower scores than typically achieving peers on academic self-efficacy. The authors studied 172 3rd to 6th grade students from Australia; 44 students had learning disabilities, 42 students had learning disabilities and were diagnosed with Attention Deficit Hyperactivity Disorder (ADHD), and 86 students were typically achieving. Learning disability status was determined by the traditional ability/achievement discrepancy model. Self-efficacy for math and reading was assessed using a domain-specific 14-item scale developed by the authors. Results showed that students with learning disabilities obtained significantly lower scores on measures of reading and math self-efficacy compared to typical peers; while nonacademic self-concept was almost equal to typical peers. No significant differences on measures of academic self-efficacy were found between students with learning disabilities and students with disabilities who were also diagnosed with ADHD.

Significant differences on measures of perceived competence were discovered by Wiest et al. (2001) in their study of 251 high school students: 104 students were enrolled in general education, 93 students were enrolled in an alternative education program for students with academic credit deficiencies, and 54 students were enrolled in special education. Regular education students reported higher levels of academic competence than students in the other two groups. The explanation for these differences was framed in a social-cognitive model, that is students reported increased levels of competence (self-efficacy) based on feedback from significant others and exploration of the environment.

Conversely Alvarez and Adelman (1986) reported that students with learning disabilities tended to overestimate their abilities as a self-protective factor in their study of nineteen students, ages 9-15, in a university clinic for children with learning and behavior problems. Four self-report measures were administered to the students including the Piers Harris Self-Concept Scale, an 80-item instrument. Students' judgments of their capability to solve a series of 20 math problems of increasing difficulty were a measure of self-efficacy. Statements related to completing an ambiguous angle matching task were used to measure students' expectancy and aspiration of success. Results indicated that global assessment of efficacy in math was near the top of a 10-point scale. Thirty percent of students' judgments were overestimations of their ability to solve math problems correctly, while only two percent of judgments were underestimations. Overall, students had a 68 percent accuracy rate for identifying problems that could and could not be solved. This suggested that the tendency for students with learning disabilities to overestimate their abilities was not due to their inability to make accurate self-judgments. Rather the authors suggested that students with learning disabilities might overestimate their abilities as a protective factor to compensate for their learning difficulties.

Sideridis et al. (2006) examined whether metacognition (surface versus deep processing) and motivation (goal orientation and self-efficacy) correctly classified students already identified with reading disabilities in a sample of 122 5th and 6th grade students, 61 students with reading disabilities and 61 typical students, all of Greek origin. Results indicated that motivation strongly predicted disability

status. Students who were highly efficacious and frequently engaged in their work were unlikely to have a reading disability. There were several methodological limitations to the study. Not all students in the reading disabled group had been formally identified as reading disabled. The reading disabled students were treated as a homogeneous group and included students with comorbid affective and behavioral issues. Any pre-existing differences between groups on motivation variables were not controlled statistically. As such, a causal or directional relationship could not be inferred from the results.

Pintrich et al. (1994) investigated differences in self-efficacy, anxiety, attributional beliefs, and metacognitive knowledge and the relationship of these to reading comprehension in a sample of 39 5th grade students with (*n*=19) and without learning disabilities (*n*=20). Learning disability status was determined by ability/achievement discrepancy. Students completed an adapted version of the MSLQ to measure self-efficacy, anxiety, and attributional beliefs. Metacognitive knowledge for reading, particularly reading comprehension was measured by administration of the Index of Reading Awareness (IRA) a 20-item multiple choice instrument. Results from two reading comprehension tasks were used to measure reading performance. Students read a short story and answered five multiple choice items. Students also completed a cloze task in which they read a short story with ten missing words. Students were presented with a choice of four possible words for each sentence. Results of the study indicated that students without learning disabilities performed significantly better than students with learning disabilities on measures of reading comprehension. Additionally,

students without learning disabilities demonstrated a greater awareness of learning strategies than peers with learning disabilities. However, ratings of self-efficacy and anxiety were not significantly different between the two groups of students. Results indicated that students with learning disabilities were more likely to report external locus of control (attribute success or failure to luck or teacher assistance). Motivational beliefs were positively related to metacognitive knowledge and reading comprehension. Attributional beliefs were also positively correlated with awareness of metacognitive strategies.

Results from research by Meltzer, Roditi, House, and Perlman (1998) indicated that students with learning disabilities rated their academic performance and organization as average to above average while these students' self-ratings were significantly lower than the self-ratings of average achieving students over all domains investigated. Students with learning disabilities reported using learning strategies less often than average achieving peers in all domains except reading, although their ratings were in the above average to average range. However, teachers rated students with learning disabilities as below average in all domains of academic performance and below average in their use of learning strategies. Participants in the study were 663 4th through 9th grade students (students with learning disabilities=308, students with average achievement=355) and 57 teachers. Students completed the Student Self-Report System (SSRS), a 50-item, 5-point Likert questionnaire developed by the lead author and based on a model of strategic learning. The SSRS is designed to measure self-perceptions of strategy use and academic self-concept

in reading, written language, spelling, math, and organization. Students also completed the Student Rating Scale, an instrument designed by the lead author to identify students' judgments of their academic performance compared to their peers. Teachers' judgments of students' strategy use were measured using the Teacher Observation System (TOS), a 20-item, 5-point Likert scale. The TOS is designed as an efficient system for teachers to observe and analyze students' use of metacognitive strategies (e.g. checking work and planning). The authors comment that a possible explanation for the discrepancy between student and teacher ratings could be that teachers rewarded the efforts of students with learning disabilities while minimizing their academic deficiencies.

Trainin and Swanson (2005) investigated cognitive and metacognitive strategy use in college students with (*n*=20) and without learning disabilities (*n*=20) and academic achievement as measured by both standardized instruments and grade point average (GPA). Learning disability status was defined as low phonological processing (<25th percentile) and average range intelligence (IQ>84). Numerous (17) tests and subtests were administered to all subjects to assess cognitive processes, including: phonological processing and reading comprehension as measured on the Woodcock Reading Mastery Test; language processing as measured by the Word Classes subtest of the Clinical Evaluation of Language Fundamentals Third Edition and the Peabody Picture Vocabulary Test, Revised; general reasoning as measured by the Raven's Advanced Progressive Matrices Test; and processing speed as measured by the Timed Letter Recognition and Digit Recognition subtests of the Comprehensive

Test of Phonological Processing. The Motivated Strategies for Learning Questionnaire (MSLQ) was administered to all subjects in its entirety. Results of the study identified that students with learning disabilities were not significantly different from peers without learning disabilities in terms of motivation or use of reading strategies. A significant, positive correlation was found between strategy use and disability group. Students with learning disabilities reported significantly higher use of self-regulation in their learning, including managing time and resources, effort regulation, participation in peer learning activities, and participation in help seeking activities. Students with learning disabilities who reported high strategy use had higher achievement than students without learning disabilities. The authors concluded that although college students with learning disabilities continued to demonstrate cognitive processing deficits, including: word reading, processing speed, semantic processing, and short-term memory; the use of compensatory self-regulated learning strategies enabled these students to achieve academic success.

Research indicates that students with learning disabilities report lower academic self-efficacy than their typically performing peers report. Students with learning disabilities reported higher feelings of academic competence in special education classes compared to general education classes and compared themselves favorably to low achieving students who had not been identified as learning disabled. Students with learning disabilities demonstrated less use of learning strategies than students without learning disabilities. However, when students with learning disabilities did utilize self-regulated learning strategies they

were able to achieve academic success. The current study measured components of self-regulated learning: self-efficacy, goal orientation, and use of learning strategies in a group of high school students with learning disabilities. Although there was not enough research to develop directional hypotheses, it was anticipated that high school students with learning disabilities would compare themselves favorably to other students with learning disabilities.

Grade Level

The ability to regulate learning processes continues to develop as students mature (Flavell, 1979; Rafoth et al., 1993; Wolters & Yu, 1996; Zimmerman & Martinez-Pons, 1990). As academic material becomes increasingly complex, success in school requires that students develop awareness of their own learning processes as well as the ability to monitor and direct them (Flavell, 1979; Shell et al.1995; Stewart & Landine, 1995; Vaidya, 1999).

Shell et al. (1995) reported on the developmental nature of self-efficacy beliefs and the positive relationship between these beliefs and academic achievement. The researchers studied self-efficacy beliefs, attribution, and outcome expectancy in reading and writing achievement in a group of 105 4th grade, 111 7th grade, and 148 10th grade students. California Achievement Test scores were used as a measure of reading and writing achievement. Students were assigned membership in a high, average, or low achieving group based on these scores. Results indicated that students in the high and average achievement groups reported higher self-efficacy in reading and writing; and lower ratings of luck, task difficulty, and teacher help as a cause for success than

students in the lower achievement group. Low achieving students expressed lower ratings of self-efficacy in reading and writing and higher causality for success to factors that were external or uncontrollable, that is luck, task difficulty, and teacher help. The self-efficacy ratings of high and average achieving students were more similar than the self-efficacy ratings of the low achieving group. Ratings of self-efficacy were positively related to achievement level differences. Significant differences were found for grade and achievement, suggesting that differences exist between task-related self-efficacy beliefs at different grade levels. This finding provided further support to Bandura's (1986) assertion that self-efficacy beliefs continue to develop as cognitive and behavioral skills improve.

Zimmerman and Martinez-Pons (1990) studied differences in self-regulated learning in 90 students (30 students per grade level) in 5th, 8th, and 11th grades. Students responded to self-regulated learning scenarios and rated their efficacy to define words (verbal efficacy scale) and solve math problems (math efficacy scale) in a structured interview format. Results indicated developmental progression in the growth of academic self-efficacy and use of self-regulated learning strategies. As predicted 11th grade students demonstrated higher levels of academic self-efficacy than 8th grade and 5th grade students. Additionally, as students grew older they demonstrated increased reliance on support from peers and teachers and decreased support form parents. Older students increased their use of complex study strategies including, reviewing self-recorded notes;

while younger students more often used simpler strategies, including reviewing text materials.

Wolters and Yu (1996) studied the relationship between three goal orientations: learning (mastery approach) goal orientation, relative ability (performance-approach) goal orientation, and extrinsic goal orientation, which the authors defined as a focus on obtaining high grades, rewards, or approval from others. The extrinsic goal orientation appeared to be somewhat similar to the relative ability goal orientation. Students' motivational beliefs including self-efficacy were measured using the Task Value, Self-Efficacy, and Test Anxiety scales from the Motivated Strategies for Learning Questionnaire (MSLQ). The cognitive and metacognitive scales from the MSLQ including: Organization, Rehearsal, and Elaboration were used to measure the self-regulated learning strategies of students in the study. Students' goal orientations were measured with an adapted version of the Patterns of Adapted Learning Survey (PALS, Midgley et al., 1996). The sample consisted of 434 7th and 8th grade students (225 females and 209 males). Students were enrolled in math, English, and social studies classes. Data was collected during the fall (October) and following spring (June) of the school year. Results from the study indicated that eighth grade students reported higher levels of both cognitive strategy use and self-regulatory strategy use than 7th grade students across all three subjects.

Research suggests that self-regulated learning strategies continue to develop as students mature. Older students have developed more complex learning strategies and demonstrate higher academic self-efficacy than younger students.

The relationship between use of learning strategies and academic self-efficacy suggests that as students experience academic success their use of learning strategies increases and confidence in their academic abilities is fostered. While the research on high school students with learning disabilities is too limited to support directional hypotheses, it is possible that these students have low academic self-efficacy because of repeated academic failure, in part, because they have more difficulty utilizing strategies to regulate their learning. Results of the present study were expected to illustrate the relationship between grade level and components of self-regulated learning in a sample of high school students with learning disabilities.

Sex

Sex has a small effect on components of self-regulated learning (Meltzer, Roditi, Houser, and Perlman, 1998; Pajares & Valiante, 2001; Pintrich & DeGroot, 1990; Rogers, Galloway, Armstrong, and Leo, 2001; Wolters & Yu, 1996; and Zimmerman & Martinez-Pons, 1990).

Rogers et al., (2001) argued that sex differences in research on classroom motivation might be related to students' perceptions of the classroom environment and teacher expectations in particular. These researchers studied sex differences in motivational style in 435 7th, 389 9th grade, and 357 11th grade students. Curiously, the investigators neglected to identify the number of students by sex in the study. Sex differences in three motivational styles: task (mastery) goal orientation, learned helplessness, and self-worth for English and math tasks were small and not significant. Results indicated that female students

were more oriented toward a mastery goal orientation, particularly in English. Additionally, female students showed an increase in mastery goal orientation and learned helplessness in math as they grew older. Male students were more motivated to maintain feelings of self-worth in both subjects. The authors concluded that sex differences were a function of cultural norms and socialization and as such varied across time and place.

Pajares and Valiante (2001) suggested that sex differences in academic performance were a function of student perception of the academic subject in accordance with socialized expectations and stereotypes. The researchers investigated the degree to which sex differences were a function of students' gender orientation beliefs. They studied sex differences in writing in a sample of 497 6th, 7th, and 8th grade students (250 females: 84 from the 6th grade, 93 from the 7th grade, and 73 from the 8th grade; and 247 males: 85 from the 6th grade, 84 from the 7th grade, and 78 from the 8th grade). The students completed questionnaires adapted by the authors related to writing self-efficacy; writing apprehension, which was the tendency to approach or avoid a writing task; writing self-concept, which was judgments of self-worth related to written language activities; and self-efficacy for self-regulated learning, for example completing homework on time. Additionally the researchers assessed the value of writing as perceived by the students, which was perceived importance, value, and interest in writing tasks. Writing achievement was measured by the students' grade point average in language arts class at the end of the semester. Three goal orientations: mastery-approach goal orientation, performance-

approach goal orientation, and performance-avoidance goal orientation were measured using scales adapted from Middleton and Midgley (1997). Students' gender orientation beliefs were assessed by measuring how strongly students agreed or disagreed with stereotypical male and female characteristics in American society. Results of the study indicated significant differences favoring female students on variables of writing self-efficacy, writing self-concept, self-efficacy for self-regulation, value of writing, task (mastery) goal orientation, and course grade. Male students reported significantly higher performance-approach goal orientation. When sex differences in motivation and achievement variables were controlled for gender orientation, differences between male and female students' responses were not significant, with the exception of ratings of male students for performance goal orientation.

Wolters and Yu (1996) studied the relationship between three goal orientations: learning (mastery approach) goal orientation, relative ability (performance-approach) goal orientation, and extrinsic goal orientation, which the authors defined as a focus on obtaining high grades, rewards, or approval from others. The extrinsic goal orientation appeared to be somewhat similar to the relative ability goal orientation. Students' motivational beliefs including self-efficacy were measured using the Task Value, Self-Efficacy, and Test Anxiety scales from the Motivated Strategies for Learning Questionnaire (MSLQ). The cognitive and metacognitive scales from the MSLQ including: Organization, Rehearsal, and Elaboration were used to measure the self-regulated learning strategies of students in the study. Students' goal orientations were measured

with an adapted version of the Patterns of Adapted Learning Survey (PALS, Midgley et al., 1996). The sample consisted of 434 7th and 8th grade students (225 females and 209 males). Students were enrolled in math, English, and social studies classes. Data was collected during the fall (October) and following spring (June) of the school year. Results from the study indicated that the two most consistent findings related to sex were that females reported higher levels of cognitive strategy use and test anxiety in all three subject areas. Female students also reported lower levels of academic self-efficacy for social studies and math. A limitation of the study was that the researchers did not examine sex by goal orientation interactions.

Pintrich and DeGroot (1990) investigated motivational and self-regulated learning components of classroom academic performance in a sample of 173 (100 females and 73 males) 7^{th} grade students enrolled in science and English classes. The students completed the Motivated Strategies for Learning Questionnaire (MSLQ). Researchers collected data on student performance on classroom tasks and assignments. Sex had no main effect on the three motivational scales of the MSLQ: intrinsic value, self-efficacy, and test anxiety or the two cognitive scales: strategy use and self-regulation. The results indicated no significant difference between males and females on academic performance variables, strategy use, self-regulation, or intrinsic value scales of the MSLQ. However, males rated themselves higher in self-efficacy and lower in test anxiety.

Zimmerman and Martinez-Pons (1990) studied differences in self-regulated learning in 90 students (30 students per grade level) in 5th, 8th, and 11th grades. Students responded to self-regulated learning scenarios and rated their efficacy to define words (verbal efficacy scale) and solve math problems (math efficacy scale) in a structured interview format. Results indicated that males had higher verbal efficacy than females, whereas females reported greater use of self-regulated learning strategies.

Meltzer et al., (1998) reported that the overrepresentation of adolescent males in programs for students with learning disabilities might account for the scarcity of research on gender differences in this population. The authors report that while investigations into sex differences in students with learning disabilities have yielded inconclusive results, results indicate that males show more positive academic self-concepts than females in the areas of math and physical attractiveness, while females report higher ratings of their verbal ability than males. In their study of 308 students with learning disabilities (213 males and 95 females) in the 4th through 9th grades Meltzer et al. (1998) identified nine academic and organizational domains including: reading, writing, spelling, math, organization, checking work, planning, effort, and use of strategies. Both students and teachers completed questionnaires developed by the authors. Results indicated no significant sex differences in student and teacher ratings of perceptions of academic competence and strategy use. However, males rated themselves higher in all areas with the exception of organization. Female students rated themselves higher in the area of organization. Teachers rated

both male and female students as below average in their performance in most areas. Male and female students rated themselves in the average to above average range in most areas.

While female students usually demonstrate greater self-efficacy for language-based tasks and more often adopt a mastery approach goal orientation; male students generally demonstrate greater self-efficacy for mathematical tasks and more frequently assume a performance-approach goal orientation. These sex differences follow socialized gender orientations prevalent in American culture (Pajares & Valiante, 2001; Rogers et al., 2001) and can be attributed, at least in part, to the vicarious learning component of social learning theory underlying self-regulated learning. Sex effects on components of self-regulated learning are small and not significant as reported in the literature (Meltzer et al., 1998; Pajares & Valiante, 2001; and Pintrich & DeGroot, 1990). Results from the present study were expected to be consistent with the literature with regard to the effects of sex.

Academic Achievement

The research literature on self-regulated learning suggests that reviewing the grades students have earned for course work represents an observable measure of academic achievement in the classroom (Bouffard & Couture, 2003; Caraway et al., 2003; Pintrich & DeGroot, 1990; Wiest et al. 2001; Wilke, 2003; Wolters et al., 1996; Wolters, 1999). In the present study the fall 2007 quarter grade

earned in special education English classes was used to indicate students' academic achievement.

Summary

The capacity to represent events and their interrelatedness symbolically allows students to think about behaviors and actions in the past, present, and future (Bandura, 1986). Students evaluate the consequences of previous learning trials and select and manage learning strategies to achieve anticipated goals. An examination of the components of self-regulated learning, grade level, sex, and academic achievement formed the basis for the current study of the interactions of the predictor variables: self-efficacy, goal orientation, learning strategies, grade level, and sex on the outcome variable of academic achievement, as measured by fall 2007 quarter grade in English, in a group of high school students with learning disabilities.

While definitions of self-regulated learning vary in the research literature (Randi & Corno, 2000; Zimmerman, 1989b) there is agreement that students who self-regulate their learning "are metacognitively, motivationally, and behaviorally active participants in their own learning process" (Zimmerman, 1986 in Zimmerman, 1989b). The social-cognitive theoretical perspective utilized in the present study identified the reciprocal interaction of personal, behavioral, and environmental factors (Bandura, 1986; Zimmerman, 2000) in the process of learning. However, causality among components of self-regulated learning: self-efficacy, goal orientation, and learning strategies; as well as the relationships among factors underlying these constructs have yet to be identified. From this

perspective, components of self-regulated learning include self-efficacy, goal orientation, and learning strategies.

A review of the literature consistently indicates a relationship between self-efficacy, goal orientation, learning strategy, and academic achievement. A positive correlation has been identified between high self-efficacy, mastery goal orientation, metacognitive learning strategies, and academic achievement. Conversely, adoption of performance-avoidance goal orientation has been associated with low self-efficacy, limited use of learning strategies, and poor academic achievement.

An inconsistent relationship has been recognized between performance-approach goals, self-efficacy, learning strategies, and academic achievement. Several researchers have discovered a positive correlation between performance-approach goal orientation and components of self-regulated learning: self-efficacy and learning strategies, and academic achievement (Bouffard & Couture, 2003; Somuncuoglu & Ali, 1999; Shim & Ryan, 2005; Wolters & Rosenthal, 2000). Midgley et al., (2001) and Wolters (2004) report that adoption of a performance-approach goal orientation can be a positive adaptation in a competitive academic environment. Other researchers (Middleton & Midgley, 1997; Bråten et al., 2004; Wolters, 2003) have reported neutral or negative correlations between these components.

Increases in the use of self-regulated learning strategies have been identified in older students (Wolters & Yu, 1996; Zimmerman & Martinez-Pons, 1990). The developmental nature of learning strategies suggests that students continue to

refine the processes used to store, retrieve, and monitor learning as they grow older (Flavell, 1979; Rafoth et al., 1993; Wolters & Yu, 1996; Zimmerman & Martinez-Pons, 1990). The current study was an exploration of possible relationships between grade level and components of self-regulated learning: self-efficacy, goal orientation, and learning strategies.

Differences between male and female students suggest that environmental factors, that is cultural expectations, influence student gender orientations (Pajares & Valiante, 2001; Rogers et al., 2001). Small and insignificant differences exist between male and female students with regard to components of self-regulated learning: self-efficacy, goal orientation, and learning strategies (Meltzer et al., 1998; Pajares & Valiante, 2001; Pintrich & DeGroot, 1990; Zimmerman & Martinez-Pons, 1990). In the present study, a small, insignificant correlation was expected between sex and components of self-regulated learning: self-efficacy, goal orientation, and learning strategies.

The research on components of self-regulated learning in high school students with learning disabilities is very limited. As a result, it was not possible to develop directional hypotheses. Social comparison affects the self-efficacy ratings of students with learning disabilities (Page-Voth & Graham, 1999; Wong et al., 1996). They may overrate their academic achievement and use of learning strategies (Alvarez & Adelman, 1986; Meltzer et al.,1998) and often do not rate themselves high on components of self-regulated learning compared to typical peers (Bouffard & Couture, 2003; Shell et al., 1995; Sideridis et al., 2006; Tabassam & Grainger, 2002; Renick & Harter, 1989; Weist et al., 2001).

Whereas these students compare themselves favorably to learning disabled peers (Renick & Harter, 1989). A potential result of this study could indicate that students with learning disabilities benefit from the social learning opportunities and additional environmental supports provided in the special education classroom toward development of compensatory self-regulated learning strategies. The current study was an effort to expand knowledge of how components of self-regulated learning operate in this population.

The research literature reviewed supports the theoretical interrelatedness of personal, behavioral, and environmental factors in self-regulated learning. Moreover, results from this preliminary examination of the interaction of components of self-regulated learning: self-efficacy, goal orientation, learning strategies, grade level, sex, and academic achievement in a group of high school students with learning disabilities could add further support to the proposition that "thinking is creating".

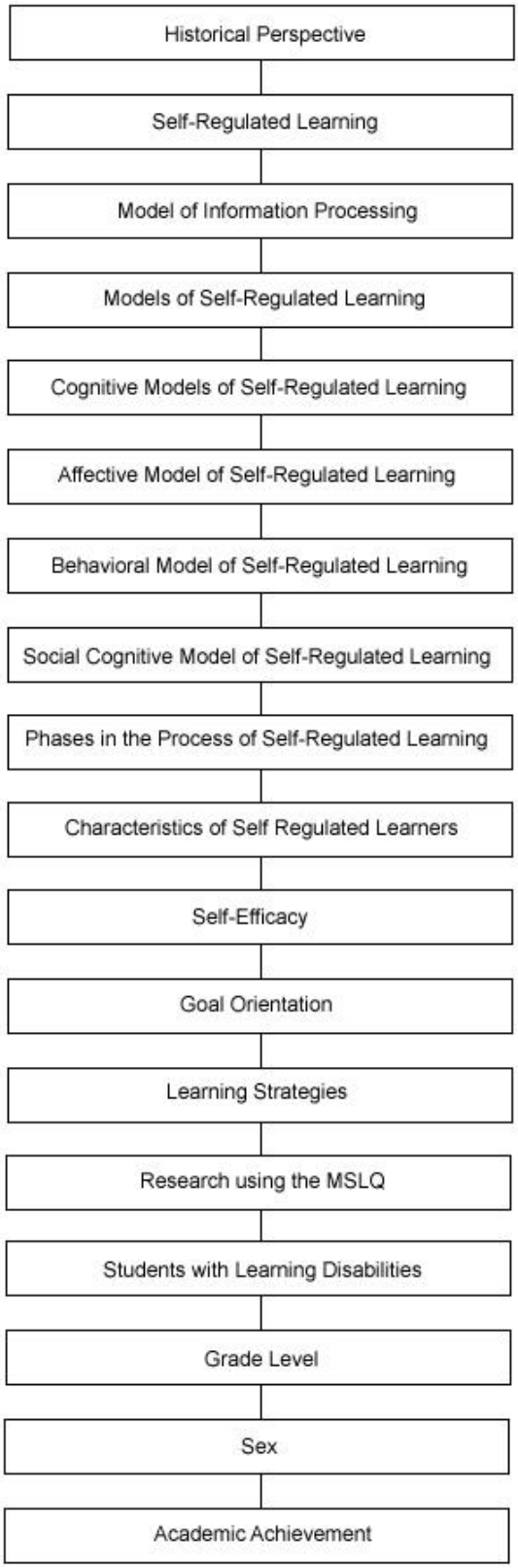


Figure 5. Flow chart of literature review.

CHAPTER III

METHODS

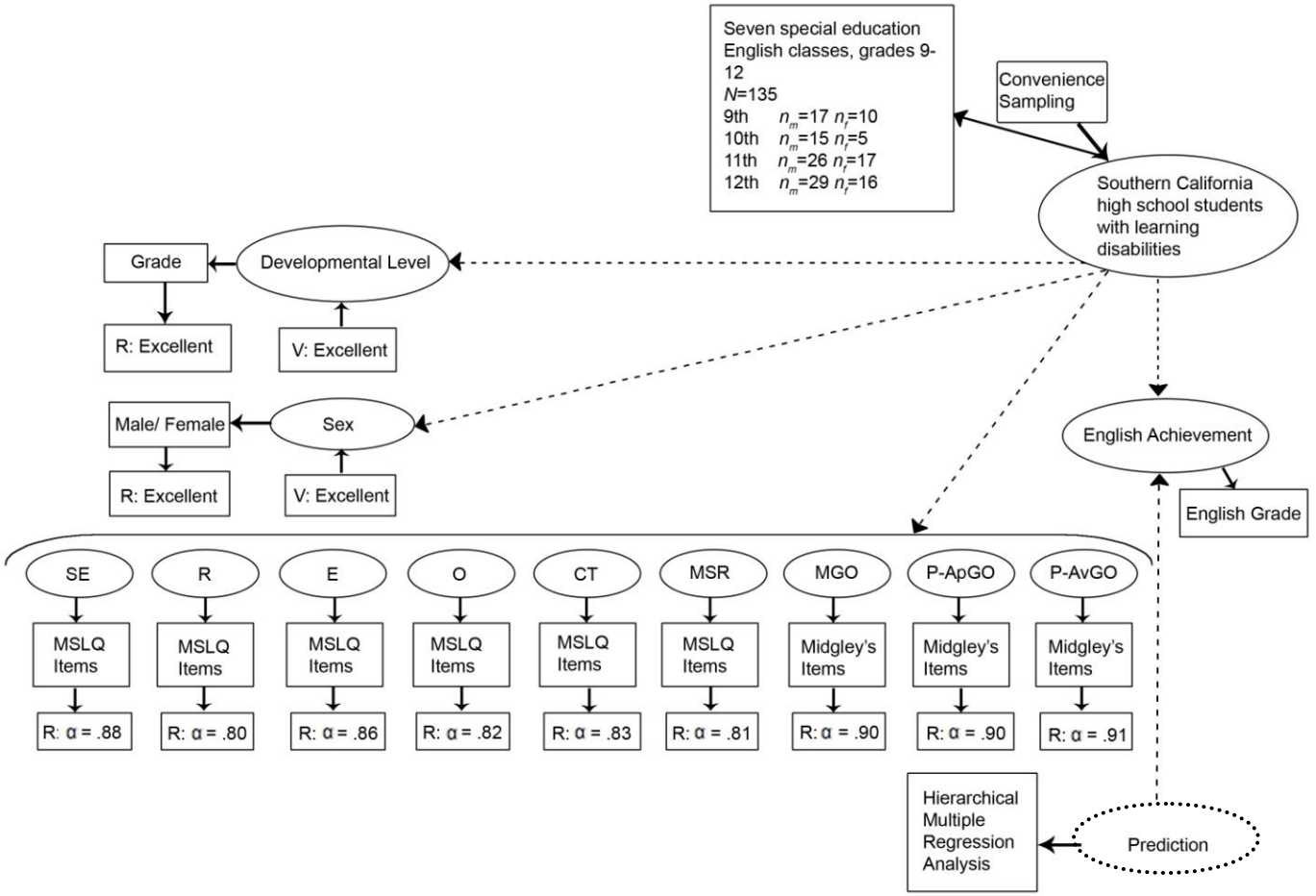
Introduction

The fundamental purpose of this research study was to determine the interactions between components of self-regulated learning: self-efficacy, goal orientation, learning strategies, grade level, sex; and academic achievement in a sample of high school students with learning disabilities. A main purpose of the study was to identify if these components of self-regulated learning predict academic achievement, as measured by quarter grade in a special education English course. Self-efficacy relates to feelings of competence for a domain-specific task. Three goal orientations had been identified: mastery-approach, performance-approach, and performance-avoidance (Midgley et al., 1998). Learning strategies include cognitive and metacognitive activities to control and direct the process of learning (Weinstein & Mayer, 1986). The literature suggests that students who report a high level of self-efficacy would adopt a mastery-approach goal orientation and use more metacognitive learning strategies to facilitate a through understanding of an academic task. Students concerned with earning good grades would adopt cognitive learning strategies and report a moderate level of academic self-efficacy. While students interested in avoiding the appearance of incompetence would report low use of learning strategies, and the lowest level of academic self-efficacy (Middleton & Midgley, 1997). Previous research suggests that students with learning disabilities rate themselves at an average level compared to disabled peers in special education classes on

components of self-regulated learning. However, there is very little research literature focused on the relationships of components of self-regulated learning in high school students with learning disabilities. As such, this study is an exploration of the operation of these mechanisms in this population. The strong and consistent directional relationships described in the research literature for students without learning disabilities may not be apparent in the current sample.

Design

This research study employed a pre-experimental design utilizing a convenience sample of high school students with learning disabilities enrolled in special education English classes. These students had been previously assessed to determine the presence of a learning disability according to the ability/achievement model (California Department of Education, 2005). The goal of this study was to identify the interaction of predictor variables (components of self-regulated learning) with the outcome variable (quarter grade in English) in a group of students with learning disabilities. See Figure 6 for a flow chart of the variables in the study. Data were analyzed using descriptive statistics, inferential statistics, a correlation matrix, and multiple regression to answer research questions.



Note: R: = reliability, V: = validity, SE=self-efficacy scale, R=rehearsal scale, E=elaboration scale, O=organization scale, CT= critical thinking scale, MSR= metacognitive self-regulation scale, MGO= mastery goal orientation scale, P-ApGO= performance-approach goal orientation scale, P-AvGO= performance-avoidance goal orientation scale

Figure 6. Flow chart of variables in the study.

Population

The population for this study consisted of adolescents in a suburban city located 50 miles northwest of Los Angeles, California. Based on 2005-2006 school year data the district had an enrollment of 22,456 students in 29 schools. The racial composition of the district was 80 % white, 18 % Hispanic, 9 % Asian, 2 % Other, and 1% African-American (CVUSD, 2005-2006). There were 2,511 students (11%) enrolled in special education programs. There were 678 students with learning disabilities enrolled in special education programs in the school district. There were 226 students with learning disabilities in grades nine through twelve.

Sample

The sample for this study was 135 high school students with learning disabilities in grades nine through twelve. See Table 1 for descriptive statistics of the population sample for this study.

Table 1

Grade Level and Sex of Study Subjects

Grade	Male	Female	Total
9	17	10	27
10	15	5	20
11	26	17	43
12	29	16	45

Measurement

Student perceptions of self-efficacy are typically assessed using self-report questionnaires (Linnenbrink & Pintrich, 2002). Students rated themselves on a 57-item questionnaire adapted by me from the Motivated Strategies for Learning Questionnaire (MSLQ) and three goal orientation scales developed by Midgley et al., (1998) (see Appendix H).

This was a quantitative study based upon responses to a questionnaire adapted from the *Motivated Strategies for Learning Questionnaire (MSLQ),* designed by Paul R. Pintrich, David A.F. Smith., Teresa Garcia, and Wilbert J. McKeachie to measure self-efficacy and use of learning strategies. See Appendix F for original version of the questionnaire. See Appendix H for the adapted version of the questionnaire. See Appendix J for permission to use and adapt the original questionnaire. Students' goal orientations were measured by their responses to three 6-item scales developed by Midgley et al. (1998). See Appendix G for the original version of the scales. See Appendix H for the adapted version of the questionnaire. See Appendix K for permission to use the scales.

One hundred thirty-five students completed questionnaires from the available pool of 226 high school students with learning disabilities. This represented an acceptable 60 % participation rate.

MSLQ

The MSLQ is authored by Paul R. Pintrich, David A.F. Smith, Teresa Garcia, and Wilbert J. McKeachie. The MSLQ was initially designed to measure components of student motivation and use of learning strategies at the college level. The MSLQ can be used in whole or part and has been used in research on students from elementary school through college (Duncan & McKeachie, 2005).

The MSLQ has 15 scales: 6 scales comprise the Motivation Section: Value Components: 1) Intrinsic Goal Orientation, 2) Extrinsic Goal Orientation, 3) Task Value; Expectancy Components: 4) Control Beliefs, 5) Self Efficacy for Learning and Performance; Affective Components: 6) Test Anxiety; 9 scales comprise the Learning Strategies Section: Cognitive and Metacognitive Strategies: 7) Rehearsal, 8) Elaboration, 9) Organization, 10) Critical Thinking, 11) Metacognitive Self-Regulation; Resource Management Strategies: 12) Time and Study Environment, 13) Effort Regulation, 14) Peer Learning, and 15) Help Seeking. The Self-Efficacy subscale and the Learning Strategies scales; rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation; were used to measure students' self-efficacy and use of learning strategies in the present study. Sample items included: "I believe I will receive an excellent grade in this class." "I expect to do well in this class." "I'm confident I can understand the basic concepts taught in this course." "When I study for this class, I practice saying the material to myself over and over." "I try to relate ideas in this subject to those in other courses whenever possible." "When I study for

this course, I go through the readings and my class notes and try to find the most important ideas."

Test Characteristics

The MSLQ was developed in a social cognitive theoretical framework. This theory presumes that motivation is dynamic and context-specific, while learning strategies can be taught to the learner. The MSLQ is designed to elicit students' responses to their participation in an academic course. It is assumed by the authors that students' responses may vary as a function of different courses. The same individual may report different levels of motivation or learning strategy use depending on the course. Therefore norms were not available for this instrument.

Test Validity

The scale correlations with final grade, while moderate, are significant, demonstrating predictive validity. The authors report validity ranging from .52 to .93. Since this range suggests considerable variability, Cronbach's alpha was calculated for each of the six scales of the MSLQ utilized to determine internal consistency for the sample in the current study. A useful rule of thumb is that the alpha coefficient should be at least .70 and preferably higher (Fraenkel & Wallen, p. 149). In the current study, alpha coefficients for these scales ranged from .88 to .82. This indicates acceptable internal consistency for the MSLQ scales used in this study.

Goal Orientation Scales

Students' goal orientations were measured using three, 6 - item scales developed by Midgley et al. (1998): (1) Task (Mastery) Goal Orientation; (2) Ability (Performance) – Approach Goal Orientation; and (3) Ability (Performance) – Avoidance Goal Orientation These scales were developed from a base in social cognitive theory over eight years of research at the University of Michigan. Sample items included: "I like school work that I'll learn from, even if I make a lot of mistakes. "I do my school work because I'm interested in it." "I would feel really good if I were the only one who could answer the teachers' questions in class." "I want to do better than other students in my classes." "It's very important to me that I don't look stupid in my classes." "The reason I do my school work is so my teachers don't think I know less than others."

Test Characteristics

Scales were administered to seven different samples of elementary and middle school students to establish internal consistency, stability, and construct validity of the scales.

Test Validity

In all samples, Cronbach's alpha for the scale assessing a mastery goal orientation was greater than .70 and was often greater than .80. Results were generally higher in middle school students than in elementary school students. The alpha coefficient for the scale assessing a performance-approach goal

orientation was always greater than .60. The alpha coefficient for the scale assessing a performance-avoidance goal orientation was measured at .84 for the area of math (Middleton & Midgley, 1997). These results indicate that the mastery goal orientation and the performance-avoidance goal orientation scales have acceptable internal consistency. The internal consistency for the performance-approach goal orientation scale reported by the authors is less than acceptable. In the current study, an acceptable alpha coefficient of .89 was established for the performance-approach goal orientation scale.

Mastery goal orientation was not correlated with either performance-approach or performance-avoidance goal orientations; however, there was a moderate (Cohen et al., 2003), .56 correlation between performance-approach and performance-avoidance goal orientations (Middleton & Midgley, 1997). The authors have established moderate (Cohen et al., 2003) stability coefficients of .63 for the mastery goal orientation scale and .61 for the performance-approach and performance-avoidance goal orientation scales. Their work to establish construct validity is important in that this indicates the degree to which the goal orientation scales are associated with other constructs in ways predicted by theory and supported by other research (Midgley et al., 1998).

Construct validity has been established between mastery goal orientation and academic self-efficacy, while performance goal orientations are sometimes associated positively and sometimes associated negatively with academic self-efficacy. A mastery goal orientation has been positively associated with the use of adaptive learning strategies fairly consistently in the literature. Previously the

positive correlation between performance-approach goal orientation and use of surface learning strategies had been reported by researchers. Adoption of a performance-avoidance goal orientation has been negatively correlated with use of learning strategies. These findings are not always consistent in more current research literature (Bråten et al., 2004; Wolters, 2004).

These items were presented to students in questionnaire format using a 7-point Likert scale, ranging from (1) not at all true of me to (7) very true of me as recommended by Rosenthal & Rosnow, 1984. Scores were computed by taking the mean of the items that make up that scale. For example, the Self-Efficacy scale had eight items. An individual's score for self-efficacy was computed by summing the eight items and taking the average. Items marked as "reverse scored" were negatively worded and the ratings had to be reversed before an individual's score could be computed. For a reverse score item, an individual who had circled 1 received a score of 7 for the item (Pintrich et al., 1991). See Appendix I for adapted MSLQ questions by scale.

Demographic Variables

Information regarding grade level and sex of the sample for this study was collected from school records. The reliability and validity of this information was assumed excellent.

Procedures

This study was conducted over a one-year period during the 2007-2008 academic school year. Table 2 details the specific period for each component of the study.

Table 2

Study Time Lines

Activity	Projected Date
Permission from School District	March 2007
Permission from School Principals	March 2007
IRB Consent	April 2007
Identify Sample	April 2007
Parental/Adult Student Consent	July – September 2007
Teenage Student Consent	July – September 2007
Data Collection	September – October 2007
Scoring of Protocols	October – November 2007
Data Analysis and Write up	November – March 2008

The senior clerk typist in the Special Education Department who was responsible for data entry in the student management information system generated a master list of all students with learning disabilities. I had not provided any services to these students in my role as school psychologist.

The list was confidentially sent to the secretary in the Special Education Department who served as a third party liaison by sending out parental/adult student and teenage consent forms. The consent forms explained the nature, purpose, confidentiality, and voluntary aspect of the study. Each parental/adult student and teenage consent form was returned to the secretary in the Special Education Department. Once the forms are returned, the secretary compiled a

list of students who had agreed, with parent consent, to participate in the study. There was a follow-up mailing two weeks later to those parents who did not return the initial consent form to the secretary. The list of eligible candidates was then shared with this researcher.

The questionnaire was composed of 57 statements presented on a 7-point Likert scale, ranging from “not at all true of me” to “very true of me”. The self-efficacy subscale of the MSLQ consists of eight items. The learning strategy section was derived from the MSLQ and consists of 31 items regarding students’ use of different cognitive and metacognitive strategies. Three 6-item scales developed by Midgley et al. (1998) measure students’ goal orientations: mastery, performance-approach, and performance-avoidance.

Principals at the respective high schools requested that teachers in special education participate in the data collection process. I provided Special Education department chairpersons with the names of students who consented to participate in study with parent permission (participating students). The chairpersons at these high schools generated the class schedules of participating students. The chairpersons developed lists of participating students grouped by special education English class. I provided the special education department chairpersons with the correct number of questionnaires. I assigned a two-digit code to a face sheet attached to each questionnaire. Department chairpersons distributed the questionnaires, along with the lists of participating students, to the special education English teachers.

Teachers informed their respective classes that they would be working in two groups. One group completed class work with paraprofessional supervision. The second group completed the questionnaire. The questionnaire was presented both orally and in writing. The classroom teacher provided directions for completing the questionnaire orally. Students had the opportunity to ask for assistance and/or clarification if needed. Students were asked to complete the questionnaire. Students were allowed one class period to complete the questionnaire (approximately 55 minutes). Additional sessions were scheduled to accommodate students who required extra time to complete the questionnaire or may have been absent the day of the initial administration of the questionnaire. Students were allowed extra time to make up class work missed during administration of the questionnaire.

The face sheet, identifying students by name and ID code was removed by the classroom teachers and forwarded to a secretary at each high school for transcription. There was no way for me to connect the identity of students to the questionnaires. Completed questionnaires were collected by the teachers and forwarded to me at the conclusion of the test session.

Rule of Thumb and Sample Size

The number of predictors (independent variables), power, and effect size need to be considered when determining the sample needed to conduct multiple correlation analyses (Green, 1991). The power of a study is the probability of not overlooking an effect or a relationship that exists between variables (Rosenthal & Rosnow, 1984). A Type I error refers to rejecting a true null hypotheses or

finding something that is not there; while a Type II error refers to failing to reject a false null hypotheses, that is failing to find something that is there (Cohen et al., 2003). Eighty percent is a conventional figure for the minimum power when conducting a study (Aron & Aron, 2002; Cohen et al., 2003). The effect size refers to the degree to which the dependent variable is related to the independent variables (Green, 1991). While the procedures for significance testing and power analysis are relatively simple when applied to one hypothesis, these procedures become increasingly complex when applied to multiple hypotheses (Cohen et al, 2003). According to Cohen et al., (2003) the greater the number of independent or dependent variables in a study, the greater the possibility of committing Type I and Type II errors. Additionally, Green (1991) suggests that traditional rules-of thumb that identify a minimum number of subjects or a ratio of subjects to predictors are simple to use but may sacrifice the overall accuracy of the calculation. Given the number of variables in the current study, 11 independent and 1 dependent, and the sample of available subjects, less than 200; Cohen's judgment regarding a medium effect size for a typical study in the behavioral sciences (Cohen et al, 2003) was the justification for using a medium effect size in the current study.

Green (1991) suggests the formula $N \geq 50 + 8m$ to determine the sample size for a test of multiple correlation with a medium effect size at approximately .80 power. In this calculation *m* equals the number of independent variables. Using this Rule of Thumb proposed by Green (1991) .80 power required a sample size of 135 to detect a medium effect and customary probability (Fraenkel & Wallen,

1993) at .05 alpha level of significance. The medium effect size for a partial correlation is .07 and the required sample size for partial regression analyses was $N \geq 104 + m$ or 115 (Green 1991). Accordingly, the larger sample size of 135 was used to calculate both the multiple and partial regression analyses in the current study (Green, 1991).

Statistical Analyses

The subjects for this study were described using descriptive statistics of frequency, means, standard deviations, and range. Using SPSS for Windows V. 10 inferential analysis determined relationships between components of self-regulated learning, grade level, and sex were calculated by means of a correlation matrix. A hierarchical regression analysis was conducted to test whether (a) predictor variables of self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal orientation, performance-approach goal orientation, performance-avoidance goal orientation, grade level, and sex predicted fall 2007 quarter grade in English and (b) how much of the variance in fall 2007 quarter grade in English was accounted for by each of these predictor variables. Hierarchical regression adds terms to the regression model in stages. At each stage, an additional term or terms was added to the model and the change in R^2 was calculated. An hypothesis test was done to test whether the change in R^2 was significantly different from zero. Assumptions of normalcy were tested by means of box plots for each independent variable and the dependent variable, a histogram of regression

standardized residuals, and a p-p plot of the regression line of standardized residuals. See Figure 6 for a flow chart of the variables in the study.

These procedures were performed on independent variables of components of self-regulated learning; self-efficacy, goal orientation, and learning strategies; as measured by six scales from the MSLQ: self-efficacy, rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation; as well as three goal orientation scales: task (mastery), ability (performance) – approach, and ability (performance) – avoidance; grade level and sex; and the dependent variable of quarter grade in a special education English class. Scores were calculated from student responses to questionnaire items using a 7-point Likert scale, ranging from (1) not at all true of me to (7) very true of me (Rosenthal & Rosnow, 1984) and taking the mean of the items that made up that scale. For example, the Self-Efficacy scale had eight items. An individual's score for self-efficacy was computed by summing the eight items and taking the average. Items marked as "reverse scored" were negatively worded and the ratings had to be reversed before an individual's score could be computed. For a reverse score item, an individual who had circled 1 received a score of 7 for the item (Pintrich et al., 1991). The dependent variable, quarter grade was reported on a 13-point scale: A+=5.33, A =5, A- =4.67, B+=4.33, B =4, B- =3.67, C+=3.33, C =3, C- =2.67, D+=2.33, D =2, D- =1.67, F =1. An alpha level 0.05 was employed for all statistical tests.

Preliminary Research Question

Does classroom teacher predict quarter grade in English in a group of high school students with learning disabilities?

This question was answered prior to addressing the main research questions by conducting an analysis of variance (ANOVA) using teacher as the grouping variable and grade as the outcome variable within each grade level. Descriptive analysis of the data including mean, mean confidence interval, and standard deviation, were used to determine normalcy of data. This determined if teachers at specific grade levels graded students differently. Grades were standardized for each teacher to remove the effects of the differences between teachers, since statistically significant differences were identified.

Question One

1. Do grade level and sex (baseline model) provide statistically significant and/or meaning prediction of the quarter grade in English in a group of high school students with learning disabilities?

Descriptive analysis of the data utilizing box plots, histogram, and p-p plot, mean, standard deviation, and range were used to determine normalcy of data. A correlation matrix permitted determination of relationships between components of self-regulated learning. A multiple regression analysis was conducted to determine relationships between the predictive variables and course grade in English. An alpha level of .05 was employed to determine significance.

Question Two

2. Does the addition of self-efficacy to the baseline model provide statistically significant and/or meaning prediction; and does the addition of the new variable improve prediction of the quarter grade in English in a group of high school students with learning disabilities?

Descriptive analysis of the data utilizing box plots, histogram, and p-p plot, mean, standard deviation, and range was used to determine normalcy of data. A correlation matrix permitted determination of relationships between components of self-regulated learning. A multiple regression analysis was conducted to determine relationships between the predictive variables and course grade in English. An alpha level of .05 was employed to determine significance.

Question Three

3. Does the addition of rehearsal, elaboration, organization, critical thinking and metacognitive self-regulation to the baseline model provide statistically significant and/or meaning prediction; and does the addition of the new variables improve prediction of the quarter grade in English in a group of high school students with learning disabilities?

Descriptive analysis of the data utilizing box plots, histogram, and p-p plot, mean, standard deviation, and range was used to determine normalcy of data. A correlation matrix permitted determination of relationships between components of self-regulated learning. A multiple regression analysis was conducted to determine relationships between the predictive variables and course grade in English. An alpha level of .05 was employed to determine significance.

Question Four

4. Does the addition of mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation to the baseline model provide statistically significant and/or meaning prediction; and does the addition of the new variables improve prediction of the quarter grade in English in a group of high school students with learning disabilities?

Descriptive analysis of the data utilizing box plots, histogram, and p-p plot, mean, standard deviation, and range was used to determine normalcy of data. A correlation matrix permitted determination of relationships between components of self-regulated learning. A multiple regression analysis was conducted to determine relationships between the predictive variables and course grade in English. An alpha level of .05 was employed to determine significance.

Question Five

5. Does the addition of self-efficacy, rehearsal, elaboration, organization, critical thinking metacognitive self-regulation, mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation to the baseline model provide statistically significant and/or meaning prediction; and does the addition of the new variables improve prediction of the quarter grade in English in a group of high school students with learning disabilities?

Descriptive analysis of the data utilizing box plots, histogram, and p-p plot, mean, standard deviation, and range was used to determine normalcy of data. A correlation matrix permitted determination of relationships between components of self-regulated learning. A multiple regression analysis was conducted to

determine relationships between the predictive variables and course grade in English. An alpha level of .05 was employed to determine significance.

Table 3 represents an overview of research questions, hypotheses, predictor and outcome variables, and statistical analyses.

Table 3

Research Questions, Hypotheses, Variables, and Statistical Analyses

Research Questions	Hypotheses	Predictor Variables	Outcome Variable	Statistics
1. Do grade level and sex (baseline model [BSM]) predict quarter grade?	Grade level and sex (baseline model [BSM]) would not predict quarter grade in English in a group of high school students with learning disabilities.	MSLQ scores for components of self-regulated learning	Quarter grade in English	Correlation Matrix Multiple Regression
2. Does the addition of SE to the BSM predict quarter grade?	The addition of SE to the BSM would not predict differences in quarter grade in English for a group of high school students with learning disabilities.	MSLQ self-efficacy scale scores	Quarter grade in English	Correlation Matrix Multiple Regression
3. Does the addition of R, E, O, CT, and MSR to the BSM predict quarter grade?	The addition of R, E, O, CT, and MSR to the BSM would not predict differences in quarter grade in English for a group of high school students with learning disabilities.	MSLQ learning strategy scale scores	Quarter grade in English	Correlation Matrix Multiple Regression

Table 3 continued

Research Questions	Hypotheses	Predictor Variables	Outcome Variable	Statistics
4. Does the addition of MGO, PApGO, and PAvGO to the BSM predict quarter grade?	The addition of MGO, PApGO, and PAvGO to the BSM would not predict differences in quarter grade in a group of high school students with learning disabilities.	Midgley, et al. goal orientation scale scores	Quarter grade in English	Correlation Matrix Multiple Regression
5. Does the addition of SE, R, E, O, CT, MSR, MGO, PApGO, and PAvGO to the BSM predict quarter grade?	The addition of SE, R, E, CT, MSR, MGO, PApGO, and PAvGO to the BSM would not predict differences in quarter grade in English for a group of high school students with learning disabilities.	Student grade level	Quarter grade in English	Correlation Matrix Multiple Regression

Note. BSM=baseline model, SE=self-efficacy, R=rehearsal, E=elaboration, O=organization, CT=critical thinking, MSR=metacognitive self-regulation, MGO=mastery goal orientation, PApGO=performance approach goal orientation, PAvGO=performance avoidance goal orientation.

Summary

The purpose of this research study was to determine the interactions between components of self-regulated learning: self-efficacy, goal orientation, and learning strategies, and grade level, sex, and academic achievement in a sample of high school students with learning disabilities. A main purpose of the study was to identify if these components of self-regulated learning predicted academic achievement, as measured by quarter grade in a special education English course. Research suggests the developmental nature of self-regulated learning strategies (Zimmerman & Martinez-Pons, 1990). Older students have developed more complex learning strategies and demonstrate higher academic self-efficacy than younger students. Meltzer, Roditi, House, and Perlman (1998) and Pintrich et al. (1994) suggest that students with learning disabilities use less learning strategies than students without learning disabilities. The effects of sex on components of self-regulated learning are small and not significant as reported in the literature (Meltzer et al., 1998; Pajares & Valiante, 2001; and Pintrich & DeGroot, 1990). The lack of literature on components of self-regulated learning in high school students with learning disabilities makes directional prediction difficult. This is an exploratory study to investigate the interactions of components of self-regulated learning in high school students with learning disabilities.

Subjects in this study were obtained from a convenience sample of intact special education English classes. The sample for this study was 135 high school students with learning disabilities in grades nine through twelve. Students rated themselves on a 57-item questionnaire including the Self-Efficacy subscale and Learning Strategies scales; rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation; of the Motivated Strategies for Learning Questionnaire (MSLQ) as well as three goal orientation scales; task (mastery) - approach, ability (performance) - approach, ability (performance) – avoidance; developed by Midgley et al. (1998).

Inferential analysis using SPSS for Windows V. 10 were conducted to determine relationships between components of self-regulated learning, grade level, and sex by means of a correlation matrix. A multiple regression analysis was conducted to test whether (a) predictor variables of self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal orientation, performance-approach goal orientation, performance-avoidance goal orientation, grade level, and sex predicted fall 2007 quarter grade in English and (b) how much of the variance in fall 2007 quarter grade in English was accounted for by each of these predictor variables.

CHAPTER IV

RESULTS

Introduction

The fundamental purpose of this research study was to determine the interactions between components of self-regulated learning: self-efficacy, goal orientation, learning strategies, grade level, sex; and academic achievement in a sample of high school students with learning disabilities. Self-regulated learning was defined as an active, constructive process whereby students set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation, and behavior, guided and constrained by their goals and the contextual features in the environment (Pintrich, 2000). I think that identifying relationships between students' beliefs about their academic capabilities, the goals they adopt for acquiring knowledge, and the strategies they use to learn may enhance the understanding of how and why students with learning disabilities achieve. Furthermore, an examination of these components of self-regulated learning may be useful in developing systems to support the education of students with learning disabilities.

This research study employed a pre-experimental design utilizing a convenience sample of high school students with learning disabilities enrolled in seven special education English classes. These students had been previously assessed to determine the presence of a learning disability according to the ability/achievement model (California Department of Education, 2005). The

sample for this study was 135 high school students with learning disabilities in grades nine through twelve from two suburban high schools in southern California. Each student was administered a 57-item questionnaire including the Self-Efficacy subscale and Learning Strategies scales: rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation of the Motivated Strategies for Learning Questionnaire (MSLQ), as well as three goal orientation scales: task (mastery) - approach, ability (performance) - approach, and ability (performance) – avoidance developed by Midgley et al. (1998). This questionnaire yielded sub-scale scores in self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation. The purpose of this study was to demonstrate how the criterion variable (quarter grade) was affected by one or more predictor variables (self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation, grade level, and sex) in a sample of high school students with learning disabilities.

Complications

No complications, unforeseen problems, or protocol violations occurred during the time that this study was conducted.

Computer Program

Descriptive and inferential analyses using SPSS for Windows V. 10 were conducted to determine relationships between components of self-regulated learning, grade level, sex, and quarter grade in English.

Analyses

The following statistical analyses were performed:

(1) An analysis of variance was conducted with classroom teacher as the grouping variable to determine if there was a significant difference between quarter grades among the seven classroom teachers.

(2) Descriptive analyses of the data including p-p plot, box plot, Cronbach's alpha, mean, standard deviation were conducted to determine normality and reliability for the sample population.

(3) A correlation matrix was utilized to determine relationships between components of self-regulated learning, grade level, sex, and quarter grade.

(4) A hierarchical multiple regression analysis was conducted to determine whether or not components of self-regulated learning predicted quarter grade in a special education English class as determined by performance on the 57-item questionnaire adapted from the MSLQ and Midgley's goal orientation scales.

These procedures were used to address the preliminary research question and the five research questions.

Preliminary Research Question

The preliminary research question asked whether classroom teacher predicted quarter grade in English in a group of high school students with learning disabilities. Assumptions for the analysis of variance were met. Results of the analysis of variance indicated that there was a significant difference ($p<.05$) between the quarter grade in the seven different groups, using teacher as the grouping variable. The quarter grade was standardized by transformation into a Z-score for each teacher to remove the effects of this difference. Appendices P and Q provide details of this analysis.

Descriptive Statistics

Table 1 presents mean, standard deviation, and range for each of the sub-scales (self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation) of the 57- item questionnaire. Box plots were generated to indicate the distribution of responses for each variable with respect to the predictor variable. Box plots in Appendices R through Z indicate a relatively normal distribution of responses for each variable. Additionally, plots of the standardized regression residual for each research question, illustrated in Appendices AA through AE indicate relative normality. Cronbach's alpha was calculated for the self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal orientation, performance approach goal orientation, and performance

avoidance goal orientation scales to establish internal consistency for the sample population in the current study. Internal consistency for the nine scales was very good and ranged from .80 to .90 Appendices AF through AN provide a summary of reliability statistics for each scale.

Table 4

Descriptive Statistics for Dependent and Independent Variables

Variable	*N*	*M*	*SD*	Range
Quarter Grade	135	3.62	1.14	1.0 – 5.3
Self-Efficacy	135	5.08	1.04	2.0 – 7.0
Rehearsal	135	4.43	1.47	1.0 – 7.0
Elaboration	135	3.92	1.33	1.2 – 7.0
Organization	135	3.78	1.50	1.0 – 7.0
Critical Thinking	135	4.19	1.31	1.0 – 7.3
Metacognitive Self-Regulation	135	4.03	1.04	1.3 – 7.0
Mastery Goal Orientation	135	3.97	1.51	1.0 – 7.0
Performance-Approach Goal Orientation	135	4.11	1.59	1.0 – 7.0
Performance-Avoidance Goal Orientation	135	3.58	1.78	1.0 – 7.0

Research Question One

The first research question asked if grade level and sex (baseline model) provided statistically significant and/or meaning prediction of the quarter grade in English in a group of high school students with learning disabilities. The research hypothesis stated that grade level and sex would not predict the quarter grade in English in a group of high school students with learning disabilities. In order to answer this question, descriptive analyses of the data utilizing mean, standard deviation, and range were used to determine normality of data. Table 4 illustrates mean, standard deviation, and range for each sub-scale. Appendix AA illustrates the p-p plot of the regression line for the standardized residual for research question one. These tables indicate that the data was normally distributed. Table 5 illustrates correlations between predictors and dependent variables in the study. Results of the regression analysis indicate that the baseline model was not a statistically significant predictor of quarter grade, $F(2,132) = 1.228$, $p=.296$. Grade level and sex predicted less than one percent (multiple regression, $R^2_{Adj.} = .003$) of the variance in quarter grade and had a small effect on this outcome variable. Table 6 illustrates the results of the hierarchical multiple regression analysis. Appendix AO provides detailed results of the ANOVA and hierarchical regression analysis for research question one.

Table 5

Correlation Matrix of Dependent and Independent Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. QGr	-	.154	.169	.001	-.001	-.010	.100	.127	.006	-.024	-.029	-.131
2. SE	-	-	**.421	**.405	**.452	**.520	**.562	**.360	*.223	*.275	-.136	-.059
3. R	-	-	-	**.423	**.469	**.390	**.499	**.436	**.228	*.350	-.133	**-.283
4. E	-	-	-	-	**.712	**.703	**.627	**.537	.154	*.230	-.132	-.089
5. O	-	-	-	-	-	**.622	**.618	**.433	*.203	*.278	-.122	-.111
6. CT	-	-	-	-	-	-	**.685	**.485	*.235	*.270	-.073	-.082
7. MSR	-	-	-	-	-	-	-	**.598	*.229	*.280	-.128	*-.143
8. MGO	-	-	-	-	-	-	-	-	*.303	*.328	-.112	-.123
9. PApGO	-	-	-	-	-	-	-	-	-	*.642	-.147	.062
10. PAvGO	-	-	-	-	-	-	-	-	-	-	-.113	.016
11. GL	-	-	-	-	-	-	-	-	-	-	-	-.018
12. SEX												-

Table 5 (continued)

Note. **p*<.05. ***p*<.001. Q Gr=quarter grade, SE=self-efficacy, R= rehearsal, E=elaboration, O=organization, CT=critical thinking, MSR=metacognitive self-regulation, MGO=Mastery Goal Orientation, PApGO=performance-approach goal orientation, PAvGO=performance-avoidance goal orientation, GL=grade level, SEX=sex.

Table 6

Summary of Hierarchical Regression Analyses for Variables Predicting Quarter Grade

Step 1

Model Fit	R^2	$R^2_{Adj.}$
F [2,132] = 1.228; *p* = .296	.018	.003

Variables in Equation

	B	SE B	*b*	t	*p*
Sex	-.269	.175	-.132	-1.531	.128
Grade Level	-.027	.076	-.031	-.363	.717

Table 6 (continued)

Step 2

Model Fit	R^2	$R^2_{Adj.}$	Change in Model Fit	R^2
F [3, 131] = 1.774; *p* = .155	.039	.017	F [1,131] =2.831; *p*=.095	.021

Variables in Equation

	B	SE B	*b*	t	*p*
Sex	-.251	.175	-.123	-1.435	.154
Grade Level	-.010	.076	-.011	-.130	.897
Self-Efficacy	.136	.081	.146	1.683	.095

Table 6 (continued)

Step 3

Model Fit	R^2	$R^2_{Adj.}$	Change in Model Fit	R^2
F [7, 127] = 1.086; *p*=.376	.056	.004	F [5,127] = 1.029; *p*=.403	.038

Variables in Equation

	B	SE B	*b*	t	*p*
Sex	-.172	.183	-.085	-.939	.350
Grade Level	.011	.077	-.012	-.137	.891
Rehearsal	.111	.071	.166	1.569	.119
Elaboration	-.023	.104	-.031	-.223	.824
Organization	-.064	.086	-.098	-.737	.463
Critical Thinking	-.080	.102	-.108	-.790	.431
Metacognitive Self-Regulation	.148	.124	.157	1.195	.234

Table 6 (continued)

Step 4

Model Fit	R^2	$R^2_{Adj.}$	Change in Model Fit	R^2
F [5,129] = .920; *p*= .470	.034	- .003	F [3, 129] = .720; *p* = .542	.016

Variables in Equation

	B	SE B	*b*	t	*p*
Sex	-.236	.178	-.116	-1.324	.188
Grade Level	-.020	.077	-.022	-.254	.800
Mastery Goal Orientation	.084	.060	.130	1.389	.167
Performance-Approach Goal Orientation	.014	.070	.023	.197	.844
Performance-Avoidance Goal Orientation	-.045	.063	-.081	-.708	.480

Table 6 (continued)

Step 5 Model Fit	R^2	$R^2_{Adj.}$
F [11, 123] = 1.089; *p*= .375	.089	.007

Change in Model Fit	R^2
F [9, 123] = 1.058; *p* = .399	.071

Variables in Equation

	B	SE B	*b*	t	*p*
Sex	-.169	.185	-.083	-.909	.365
Grade Level	-.004	.077	-.004	-.046	.963
Mastery Goal Orientation	.080	.075	.124	1.066	.289
Performance-Approach Goal Orientation	.014	.070	.023	.201	.841
Performance-Avoidance Goal Orientation	-.064	.065	-.117	-.993	.323
Self-Efficacy	.164	.103	.175	1.593	.114
Rehearsal	.097	.074	.146	1.305	.194

Table 6 (continued)

Variables in Equation

	B	SE B	*b*	t	*p*

Elaboration	-.036	.108	.049	-.337	.737
Organization	-.061	.087	-.094	-.706	.482
Critical Thinking	-.109	.105	-.147	-1.046	.298
Metacognitive Self-Regulation	.056	.135	.059	.416	.678

Research Question Two

The second research question asked if the addition of self-efficacy to the baseline model provided statistically significant and/or meaning prediction of the quarter grade in English for a group of high school students with learning disabilities. The research hypothesis stated that the addition of self-efficacy to the baseline model would not be statistically significant and/or provide meaning prediction of the quarter grade in English in a group of high school students with learning disabilities. In order to answer this question descriptive analyses of the data utilizing mean, standard deviation, and range were used to determine normality of data. Table 4 illustrates mean, standard deviation, and range for each sub-scale. Appendix R illustrates the box plot of the residuals for self-efficacy and quarter grade. Appendix AB illustrates the p-plot of the regression line for the standardized residual for research question two. Appendix AF illustrates the Cronbach's alpha statistics for the self-efficacy sub-scale. A correlation matrix permitted determination of relationships between sub-scale

components of self-regulated learning. Cohen (2003) provides the following definitions for effect size :

A "small" effect size is equal to one-fifth the standard deviation.

A "medium" effect size is equal to one-half the standard deviation.

A "large" effect size is equal to 0.8 times the standard deviation.

Based on Cohen's research the strength of a correlation is generally defined as follows: strong: $|r| \geq 0.8$, moderate: $0.5>|r|<0.8$, weak: $|r| \leq 0.5$ (Effect Size (n.d.) in Bandolier electronic newsletter and Lethen, 1996).

Table 5 illustrates these results. Self-efficacy had a moderate to weak correlation with all learning strategy sub-scales *(r*=.56, *p*<.001 metacognitive self-regulation sub-scale to *r* =.41, *p*<.001 elaboration sub-scale). There were weak correlations with mastery goal orientation(*r*=.36, *p*<.001), performance-approach goal orientation(*r* =.22, *p*<.05) and performance-avoidance goal orientation (*r*=.28, *p*<.05). The self-efficacy scale had a weak negative correlation with grade level (*r* =-.14, *p*=.116) and sex (*r* =-.06, *p*=.50). Self-efficacy had a weak correlation with quarter grade (*r* =.15, *p*=.074).

The addition of self-efficacy to the baseline model did not result in a statistically significant change (*p*=.095). The second model did not provide statistically significant prediction of the quarter grade, F (3,131) =1.774; *p*=.155. Self-efficacy predicted approximately 2 percent (multiple regression, R^2_{Adj}.=.017) of the variance in quarter grade and had a relatively small effect on

this outcome variable. Table 6 indicates results of the hierarchical regression analysis. Appendix AP provides detailed results of the ANOVA and hierarchical regression analysis for research question two.

Research Question Three

The third research question asked whether the addition of rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation to the baseline model provided statistically significant and/or meaning prediction of the quarter grade in English in a group of high school students with learning disabilities. The research hypothesis stated that the addition of rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation to the baseline model would not predict the quarter grade in English in a group of high school students with learning disabilities. In order to answer this question, descriptive analyses of the data utilizing mean, standard deviation, and range were used to determine normality of data. Table 4 illustrates mean, standard deviation, and range for each sub-scale. Appendices S through W illustrate the box plots of the residuals for rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, and quarter grade. Appendix AC illustrates the p-p plot of the regression line for the standardized residual for research question three. Appendices AG through AK illustrate the Cronbach's alpha statistics for the learning strategy sub-scales.

A correlation matrix permitted determination of relationships between sub-scale components of self-regulated learning. Table 5 illustrates these results. There were moderate to weak correlations among all learning strategy sub-

scales. Correlations ranged from r=.71, p<.001, for organization and elaboration sub-scales to r=.39, p<.001 for critical thinking and rehearsal sub-scales. There were moderate to weak correlations between mastery goal orientation and the learning strategy sub-scales (r =.60, p<.001, metacognitive self-regulation sub-scale to r = .43, p<.001, with organization sub-scale). The learning strategy sub-scales had a weak correlation with both the performance-approach goal orientation (r =.24, p<.05, critical thinking sub-scale to r =.15, elaboration sub-scale) and performance-avoidance goal orientation(r=.35, p<.001, rehearsal sub-scale to r=.23, p<.05, elaboration sub-scale). There was a weak negative correlation between learning strategy sub-scales and student grade level (r =-.13, elaboration sub-scale to r =-.07, critical thinking sub-scale). There was a weak negative correlation between learning strategy sub-scales and gender (r =-.28, rehearsal sub-scale to r =-.08, elaboration sub-scale).

The addition of rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation to the baseline model was not statistically significant (p=.403). As indicated in Table 6, model 3 was not a significant predictor of quarter grade F (7, 127) = 1.086, p=.376. Rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation predicted much less than 1 percent (multiple regression, R^2_{Adj}. =.004) of the variance in quarter grade and had a minimal effect on this outcome variable. Appendix AQ provides detailed results of the ANOVA and hierarchical regression analysis for research question three.

Research Question Four

The fourth research question asked whether the addition of mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation to the baseline model provided statistically significant and/or meaning prediction of the quarter grade in English in a group of high school students with learning disabilities The research hypothesis stated that the addition of mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation to the baseline model would not predict the quarter grade in English in a group of high school students with learning disabilities. In order to answer this question, descriptive analyses of the data utilizing mean, standard deviation, and range were used to determine normality of data. Table 4 illustrates mean, standard deviation, and range for each sub-scale. Appendices X through Z illustrate the box plots of the residuals for mastery goal orientation, performance-approach goal orientation, performance-avoidance goal orientation, and quarter grade. Appendix AD illustrates the p-p plot of the regression line for the standardized residual for research question four. Appendices AL through AN illustrate the Cronbach's alpha statistics for the goal orientation sub-scales. A correlation matrix permitted determination of relationships between sub-scale components of self-regulated learning. Table 5 illustrates these results.

Mastery goal orientation had a weak correlation with self-efficacy (r=.36, p<.001). There were moderate to weak correlations between mastery goal orientation and learning strategy sub-scales (r= .60, p<.001 metacognitive self-

regulation to r =.43, p<.001, organization). Mastery goal orientation had a weak association with both performance-approach goal orientation (r=.30, p<.001) and performance-avoidance goal orientation (r=.33, p<.001). There was a moderate correlation between performance-approach goal orientation and performance-avoidance goal orientation (r=.64, p<.001).

The addition of mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation to the baseline model was not statistically significant, (p=.542) . As indicated in Table 6 model 4 was not a significant predictor of quarter grade F (5, 129) =.920, p=.470. Mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation predicted much less than 1 percent (multiple regression, $R^2_{Adj.}$ =.003) of the variance in quarter grade and had a minimal effect on this outcome variable. Appendix AR provides detailed results of the ANOVA and hierarchical regression analysis for research question four.

Research Question Five

The fifth research question asked whether the addition of self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation to the baseline model provided statistically significant and/or meaning prediction of the quarter grade in English in a group of high school students with learning disabilities. The research hypothesis stated that the addition of self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal

orientation, performance-approach goal orientation, and performance-avoidance goal orientation to the baseline model would not predict the quarter grade in English in a group of high school students with learning disabilities. In order to answer this question, descriptive analyses of the data utilizing mean, standard deviation, and range were used to determine normality of the data. Table 4 illustrates mean, standard deviation, and range for each sub-scale. Appendices R through Z illustrate the box plot of the residuals for self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal orientation, performance-approach goal orientation, performance-avoidance goal orientation, and quarter grade. Appendix AE illustrates the p-p plot of the regression line for the standardized residual for research question five. Appendices AF through AN illustrate the Cronbach's alpha statistics for the self-regulated learning sub-scales.

A correlation matrix permitted determination of relationships between sub-scale components of self-regulated learning. Table 5 illustrates these results. The addition of self-efficacy, rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation to the baseline model was not statistically significant, as indicated in Table 6. Model 5 was not a significant predictor of quarter grade F (11,123) = 1.089, p=.375. The full model accounted for less than 1 percent (multiple regression, R^2_{Adj}.=.007) of the variance in quarter grade. Appendix AS provides detailed results of the ANOVA and hierarchical regression analysis for research question five.

Summary

Results of the current study indicated that there were statistically significant relationships between many components of self-regulated learning. As expected there were moderate relationships between self-efficacy and. rehearsal, elaboration, organization, critical thinking, and metacognitive self-regulation, A moderate relationship was identified between performance-approach goal orientation and performance-avoidance goal orientation (*r* =.64)

However, the full model predicted only a small portion of the variance in quarter grade in a group of high school students with learning disabilities (multiple regression, R^2_{Adj}. =.007 percent). Table 6 illustrates that independent variables in the full model explained a small percentage of the variance in quarter grade (self-efficacy = 3 percent to elaboration = less than 1 percent). Partial regression coefficients indicate that each sub-scale of self-regulated learning had a modest effect on quarter grade when the effects of the other sub-scales were controlled, (self-efficacy = 2 percent to performance-approach goal orientation = .3 percent). Model three had the largest effect on quarter grade, 4 percent. There was a failure to reject the null hypotheses since overall there was almost 9 percent chance that independent variables had no significant effect on quarter grade. This was well above the .05 level of significance established for this study.

CHAPTER V

DISCUSSION

Introduction

The purpose of this research study was to assess interactions between components of self-regulated learning (self-efficacy, goal orientation, and learning strategies) and their predictive effect on academic achievement in a sample of high school students with learning disabilities. The impact of grade level and sex was also examined. Subjects in this study were obtained from a convenience sample of seven intact special education English classes. The sample for this study was 135 high school students with learning disabilities, 87 males and 48 females, in grades nine through twelve from two high schools in a suburban school district in southern California.

The students completed a 57-item questionnaire adapted from the Motivated Strategies for Learning Questionnaire (MSLQ) and three goal orientation scales. While results of the study demonstrated that components of self-regulated learning, sex, and grade level did not predict academic achievement, positive relationships were identified among the predictors. High school students with learning disabilities endorsed beliefs of self-efficacy, use of varied and complex learning strategies, and a focus on learning for mastery, as well as performance in comparison to their peers.

Little is known about the development and operation of self-efficacy, learning strategies, and goal orientation in high school students with learning disabilities (Alvarez & Adelman, 1986; Bouffard & Couture, 2003; Page-Voth &

Graham, 1999). However, it was expected that high school students with learning disabilities who demonstrated positive feelings about their academic capabilities, adopted affirmative goals for learning, and utilized constructive learning strategies would outperform those that did not. Results of this study indicate that significant differences with regard to the prediction of quarter grade from components of self-regulated learning among high school students with learning disabilities could not be identified.

Bandura (1986) asserts that personal evaluations and feedback from peers and significant adults related to behavior and action in the past form the basis for present and future actions. In education, the reciprocal relationship between self-efficacy beliefs, developed from evaluations of previous academic performance and feedback from peers, teachers and parents, use of learning strategies to control, monitor, and direct the process learning, and performance goals for learning is referred to as self-regulated learning (Zimmerman,2000). Students without learning disabilities, who believe they are competent, adopt positive goals for learning, and use strategies to support knowledge acquisition, demonstrate higher academic achievement than those students who do not (Bråten et al., 2004; Pintrich, Anderman, & Klobucar, 1994; Pintrich et al., 1994, Pintrich & DeGroot, 1990; Wolters, 2003; Wolters et al., 1996). Furthermore, Shell et al. (1995), Wolters and Yu (1996), and Zimmerman and Martinez-Pons (1990) suggest that self-efficacy and use of self-regulated learning strategies increase as students without learning disabilities mature. However, components of self-regulated learning may develop and operate differently in students with

learning disabilities. Renick and Harter (1989) report on the developmental nature of self-efficacy beliefs in students with learning disabilities. Their results indicate that, as students with learning disabilities grow older; they perceive themselves as less competent compared to students without learning disabilities. Additionally, students with learning disabilities report less use of learning strategies compared to students without learning disabilities (Bouffard & Couture, 2003; Meltzer et al., 1998; Page-Voth & Graham, 1999; Renick & Harter, 1989; Tabassam & Grainger, 2002; Wiest et al., 2001). Vaidya (1999) suggests that cognitive deficits related to the ability to monitor and regulate learning may exist due to impaired executive function in students with learning disabilities. Finally, in the only reviewed study to focus on the operation of goal orientation in students with learning disabilities, Bouffard and Couture (2003) report that students with learning disabilities endorsed higher work (performance)-avoidance goals compared to students without learning disabilities. The scarcity of research literature on a topic so critical to academic success suggests the need for further investigation on the development and operation of components of self-regulated learning in high school students with learning disabilities.

Impact of Grade Level and Sex on Academic Achievement

Student sex and age did not significantly affect academic achievement in the group of high school students with learning disabilities in this study regarding achievement in special education English classes after ten weeks of instruction. In the current study, older high school students with learning disabilities did not achieve at a significantly higher level than younger high school students with

learning disabilities. While there is some evidence that suggests the developmental nature of academic achievement in students without learning disabilities (Zimmerman & Martinez-Pons, 1990), little research has been conducted utilizing high school students with learning disabilities in grades ten through twelve (Alvarez & Adelman, 1986; Meltzer et al., 1998; Pintrich et al., 1994). Results of the current study suggest that students with learning disabilities may not follow developmental patterns in the same ways as peers without disabilities.

The current study also found that sex had no effect on quarter grade in a special education English class. Both males and females achieved about the same academic level after ten weeks of instruction. This finding is consistent with the literature on students without learning disabilities (Pajares & Valiante, 2001; Pintrich & DeGroot, 1990; Rogers et al., 2001; Wolters & Yu, 1996; and Zimmerman & Martinez-Pons, 1990). There were no significant differences in components of self-regulated learning based on age or sex in this study.

Impact of Self-Efficacy on Academic Achievement

There were moderate to weak relationships between self-efficacy and learning strategies (r=.56, p<.001 metacognitive self-regulation sub-scale to r=.405, p<.001 elaboration sub-scale). Weak associations were identified between self-efficacy and mastery goal orientation (r=.36, p<.001) and self-efficacy and performance-approach goal orientation (r=.22, p<.05). There were weak negative interactions between self-efficacy and quarter grade (r=.154, p=.074), self-efficacy and grade level (r=-.136, p=.116) and self-efficacy and sex (r=-.059,

p=.50). Self-efficacy was not a statistically significant variable, nor did it provide meaningful prediction of the quarter grade in English in the sample. These results were surprising given the strong and consistent association between self-efficacy, leaning strategies, goal orientation and academic achievement in the literature ((Bouffard & Couture, 2003; Bråten et al., 2004; Caraway et al., 2003; Pintrich, Anderman, & Klobucar, 1994; Pintrich et al., 1994; Pintrich & De Groot, 1990; Schunk, 2005; Shim & Ryan, 2005; Somuncuoglu & Ali, 1999; Wilke, 2003; Wolters, 2004; Wolters, 2003; Wolters et al., 1996; Wong et al., 1996; Zimmerman & Kitsantas, 1999; Zimmerman et al., 1992; Zimmerman & Martinez-Pons, 1990).

Bandura (1986) noted that student performance could affect self-efficacy beliefs. He reported that self-efficacy beliefs are based largely on perceptions of competence supported by direct experience, social comparative information, and verbal persuasion. Similarly, Bouffard and Couture(2003), Renick and Harter (1989), and Tabassam and Grainger (2002) report that students with learning disabilities rate themselves as equally competent compared to other students with learning disabilities. While Alvarez and Adelman (1986) and Meltzer et al. (1998) indicate that students with learning disabilities may overreport self-efficacy beliefs. After years of school failure (Renick & Harter, 1989) students with learning disabilities might actually perceive themselves as less competent as they grow older, because of previous academic difficulty (Alvarez & Adelman, 1986). This may serve as a protective factor to compensate for their learning difficulties (Alvarez and Adelman, 1986). The findings in this study suggest that

high school students with learning disabilities, who have experienced years of academic challenge, might endorse stronger self-efficacy beliefs to compensate for their self-perceived weak academic skills.

Impact of Learning Strategies on Academic Achievement

Strong to moderate associations existed among learning strategy sub-scales on the Motivated Strategies for Learning Questionnaire (MSLQ) (r =.71, p < .001, for organization and elaboration sub-scales to r .42, p <.001 for rehearsal and elaboration sub-scales). Results of the study identified a weak relationship between critical thinking and rehearsal sub-scales (r =.39, p <.001). Students with learning disabilities in this study reported that they used a variety of strategies to help them learn. These students endorsed use of rehearsal and organization strategies as well as strategies that involved enhancing recall of new information by connection with meaningful information that had been previously learned. It is likely these students were taught learning strategies as part of their special education and may have developed complex learning strategies. The literature reviewed in this study suggests that the development of learning strategies follows a developmental trajectory (Flavell, 1979). Over time, students without learning disabilities increase both the variety (Flavell, 1979; Rafoth et al., 1993) and complexity (Zimmerman & Martinez-Pons, 1990) of the strategies used for learning.

However, the research also indicated that students with learning disabilities made less use of learning strategies than their non-disabled counterparts (Meltzer et al., 1998; Pintrich et al., 1994; Sideridis et al, 2006). Additionally,

Wolters (2004) reported that students concerned with appearing competent might overreport their use of learning strategies. Similarly, Meltzer et al., (1998) identified that students with learning disabilities overrated their use of learning strategies. Moreover, Vaidya (1999) suggested that students with learning disabilities might have poor metacognitive skills due to impaired executive function required to monitor and regulate learning when compared to students without learning disabilities. This presents the possibility that while high school students with learning disabilities in this study endorsed the use of a variety of strategies to learn, their use might be overreported, and these strategies might not be applied efficiently or consistently to the acquisition, storage, and retrieval of knowledge.

Impact of Goal Orientation on Academic Achievement

Positive associations were identified among mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation. Students with learning disabilities in the study adopted all three goal orientations. Students with learning disabilities reported that completing academic tasks to learn as much as possible with a focus on long-term understanding was an important goal (mastery goal orientation). They also endorsed goals related to demonstrating ability or hiding lack of ability relative to others (Middleton & Midgley, 1997). These students were concerned with demonstrating superior achievement in comparison to others (performance-approach orientation) or avoiding the appearance of incompetence in comparison to others (performance-avoidance orientation).

The literature reviewed in this study was inconsistent with regard to the effects of mastery goal orientation (Wolters and Rosenthal, 2000) and performance-approach goal orientation on academic achievement and components of self-regulated learning (Bouffard & Couture, 2003; Middleton & Midgley, 1997; Wolters, 2004; Wolters et al., 1996). A number of authors note that mastery goal orientation was more strongly associated with greater use of learning strategies and higher self-efficacy than either performance-approach or performance-avoidance goal orientation (Bouffard & Couture, 2003; Bråten et al., 2004; Middleton & Midgley, 1997; Midgley et al., 2001; Schunk, 2005; Wolters & Rosenthal, 2000; Wolters et al., 1996). Conversely, Wolters and Rosenthal (2000) found both learning (mastery) goal orientation and performance-approach goal orientation were associated with students' use of self-regulatory strategies. Several scholars have identified that performance-avoidance goal orientation was associated with lower academic achievement and use of "self-handicapping" (Midgley et al., 2001) strategies including avoiding asking for needed help (Bouffard & Couture, 2003; Middleton & Midgley, 1997; Schunk, 2005; Wolters et al., 1996). Bouffard and Couture (2003) provide the only goal orientation research reviewed in the study that focused on students with learning disabilities. Their results indicate that these students endorse more work (performance)-avoidance goals compared to students without learning disabilities.

In the current study, high school students with learning disabilities endorsed all three goal orientations, with positive associations identified among these. While students with learning disabilities in the study demonstrated interest in

mastering curriculum, they also endorsed the importance of performance in comparison to their peers. Zimmerman (1989b) suggested that a complex, reciprocal relationship exists between students, the goals they adopt for learning, and the learning environment. Although there is insufficient information about the interaction of goal orientations in students with learning disabilities, there may be additional external and/or internal factors that affected the goal orientations adopted by these students. Findings in this study suggest that the interaction among goal orientations in high school students with learning disabilities might be more complex than previously reported in the literature.

Impact of the Study

While there is a large body of literature describing how components of self-regulated learning operate in students without learning disabilities, there is scant literature that has focused on the operation of these factors in high school students with learning disabilities. The present study has explored this interaction and results identify several ideas that are important in the education of high school students with learning disabilities.

The social cognitive theoretical model suggests that students without learning disabilities develop beliefs about their academic competence at a young age based on their performance and in comparison to the performance of others in their environment. These beliefs continue to develop in a reciprocal manner as students experience academic success and refine their use of strategies to recall, retain, and retrieve information. Results of the current study suggest that the development of components of self-regulated learning may not follow this

trajectory in high school students with learning disabilities. Students with learning disabilities may not have the metacognitive skill to refine their learning strategies, may overreport their use of learning strategies, and may believe they are less academically competent as they advance in school.

Secondly, the consequences of years of academic failure may have a strong effect on the academic performance of this population. Repeated academic failure may have eroded students' perceptions of academic competence prior to their eligibility/identification for specialized academic instruction. These beliefs may have developed through direct experience of failure and in the course of classroom observation of the performance of peers without learning disabilities. As a result, these students may balance a view of academic incompetence by adopting academic self-efficacy beliefs as a protective factor while also avoiding the appearance of failure by not utilizing the environmental support that could help them compensate for their academic deficiencies.

Finally, these results suggest that educators recognize that students with learning disabilities need to experience academic success as early in their school careers as possible. Educators working with this population need to help students acquire strategies and goals, perhaps through repeated direct instruction, to access and support learning so that they can experience academic success, and cultivate positive beliefs about their academic competence.

Limitations

A primary limitation of the study was the lack of a comparison group of high school students without learning disabilities. Additionally, the use of grades as

an outcome variable was problematic since these were subjective rather than standardized measures of academic achievement.

Internal Threats to Validity

There were several factors within this study which may have threatened the internal validity of the research, including sample size, research design, and subject selection. The sample size may have been too small to detect significant differences given the relatively large number of variables in this study (Cohen, 2003). Additionally, the study utilized students from pre-existing classrooms. Consequently, a myriad of subject characteristics including cognitive level, comorbid conditions, attention and behavioral difficulties, medication use, and academic achievement may have affected the validity of the results. The study did not control for the number of years a student had been enrolled in Special Education. Additionally, student maturation and attitude may have changed over the course of the study.

Learning disability status was based on existing Special Education records. As a result, there may have been variations in assessment protocols used to determine this eligibility. Self-report was the primary method of data collection. Consequently, social desirability, the tendency to make positive reports about oneself in an effort to make a better presentation to others, may have presented an additional measurement issue in this study. Finally, the effects of location, including classroom climate and teaching style, among seven classrooms may have had some unknown effect on student performance (Bandura, 1986).

External Threats to Validity

There were additional factors, which might limit the extent to which the results of this study can be generalized to other students or settings. The subjects in this study were primarily Caucasian, from a suburban, middle-class community in southern California. A multitude of factors that may contribute to components of self-regulated learning including family socioeconomic status, parental involvement and expectations for school success, peer relationships, students' perception of the academic climate, and student attendance and participation in school activities were not controlled in this study.

Suggestions for Future Research

This was a preliminary study investigating existing self-regulated learning characteristics in a sample of high school students with learning disabilities. Further research should investigate the development of components of self-regulated learning in this population by implementing specific treatment conditions utilizing a larger sample size with a comparison group of students without learning disabilities. Additionally, students with comorbid conditions, including attention, emotional, and behavioral factors should be eliminated as much as possible and the sample should be randomly selected to minimize the effects of environmental factors on student performance.

Components of self-regulated learning were expected to predict quarter grade in English in this study, but this hypothesis was not supported. High school students with learning disabilities in this study endorsed self-efficacy

beliefs, use of varied and complex learning strategies, and endorsed mastery goal orientation, performance-approach goal orientation, and performance-avoidance goal orientation. While there were some moderate to weak associations among components of self-regulated learning, overall the model indicated poor prediction of the outcome variable. This may have occurred for either or both of two reasons. First, the scarcity of research on components of self-regulated learning in high school students with learning disabilities may have contributed to an incomplete understanding of the operation of these factors in this population. Second, the lack of a comparison group of high school students without learning disabilities made it impossible to find differences that did not exist in the sample of high school students with learning disabilities. Future research on components of self-regulated learning in high school students with learning disabilities should seek to clarify how these mechanisms develop and operate in this population.

The effects of years of academic failure may affect the function of components of self-regulated learning in students with leaning disabilities. Students in the current study may have overestimated their academic competence (Alvarez & Adelman, 1986) and their use of learning strategies (Meltzer et al., 1998) as a protective factor to mitigate negative self-evaluations after years of academic failure (Renick & Harter, 1989; Shell et al., 1995). Environmental factors, including vicarious learning and observations of their peers may have reinforced beliefs of academic inadequacy. While high school students with learning disabilities may be aware of academic deficiencies, their

positive reports of academic self-efficacy may defend against allowing others access to this awareness. Students' lack of appropriate feedback to peers and teachers may have the effect of limiting the opportunity they have to benefit from specialized academic instruction and environmental supports designed to remediate these deficits. An examination of the development of self-efficacy beliefs in high school students with learning disabilities is warranted.

Additionally, students with learning disabilities were equally concerned with the quality of their academic performance in comparison to others as they were with curriculum mastery. Wolters (2004) and Midgley et al. (2001) have proposed that what students think about their classroom environment, and by extension their teachers' expectations for them, exerts a powerful influence on what they think about their own performance and the goal orientation they adopt. Environmental factors, especially the effect of teacher support and encouragement may be an important element in the development of goals for learning. While the effects of individual teachers' grading were statistically controlled in this study, other unknown and potentially important effects were not. An examination of the effects of environmental factors including observation, encouragement, and vicarious learning (Bandura, 1986) on the development and operation of components of self-regulated learning in students with learning disabilities may be a necessary step toward developing classroom supports to foster their academic success.

Finally, these students may not have developed the metacognitive skills, by virtue of their learning disabilities (Vaidya, 1999) to monitor, control, and direct

their learning. Students with learning disabilities may not be aware of when and how to utilize strategies for learning (Meltzer et al., 1998; Pintrich et al., 1994). As a result, they may not be able to benefit from incidental environmental learning opportunities and may require repeated direct instruction to master abstract concepts. However, Trainin and Swanson (2005) state that college students with learning disabilities who reported high strategy use were able to compensate for cognitive processing deficits and had higher achievement than college students without learning disabilities had. Further research on the acquisition and application of learning strategies by students with learning disabilities is required to clarify these issues.

Summary

The main purpose of this research investigation was to determine the interactions between components of self-regulated learning (self-efficacy, goal orientation and learning strategies) on academic achievement in a sample of high school students with learning disabilities. An additional intention of this study was to identify interactions among components of self-regulated learning that might be important in the development of systems to support the acquisition of knowledge in students with learning disabilities. The impact of grade level and sex on the outcomes was also addressed.

These results indicate that components of self-regulated learning may operate differently in high school students with learning disabilities. Students without learning disabilities develop beliefs about their academic competence based on personal evaluation of previous performance in school as well as feedback from

peers and adults in their environment. As they mature, they develop increasingly complex strategies to support learning, while adopting goals that foster the acquisition of knowledge. However, students with learning disabilities may overreport self-efficacy beliefs and use of learning strategies as a protective factor to diminish the effects of years of academic failure. Deficiencies in metacognition due to learning disabilities may impair their ability to use learning strategies consistently and/or efficiently. Finally, environmental feedback may have an effect on the learning goals these students adopt. Further research is needed to clarify how self-regulated learning constructs develop and operate in high school students with learning disabilities relative to their peers without learning disabilities and the impact of that development on academic achievement.

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APPENDICES

Appendix A

PARENT/ADULT STUDENT INFORMED CONSENT

Indiana University of Pennsylvania

Department of Educational and School Psychology
Stouffer Hall, Room 246
1175 Maple Street

724-357-2316
Fax: 724-357-6946
Internet:
http://www.iup.edu/edsp

Dear Parent, Guardian, or Adult Student:

My name is Madhavi Williams, and I currently work as a school psychologist at Thousand Oaks High School. I am also a doctoral student at Indiana University of Pennsylvania. This letter is to request permission for your student to participate in a research study entitled *"Components of Self-Regulated Learning in High School Students with Learning Disabilities".*

The purpose of this study is to better understand what aspects of learning (study habits, reasons why teenagers participate in learning, or what teenagers think about their ability to learn) most affect the grades teenagers earn. Your son or daughter's participation in this study is voluntary. There will be no penalty if you do not wish your son or daughter to be in this study, and he or she may withdraw at any time during the study by contacting me at the address or telephone number listed below.

Upon your request to withdraw, all information pertaining to your son or daughter will be destroyed. It should be noted that all information is used solely for research purposes, and has no bearing on your son or daughter's educational program, nor will any information be used as part of a psychological evaluation. This study has been approved by Mrs. Athol Wong, Principal, Newbury Park High School; and Mr. Ronald Lipari, Principal, Westlake High School.

Teenagers who participate will be asked to spend a total of about 55 minutes completing a questionnaire in their English class. Your son or daughter will indicate how much they agree or disagree with statements. Examples of the kinds of statements on the questionnaire are "I expect to do well in this class", "I make good use of my study time for this course", and "I memorize key words to remind me of important concepts in this class". If your son or daughter misses part of a class, they may have to make up work that has been missed.

Your student was selected from a list of high school students with learning disabilities attending either Newbury Park High School or Westlake High School. In addition to the questionnaire, I will also collect the fall 2007 quarter grade for English from your son or daughter's high school transcript.

All information will be held as confidential, and only group results will analyzed and reported. The information obtained in the study may be published in a scientific journal or presented at a scientific meeting, but all identities will be confidential.

I would appreciate it if you would return the form on the next page whether or not you would like your son or daughter to participate, so that I know that this information has reached you. You may keep the attached copy of this letter for your records. If you have any questions, please feel free to call Mrs. Madhavi Williams (805) 495-7491 x1107 or Dr. MaryAnn Rafoth (724) 357-2480. Either of us can arrange for you to see the questionnaire in advance if you wish. This study has been approved by the Indiana University of Pennsylvania Institutional Review Board for the Protection of Human Subjects (Phone: (724) 357-7730).

Thank you for your consideration.

Sincerely,

Madhavi Williams, M.A.
Doctoral Candidate
Indiana University of Pennsylvania
Department of Educational and School Psychology
Stouffer Hall, Room 104
1175 Maple Street
Indiana, Pennsylvania 15705-1058
(805) 495-7491 x1107

MaryAnn Rafoth, PhD.
Interim Dean
College of Education and Educational Technology
Stouffer Hall, Room 104
1175 Maple Street
Indiana, Pennsylvania 15705-1058
(724) 357-2480

I have read and understand the information and consent for my son or daughter to be a volunteer in this study. I understand that all information will be completely confidential and that I have the right to withdraw my son or daughter at any time. I have received an unsigned copy of this form to keep in my possession.

Please check the appropriate boxes and send this form back to school with your son or daughter:

__I have read and understand the permission letter, I give consent for my son or daughter to participate in this study.

___I am an adult student. I have read and understand the permission letter, and I consent to participate in this study.

__I have received a copy of Mrs. Williams and Dr. Rafoth's letter for my records.

__I would like more information before giving consent for my son or daughter to participate in this study. Call me at _____.

__I do not wish my son or daughter to participate in this study.

Parent's Signature/Date_____

Adult Student's Signature/Date _____

Teenager's name _____

Please return this form in the envelope provided.

Thank you!

If you have further questions about the nature and purpose of the study, the potential benefits and possible risks, or any other questions, please contact Madhavi Williams, Doctoral Candidate, Indiana University of Pennsylvania, Educational and School Psychology, Stouffer Hall-Room 246, 1175 Maple Street, Indiana, PA 15705, (805) 495-7491 x1107, madhaviwilliams@conejo.k12.ca.us

Appendix B

Teenage Student Informed Consent

Study Title: Components of self-regulated learning in high school students with learning disabilities.

Investigators: Madhavi Williams, M.A. (805) 495-7491
MaryAnn Rafoth, Ph.D. (724) 357-2480

I am being asked to help Mrs. Williams and Dr. Rafoth in a project. The goal of this project is to find out about the things that help teenagers study better.

If I decide to participate, my part in the project will take about 55 minutes. I will fill out a questionnaire that will be read aloud that asks about my motivation and study skills in my English class this semester. I agree to allow information to be collected about my special education status. I also agree to allow my Spring 2007 semester grade for my English class to be collected from my high school transcript.

I understand that my participation is voluntary. There will be no penalty if I do not wish to be in this study, and I may withdraw at any time during the study by contacting Mrs. Williams at the address or telephone number listed below.

Upon my request to withdraw, all information pertaining to me will be destroyed. It should be noted that all information is used solely for research purposes, and has no bearing on my educational program, nor will any information be used as part of a psychological evaluation. This study has been approved by Mrs. Athol Wong, Principal, Newbury Park High School; and Mr. Ronald Lipari, Principal, Westlake High School.

I understand that I will not receive any compensation for participating in the study.

I understand that all information will be kept confidential and all identifying information about me will be removed from the results of this study.

If I miss part of a class, I may have to make up the work I miss. I also understand that thinking about how motivated I am and how I study for my English class may help me better understand how I learn.

This project has been explained to me and I have been allowed to ask questions about it. I understand that I do not have to fill out the questionnaire if I do not want to and no one will treat me badly. I can stop part way through if I want to and skip questions I do not want to answer. I have read this form, understand the project, and agree to participate. I have received an unsigned copy of this

informed Consent Form to keep in my possession.

This project has been approved by the Indiana University of Pennsylvania Institutional Review Board for the Protection of Human Subjects (Phone: (724) 357-7730).

Name (PLEASE PRINT)

_____

Student
signature_____

Date _____

Phone number or location where you can be reached
_____

Best days and times to reach you_____

I certify that I have explained to the above individual the nature and purpose, the potential benefits, and possible risks associated with participating in this research study, have answered any questions that have been raised, and have witnessed the above signature.

Investigator _____

Date_____

Appendix C

CVUSD Consent

Conejo Valley Unified School District

INSTRUCTIONAL SERVICES DIVISION

1400 E. Janss Road, Thousand Oaks, California 91362-2198

Telephone (805) 497-9511 • FAX (805) 379-5756

Mario V. Contini
Superintendent of Schools

Richard W. Simpson, Ed.D.
Deputy Superintendent

March 16, 2007

To Whom it May Concern:

Madhavi Williams is currently employed by the Conejo Valley Unified School District as a School Psychologist. Ms. Williams also is a doctoral student at Indiana University of Pennsylvania. A requirement of the doctoral program is for Ms. Williams to conduct a research study approved by her university.

Ms. Williams has presented her proposed research project to the District. This letter will confirm that the District has reviewed and approved Ms. Williams research study and she is authorized to make appropriate contacts regarding her study with staff and students at Newbury Park and Westlake High Schools.

Sincerely,

Richard W. Simpson, Ed.D.
Deputy Superintendent

cc: Margaret Saleh, Director, Special Education
Jo-Ann Yoos, Assistant Superintendent, Personnel Services

Appendix D

Newbury Park High School Consent

Conejo Valley Unified School District

1400 E. Janss Road, Thousand Oaks, California 91362-2198
(805) 497-9511

An International Baccalaureate World School
2005 California Distinguished School
2006 National Blue Ribbon School

Mario V. Contini
Superintendent of Schools

Newbury Park High School
456 Reino Road
Newbury Park, CA 91320-3798
(805) 498-3676
FAX (805) 499-3549

Athol W. Wong
Principal

March 19, 2007

To Whom It May Concern:

Madhavi Williams serves as a Psychologist at another site in the Conejo Valley Unified School District. A requirement of her doctoral program at the University of Pennsylvania is that she conduct a research study approved by her university.

Ms. Williams has presented her proposed research project to district administration and to me at Newbury Park High School. This letter confirms that she has received approval to conduct her study with students and staff members on our campus.

Sincerely,

Athol W. Wong
Principal

HIGH EXPECTATIONS → HIGH ACHIEVEMENT

Appendix E

Westlake High School Consent

Conejo Valley Unified School District

1400 E. Janss Road, Thousand Oaks, California 91362-2198
(805) 497-9511

2004 No Child Left Behind - Blue Ribbon School

Mario V. Contini
Superintendent of Schools

Westlake High School
100 N. Lakeview Canyon Road
Westlake Village, CA 91362-3895
(805) 497-6711
FAX (805) 497-2606
www.conejo.k12.ca.us/westlake

Ronald A. Lipari
Principal

March 30, 2006

To Whom It May Concern:

Madhavi Williams is currently employed by the Conejo Valley Unified School District as a School Psychologist. Ms. Williams also is a doctoral student at Indiana University of Pennsylvania. A requirement of the doctoral program is for Ms. Williams to conduct a research study approved by her university.

Ms. Williams has presented her proposed research project to Mr. Ronald Lipari, Principal, Westlake High School. This letter will confirm that the District has reviewed and approved Ms. Williams' research study and she is authorized to make appropriate contacts regarding her study with staff and students at Newbury Park and Westlake High Schools.

Sincerely,

Ronald A. Lipari, Principal
Westlake High School

Cc: Margaret Saleh, Director, Special Education
Jo-Ann Yoos, Assistant Superintendent, Personnel Services

Appendix F

Original MSLQ Questionnaire

Motivated Strategies for Learning Questionnaire Manual

Part A. Motivation

The following questions ask about your motivation for and attitudes about this class. **Remember there are no right or wrong answers, just answer as accurately as possible.** Use the scale below to answer the questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

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

1.	In a class like this, I prefer course material that really challenges me so I can learn new things.	1	2	3	4	5	6	7
2.	If I study in appropriate ways, then I will be able to learn the material in this course.	1	2	3	4	5	6	7
3.	When I take a test I think about how poorly I am doing compared with other students.	1	2	3	4	5	6	7
4.	I think I will be able to use what I learn in this course in other courses.	1	2	3	4	5	6	7
5.	I believe I will receive an excellent grade in this class.	1	2	3	4	5	6	7
6.	I'm certain I can understand the most difficult material presented in the readings for this course.	1	2	3	4	5	6	7
7.	Getting a good grade in this class is the most satisfying thing for me right now.	1	2	3	4	5	6	7
8.	When I take a test I think about items on other parts of the test I can't answer.	1	2	3	4	5	6	7

		not at all true of me						very true of me
9.	It is my own fault if I don't learn the material in this course.	1	2	3	4	5	6	7
10.	It is important for me to learn the course material in this class.	1	2	3	4	5	6	7
11.	The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.	1	2	3	4	5	6	7
12.	I'm confident I can learn the basic concepts taught in this course.	1	2	3	4	5	6	7
13.	If I can, I want to get better grades in this class than most of the other students.	1	2	3	4	5	6	7
14.	When I take tests I think of the consequences of failing.	1	2	3	4	5	6	7
15.	I'm confident I can understand the most complex material presented by the instructor in this course.	1	2	3	4	5	6	7
16.	In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.	1	2	3	4	5	6	7
17.	I am very interested in the content area of this course.	1	2	3	4	5	6	7
18.	If I try hard enough, then I will understand the course material.	1	2	3	4	5	6	7
19.	I have an uneasy, upset feeling when I take an exam.	1	2	3	4	5	6	7

		not at all true of me						very true of me
20.	I'm confident I can do an excellent job on the assignments and tests in this course.	1	2	3	4	5	6	7
21.	I expect to do well in this class.	1	2	3	4	5	6	7
22.	The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.	1	2	3	4	5	6	7
23.	I think the course material in this class is useful for me to learn.	1	2	3	4	5	6	7
24.	When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.	1	2	3	4	5	6	7
25.	If I don't understand the course material, it is because I didn't try hard enough.	1	2	3	4	5	6	7
26.	I like the subject matter of this course.	1	2	3	4	5	6	7
27.	Understanding the subject matter of this course is very important to me.	1	2	3	4	5	6	7
28.	I feel my heart beating fast when I take an exam.	1	2	3	4	5	6	7
29.	I'm certain I can master the skills being taught in this class.	1	2	3	4	5	6	7
30.	I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.	1	2	3	4	5	6	7
31.	Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.	1	2	3	4	5	6	7

Part B. Learning Strategies

The following questions ask about your learning strategies and study skills for this class. **Again, there are no right or wrong answers. Answer the questions about how you study in this class as accurately as possible.** Use the same scale to answer the remaining questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

1 not at all true of me	2	3	4	5	6	7 very true of me	
32.	When I study the readings for this course, I outline the material to help me organize my thoughts.	1	2	3	4	5	6	7
33.	During class time I often miss important points because I'm thinking of other things.	1	2	3	4	5	6	7
34.	When studying for this course, I often try to explain the material to a classmate or friend.	1	2	3	4	5	6	7
35.	I usually study in a place where I can concentrate on my course work.	1	2	3	4	5	6	7
36.	When reading for this course, I make up questions to help focus my reading.	1	2	3	4	5	6	7
37.	I often feel so lazy or bored when I study for this class that I quit before I finish what I planned to do.	1	2	3	4	5	6	7
38.	I often find myself questioning things I hear or read in this course to decide if I find them convincing.	1	2	3	4	5	6	7
39.	When I study for this class, I practice saying the material to myself over and over.	1	2	3	4	5	6	7

		not at all true of me						very true of me
40.	Even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone.	1	2	3	4	5	6	7
41.	When I become confused about something I'm reading for this class, I go back and try to figure it out.	1	2	3	4	5	6	7
42.	When I study for this course, I go through the readings and my class notes and try to find the most important ideas.	1	2	3	4	5	6	7
43.	I make good use of my study time for this course.	1	2	3	4	5	6	7
44.	If course readings are difficult to understand, I change the way I read the material.	1	2	3	4	5	6	7
45.	I try to work with other students from this class to complete the course assignments.	1	2	3	4	5	6	7
46.	When studying for this course, I read my class notes and the course readings over and over again.	1	2	3	4	5	6	7
47.	When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.	1	2	3	4	5	6	7
48.	I work hard to do well in this class even if I don't like what we are doing.	1	2	3	4	5	6	7
49.	I make simple charts, diagrams, or tables to help me organize course material.	1	2	3	4	5	6	7

	not at all true of me						very true of me
50. When studying for this course, I often set aside time to discuss course material with a group of students from the class.	1	2	3	4	5	6	7
51. I treat the course material as a starting point and try to develop my own ideas about it.	1	2	3	4	5	6	7
52. I find it hard to stick to a study schedule.	1	2	3	4	5	6	7
53. When I study for this class, I pull together information from different sources, such as lectures, readings, and discussions.	1	2	3	4	5	6	7
54. Before I study new course material thoroughly, I often skim it to see how it is organized.	1	2	3	4	5	6	7
55. I ask myself questions to make sure I understand the material I have been studying in this class.	1	2	3	4	5	6	7
56. I try to change the way I study in order to fit the course requirements and the instructor's teaching style.	1	2	3	4	5	6	7
57. I often find that I have been reading for this class but don't know what it was all about.	1	2	3	4	5	6	7
58. I ask the instructor to clarify concepts I don't understand well.	1	2	3	4	5	6	7
59. I memorize key words to remind me of important concepts in this class.	1	2	3	4	5	6	7
60. When course work is difficult, I either give up or only study the easy parts.	1	2	3	4	5	6	7

		not at all true of me						very true of me
61.	I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for this course.	1	2	3	4	5	6	7
62.	I try to relate ideas in this subject to those in other courses whenever possible.	1	2	3	4	5	6	7
63.	When I study for this course, I go over my class notes and make an outline of important concepts.	1	2	3	4	5	6	7
64.	When reading for this class, I try to relate the material to what I already know.	1	2	3	4	5	6	7
65.	I have a regular place set aside for studying.	1	2	3	4	5	6	7
66.	I try to play around with ideas of my own related to what I am learning in this course.	1	2	3	4	5	6	7
67.	When I study for this course, I write brief summaries of the main ideas from the readings and my class notes.	1	2	3	4	5	6	7
68.	When I can't understand the material in this course, I ask another student in this class for help.	1	2	3	4	5	6	7
69.	I try to understand the material in this class by making connections between the readings and the concepts from the lectures.	1	2	3	4	5	6	7
70.	I make sure that I keep up with the weekly readings and assignments for this course.	1	2	3	4	5	6	7
71.	Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.	1	2	3	4	5	6	7

		not at all true of me						very true of me
72.	I make lists of important items for this course and memorize the lists.	1	2	3	4	5	6	7
73.	I attend this class regularly.	1	2	3	4	5	6	7
74.	Even when course materials are dull and uninteresting, I manage to keep working until I finish.	1	2	3	4	5	6	7
75.	I try to identify students in this class whom I can ask for help if necessary.	1	2	3	4	5	6	7
76.	When studying for this course I try to determine which concepts I don't understand well.	1	2	3	4	5	6	7
77.	I often find that I don't spend very much time on this course because of other activities.	1	2	3	4	5	6	7
78.	When I study for this class, I set goals for myself in order to direct my activities in each study period.	1	2	3	4	5	6	7
79.	If I get confused taking notes in class, I make sure I sort it out afterwards.	1	2	3	4	5	6	7
80.	I rarely find time to review my notes or readings before an exam.	1	2	3	4	5	6	7
81.	I try to apply ideas from course readings in other class activities such as lecture and discussion.	1	2	3	4	5	6	7

Appendix G

Original Goal Orientation Scales

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The Development and Validation of Scales Assessing Students' Achievement Goal Orientations

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Achievement goal theory has emerged as a major new direction in motivational research. A distinction is made among conceptually different achievement goal orientations including the goal to develop ability (task goal orientation), the goal to demonstrate ability (ability-approach goal orientation), and the goal to avoid the demonstration of lack of ability (ability-avoid goal orientation). Scales assessing each of these goal orientations were developed over an eight year period by a group of researchers at the University of Michigan. The results of studies conducted with seven different samples of elementary and middle school students are used to describe the internal consistency, stability, and construct validity of the scales. Comparisons of these scales with those developed by Nicholls and his colleagues provide evidence of convergent validity. Confirmatory factor analysis attests to the discriminant validity of the scales. © 1998 Academic Press

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in school, whereas all of his ego-enhancing items refer to out-performing others. The avoidance scale developed by Elliot & Church (1997), as previously mentioned, includes items that tap into general anxiety in school rather than the desire to avoid the demonstration of lack of ability. Making relative ability the salient feature of all of the items in both our ability-approach and ability-avoid scales may have contributed to the higher than desirable correlation. Although the confirmatory factor analysis revealed good model fit and clear distinctions among the items in the three goal scales, further refinement may help to clarify the distinction between approach and avoidance ability goal orientations.

APPENDIX

Goal Orientation Scales

Task Goal Orientation

X1–I like school work that I'll learn from, even if I make a lot of mistakes.
X2–An important reason why I do my school work is because I like to learn new things.
X3–I like school work best when it really makes me think.
X4–An important reason why I do my work in school is because I want to get better at it.
X5–I do my school work because I'm interested in it.
X6–An important reason I do my school work is because I enjoy it.

Ability-Approach Goal Orientation

X7–I would feel really good if I were the only one who could answer the teachers' questions in class.
X8–It's important to me that the other students in my classes think that I am good at my work.[3]
X9–I want to do better than other students in my classes.
X10–I would feel successful in school if I did better than most of the other students.
X11–I'd like to show my teachers that I'm smarter than the other students in my classes.
X12–Doing better than other students in school is important to me.

Ability-Avoid Goal Orientation

X13–It's very important to me that I don't look stupid in my classes.
X14–An important reason I do my school work is so that I don't embarrass myself.

[3] This item cross-loaded on the ability-approach and ability-avoid scales and thus was eliminated from the analyses.

X15–The reason I do my school work is so my teachers don't think I know less than others.
X16–The reason I do my work is so others won't think I'm dumb.
X17–One reason I would not participate in class is to avoid looking stupid.
X18–One of my main goals is to avoid looking like I can't do my work.

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Appendix H

Adapted 57-Item Questionnaire

Directions: The following questions ask about your motivation for and attitudes about this class. Remember there are no rights or wrong answers; just answer as accurately as possible. Use the scale below to answer the questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

1. I believe I will receive an excellent grade in English class.

Not at all true of me Very true of me
1 2 3 4 5 6 7

2. I'm certain I can understand the most difficult material presented in the readings for English class.

Not at all true of me Very true of me
1 2 3 4 5 6 7

3. I'm confident I can understand the basic concepts taught in English class.

Not at all true of me Very true of me
1 2 3 4 5 6 7

4. I'm confident I can understand the most complex material presented by the instructor in English class.

Not at all true of me Very true of me
1 2 3 4 5 6 7

5. I'm confident I can do an excellent job on the assignments and tests in English class.

Not at all true of me Very true of me
1 2 3 4 5 6 7

6. I expect to do well in English class.

Not at all true of me Very true of me
1 2 3 4 5 6 7

7. I'm certain I can master the skills being taught in English class.

Not at all true of me Very true of me
1 2 3 4 5 6 7

8. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in English class.

Not at all true of me Very true of me
1 2 3 4 5 6 7

9. When I study for English class, I practice saying the material to myself over and over.

Not at all true of me Very true of me
1 2 3 4 5 6 7

10. When studying for English class, I read my class notes and the course readings over and over again.

Not at all true of me Very true of me
1 2 3 4 5 6 7

11. I memorize key words to remind me of important concepts in English class.

Not at all true of me Very true of me
1 2 3 4 5 6 7

12. I make lists of important terms for English class and memorize the lists.

Not at all true of me Very true of me
1 2 3 4 5 6 7

13. When I study for English class, I pull together information from different sources, such as lectures, readings, and discussions.

Not at all true of me Very true of me
1 2 3 4 5 6 7

14. I try to relate ideas in this subject to those in other courses whenever possible.

Not at all true of me Very true of me
1 2 3 4 5 6 7

15. When reading for English class, I try to relate the material to what I already know.

Not at all true of me Very true of me
1 2 3 4 5 6 7

16. When I study for this English, I write brief summaries of the main ideas from the readings and the concepts from the lectures.

Not at all true of me						Very true of me
1	2	3	4	5	6	7

17. I try to understand the material in English class by making connections between the readings and the concepts from the lectures.

Not at all true of me						Very true of me
1	2	3	4	5	6	7

18. I try to apply ideas from course readings in other class activities such as lecture and discussion.

Not at all true of me						Very true of me
1	2	3	4	5	6	7

19. When I study the readings for this course, I outline the material to help me organize my thoughts.

Not at all true of me						Very true of me
1	2	3	4	5	6	7

20. When I study for English class, I go through the readings and my class notes and try to find the most important ideas.

Not at all true of me						Very true of me
1	2	3	4	5	6	7

21. I make simple charts, diagrams, or tables to help me organize course material.

Not at all true of me						Very true of me
1	2	3	4	5	6	7

22. When I study for English class, I go over my class notes and make an outline of important concepts.

Not at all true of me						Very true of me
1	2	3	4	5	6	7

23. I often find myself questioning things I hear or read in this course to decide if I find them convincing.

Not at all true of me						Very true of me
1	2	3	4	5	6	7

24. When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.

Not at all true of me Very true of me
1 2 3 4 5 6 7

25. I treat the course material as a starting point and try to develop my own ideas about it.

Not at all true of me Very true of me
1 2 3 4 5 6 7

26. I try to play around with ideas of my own related to what I am learning in this course.

Not at all true of me Very true of me
1 2 3 4 5 6 7

27. Whenever I read or hear an assertion or conclusion in English class, I think about possible alternatives.

Not at all true of me Very true of me
1 2 3 4 5 6 7

28. During class time I often miss important points because I'm thinking of other things.

Not at all true of me Very true of me
1 2 3 4 5 6 7

29. When reading for this course, I make up questions to help focus my reading.

Not at all true of me Very true of me
1 2 3 4 5 6 7

30. When I become confused about something I'm reading for this class, I go back and try to figure it out.

Not at all true of me Very true of me
1 2 3 4 5 6 7

31. If course materials are difficult to understand, I change the way I read the material.

Not at all true of me Very true of me
1 2 3 4 5 6 7

32. Before I study new course material thoroughly, I often skim it to see how it is organized.

Not at all true of me Very true of me
1 2 3 4 5 6 7

33. I ask myself questions to make sure I understand the material I have been studying in English class.

Not at all true of me Very true of me
1 2 3 4 5 6 7

34. I try to change the way I study in order to fit the course requirements and instructor's teaching style.

Not at all true of me Very true of me
1 2 3 4 5 6 7

35. I often find that I have been reading for English but don't know what it was all about.

Not at all true of me Very true of me
1 2 3 4 5 6 7

36. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying.

Not at all true of me Very true of me
1 2 3 4 5 6 7

37. When studying for English I try to determine which concepts I don't understand well.

Not at all true of me Very true of me
1 2 3 4 5 6 7

38. When I study for this class, I set goals for myself in order to direct my activities in each study period.

Not at all true of me Very true of me
1 2 3 4 5 6 7

39. If I get confused taking notes in English, I make sure I sort it out afterwards.

Not at all true of me Very true of me
1 2 3 4 5 6 7

40. I like school work that I'll learn from, even if I make a lot of mistakes.

Not at all true of me Very true of me
1 2 3 4 5 6 7

41. An important reason why I do my school work is because I like to learn new things.

Not at all true of me Very true of me
1 2 3 4 5 6 7

42. I like school work best when it really makes me think.

Not at all true of me Very true of me
1 2 3 4 5 6 7

43. An important reason why I do my work in school is because I want to get better at it.

Not at all true of me Very true of me
1 2 3 4 5 6 7

44. I do my school work because I'm interested in it.

Not at all true of me Very true of me
1 2 3 4 5 6 7

45. An important reason I do my school work is because I enjoy it.

Not at all true of me Very true of me
1 2 3 4 5 6 7

46. I would feel really good if I were the only one who could answer the teachers' questions in class.

Not at all true of me Very true of me
1 2 3 4 5 6 7

47. It's important to me that the other students in my classes think that I am good at my work.

Not at all true of me Very true of me
1 2 3 4 5 6 7

48. I want to do better than other students in my classes.

Not at all true of me Very true of me
1 2 3 4 5 6 7

49. I would feel successful in school if I did better than most of the other students.

Not at all true of me Very true of me
1 2 3 4 5 6 7

50. I'd like to show my teachers that I'm smarter than the other students in my classes.

Not at all true of me Very true of me
1 2 3 4 5 6 7

51. Doing better than other students in school is important to me.
Not at all true of me Very true of me
1 2 3 4 5 6 7

52. It's very important to me that I don't look stupid in my classes.

Not at all true of me Very true of me
1 2 3 4 5 6 7

53. An important reason I do my school work is so that I don't embarrass myself.

Not at all true of me Very true of me
1 2 3 4 5 6 7

54. The reason I do my school work is so my teachers don't think I know less than others.

Not at all true of me Very true of me
1 2 3 4 5 6 7

55. The reason I do my work is so others won't think I'm dumb.

Not at all true of me Very true of me
1 2 3 4 5 6 7

56. One reason I would not participate in class is to avoid looking stupid.

Not at all true of me Very true of me
1 2 3 4 5 6 7

57. One of my main goals is to avoid looking like I can't do my work.

Not at all true of me Very true of me

1 2 3 4 5 6 7

Appendix I
Adapted Questionnaire Items by Scale

Self-Efficacy Scale

1. I believe I will receive an excellent grade in English class.

2. I'm certain I can understand the most difficult material presented in the readings for English class.

3. I'm confident I can understand the basic concepts taught in English class.

4. I'm confident I can understand the most complex material presented by the instructor in English class.

5. I'm confident I can do an excellent job on the assignments and tests in English class.

6. I expect to do well in English class.

7. I'm certain I can master the skills being taught in English class.

8. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in English class.

Learning Strategies Scales

Rehearsal Scale

9. When I study for English class, I practice saying the material to myself over and over.

10. When studying for English class, I read my class notes and the course readings over and over again.

11. I memorize key words to remind me of important concepts in English class.

12. I make lists of important terms for English class and memorize the lists.

Elaboration Scale

13. When I study for English class, I pull together information from different sources, such as lectures, readings, and discussions.

14. I try to relate ideas in this subject to those in other courses whenever possible.

15. When reading for English class, I try to relate the material to what I already know.

16. When I study for this English, I write brief summaries of the main ideas from the readings and the concepts from the lectures.

17. I try to understand the material in English class by making connections between the readings and the concepts from the lectures.

18. I try to apply ideas from course readings in other class activities such as lecture and discussion.

Organization Scale

19. When I study the readings for this course, I outline the material to help me organize my thoughts.

20. When I study for English class, I go through the readings and my class notes and try to find the most important ideas.

21. I make simple charts, diagrams, or tables to help me organize course material.

22. When I study for English class, I go over my class notes and make an outline of important concepts.

Critical Thinking Scale

23. I often find myself questioning things I hear or read in this course to decide if I find them convincing.

24. When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.

25. I treat the course material as a starting point and try to develop my own ideas about it.

26. I try to play around with ideas of my own related to what I am learning in this course.

27. Whenever I read or hear an assertion or conclusion in English class, I think about possible alternatives.

Metacognitive Self-Regulation Scale

28. During class time I often miss important points because I'm thinking of other things. (REVERSED SCORED).

29. When reading for this course, I make up questions to help focus my reading.

30. When I become confused about something I'm reading for this class, I go back and try to figure it out.

31. If course materials are difficult to understand, I change the way I read the material.

32. Before I study new course material thoroughly, I often skim it to see how it is organized.

33. I ask myself questions to make sure I understand the material I have been studying in English class.

34. I try to change the way I study in order to fit the course requirements and instructor's teaching style.

35. I often find that I have been reading for English but don't know what it was all about. (REVERSED SCORED).

36. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying.

37. When studying for English I try to determine which concepts I don't understand well.

38. When I study for this class, I set goals for myself in order to direct my activities in each study period.

39. If I get confused taking notes in English, I make sure I sort it out afterwards.

Goal Orientation Scales from Midgley et al. (1998)

Mastery Goal Orientation Scale

40. I like school work that I'll learn from, even if I make a lot of mistakes.

41. An important reason why I do my school work is because I like to learn new things.

42. I like school work best when it really makes me think.

43. An important reason why I do my work in school is because I want to get better at it.

44. I do my school work because I'm interested in it.

45. An important reason I do my school work is because I enjoy it.

Performance-Approach Goal Orientation Scale

46. I would feel really good if I were the only one who could answer the teachers' questions in class.

47. It's important to me that the other students in my classes think that I am good at my work.

48. I want to do better than other students in my classes.

49. I would feel successful in school if I did better than most of the other students.

50. I'd like to show my teachers that I'm smarter than the other students in my classes.

51. Doing better than other students in school is important to me.

Performance-Avoid Goal Orientation Scale

52. It's very important to me that I don't look stupid in my classes.

53. An important reason I do my school work is so that I don't embarrass myself.

54. The reason I do my school work is so my teachers don't think I know less than others.

55. The reason I do my work is so others won't think I'm dumb.

56. One reason I would not participate in class is to avoid looking stupid.

57. One of my main goals is to avoid looking like I can't do my work.

Appendix J

Consent to Use MSLQ Scales

January 10, 2007

Permission Department
The Office of Educational Research and Improvement
Department of Education, Suite 2400
University of Michigan
Ann Arbor, Michigan 48109-1259

Dear Sir or Madam:

I am completing a doctoral dissertation at Indiana University of Pennsylvania. I would like permission to duplicate the following for research use.

Title: *A. manual for the use of the motivated strategies for learning questionnaire (MSLQ).*

Copyright: The Regents of the University of Michigan, 1991

Authors: Pintrich, P.; Smith, D. A. F.; Garcia, T.; and McKeachie, W.J.

Material to be Duplicated: Self-efficacy sub-scale; Cognitive and Metacognitive Strategies Scales: Rehearsal, Elaboration, Organization, Critical Thinking, and Metacognitive Self-regulation, pages 13, 19-23 (photocopies enclosed).

Use: To be included in my dissertation entitled *"Components of self-regulated learning in 11th and 12th grade learning disabled students and general education students at risk for academic failure".*

A self-addressed envelope and a copy of this letter for your files are enclosed for your convenience.

Sincerely,

Madhavi Williams

Madhavi Williams
Doctoral Candidate
Education and School Psychology Department

Permission granted Marie Bien Date 1-18-2007
Signature
Secretary for MSLQ

Conditions, if any: That authors be cited.

Appendix K

Consent to Use Goal Orientation Scales

February 7, 2007

Michael Middleton, PhD
Assistant Professor
Department of Education, Morrill Hall
University of New Hampshire
Durham, NH 03824

Dear Dr. Middleton:

I am completing a doctoral dissertation at Indiana University of Pennsylvania. I would like permission to duplicate the following for research use.

Title: The Development and validation of scales assessing students' achievement goal orientations, *Contemporary Educational Psychology, 23*, 113-131 (1998).

Copyright: Academic Press, 1998

Authors: Midgley, C.; Kaplan, A.; Middleton, M.; Maehr, M.L.; Urdan, T.; Anderman, L.H.; Anderman; and Roeser, R.

Material to be Duplicated: 3, 6-item goal orientation scales: Task Goal Orientation, Ability-Approach Goal Orientation, and Ability-Avoid Goal Orientation, pages 128-129, (photocopies enclosed).

Use: To be included in my dissertation entitled *"Components of self-regulated learning in 11th and 12th grade learning disabled students and general education students at risk for academic failure"*.

A self-addressed envelope and a copy of this letter for your files are enclosed for your convenience.

Sincerely,

Madhavi Williams

Madhavi Williams
Doctoral Candidate
Education and School Psychology Department

Permission granted Michael Middleton Date 2/7/07
Signature

Conditions, if any:

Appendix L

Consent to Use An Information Processing Model of Learning

April 15, 2007

Permission Department
Houghton Mifflin Company
One Beacon Street
Boston, MA 02108

Dear Sir or Madam:

I am completing a doctoral dissertation at Indiana University of Pennsylvania. I would like permission to duplicate the following for research use.

Title: *Psychology Applied to Teaching, 5th Edition*

Copyright: Houghton Mifflin Company, 1986

Authors: Biehler, R.F. and Snowman, J.

Material to be Duplicated: *An Information Processing Model of Learning*, Figure 10.1, p. 422. (a photocopy is included).

Use: To be included in my dissertation entitled *"Components of self-regulated learning in high school students with learning disabilities"*.

A self-addressed envelope and a copy of this letter for your files are enclosed for your convenience.

Sincerely,

Madhavi Williams

Madhavi Williams
Doctoral Candidate
Education and School Psychology Department

Permission granted Sheila Harris Date 5/21/07
Signature

Conditions, if any: _____

Appendix M

Consent to Use Triadic Forms of Self-regulation

April 15, 2007

Barry J. Zimmerman, PhD.
Department of Educational Psychology
Graduate Center
City University of New York
365 5th Avenue
New York, New York 10016

Dear Dr. Zimmerman:

I am completing a doctoral dissertation at Indiana University of Pennsylvania. I would like permission to duplicate the following for research use.

Title: Attaining Self-Regulation: A Social Cognitive Perspective, (pp. 13-39), B.J. Zimmerman. In Boekaerts, M., Pintrich, P.R., & Zeidner, M. (Eds.), *Handbook of Self-Regulation*, San Diego, CA: Academic Press.

Copyright: Academic Press, 2000

Author: Zimmerman, B.J.

Material to be Duplicated: Figure 1 – Triadic forms of self-regulation (p. 15), and Figure 2 – Cyclical phases of self-regulation (p. 16); (photocopies enclosed).

Use: To be included in my dissertation entitled *"Components of self-regulated learning in high school students with learning disabilities"*.

A self-addressed envelope and a copy of this letter for your files are enclosed for your convenience.

Sincerely,

Madhavi Williams

Madhavi Williams
Doctoral Candidate
Education and School Psychology Department

Permission granted Barry J. Zimmerman Date 4/29/07
Signature

Conditions, if any:

Appendix N

Consent to Use Cyclical Phases of Self-regulation

April 15, 2007

Barry J. Zimmerman, PhD.
Department of Educational Psychology
Graduate Center
City University of New York
365 5th Avenue
New York, New York 10016

Dear Dr. Zimmerman:

I am completing a doctoral dissertation at Indiana University of Pennsylvania. I would like permission to duplicate the following for research use.

Title: Attaining Self-Regulation: A Social Cognitive Perspective, (pp. 13-39), B.J. Zimmerman. In Boekaerts, M., Pintrich, P.R., & Zeidner, M. (Eds.), *Handbook of Self-Regulation*, San Diego, CA: Academic Press.

Copyright: Academic Press, 2000

Author: Zimmerman, B.J.

Material to be Duplicated: Figure 1 – Triadic forms of self-regulation (p. 15), and Figure 2 -- Cyclical phases of self-regulation (p. 16); (photocopies enclosed).

Use: To be included in my dissertation entitled *"Components of self-regulated learning in high school students with learning disabilities"*.

A self-addressed envelope and a copy of this letter for your files are enclosed for your convenience.

Sincerely,

Madhavi Williams

Madhavi Williams
Doctoral Candidate
Education and School Psychology Department

Permission granted Barry J. Zimmerman Date 4/29/07
Signature

Conditions, if any:

Appendix O

Consent to Use 2X2 Achievement Goal Framework

April 29, 2007

Dr. Andrew J. Elliot
Department of Clinical and Social Sciences
in Psychology
University of Rochester
Meliora Hall
RC Box 270266
Rochester, New York 14627-0266

Dear Dr. Elliot,

I am completing a doctoral dissertation at Indiana University of Pennsylvania. I would like permission to duplicate the following for research use.

Title: A 2X2 achievement goal framework

Copyright: American Psychological Association, 2001

Authors: Elliot, A.J. & McGregor, H.A.

Material to be Duplicated: *The 2X2 Achievement goal orientation framework.* Figure 1, p. 502. (a photocopy is included).

Use: To be included in my dissertation entitled *"Components of self-regulated learning in high school students with learning disabilities".*

A self-addressed envelope and a copy of this letter for your files are enclosed for your convenience.

Sincerely,

Madhavi Williams

Madhavi Williams
Doctoral Candidate
Education and School Psychology Department

Permission granted Andy J. Elliot Date May 3, 2007
Signature

Conditions, if any: none

Appendix P
Descriptive Statistics for the Preliminary Research Question

Quarter Grade

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum	Between-Component Variance
						Lower Bound	Upper Bound			
1.00		24	3.0550	1.23806	.25272	2.5322	3.5778	1.00	5.00	
2.00		17	3.1376	1.39936	.33939	2.4182	3.8571	1.00	5.00	
3.00		15	4.1787	.86240	.22267	3.7011	4.6563	2.67	5.33	
4.00		29	3.8745	.91472	.16986	3.5265	4.2224	2.00	5.00	
5.00		11	4.1218	.27103	.08172	3.9397	4.3039	4.00	4.67	
6.00		19	4.0347	1.19105	.27325	3.4607	4.6088	1.00	5.33	
7.00		20	3.3170	1.04594	.23388	2.8275	3.8065	2.00	5.00	
Total		135	3.6299	1.13794	.09794	3.4362	3.8236	1.00	5.33	
Model	Fixed Effects			1.07340	.09238	3.4471	3.8127			
	Random Effects				.18545	3.1762	4.0837			.16752

Appendix Q

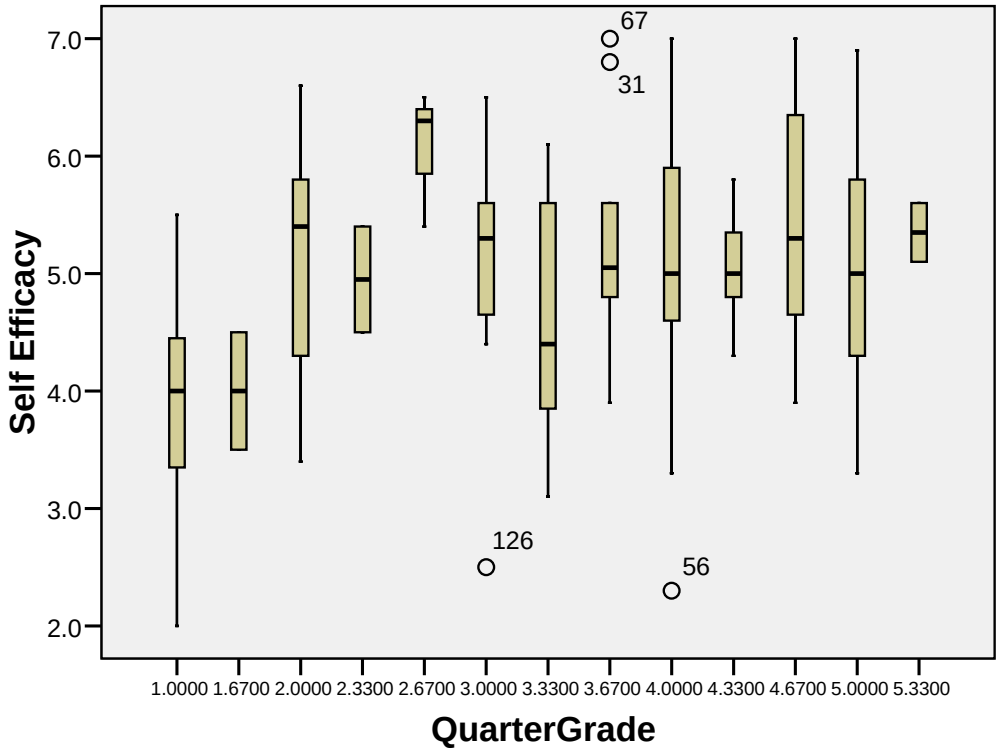
ANOVA for the Preliminary Research Question

Quarter Grade

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	26.037	6	4.340	3.766	.002
Within Groups	147.481	128	1.152		
Total	173.518	134			

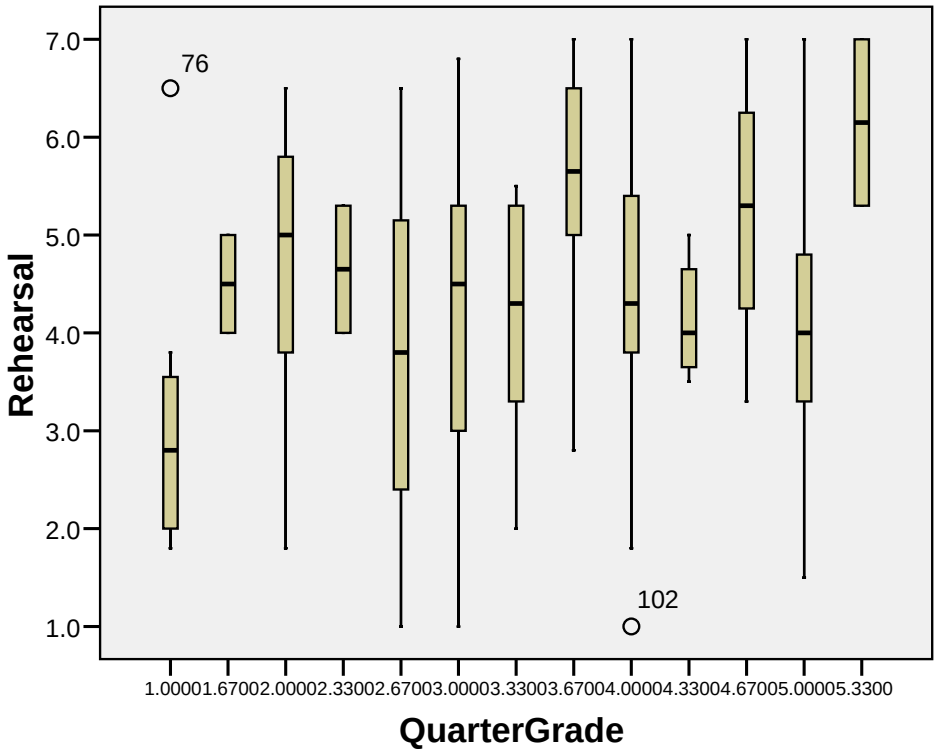
Appendix R

Box Plot for Self-Efficacy and Quarter Grade



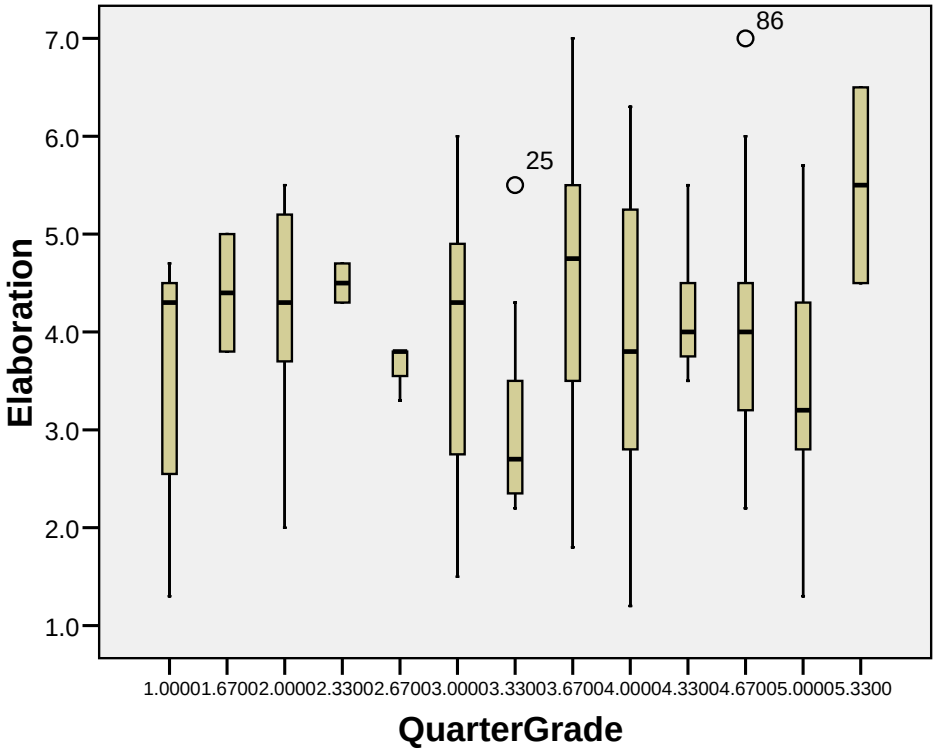
Appendix S

Box Plot for Rehearsal and Quarter Grade



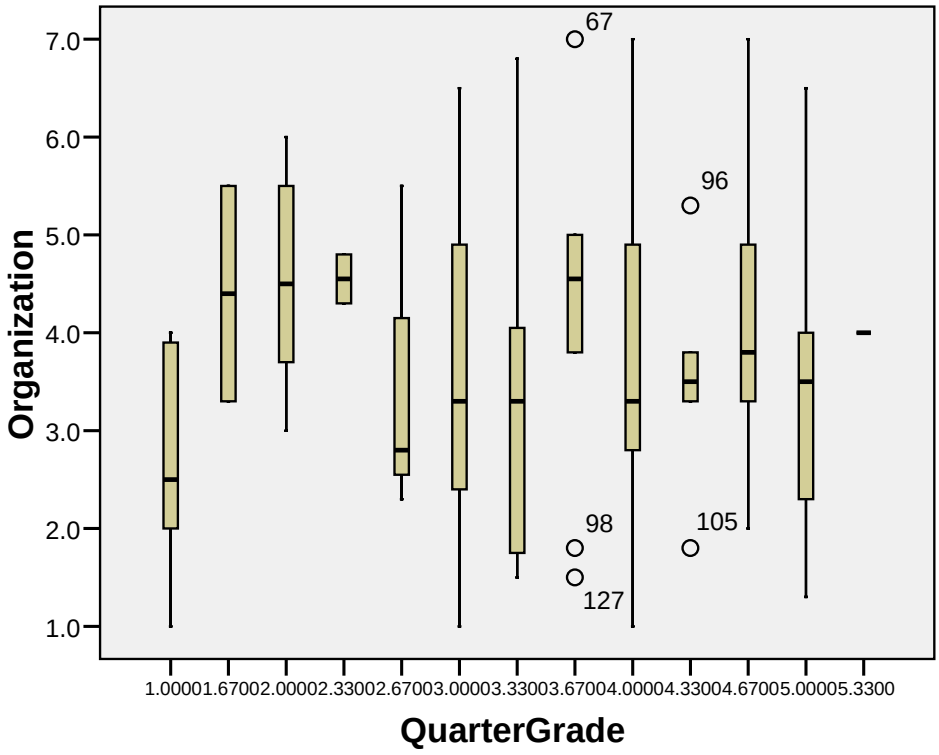
Appendix T

Box Plot for Elaboration and Quarter Grade



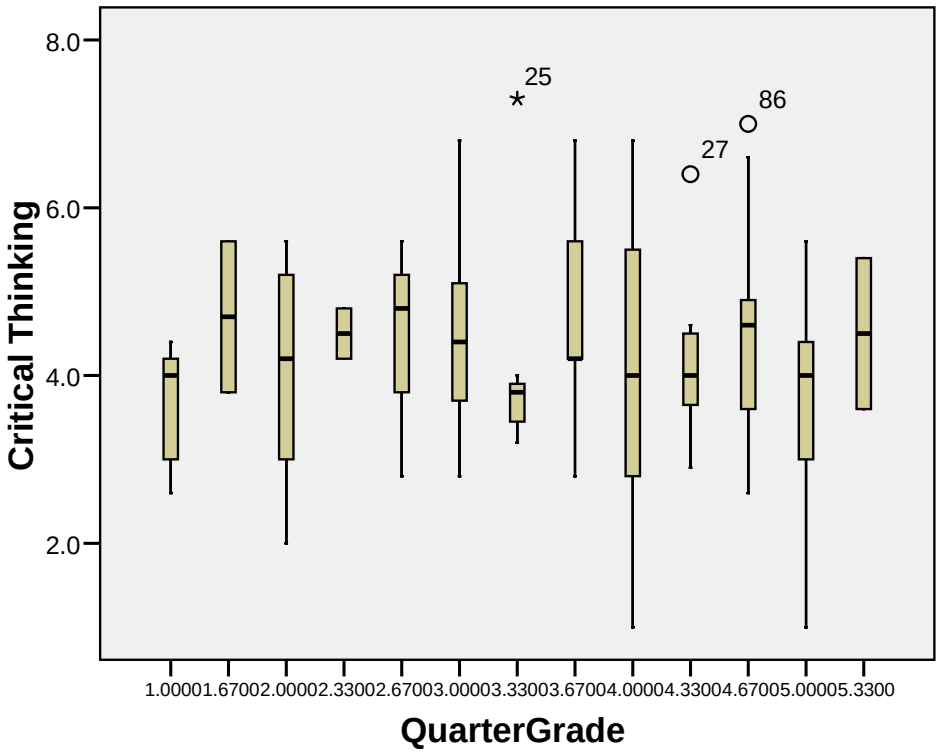
Appendix U

Box Plot for Organization and Quarter Grade



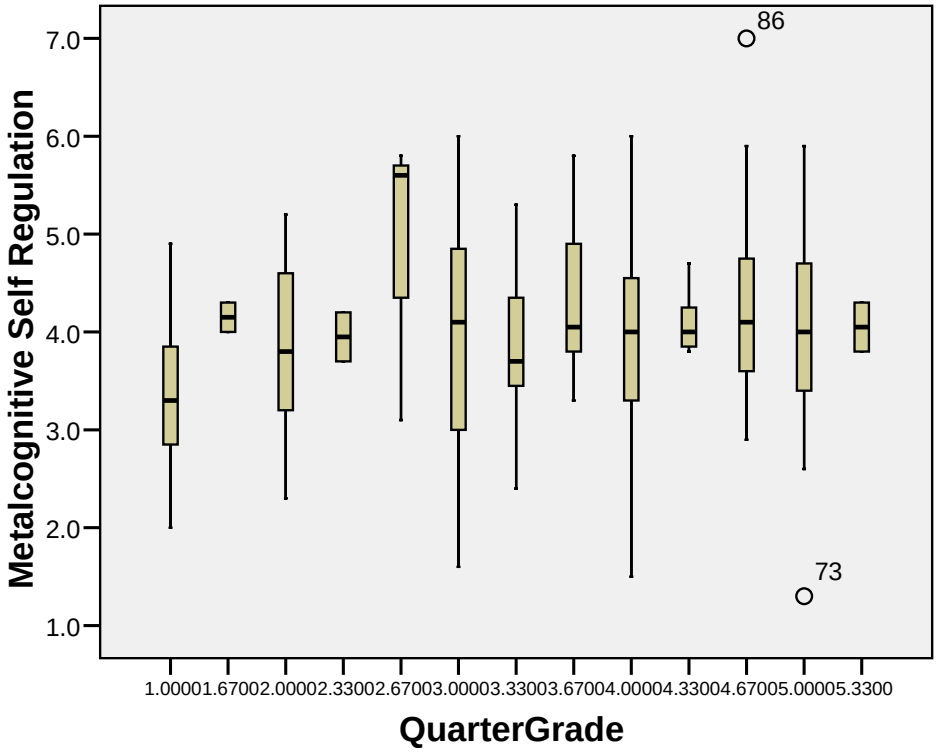
Appendix V

Box Plot for Critical Thinking and Quarter Grade



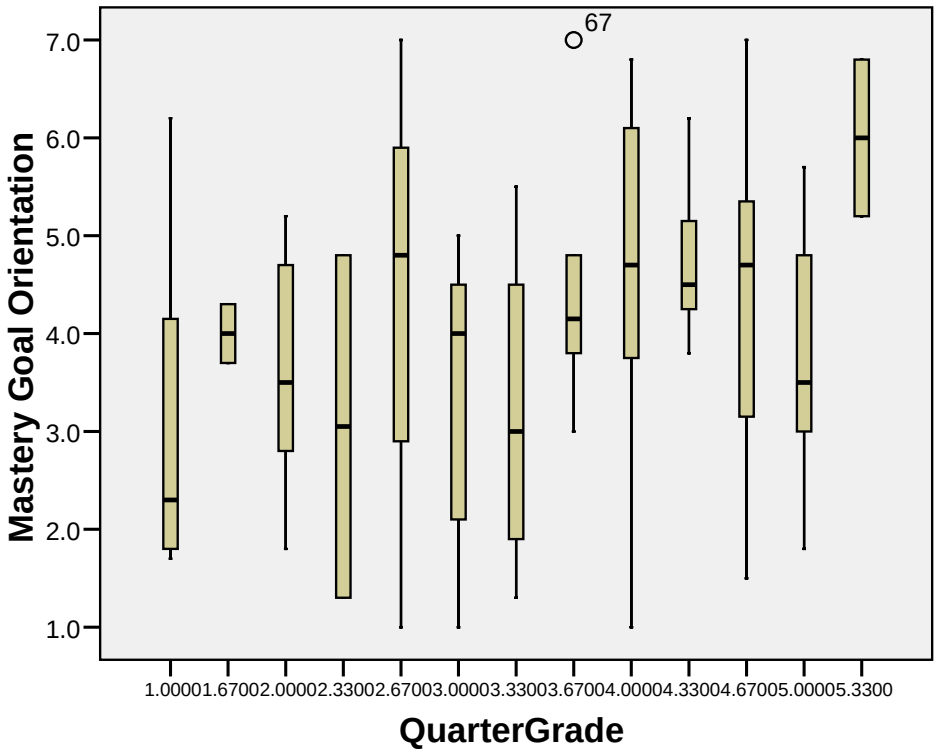
Appendix W

Box plot for Metacognitive Self-Regulation and Quarter Grade



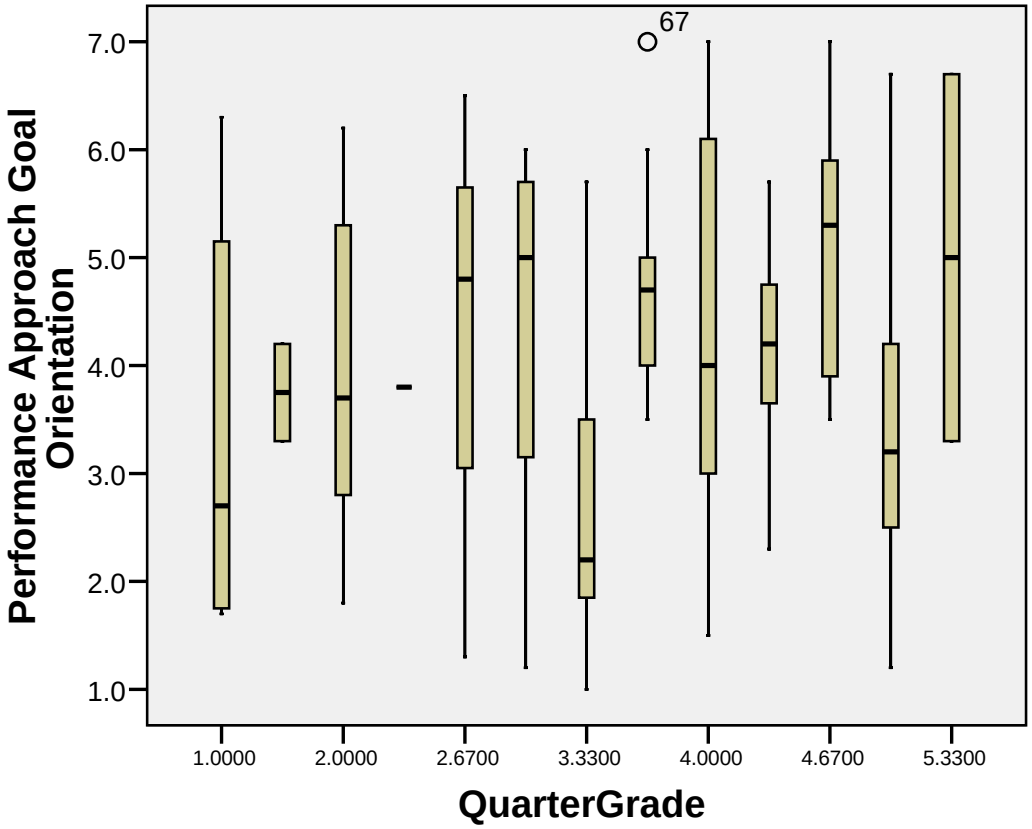
Appendix X

Box plot for Mastery Goal Orientation and Quarter Grade



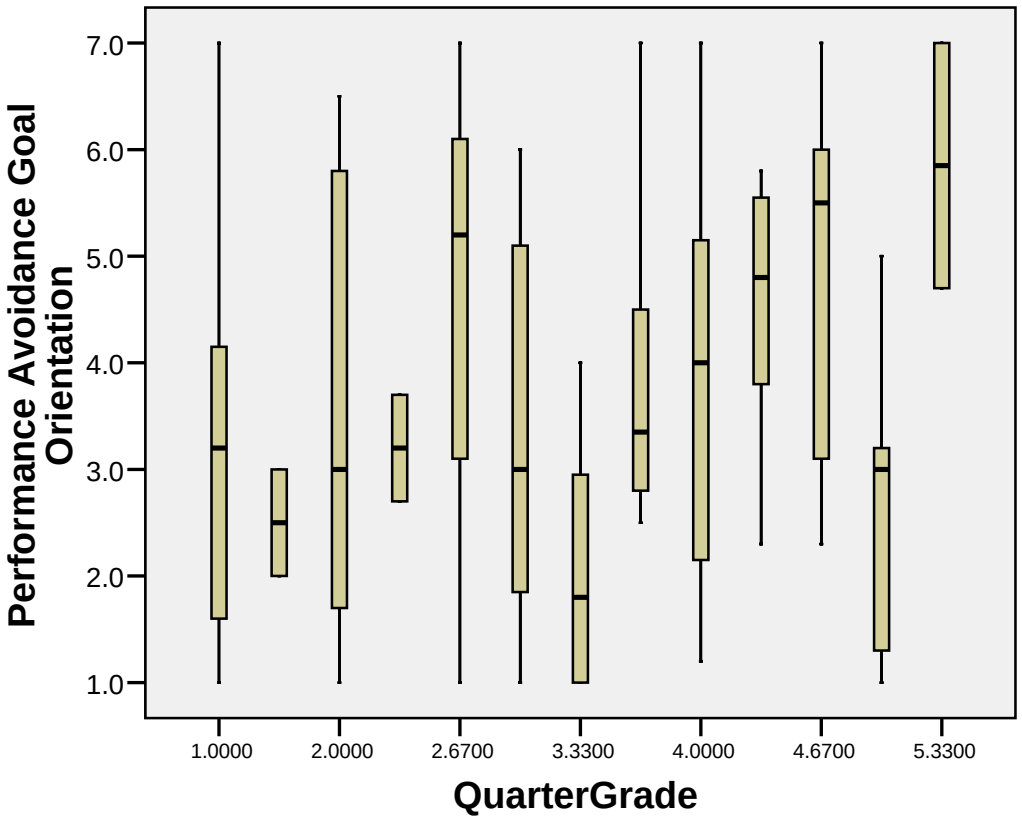
Appendix Y

Box plot for Performance-Approach Goal Orientation and Quarter Grade



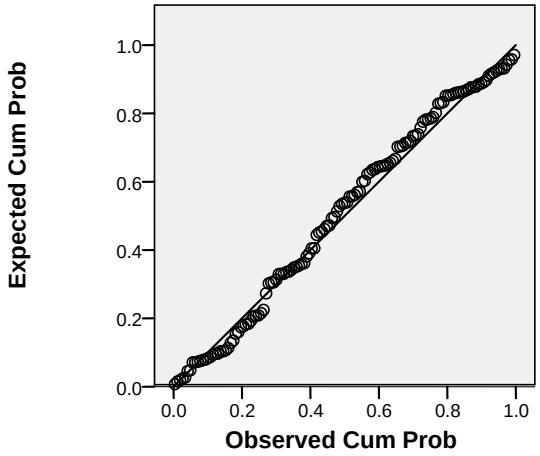
Appendix Z

Box plot for Performance-Avoidance Goal Orientation and Quarter Grade



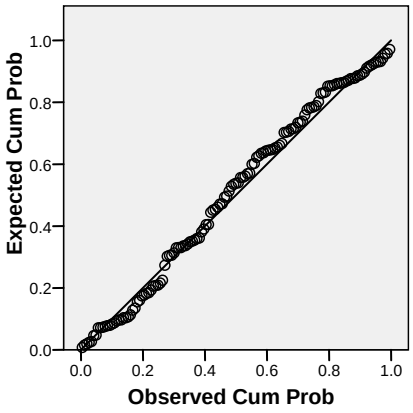
Appendix AA

Question One P-P Plot of Regression Standardized Residual



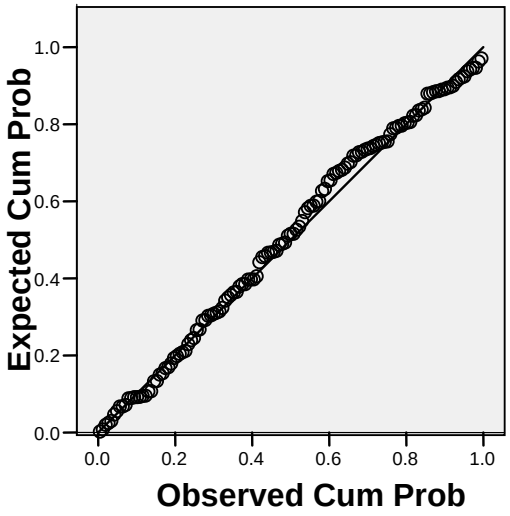
Appendix AB

Question Two P-P Plot of Regression Standardized Residual



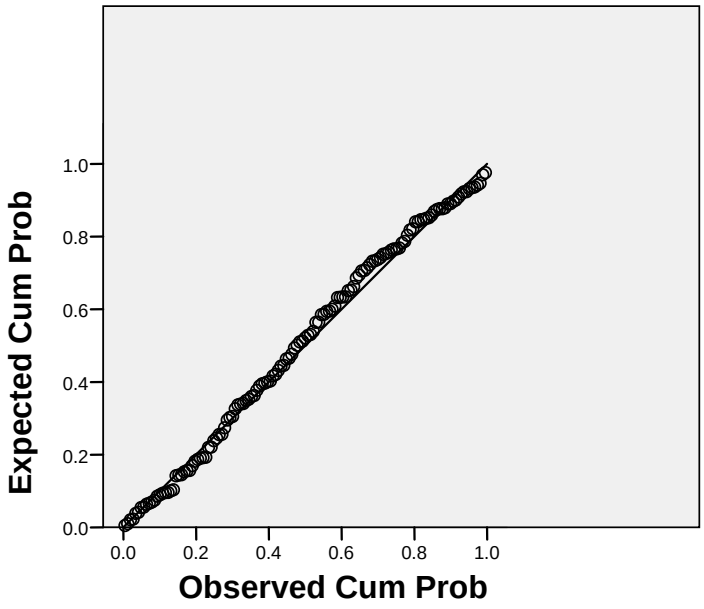
Appendix AC

Question Three P-P Plot of Regression Standardized Residual



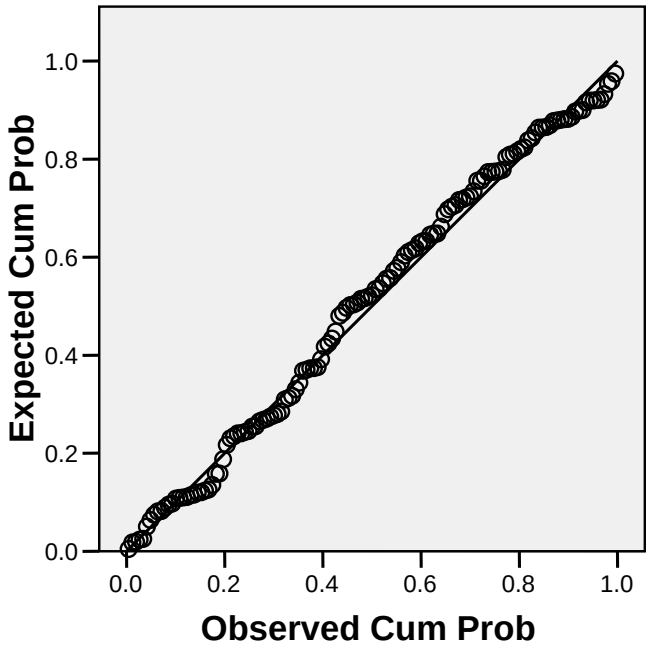
Appendix AD

Question Four P-P Plot of Regression Standardized Residual



Appendix AE

Question Five P-P Plot of Regression Standardized Residual



Appendix AF

Cronbach's Alpha Statistics for Self-Efficacy Sub-Scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.880	.881	8

Item Statistics

	Mean	Std. Deviation	N
QSE1	5.15	1.357	134
QSE2	4.24	1.542	134
QSE3	5.45	1.324	134
QSE4	4.68	1.606	134
QSE5	4.96	1.448	134
QSE6	5.64	1.453	134
QSE7	5.11	1.336	134
QSE8	5.36	1.357	134

Inter-Item Covariance Matrix

	QSE1	QSE2	QSE3	QSE4	QSE5	QSE6	QSE7	QSE8
QSE1	1.842	.731	.782	.920	.968	1.197	.810	1.074
QSE2	.731	2.379	.960	1.468	1.197	.658	1.116	.733
QSE3	.782	.960	1.753	.897	.814	.650	1.055	.831
QSE4	.920	1.468	.897	2.580	1.356	.974	1.179	.920
QSE5	.968	1.197	.814	1.356	2.096	1.182	1.087	.683
QSE6	1.197	.658	.650	.974	1.182	2.111	.965	1.122
QSE7	.810	1.116	1.055	1.179	1.087	.965	1.784	1.042
QSE8	1.074	.733	.831	.920	.683	1.122	1.042	1.841

Appendix AG

Cronbach's Alpha Statistics for Rehearsal Sub-Scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.805	.807	4

Item Statistics

	Mean	Std. Deviation	N
QRS9	4.3704	1.96135	135
QRS10	4.5111	1.70104	135
QRS11	4.6296	1.81922	135
QRS12	4.1556	1.88817	135

Inter-Item Covariance Matrix

	QRS9	QRS10	QRS11	QRS12
QRS9	3.847	2.220	1.892	1.726
QRS10	2.220	2.894	1.519	1.614
QRS11	1.892	1.519	3.310	1.409
QRS12	1.726	1.614	1.409	3.565

Appendix AH

Cronbach's Alpha Statistics for Elaboration Sub-Scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.861	.861	6

Item Statistics

	Mean	Std. Deviation	N
QES13	4.0746	1.75417	134
QES14	4.0149	1.64058	134
QES15	4.5000	1.67130	134
QES16	3.1418	1.74353	134
QES17	4.0224	1.72756	134
QES18	3.9328	1.81555	134

Inter-Item Covariance Matrix

	QES13	QES14	QES15	QES16	QES17	QES18
QES13	3.077	1.480	1.436	1.072	1.464	1.298
QES14	1.480	2.692	1.654	1.464	1.714	1.806
QES15	1.436	1.654	2.793	1.064	1.462	1.628
QES16	1.072	1.464	1.064	3.040	1.410	1.611
QES17	1.464	1.714	1.462	1.410	2.984	2.099
QES18	1.298	1.806	1.628	1.611	2.099	3.296

Appendix AI

Cronbach's Alpha Statistics for Organization Sub-Scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.829	.828	4

Item Statistics

	Mean	Std. Deviation	N
QOS19	3.7926	1.85318	135
QOS20	4.3704	1.74809	135
QOS21	3.2296	1.91981	135
QOS22	3.5926	1.91731	135

Inter-Item Covariance Matrix

	QOS19	QOS20	QOS21	QOS22
QOS19	3.434	1.674	2.503	2.072
QOS20	1.674	3.056	1.370	1.607
QOS21	2.503	1.370	3.686	2.161
QOS22	2.072	1.607	2.161	3.676

Appendix AJ

Cronbach's Alpha Statistics for Critical Thinking Sub-Scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.832	.834	5

Item Statistics

	Mean	Std. Deviation	N
QCT23	4.3407	1.71544	135
QCT24	4.1852	1.66252	135
QCT25	4.1778	1.48559	135
QCT26	4.1481	1.77259	135
QCT27	4.0222	1.67273	135

Inter-Item Covariance Matrix

	QCT23	QCT24	QCT25	QCT26	QCT27
QCT23	2.943	1.608	.917	1.151	1.112
QCT24	1.608	2.764	1.034	1.129	1.526
QCT25	.917	1.034	2.207	1.817	1.615
QCT26	1.151	1.129	1.817	3.142	1.877
QCT27	1.112	1.526	1.615	1.877	2.798

Appendix AK

Cronbach's Alpha Statistics for Metacognitive Cognitive Self-Regulation Sub-Scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.815	.823	12

Item Statistics

	Mean	Std. Deviation	N
QMR28	3.7090	1.99558	134
QMR29	3.4701	1.84631	134
QMR30	4.8881	1.59727	134
QMR31	3.9254	1.74987	134
QMR32	3.7836	1.78280	134
QMR33	4.1716	1.85783	134
QMR34	3.5970	1.78178	134
QMR35	4.0448	1.92672	134
QMR36	4.2239	1.73700	134
QMR37	4.5149	1.72001	134
QMR38	3.8881	1.75431	134
QMR39	4.2761	1.79553	134

Inter-Item Covariance Matrix

	QMR28	QMR29	QMR30	QMR31	QMR32	QMR33	QMR34	QMR35	QMR36	QMR37	QMR38	QMR39
QMR28	3.982	-.381	.554	.256	-.259	-.055	-.389	2.148	-.333	.159	-.040	.021
QMR29	-.381	3.409	.662	1.291	1.561	1.543	1.469	-.766	1.014	.899	1.083	.486
QMR30	.554	.662	2.551	1.240	.878	1.207	.864	.426	.973	1.141	.957	1.287
QMR31	.256	1.291	1.240	3.062	1.841	1.742	1.692	-.170	1.483	1.385	1.368	1.269
QMR32	-.259	1.561	.878	1.841	3.178	1.977	1.694	-.374	1.523	1.067	1.555	1.135
QMR33	-.055	1.543	1.207	1.742	1.977	3.452	1.814	-.384	1.179	1.392	1.877	1.381
QMR34	-.389	1.469	.864	1.692	1.694	1.814	3.175	-1.222	1.271	1.247	1.210	1.075
QMR35	2.148	-.766	.426	-.170	-.374	-.384	-1.222	3.712	-.657	-.016	.005	-.035
QMR36	-.333	1.014	.973	1.483	1.523	1.179	1.271	-.657	3.017	1.688	1.469	.960
QMR37	.159	.899	1.141	1.385	1.067	1.392	1.247	-.016	1.688	2.958	1.404	1.203
QMR38	-.040	1.083	.957	1.368	1.555	1.877	1.210	.005	1.469	1.404	3.078	1.385
QMR39	.021	.486	1.287	1.269	1.135	1.381	1.075	-.035	.960	1.203	1.385	3.224

Appendix AL

Cronbach's Alpha Statistics for Mastery Goal Orientation Sub-Scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.900	.901	6

Item Statistics

	Mean	Std. Deviation	N
QM40	4.1704	1.89871	135
QM41	4.2296	1.80770	135
QM42	3.8741	1.94487	135
QM43	4.5704	1.87895	135
QM44	3.7111	1.76139	135
QM45	3.2741	1.80559	135

Inter-Item Covariance Matrix

	QM40	QM41	QM42	QM43	QM44	QM45
QM40	3.605	2.281	2.313	1.827	1.900	1.714
QM41	2.281	3.268	2.395	2.226	2.149	1.937
QM42	2.313	2.395	3.783	1.945	2.239	1.960
QM43	1.827	2.226	1.945	3.530	2.076	1.499
QM44	1.900	2.149	2.239	2.076	3.102	2.416
QM45	1.714	1.937	1.960	1.499	2.416	3.260

Appendix AM

Cronbach's Alpha Statistics for Performance-Approach Goal Orientation Sub-Scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.896	.898	6

Item Statistics

	Mean	Std. Deviation	N
QPA46	4.1852	2.03765	135
QPA47	3.8815	1.87701	135
QPA48	4.4741	2.02164	135
QPA49	4.3926	1.90481	135
QPA50	3.9778	1.92574	135
QPA51	3.7185	1.99496	135

Inter-Item Covariance Matrix

	QPA46	QPA47	QPA48	QPA49	QPA50	QPA51
QPA46	4.152	1.739	1.897	1.867	1.855	1.500
QPA47	1.739	3.523	2.475	2.159	2.281	2.422
QPA48	1.897	2.475	4.087	2.812	2.526	2.709
QPA49	1.867	2.159	2.812	3.628	2.763	2.417
QPA50	1.855	2.281	2.526	2.763	3.708	2.658
QPA51	1.500	2.422	2.709	2.417	2.658	3.980

Appendix AN

Cronbach's Alpha Statistics for Performance-Avoidance Goal Orientation Sub-Scale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.913	.913	6

Item Statistics

	Mean	Std. Deviation	N
QPV52	4.1716	2.09735	134
QPV53	3.3657	2.07216	134
QPV54	3.6791	2.13669	134
QPV55	3.4104	2.25186	134
QPV56	3.1269	2.00908	134
QPV57	3.6642	2.23420	134

Inter-Item Covariance Matrix

	QPV52	QPV53	QPV54	QPV55	QPV56	QPV57
QPV52	4.399	2.741	3.116	3.132	2.159	2.765
QPV53	2.741	4.294	3.434	3.661	2.495	2.522
QPV54	3.116	3.434	4.565	3.952	2.575	2.613
QPV55	3.132	3.661	3.952	5.071	3.113	2.921
QPV56	2.159	2.495	2.575	3.113	4.036	2.336
QPV57	2.765	2.522	2.613	2.921	2.336	4.992

Appendix AO

Summary of Hierarchical Multiple Regression Statistics for Question One

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.135[a]	.018	.003	.97569	.018	1.228	2	132	.296

a. Predictors: (Constant), Gradelevel, Gender

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.338	2	1.169	1.228	.296[a]
	Residual	125.659	132	.952		
	Total	127.997	134			

a. Predictors: (Constant), Gradelevel, Gender

b. Dependent Variable: StdQuaterGrade

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	.518	.370		1.401	.164			
	Gender	-.269	.175	-.132	-1.531	.128	-.131	-.132	-.132
	Gradelevel	-.027	.076	-.031	-.363	.717	-.029	-.032	-.031

a. Dependent Variable: StdQuaterGrade

Appendix AP

Summary of Hierarchical Multiple Regression Statistics for Question Two

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.135[a]	.018	.003	.97569	.018	1.228	2	132	.296
2	.198[b]	.039	.017	.96899	.021	2.831	1	131	.095

a. Predictors: (Constant), Gradelevel, Gender

b. Predictors: (Constant), Gradelevel, Gender, Self Efficacy

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.338	2	1.169	1.228	.296[a]
	Residual	125.659	132	.952		
	Total	127.997	134			
2	Regression	4.997	3	1.666	1.774	.155[b]
	Residual	123.001	131	.939		
	Total	127.997	134			

a. Predictors: (Constant), Gradelevel, Gender

b. Predictors: (Constant), Gradelevel, Gender, Self Efficacy

c. Dependent Variable: StdQuaterGrade

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	.518	.370		1.401	.164			
	Gender	-.269	.175	-.132	-1.531	.128	-.131	-.132	-.132
	Gradelevel	-.027	.076	-.031	-.363	.717	-.029	-.032	-.031
2	(Constant)	-.253	.587		-.430	.668			
	Gender	-.251	.175	-.123	-1.435	.154	-.131	-.124	-.123
	Gradelevel	-.010	.076	-.011	-.130	.897	-.029	-.011	-.011
	Self Efficacy	.136	.081	.146	1.683	.095	.154	.145	.144

a. Dependent Variable: StdQuaterGrade

Appendix AQ

Summary of Hierarchical Multiple Regression Statistics for Question Three

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.135[a]	.018	.003	.97569	.018	1.228	2	132	.296
2	.238[b]	.056	.004	.97515	.038	1.029	5	127	.403

a. Predictors: (Constant), Gradelevel, Gender

b. Predictors: (Constant), Gradelevel, Gender, Critical Thinking, Rehearsal, Organization, Metalcognitive Self Regulation, Elaboration

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.338	2	1.169	1.228	.296(a)
	Residual	125.659	132	.952		
	Total	127.997	134			
2	Regression	7.232	7	1.033	1.086	.376(b)
	Residual	120.765	127	.951		
	Total	127.997	134			

Predictors: (Constant), Grade level, Gender

b Predictors: (Constant), Grade level, Gender, Critical Thinking, Rehearsal, Organization, Metacognitive Self Regulation, Elaboration

c Dependent Variable: Std Quarter Grade

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	.518	.370		1.401	.164			
	Gender	-.269	.175	-.132	-1.531	.128	-.131	-.132	-.132
	Gradelevel	-.027	.076	-.031	-.363	.717	-.029	-.032	-.031
2	(Constant)	-.111	.594		-.186	.852			
	Gender	-.172	.183	-.085	-.939	.350	-.131	-.083	-.081
	Gradelevel	-.011	.077	-.012	-.137	.891	-.029	-.012	-.012
	Rehearsal	.111	.071	.166	1.569	.119	.169	.138	.135
	Elaboration	-.023	.104	-.031	-.223	.824	.001	-.020	-.019
	Organization	-.064	.086	-.098	-.737	.463	-.001	-.065	-.063
	Critical Thinking	-.080	.102	-.108	-.790	.431	-.010	-.070	-.068
	Metalcognitive Self Regulation	.148	.124	.157	1.195	.234	.100	.105	.103

a. Dependent Variable: StdQuaterGrade

Appendix AR

Summary of Hierarchical Multiple Regression Statistics for Question Four

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.135[a]	.018	.003	.97569	.018	1.228	2	132	.296
2	.186[b]	.034	-.003	.97880	.016	.720	3	129	.542

a. Predictors: (Constant), Gradelevel, Gender

b. Predictors: (Constant), Gradelevel, Gender, Performance Avoidance Goal Orientation, Mastery Goal Orientation, Performance Approach Goal Orientation

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.338	2	1.169	1.228	.296[a]
	Residual	125.659	132	.952		
	Total	127.997	134			
2	Regression	4.408	5	.882	.920	.470[b]
	Residual	123.589	129	.958		
	Total	127.997	134			

a. Predictors: (Constant), Gradelevel, Gender

b. Predictors: (Constant), Gradelevel, Gender, Performance Avoidance Goal Orientation, Mastery Goal Orientation, Performance Approach Goal Orientation

c. Dependent Variable: StdQuaterGrade

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	.518	.370		1.401	.164			
	Gender	-.269	.175	-.132	-1.531	.128	-.131	-.132	-.132
	Gradelevel	-.027	.076	-.031	-.363	.717	-.029	-.032	-.031
2	(Constant)	.212	.494		.430	.668			
	Gender	-.236	.178	-.116	-1.324	.188	-.131	-.116	-.115
	Gradelevel	-.020	.077	-.022	-.254	.800	-.029	-.022	-.022
	Mastery Goal Orientation	.084	.060	.130	1.389	.167	.127	.121	.120
	Performance Approach Goal Orientation	.014	.070	.023	.197	.844	.006	.017	.017
	Performance Avoidance Goal Orientation	-.045	.063	-.081	-.708	.480	-.024	-.062	-.061

a. Dependent Variable: StdQuaterGrade

Appendix AS

Summary of Hierarchical Multiple Regression Statistics for Question Five

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.135[a]	.018	.003	.97569	.018	1.228	2	132	.296
2	.298[b]	.089	.007	.97377	.071	1.058	9	123	.399

a. Predictors: (Constant), Gradelevel, Gender

b. Predictors: (Constant), Gradelevel, Gender, Critical Thinking, Performance Approach Goal Orientation, Rehearsal, Mastery Goal Orientation, Self Efficacy, Organization, Performance Avoidance Goal Orientation, Metalcognitive Self Regulation, Elaboration

ANOVA[c]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.338	2	1.169	1.228	.296[a]
	Residual	125.659	132	.952		
	Total	127.997	134			
2	Regression	11.364	11	1.033	1.089	.375[b]
	Residual	116.633	123	.948		
	Total	127.997	134			

a. Predictors: (Constant), Gradelevel, Gender

b. Predictors: (Constant), Gradelevel, Gender, Critical Thinking, Performance Approach Goal Orientation, Rehearsal, Mastery Goal Orientation, Self Efficacy, Organization, Performance Avoidance Goal Orientation, Metalcognitive Self Regulation, Elaboration

c. Dependent Variable: StdQuaterGrade

Appendix AS (continued)

Summary of Hierarchical Multiple Regression Statistics for Question Five

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations		
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part
1	(Constant)	.518	.370		1.401	.164			
	Gender	-.269	.175	-.132	-1.531	.128	-.131	-.132	-.132
	Gradelevel	-.027	.076	-.031	-.363	.717	-.029	-.032	-.031
2	(Constant)	-.516	.655		-.787	.433			
	Gender	-.169	.185	-.083	-.909	.365	-.131	-.082	-.078
	Gradelevel	-.004	.077	-.004	-.046	.963	-.029	-.004	-.004
	Mastery Goal Orientation	.080	.075	.124	1.066	.289	.127	.096	.092
	Performance Approach Goal Orientation	.014	.070	.023	.201	.841	.006	.018	.017
	Performance Avoidance Goal Orientation	-.064	.065	-.117	-.993	.323	-.024	-.089	-.085
	Self Efficacy	.164	.103	.175	1.593	.114	.154	.142	.137
	Rehearsal	.097	.074	.146	1.305	.194	.169	.117	.112
	Elaboration	-.036	.108	-.049	-.337	.737	.001	-.030	-.029
	Organization	-.061	.087	-.094	-.706	.482	-.001	-.064	-.061
	Critical Thinking	-.109	.105	-.147	-1.046	.298	-.010	-.094	-.090
	Metalcognitive Self Regulation	.056	.135	.059	.416	.678	.100	.037	.036

a. Dependent Variable: StdQuaterGrade