THE RELATIONSHIP BETWEEN PARENTAL INVOLVEMENT, SELF-REGULATED LEARNING, AND READING ACHIEVEMENT OF FIFTH GRADERS: A PATH ANALYSIS USING THE ECLS-K DATABASE

A Dissertation

Presented to

The Graduate Faculty of The University of Akron

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

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August, 2008

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ABSTRACT

This dissertation examined the relationship between parental involvement, selfregulated learning (SRL), and reading achievement of fifth graders using an archival data research design. Through a path analysis of the fifth grade data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K), this dissertation identified six dimensions of parental involvement that are likely to foster SRL of fifth graders: School Involvement, TV Rules, Homework Help, Homework Frequency, Parental Education Expectations, and Extracurricular Activities. Of them, three dimensions, Parental Education Expectations, School Involvement, and Homework Help, were found to have stronger effect on SRL; *Parental Education Expectations* was found to have the strongest beneficial effect on SRL. In addition, the results of this dissertation demonstrate that both School Involvement and Parental Education Expectations have the same strongest effect on fifth graders' reading achievement. Finally, the dissertation found that SRL mediates the relationship between parental involvement and reading achievement. These results provide a framework for educators and policymakers to engage parents more effectively in their children's education process by helping parents to promote their children's SRL.

ACKNOWLEDGEMENTS

I wish to express my deepest gratitude and appreciation to my advisor, Dr. Susan Kushner Benson, for mentoring, developing, and supporting me to be the best I can be as an educational researcher. I wish to thank my co-advisor, Dr. Renee Mudrey-Camino, for her guidance and inspiration along my dissertation journey. I am grateful to Dr. Richard Steiner, Dr. Sandra Spickard Prettyman, and Dr. Sharon Kruse for guiding me through my coursework and dissertation process. Finally, I wish to thank my parents and my husband for their love, sacrifice, and support; I want to thank my family and E-Docs friends for their encouragement.

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CHAPTER I

INTRODUCTION

Researchers in the field of self-regulated learning (SRL) emphasize that students are more effective when they take a purposeful role in their own learning. Self-regulated learners are autonomous, reflective, and efficient learners who have developed positive attitudes about their learning process (Grolnick, Kurowski, & Gurland, 1999; Martinez-Pons, 2002; Puustinen & Pulkkinen, 2001; Zimmerman, 2002). Unfortunately, not all children acquire a high level of self-regulation, perhaps because traditional instructional practices do little to encourage these self-directed behaviors (Ormrod, 2006; Zimmerman, 2002; Zimmerman, Bonner, & Kovach, 1996). Despite the increased efforts to accommodate individual differences in learning (e.g., ethnicity, language, learning style, learning difficulty, disability) and provide students with opportunities to succeed, some students still fall short. According to Zimmerman (2002), it is possible that teachers' accommodation and assistance could actually be undermining students' self-regulatory development.

While current teaching practices may be not sufficient for promoting SRL, recent research has discovered the impact of the "social origins" of SRL and the essential role that parents and peers play in helping children to assume personal initiative, responsibility, and control for their own learning (Schunk & Zimmerman, 1997; Zimmerman, 2000). It is therefore critical to examine the impact of the broad society on children's learning and development beyond the limited school hours. In "*Self-regulation: Directions and challenges for future research*," Zeidner, Boekaerts, and Pintrich (2000) identified a need for further exploring interactions between environment and selfregulation. As such, the focus of the current study was on the interaction between one environmental factor, parental involvement, and self-regulated learning. The dissertation study was conducted by analyzing data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K).

Self-Regulated Learning

SRL describes learners who are more mastery-oriented and tend to understand better their own learning process; therefore, they appear to be more self-motivated, strategic, and effective (Zimmerman, 1990). Many definitions have been developed to describe such self-regulated learners. The common conceptualization of SRL is: learners are self-regulated if they are "metacognitively, motivationally, and behaviorally active participants in their own learning" (Zimmerman, 1990, p. 4). Detailed definitions differ depending upon the theoretical perspectives from which they are derived. According to Social Cognitive Theory, SRL is defined in terms of the self-directive processes by which "learners control their thoughts, feelings, and actions" in order to attain goals (Zimmerman & Schunk, 2001, p. vii).

The interest in self-regulation has its roots in many learning theories, and all these theories are complementary in explaining the development of self-regulation. The lens of the current dissertation is mainly Social Cognitive Theory (Bandura, 1986) because of its utility in explaining the impact of social environment on children's self-regulatory development. According to Social Cognitive Theory, social cognition or learning is an interaction effect of three sets of factors: self, behavior, and social environment. This interdependence among the three types of factors is known as triadic reciprocal causation (Bandura, 1986, 1989), which sets the theoretical foundation for social cognitive models of SRL. The two prominent models of SRL derived from Social Cognitive Theory are Zimmerman's *Social Cognitive Model of Self-Regulation* and Pintrich's *General Framework for Self-Regulated Learning*. Both models explain the structure and function of SRL processes and will be discussed further in the following section.

According to Zimmerman's *Social Cognitive Model of Self-Regulation*, SRL is composed of three phases: forethought, performance, and self-reflection; each of the phases includes several-regulatory processes. The first phase, *forethought*, includes the processes of task analysis and self-motivational beliefs. The second phase, *performance*, contains self-control and self-observation processes. The third phase, *self-reflection*, consists of self-judgment and self-reaction processes. The results of the self-reflection phase feed back into the forethought phase. The three phases of forethought, performance, and self-reflection constitute what Zimmerman identifies as the "feedback loop" or selfregulatory cycle. Self-regulation phases are cyclical because self-reflection on current actions affects subsequent effort (Zimmerman, 1998, 2000, 2002; Zimmerman & Bandura, 1994).

In addition to explaining the structure and function of SRL processes, Zimmerman and his colleagues have also analyzed the process of developing self-regulatory competency by categorizing it into four levels: *observation* (i.e., observing the model's

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use of a skill), *emulation* (i.e., imitating the use of a skill), *self-control* (i.e., internalizing the use of a skill), and *self-regulation* (i.e., adaptive and independent use of a skill) (Schunk & Zimmerman, 1997; Zimmerman, 2000).

Another model that has profound influence on current investigations of SRL is Pintrich's *General Framework for Self-regulated learning* (Pintrich, 2000). According to this model, SRL includes four phases that cut across four functional/context areas. The four phases of SRL are: forethought, planning, and activation; monitoring; control; and reaction and reflection. The four areas of the self-regulatory system include cognition, motivation/affect, behavior, and context. Self-regulation phases constitute a cyclical loop because evaluations of each area affect subsequent adjustment and adaptation in Phase 1 (*forethought, planning, and activation*). In addition, these individual phases are not necessarily linear-structured. "Monitoring, control, and reaction can be ongoing simultaneously and dynamically as one progresses through the task, with the goals and plans being changed or updated based on the feedback from the monitoring, control, and reaction processes" (p. 455).

The models of Zimmerman and Pintrich are similar in terms of their theoretical origin and elements included. Both models have been derived from Social Cognitive Theory. Both models include similar phases and sub-processes, and the only difference between the models is that the phases of monitoring and control in Pintrich's model are combined into one performance phase in Zimmerman's model. Although the two models resemble each other and are both influential, the current study was based mainly upon Zimmerman's model because it is better aligned with the data used for the current study. The data assesses the phases/processes of SRL as demonstrated in Zimmerman's model

but do not provide details regarding the areas of regulation as represented in Pintrich's model. Furthermore, Zimmerman's four-level sequential formulation of developing self-regulatory competence, as discussed earlier, provides a more explicit rationale for studying the impact of social environments, such as parental involvement, on SRL of children.

Parental Influences on SRL

Parental involvement in education has been found to be a multidimensional concept and takes many forms: parental expectations for children's educational attainment, parental involvement in homework, cognitive stimulation activities at home, parent-child communication (about school, friends, and health-risk behaviors), and participation in school and community activities (Epstein, 1995; Fan & Chen, 2001; Hoover-Dempsey & Sandler, 1995, 1997; Hoover-Dempsey & Sandler, 2005; Timothy Z. Keith & et al., 1993; Reynolds & Clements, 2005; Sheldon & Epstein, 2005; Walker, Wilkins, Dallaire, Sandler, & Hoover-Dempsey, 2005). Some dimensions of parental involvement have been suggested to be associated with children's academic achievement (Coleman et al., 1968; Fan & Chen, 2001; Timothy Z. Keith et al., 1998; Reynolds & Clements, 2005). Because of the positive correlation between SRL and academic achievement, it is reasonable to expect that these parental involvement variables are potential factors affecting children's SRL development. It is unclear whether certain dimensions of parental involvement are more likely to be associated with SRL and thus are more effective than others in fostering children's self-regulated learning. Therefore, identifying parental involvement dimensions that are more effective in fostering children's SRL would be important to both education researchers and practitioners. Research also

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indicates that parental involvement may affect student academic achievement indirectly through influencing their SRL. Therefore, it is possible that SRL mediates the relationship between parental involvement and student academic achievement. However, empirical evidence concerning this mediational hypothesis has been mixed (Grolnick & Slowiaczek, 1994; Hoover-Dempsey & Sandler, 2005; Martinez-Pons, 1996). The parental involvement variables used in this study include seven dimensions: parent-child communication, school involvement, TV viewing rules, homework help, homework frequency, parental education expectations, and extracurricular activities. In this study, parental involvement was studied in relationship to SRL as well as reading achievement, which is discussed in the next section.

Reading Achievement

Reading achievement is defined as knowledge and skills in language and literacy. Recent research reveals that reading achievement/comprehension can be measured in terms of product, process, or both (Myers, 1991). In this study, reading achievement is assessed in terms of the product of children's reading achievement.

Previous research suggests that reading achievement or comprehension is determined by a number of factors, including reading amount and motivation variables (Guthrie, Wigfield, Metsala, & Cox, 1999). As a related concept of motivation, SRL may contribute to reading achievement (Souvignier & Mokhlesgerami, 2006).

With regard to SRL across the age spectrum, elementary children, including fifth graders, have been less adequately studied. In the next section, the rationale for studying SRL of fifth graders will be provided.

Self-Regulated Learning of Fifth Graders

The participants in SRL studies are often college and postsecondary students (Zeidner et al., 2000). This is probably due to concerns that young children are not developmentally ready to self-regulate, such as attending to models or persisting at a task (Bandura, 1986). Recent research indicates that fifth graders can be more effectively engaged in self-regulated learning than students in earlier grades (Marsh, 1986; Zimmerman & Martinez-Pons, 1990). According to Ormrod (2006), children at grade levels three through five have demonstrated improved competency in using self-control (such as attention control) and self-evaluation processes/strategies and can work on short assignments independently; other processes, such as self-motivation, planning, and longrange goal setting, are highly metacognitive and emerge later in middle school and high school years but can emerge earlier through such methods as scaffolding and guided learning. The inadequate understanding of the development of SRL for elementary children leads to the present investigation on SRL of fifth graders. In addition, Marsh (1986) suggested that children used their parents as primary sources of academic assistance before eighth grade, indicating that it is particularly appropriate to study the relationship between parental involvement and SRL with fifth graders.

Purpose and Rationale

The purpose of this research was to examine the potential effects of specific dimensions of parental involvement on self-regulated learning and reading achievement of fifth graders, as well as to determine if self-regulated learning mediates the relationship between parental involvement and student reading achievement. This study utilized the method of archival data research by analyzing data from the ECLS-K. Specifically, a path analysis was conducted to (a) identify the dimensions of parental involvement that are more likely to be effective in fostering SRL and (b) test the path by which parental involvement affects SRL and, in turn, student reading achievement.

The ECLS-K database is particularly suited for the current study because it includes specific measures on the variables of interest: parental involvement dimensions, SRL, and reading achievement. It is also the most recent nationally representative data appropriate for this study.

Using data from the ECLS-K has the following advantages. First, gathering data on various dimensions of parenting behavior by the ECLS-K allows the researcher to explore the relative contribution of each dimension of parental involvement to SRL and reading achievement. Second, the ECLS-K utilized large samples, which enhances the external validity (the generalizability of the results) of the current study. Finally, there is strong evidence on the validity and reliability of the data collection instruments. A common dilemma in using existing databases is data limitations. How can new research questions be answered by old data that were not collected to address them? The challenge "is to devise research questions that can be addressed by the database. In this sense, data shape the agenda by defining what is and is not possible" (Elder, Pavalko, & Clipp, 1993, p. 21). The ECLS-K data shape this study's agenda in terms of what data are available to measure the variables of interest. For example, the ECLS-K provides a combined measure of three of the SRL processes in Zimmerman's model: self-motivation, self-

control, and self-reaction/evaluation. This combined measure of SRL was used in the current study.

Significance of the Study

This study addresses gaps in previous research pertaining to the interactions between parental involvement and self-regulated learning, and the results of the study have both theoretical and practical implications.

First, the results of the study increase our understanding of what dimensions of parental involvement are effective in promoting children's SRL and reading achievement. The results also provide insights into the mechanism by which parental involvement practices affect student academic achievement: parental involvement affects students' reading achievement through influencing their SRL efforts.

Second, as encouraging parental involvement has been increasingly required in various federal and state education programs in the United States, identifying what parental involvement practices are effective in promoting student outcomes has become an important policy issue. The findings of the study may inform and guide educators and policymakers as they create effective education programs to facilitate student learning and school improvement. For example, the education programs could include a component that involves offering parents training and information regarding how to help their children self-regulate and achieve. Therefore, the findings may not only provide parents with concrete guidelines to promote children's SRL and academic achievement but also insights for schools and organizations in supporting parental involvement practices that are critical in increasing SRL and student reading achievement.

Delimitations

Two things regarding the operational measure of SRL are worth mentioning. First, the data captured only some of the SRL strategies/processes demonstrated by children of fifth-grade age (e.g., self-motivation, self-control, and self-reaction/evaluation). Second, it is important to bear in mind that the data assesses SRL as the aptitude for using SRL processes rather than the dynamic event of SRL given the use of survey instrument to measure SRL.

Limitation

One limitation relates to the correlation nature of this study. The study tried to approximate the causal effects of parental involvement on SRL and reading achievement by using path analysis with large-scale observational data, but the causal effects of parental involvement can be discovered only through using experimental or quasiexperimental designs.

Definition of Terms

Definitions of three general terms and nine key variables used in the current study are provided as follows:

1. <u>Archival data research.</u> One type of secondary analysis that involves reanalyzing data collected by others to answer new research questions (Elder et al., 1993).

2. <u>The ECLS-K</u>. The Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K) is the first longitudinal study that collects information on children's early schooling experience through following a nationally representative

sample of children from kindergarten through eighth grade. The ECLS-K is sponsored by the U.S. Department of Education, National Center for Education Statistics (NCES).

3. <u>Path analysis</u>. A statistical method used to test causal relationships between a number of observed variables.

4. <u>Parent-child communication</u>. Parent-child conversations initiated by parents; it is measured by an average score of five items regarding the frequency of parent-child conversations about friends, sex, alcoholic beverage, smoking, and drugs.

5. <u>School involvement</u>. Parent participation in school events and activities; it is an average score of seven items about whether parents are involved in school activities during the fifth grade school year.

<u>Television viewing rules</u>. Family rules set by parents for restricting TV viewing;
 it is an average score of two items about whether parents have family rules restricting
 children's TV watching.

7. <u>Homework help</u>. It is an average score of two items about how often parents help the child with his/her math and reading homework

8. <u>Homework Frequency.</u> It is measured by one item about how often the child does homework.

9. <u>Parental education expectations</u>. The expectations, values, and standards that parents have on their children's education; it is measured by one item about "how far parents realistically expect a child to go in school."

10. <u>Extracurricular activities</u>. Educational activities that are not part of the academic curriculum, usually sponsored by and held at school, such as sports and drama;

it is an average score of five items regarding whether the child participates in specific types of extracurricular activities.

11. <u>Self-regulated learning</u>. Students' general aptitude for using self-directive processes to control their thoughts, feelings, and actions in order to achieve academically (Zimmerman & Schunk, 2001); it is measured by the ECLS-K variable T6LEARN, which is an average score of the seven items on the Approaches to Learning scale.

12. <u>Reading achievement</u>. Competence in language and literacy as assessed by the ECLS-K variable, C6R3RSCL, which is the reading IRT scale score and product measure of reading competence.

CHAPTER II

REVIEW OF LITERATURE

This chapter addresses theoretical and methodological issues to provide a basis for the current study. In the first section, self-regulated learning (SRL) is defined and two social cognitive models of SRL are presented and compared. In the second section, the method of archival data research and the database, the Early Childhood Longitudinal Study: Kindergarten Class of 1998-1999 (ECLS-K), are discussed. In the third section, parental influences on SRL and academic achievement are reviewed. The fourth section concerns how reading achievement is defined and measured. The fifth section provides the rationale for studying SRL of fifth graders. Finally, this chapter concludes with three research questions that are the focus of the study.

Self-Regulated Learning

SRL, also known as academic self-regulation, has attracted more research attention since the late 1970s and 1980s. According to Zimmerman (1990), SRL describes learners who are more mastery-oriented and tend to understand better their own learning process. Such learners assume initiative and responsibility for their own learning and appear to be self-motivated, strategic, and effective; they also tend to attribute failure to lack of effort or strategies; therefore, they are more motivated to improve through expending more effort and attempting different learning strategies in the face of failure. In contrast, less self-regulated learners would typically show a lack of interest and strategies in learning. They avoid seeking help and become defensive regarding their lack of learning strategies because they tend to attribute failure to their personal limitations in intelligence and abilities. Thus, they often rely on instructions or accommodations of others to help them acquire knowledge and skills. In the next section, the definition of SRL will be provided.

Defining Self-Regulated Learning

Many definitions have been developed to describe this personal quality of SRL. The common conceptualization of SRL is: learners are self-regulated if they are "metacognitively, motivationally, and behaviorally active participants in their own learning" (Zimmerman, 1990, p. 4). Contemporary definitions of SRL also share the feature of depicting it in terms of cyclical processes or a feedback loop in which learners set goals, self-control and monitor their learning effectiveness, react to this feedback on learning effectiveness, and reset goals or revise learning strategies in subsequent effort (Zeidner et al., 2000; Zimmerman, 1990). Finally, motivation and learning are treated as two integrated components of SRL in most contemporary definitions. Detailed definitions differ depending upon the theoretical perspectives from which they are derived. According to Social Cognitive Theory, SRL is defined in terms of the self-directive processes by which "learners control their thoughts, feelings, and actions" in order to attain goals (Zimmerman & Schunk, 2001, p. vii).

Social cognitive definitions of SRL share the following four characteristics. First, SRL differs from personal abilities or attributes and consists of processes of utilizing personal abilities and attributes to achieve learning goals. To support this view of SRL, it has been found that SRL makes a distinctive contribution to academic achievement in addition to students' general abilities (Schunk & Zimmerman, 1997; Zimmerman & Bandura, 1994; Zimmerman & Martinez-Pons, 1986, 1988). Second, SRL is not a personal attribute that learners either possess or lack. It is a matter of degree that learners vary on utilizing SRL processes. Next, SRL is not necessarily a solitary or discovery type of learning and includes social learning. Seeking help is an important SRL strategy and is an indication of initiative and self-directedness during learning processes (Zimmerman, 2002). Finally, social cognitive theorists believe that SRL is situation or domain specific (Boekaerts, 1997; Pintrich, 2004; Schunk, 2001). It consists of temporarily orchestrated processes to perform a task, and SRL strategies may not automatically transfer across areas/domains. For example, a student may be more strategic and effective in solving math problems but may not show the same degree of self-directedness while working on writing. This example is supported by empirical evidence that demonstrates students' motivation and strategies vary for different courses (VanderStoep et al., 1996; Wolters and Pintrich, 1998). The domain specific feature of SRL suggests a need to pay attention to the empirical measure of SRL. It may not be appropriate to measure SRL in general, such as self-regulation in college learning. Ideally, SRL should be measured with respect to a specific learning task. In terms of utility and practical applications, it is a good compromise to measure SRL at the subject level (Pintrich, 2004; VanderStoep & Pintrich, 1996), such as measuring SRL in math, reading, or science. In addition, since SRL strategies may not be automatically transferable across contexts, one area of SRL research focuses on the mechanisms of transfer. While the role of transfer is not the emphasis of the current study, this area of research attempts to recognize common

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features between situations and to understand the value of a skill and strategy in different contexts (Boekaerts, 1999; Zeidner et al., 2000).

SRL is important because it not only helps students succeed today by integrating motivation and strategic learning into one process of effective learning, but also leads to success in various work settings in the future (Zimmerman, 2002). Despite the increasing awareness of the importance of SRL to student academic life, our current practices of teaching and learning are not oriented toward preparing students to learn on their own; many students still lack this personal quality to self-discipline and to learn effectively (Zimmerman, 2002). As such, fostering SRL of students has become an important issue for researchers, educators, and policymakers; and one of the purposes of schooling should be to teach students to learn on their own. In the next section, Social Cognitive Theory and its related theories will be discussed because they constitute theoretical foundations for social cognitive models of SRL.

Theoretical Foundations of Social Cognitive Models of SRL

The interest in self-regulation has its roots in many theoretical perspectives, including psychoanalysis, phenomenology, operant behaviorism, constructivism (cognitive constructivism and social constructivism), information processing theory, and Social Cognitive Theory (Bronson, 2000; McCombs, 2001). Although all these theories are complementary in explaining the development of self-regulation, the lens of the current dissertation is mainly Social Cognitive Theory (Bandura, 1986). Social Cognitive Theory looks at social influences on children's self-regulatory development and has the utility to explain the role of social influences (e.g., parents, teachers, and peers) in fostering children's self-regulatory development (Martinez-Pons, 2002). The adoption of the social cognitive view of SRL does not exclude other theoretical perspectives because Social Cognitive Theory has drawn heavily from other theories, such as Behavioral Learning Theory and Social Cultural Theory. In the following section, Social Cognitive Theory is compared with these two theories; then triadic reciprocal causation, the most significant component of Social Cognitive Theory, will be discussed because it is the foundation for social cognitive models of SRL.

Social Cognitive Theory draws heavily from Behavioral Learning Theory. Both the Behavioral Learning and the Social Cognitive Theories recognize the importance of environment in children's self-regulatory development. Social cognitive theorists adopt some of the behavioral learning methods, such as the use of rewards in training SRL strategies. In addition, Social Cognitive Theory differs from Behavioral Learning Theory in a number of ways. For example: Behavioral Learning Theory places an emphasis on the dominant shaping role of environment, whereas Social Cognitive Theory stresses observation and cognition as the filter to the environmental influences on self-regulation (Zimmerman, 2001).

Social Cognitive Theory also relates closely to Social Cultural Theory. Both social cultural and social cognitive theorists embrace the same view of "social origins of self-regulation" and view students' development of self-regulation as an achievement of socialization processes (Ormrod, 2006; Zimmerman & Martinez-Pons, 1990). The only difference between the two theoretical perspectives is the aspect of the social environment they address in acquiring self-regulatory competency. According to the Social Cultural Theory, self-regulatory skills are developed in a social cultural context with support from adults and more capable peers within children's zone of proximal

development; language and culture are mediators through which individuals interact with more competent others (Vygotsky, 1962, 1978). Social cognitive theorists further stress the significance of various types of social supports and feedback (e.g., instruction, feedback, modeling, and rewarding) in children's self-regulatory development (Martinez-Pons, 1996, 2002; Zimmerman, 2000). They believe that the method of social learning has advantages over discovery learning because having expert models available makes learning more efficient and effective, and that a lack of social learning experiences is likely to lead to dysfunctions in self-regulation because many forms of self-regulation are difficult to learn without modeling (Pressley, 1995; Zimmerman, 2000). In the two paragraphs that follow, the triadic reciprocal causation upon which social cognitive models of SRL based will be explained.

According to Social Cognitive Theory, social cognition or learning is an interaction effect of three sets of factors: self, behavior, and social environment. This interdependence among the three types of factors is known as triadic reciprocal causation (Bandura, 1986, 1989). As adapted from Ormrod (2006), Figure 2.1 illustrates the interaction effects between the three set of factors.



Figure 2.1 Personal, behavioral, and environmental variables mutually influence one another. Cited in Ormrod (2006).

According to the triadic reciprocal causation, a student's SRL effort is determined by all the three sets of factors: personal processes (such as self-efficacy and motivation), environmental factors (such as seeking teacher or parental assistance to optimize academic context), and behaviors (such as academic achievement or other outcomes of effort). For example, a student Ben's response to a spelling task is determined by his or her perceived efficacy for spelling (*personal processes*), encouragement from teachers (*environmental factors*), and enactive outcomes, such as success in previous spelling tasks (*behaviors*). The two prominent models of SRL derived from the Social Cognitive Theory are Zimmerman's *Social Cognitive Model of Self-Regulation* and Pintrich's *General Framework for Self-Regulated Learning*. Both models explain the structure and function of SRL processes and will be discussed further in the following.

Zimmerman's Social Cognitive Model of Self-Regulation

According to Zimmerman's *Social Cognitive Model of Self-Regulation*, the event of self-regulation consists of three cyclical phases: forethought, performance, and self-reflection. Each of the phases includes several self-regulatory processes. Figure 2.2 illustrates the phases and processes in Zimmerman's social cognitive model.

As shown in Figure 2.2, the first phase of SRL is forethought, which happens before task implementation and includes the processes of task analysis and self-motivational beliefs, such as goal setting, strategic planning, and outcome expectations. The second phase is performance, which is the actual task implementation and contains self-control and self-observation processes, such as attention focusing, task strategies, and self recording/monitoring. The third phase is self-reflection, which occurs after task implementation and is oriented toward adaptation to future tasks. The self-reflection



Figure 2.2 Phases and Subprocesses of Self-Regulation. From Zimmerman (2002).

phase consists of self-judgment and self-reaction processes, such as self-evaluation, selfaffect, and adaptive help-seeking. The results of the self-reflection phase feed back into the forethought phase. The three phases of forethought, performance, and self-reflection constitute what Zimmerman identifies as the "feedback loop" or self-regulatory cycle. The cyclical view of SRL is supported by high correlations among the uses of forethought, performance, and self-reflection phases (Cleary, Zimmerman, & Keating, 2006; Zimmerman & Kitsantas, 1997, 1999). Self-regulation phases are cyclical because self-reflection on current actions affects subsequent effort (Zimmerman, 1998, 2000, 2002; Zimmerman & Bandura, 1994). The following is a hypothetical case, which uses the aforementioned student, Ben, to illustrate Zimmerman's model of self-regulated learning. According to Zimmerman's model, to be characterized as self-regulated, Ben would proceed in the following manner when facing the task of preparing for a reading test. He would first set a learning goal and plan on what to study for the test. For example, he would review text and notes, followed by reviewing previous reading assignments. He would manage his study time, find a quiet place to study, and seek help if necessary. After the test, he would reflect upon his performance to determine different strategies and role of effort in future test performance. A self-regulated learner in reality may not necessarily demonstrate all the self-regulatory processes (e.g., goal-setting, planning, and reflection) as outlined in the previous example as these processes are dependent on the learner's SRL competency as well as the task at hand. Not all tasks need conscious self-regulation effort.

Developing self-regulatory competency. In addition to explaining the structure and function of SRL processes, Zimmerman and his colleagues have also described the process by which learners acquire their capacity to SRL (Schunk & Zimmerman, 1997; Zimmerman, 2000). Specifically, individuals develop their self-regulatory competency through the following four levels of proficiency: *observation* (i.e., observing the model's use of a skill), *emulation* (i.e., imitating the use of a skill), *self-control* (i.e., internalizing the use of a skill), and *self-regulation* (i.e., adaptive and independent use of a skill). In other words, self-regulatory skills are developed in a hierarchical sequence by which a learner observes the model, emulates the model, self-controls, and self-regulates the use of the skills. Although the goal is to achieve independence in using SRL skills, various types of social supports (e.g., modeling, verbal feedback, and encouragement) are needed to facilitate this observational learning process. For example, Zimmerman and Kitsantas (1997) suggested that 9th and 10th graders still need social guidance at their initial stages of learning a complex motoric skill. Social support is reduced during the last two levels but is still necessary.

To test the validity of this four-level sequential formulation of self-regulatory development, two studies on the progression of writing were conducted with high school students, which verified the sequential advantages of engaging in the four levels of learning. The first study suggested that students who shifted from process goals (*selfcontrol*) to outcome goals (*self-regulation*) after mastering the revision technique outperformed those who stayed on process goals or outcome goals (Zimmerman & Kitsantas, 1999). The second study indicated that students performed better if they were involved in observational learning (*observation*) before actually performing a learning task (*emulation*) (Zimmerman & Kitsantas, 2002).

Although Zimmerman's model is one of the best-known models to guide SRL research, another model that has profound influence on the understanding of SRL is Pintrich's *General Framework for Self-regulated learning*, which will be discussed in the section that follows.

Pintrich's General Framework for Self-Regulated Learning

According to Pintrich's *General Framework for Self-regulated learning*, SRL includes four phases that cut across four functional/context areas (Pintrich, 2000). Pintrich presented his model in a matrix with four rows and four columns as displayed in Table 2.1. As shown in Table 2.1, the rows of the matrix represent the four phases of SRL: forethought, planning, and activation; monitoring; control; and reaction and

Phases	Areas for regulation			
	Cognition	Motivation/affect	Behavior	Context
1. Forethoughts, planning, and activation	 Target goal setting Prior content knowledge activation Metacognitive knowledge activation 	 Goal orientation adoption Efficacy judgments Ease of learning judgments; perception of task difficulty Task value activation Interest activation 	 Time and effort planning Planning for self-observations of behavior 	 Perceptions of task Perceptions of context
2. Monitoring	• Metacognitive awareness and monitoring of cognition	• Awareness and monitoring of motivation and affect	 Awareness of monitoring of effort, time use, need for help Self-observation of behavior 	• Monitoring changing task and context conditions
3. Control	• Selection and adaptation of cognitive strategies for learning, thinking	• Selection and adaptation of strategies for managing motivation and affect	 Increase or decrease effort Persist, give up Help seeking behavior 	 Change or renegotiate task Change or leave context
4. Reaction and reflection	Cognition judgmentsAttributions	Affective reactionsAttributions	Choice behavior	 Evaluation of task Evaluation of context

Table 2.1 Pintrich's Model – Phases and Areas for SRL

Note. From Pintrich (2000).

reflection. The columns of the matrix represent the four areas of the self-regulatory system: cognition, motivation/affect, behavior, and context. According to Pintrich (2000), self-regulation phases constitute a cyclical loop because evaluations of each area affect subsequent adjustment and adaptation in Phase 1. In addition, these individual phases are not necessarily linear-structured. "Monitoring, control, and reaction can be ongoing simultaneously and dynamically as one progresses through the task, with the goals and plans being changed or updated based on the feedback from the monitoring, control, and reaction processes" (p. 455). In support of this cyclical view, students who set a mastery goal (*Phase 1*) were found to be more likely to use self-monitoring process (*Phase 2*) and deep processing strategies (*Phase 3*) (Patrick, Ryan, & Pintrich, 1999).

To illustrate Pintrich's model of SRL, suppose the aforementioned student, Ben, is working on another task: reading an article about tropical fish hobby. In this case, Ben would progress through the four phrases of SRL for finishing this reading assignment; within each of the four phases, Ben would function simultaneously in all four areas of the SRL system.

During Phase 1 (*Forethoughts, planning, and activation*), Ben would set a goal of finishing reading the article, and he realizes that he actually knows the topic of tropical fish well (*cognition*). He is confident in his ability to complete the reading material and enjoys the topic (*motivation/affect*). He plans to spend only 15 minutes on the fish hobby article (*behavior*). He knows the article is going to be easy for him because he lived in rural Australia two years ago and knows many species of fish (*context*).

During phase 2 (*monitoring*), Ben would monitor his understanding of fish care and breeding (*cognition*), whether the article is fun to read (*motivation/affect*), whether he is focusing attention on reading (*behavior*), and whether the article is easy enough to finish in about 15 minutes (*context*).

During Phase 3 (*control*), Ben would use reading techniques, such as highlighting text and taking notes to speed up reading (*cognition*). He considers a reward for himself if he could complete this reading (*motivation/affect*). He chews gum to keep him

concentrating while reading (*behavior*). He also turns down the music to avoid distraction (*context*).

During Phase 4 (*Reaction and reflection*), Ben would reflect upon his reading process. He would probably make the following judgments and attributions: he is a good reader, and he knows more about fish care and breeding after completing this reading (*cognition*); he really enjoyed the reading (*motivation/affect*); chewing gum helped him stay on task (*behavior*); and to make reading more efficient and effective, he would turn the music off in the future (*context*).

To highlight the diversity and complexity of self-regulatory processes, Pintrich's model describes how the different phases and areas of SRL are related in a matrix of four phases by four areas. In reality, the four phases are occurring cyclically but not necessarily in a linear sequence; the four areas are ongoing simultaneously and inseparable.

The models of Zimmerman and Pintrich are similar in terms of their theoretical origin and elements included. Both models have been derived from Social Cognitive Theory. In both models, SRL is defined in terms of cyclical processes by which people direct and regulate their actions to achieve goals (Pintrich, 2000; Zimmerman, 2000). Both models include similar phases and sub-processes, and the only difference between the models is that the phases of monitoring and control in Pintrich's model are combined into one performance phase in Zimmerman's model. Finally, both models are influential given the substantial body of research they have generated.

Although the two models resemble each other and are both influential, the current study was based mainly upon Zimmerman's model because it is better aligned with the

data used for the current study. The data assesses the phases/processes of SRL as demonstrated in Zimmerman's model but do not provide details regarding the areas of regulation as represented in Pintrich's model. Furthermore, Zimmerman's four-level sequential formulation of developing self-regulatory competence, as discussed earlier, provides a more explicit rationale for studying the impact of social environments (e.g., parental involvement or teacher encouragement) on SRL of children. In the next section, the method of archival data research and the database used for this study will be discussed.

Archival Data Research and the ECLS-K Database

SRL will be studied using the method of archival data research, which is one type of secondary analysis that involves reanalyzing data collected by others to answer new research questions (Elder et al., 1993). Data for this study will be drawn from the existing database of the ECLS-K, which is sponsored by U.S. Department of Education, National Center for Education Statistics (NCES). The ECLS-K is the first longitudinal study that collects information on children's early schooling experience through following a nationally representative sample of children from kindergarten through eighth grade. The database is suited for the current study because it includes specific measures on the variables of interest: parental involvement practices, SRL, and student academic achievement. It is also the most recent nationally representative data appropriate for this study.

Using data from the ECLS-K has the following advantages. First, gathering data on various types of parenting practices by the ECLS-K allows the researcher to explore the relative contribution of parenting behaviors to SRL and other student outcomes. Second,
the large sample size of the ECLS-K will enhance the external validity (the generalizability of the results) of the current study. Finally, there is strong evidence on the validity and reliability of the data collection instruments.

A common dilemma in using existing databases is data limitations. How can new research questions be answered by old data that were not collected to address them? The challenge "is to devise research questions that can be addressed by the database. In this sense, data shape the agenda by defining what is and is not possible" (Elder et al., 1993, p. 21). The ECLS-K data shape the study's agenda in terms of what data are available to measure the variables of interest. For example, the ECLS-K provides a combined measure of three of the SRL processes in Zimmerman's model: self-motivation, self-control, and self-reaction. This combined measure of SRL was used in the current study.

As of February 25, 2008, a search of four bibliographic databases related to education research (i.e., ERIC, Education Research Complete, Psychology and Behavioral Sciences Collection, and Dissertation Abstracts) for "ECLS-K" resulted in approximately 100 citations of scholarly studies. Most of these studies focus on pre-K child care, school readiness, and factors influencing children's academic achievement (e.g., parenting practices, teacher training and practices, race, socioeconomic status, and computer access). The ECLS-K has also been used to study issues with obesity and socialization. However, few research efforts have been focusing on children's SRL using this database. The current study is designed to fill this gap within the literature through studying the impact of parental involvement on SRL of young children. Parents are known to play a major role in their children's education and development (Coleman, 1968; Epstein, 1995; Fan & Chen, 2001; Reynolds & Clements, 2005). In the section that follows, the impact of parental involvement on children's SRL will be discussed.

Parental Influences on Self-Regulated Learning

Parental involvement in education has been found to be a multidimensional concept and takes many forms: parental expectations for children's educational attainment, parental involvement in homework, cognitive stimulation activities at home, parent-child communication (about school, friends, and health-risk behaviors), and participation in school and community activities (Epstein, 1995; Fan & Chen, 2001; Hoover-Dempsey & Sandler, 1995, 1997; Hoover-Dempsey & Sandler, 2005; Timothy Z. Keith & et al., 1993; Reynolds & Clements, 2005; Sheldon & Epstein, 2005; Walker, Wilkins, Dallaire, Sandler, & Hoover-Dempsey, 2005). Some dimensions of parental involvement have been suggested to be associated with students' academic achievement (Coleman et al., 1968; Fan & Chen, 2001; Timothy Z. Keith et al., 1998; Reynolds & Clements, 2005). Because of the positive correlation between SRL and academic achievement, it is reasonable to expect that these parental involvement variables are potential factors affecting children's SRL development. In the subsections that follow, six of the parental involvement variables that have measures available in the ECLS-K database are discussed.

Parent-Child Communication

Parent-child communication refers to parent-child conversations initiated by parents about children's study, peer relationships, and possible health risk behaviors. Parent-child communication has been studied as a potential key process/mechanism to prevent children's health-risk behaviors, such as early sexual involvement, tobacco, alcohol, and drug use (Eisenberg, Sieving, Bearinger, Swain, & Resnick, 2006; Riesch, Anderson, & Krueger, 2006). Previous research found strong association between low academic achievement and health-risk behaviors in late childhood (Chewning et al., 2001; Cox, Zhang, Johnson, & Bender, 2007; Riesch et al., 2006). Previous research also indicated that the ideal time for such parent-child communication is during the transition from elementary to middle school (children age 9 to 11) (Riesch et al., 2006). Although there is a lack of research pertaining to the relationship between parent-child communication and students' SRL or academic achievement, Martinez-Pons (1996) indicated that parent-child communication may provide opportunities for parents to induce positive values, beliefs, and SRL standards. Therefore, it would be reasonable to expect an association between parent-child communication and increased SRL skills in students.

School Involvement

Parental school involvement includes communication with teachers and school administrators, attending school events, volunteering at school, and participation in community events to strengthen school programs (Epstein, 1995). Although the dimension of parental school involvement is less frequently studied compared to parental home supervision, Fan and Chen's (2001) meta-analysis suggested that parental involvement at school had greater correlation with student academic achievement (r = .32) than parental home supervision(e.g., home rules for watching TV, doing homework, etc.) (r = .09). In a study with a large representative sample of U.S. middle school students, Sui-Chu and Willms (1996) indicated that parental school participation had a moderate effect on reading achievement and a negligible effect on math achievement. It is unclear

why parental school involvement is associated with increased academic achievement. One possible link for the association between parental school involvement and children's academic achievement may be SRL.

Television Viewing Rules

Overall, TV viewing has been demonstrated to have a small negative effect on student achievement (Cooper, Valentine, Nye, & Lindsay, 1999; Fan & Chen, 2001; Keith, Reimers, Fehrmann, Pottebaum, & Aubey, 1986), although its impact on academic achievement may be complex and depend on types of programming and amount of time spent on watching TV (Thompson & Austin, 2003). Nary (2004) tested the paths for the influence of TV viewing on academic achievement using data from the 1997 Child Development Supplement (CDS) and the Panel Study of Income Dynamics (PSID). The results suggested that TV viewing hindered academic achievement not only by reducing the time students spent on homework, studying, and reading for leisure but also by increasing their mental passivity and impulsiveness. In addition, the hypothesis that television viewing stimulated academic achievement was not supported.

As a result of the negative influences TV viewing may have on student achievement, one form of parental involvement is to set rules restricting TV viewing. Ridley-Johnson, Cooper, and Chance (1983) suggested that children perform better when their parents have rules concerning TV watching. Bembenutty (2006) found that parents' control of TV watching is a positive predictor of math achievement of tenth graders. Encouraging family rules restricting TV viewing has been continuously suggested for children's school performance and well-being (Davis, 2004; Odland, 2004; Zutphen, Bell, Kremer, & Swinburn, 2007). Because parents setting TV viewing rules provides opportunities for parents to model good time management and learning environment arrangement, it may be reasonable to hypothesize that having TV viewing rules promotes children's SRL.

Homework

Homework refers to tasks assigned by teachers to be completed outside of class. The benefits of doing homework in promoting self-regulation and academic achievement are generally acknowledged (e.g., Zimmerman & Kitsantas, 2005). It is also generally agreed that students benefit when their parents are involved in their homework process. Empirical findings regarding the impact of parental involvement in children's homework, however, are mixed.

On the one hand, Hoover-Dempsey et al. (2001) reviewed the research on homework and found: (a) parents' involvement in homework took many forms, from establishing structures for homework to direct instruction on content and learning strategies; (b) parents' involvement appeared to influence student academic achievement through supporting the development of attitudes and attributes (e.g., motivation and selfregulation) that support learning. For example, Xu and Corno (2003) suggested that "family help with homework" was related to middle school students' behaviors of arranging learning environments and controlling emotions. Martinez-Pons (2002) indicated that homework provides an opportunity for exposing children to the inducement of SRL by parents.

On the other hand, parental involvement in homework is often found to correlate negatively with student achievement. For example, Bembenutty (2006) found that SRL (such as self-efficacy, effort regulation, and intrinsic motivation) was a positive predictor of math achievements as measured by the standardized test, but parental involvement in homework (frequency of checking homework and offering help) was found to be negatively related to math achievement of tenth grade high school students. One possible explanation for the negative correlation between parental involvement in homework and student achievement would be that high school students usually need less parental help with homework compared with young elementary students. As Marsh (1986) suggested, children shifted from using their parents as primary sources of academic assistance to seeking help from teachers and peers by 8th grade. Using a large national representative sample, the ECLS-K, the current study was designed to test whether parental involvement in homework has a positive or negative effect on SRL and academic achievement for children of fifth grade age.

Parental Education Expectations or Aspirations

The concept of parental education expectations or aspirations refers to how far parents expect their children to go in school and the values they place on their children's education. Schoon, Parsons, and Sacker (2004) indicated that parental educational aspirations have a positive effect on overall academic achievement and school adjustment. Zimmerman, Bandura, and Martinez-Pons (1992) found that parents' grade goals, as one form of parental educational aspirations, directly affected their children's grade goals and, in turn, their children's final grade. Fan and Chen (2001) conducted a meta-analysis to synthesize the quantitative literature about the relationship between parental involvement and students' academic achievement, and this analysis concluded that parental aspirations/expectations for children's education attainment had the strongest relationship with student academic achievement (r = .40) among all indicators of parental involvement. According to Bandura (1986), goals and aspirations not only reflect selfstandards that are necessary to maintain "a given level of behavior," but also affect selfmotivation (p. 350). Parental goals and educational aspirations affect student academic achievement positively probably because they have positive influence on children's selfmotivation and self-evaluation standards.

Extracurricular Activities

Extracurricular activities are defined as educational activities that are not part of the academic curriculum, such as sports and drama. Extracurricular activities are usually sponsored by and held at school. Participation in extracurricular programs depends on not only availability of such programs but also parental financial, time, and other resources. In general, exposure to a variety of extracurricular activities provides supplemental learning experiences that can be translated into student achievement and development although some forms of extracurricular activities may even impair academic achievement.

Eccles and Templeton (2002) reviewed previous work on the impact of extracurricular and other out-of-school experiences on youth development. The review suggests that participation in extracurricular activities is associated with academic achievement and other aspects of positive development during adolescence and early adulthood years. However, most studies focused on extracurricular participation in secondary schools; few examined extracurricular participation during elementary grades; and even fewer studies examined the reasons or mechanisms for the associations between participation and student outcomes. Among the few studies on participation in extracurricular activities in elementary grades, Dumais (2006) used data from the ECLS-K to study the effects of participation on student achievement during kindergarten and first grade. The study reported that the number of extracurricular activities affects gains in reading achievement. Regarding the types of activities, dance lessons and athletic activities are particularly influential in increasing students' gains in reading scores, but it is unclear why they cause gains in reading scores. The study suggested further research on determining the specific causal mechanisms that link participation in extracurricular activities to gains in academic achievement, and these mechanisms may include enhanced student skills, parental involvement, social networks at the adult level, and peer cultures. The present dissertation study hypothesizes that one possible outcome for participation may be improved SRL skills, and that SRL may be one possible link between extracurricular participation and increased academic achievement.

Among the aforementioned parental involvement practices, parental education expectations for children's education attainment and parental school involvement were found to have the most consistent effects on student academic achievement across studies (Reynolds & Clements, 2005). Given their effects on academic achievement, all these dimensions may have potential to provide opportunities for parental inducement of SRL. It is unclear whether certain parental involvement activities are more likely to be associated with SRL and thus are more effective than others in fostering children's SRL. The current study is designed to identify what dimensions of parental involvement are more effective in promoting SRL of young children.

SRL as a Mediator between Parental Involvement and Student Academic Achievement

Recent research on parental involvement suggests that parental involvement may have a more critical effect on learning related outcomes or proximal student outcomes (e.g., self-regulation, motivation, and self-efficacy) that support learning than on direct measures of academic achievement (Hoover-Dempsey et al., 2001; Hoover-Dempsey &

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Sandler, 2005; Martinez-Pons, 2002). In other words, parental involvement may affect students' academic achievement indirectly through SRL; or as one type of proximal student outcome, SRL may be a mediator that mediates the association between parental involvement and students' academic achievement.

Social cognitive models of SRL assume that individuals' self-regulation efforts mediate the effects of personal and context characteristics on achievement or performance:

"That is, it is not just individuals' cultural, demographic, or personality characteristics that influence achievement and learning directly, or just the contextual characteristics of the classroom environment that shape achievement, but the individuals' self-regulation of their cognition, motivation, and behavior that mediate the relationships between the person, context, and eventual achievement" (Pintrich, 2000, p. 453).

Thus, the effects of parental involvement on academic achievement may be mediated by children's SRL effort; or parental involvement may not only influence children's academic achievement directly but also affects academic achievement indirectly through its influence on children's self-regulation effort.

As discussed in previous sections, Fan and Chen (2001) suggested that parental involvement influenced not only children's academic achievement but also SRL. Weishaar (2001) studied the effects of various types of parental involvement (parenting, communicating, volunteering, learning at home, and decision making) on secondary students' motivation and academic achievement. The results indicated that parental involvement had a greater correlation with student motivation (especially for ninth

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graders) than with student achievement. Often, the correlation of parental involvement with student achievement was even in the negative direction. These results supported the assertion that the effect of parental involvement on student achievement is complicated and may be mediated by student motivational factors, such as self-regulation. As such, one hypothesis has been added to Hoover-Dempsey and Sandler's (2005) revised model of parental involvement process: parental involvement may have the most critical effect on proximal student outcomes (including academic self-efficacy, intrinsic motivation to learn, self-regulatory strategy use, and social self-efficacy for relating to teachers), and these proximal student outcomes may mediate the impact of parental involvement on student achievement (Hoover-Dempsey & Sandler, 1995, 1997; Hoover-Dempsey & Sandler, 2005).

While the hypothesis that SRL mediates the relationship between parental involvement and student academic achievement is widely accepted, empirical evidence concerning this hypothesis is mixed. For example, there is empirical evidence supporting the mediation effect of SRL. Martinez-Pons (1996) found parental inducement of selfregulation (modeling, encouragement, facilitation, and rewarding) predicted students' (grades five through eight) academic achievement through affecting their self-regulatory behaviors. Parents' inducement of self-regulation explained 19% of the variation in academic achievement and 25% of the variation in self-regulation. In Martinez-Pons' study, modeling referred to everyday parental activities that display SRL strategies; encouragement meant to encourage children to persist in the face of a failure; facilitation referred to direct guidance and intervention; and rewarding was to reward desired SRL behaviors. As another example of the mediating effect of SRL, parents' academic goals for children predicted children's grade goals and, in turn, their final grade (Zimmerman et al., 1992). Specifically, as one of the motivational variables, parents' grade goals predicted the grade goals that ninth and tenth graders set for themselves (path coefficient = .36), and students' grade goals predicted their final grades in social studies (path coefficient = .43).

Research studies have also been conducted that do not support the hypothesis that self-regulation mediates the relationship between parental involvement and academic achievement. Grolnick and Slowiaczek (1994) assessed a model in which self-regulation was hypothesized to be one of the mediators between parental involvement and school performance of sixth, seventh, and eighth graders. The findings supported a multidimensional model of parental involvement but did not support the mediational hypothesis for self-regulation. In testing their model of parental involvement process, Hoover-Dempsey and Sandler (2005) found parents' involvement mechanisms (as measured by encouragement, modeling, reinforcement, and instruction) were positively related to important proximal student outcomes (academic self-efficacy, intrinsic motivation, self-regulatory strategy use, and social self-efficacy for relating to teachers) for elementary and middle school students (r = .20). However, the authors did not have achievement data available to test whether these proximal student outcomes mediated the relationship between parental involvement and academic achievement. Weishaar (2001) found parental involvement was related to student motivation but not academic achievement. The mixed results regarding whether self-regulation is a mediator between parental involvement and student achievement provide a basis for continuing to study the relationships among parental involvement, SRL, and student achievement. Moreover,

recent research on the association between parental involvement and student academic achievement suggests the need to study the mechanisms of such association. SRL may be one of the important variables that mediate the association between parental involvement and student academic achievement. In this study, student academic achievement was measured in terms of reading achievement, which is discussed in the next section.

Reading Achievement

The reason for choosing reading achievement rather than math or science achievement is because of the domain specific feature of SRL (Boekaerts, 1997; Pintrich, 2004; Schunk, 2001). According to the domain specific feature, a student who is selfregulated in reading may not necessarily show the same degree of self-directedness in other subject domains, such as math or science. In the ECLS-K database, SRL is measured by ratings of reading teachers. Therefore, it is more appropriate to study SRL in relation to reading achievement rather than math, science, or a global measure of academic achievement.

Reading achievement refers to knowledge and skills in language and literacy. Recent research reveals that reading achievement can be measured in terms of product, process, or both. From the comprehension testing view, reading achievement or comprehension is a product as revealed by "right" answers to questions. From the metacomprehension view, it is measured by processes involved to arrive at the answers. Both product and process information are necessary for decision making (Myers, 1991). In this study, reading achievement is assessed in terms of the product of reading achievement. Research suggests that reading achievement or text comprehension is determined by a number of factors, including reading amount and motivation variables. Guthrie et al. (1999) reported results from two studies about factors affecting reading achievement and text comprehension. The results from Study 1, which included 3rd and 5th graders, suggest: (a) reading amount significantly predicted text comprehension and (b) reading motivation significantly predicted reading amount. Study 2 examined the same variables with 8th and 10th graders from a nationally representative data set. Similar to Study 1, the results indicated that reading amount significantly predicted text comprehension, and motivation predicted reading amount as well as text comprehension. As a closely related concept of motivation, SRL may contribute to reading achievement (Souvignier & Mokhlesgerami, 2006).

Self-Regulated Learning of Fifth Graders

The participants in SRL studies are often college and postsecondary students (Zeidner et al., 2000) and rarely young children (e.g., N. E. Perry, 1998; N. E. Perry, VandeKamp, Mercer, & Nordby, 2002). One concern is that young children are probably not developmentally ready to self-regulate, such as attending to models or persisting at a task (Bandura, 1986). There is still no consensus about whether children younger than ten years can effectively regulate their behavior (Perry, Phillips, & Dowler, 2004). In terms of grade level, recent developmental research indicates that fifth graders can effectively engage in SRL compared with students in earlier grades. Marsh (1986) reported that students' verbal and mathematical self-concepts become differentiated by fifth grade. Zimmerman and Martinez-Pons (1990) found that fifth graders' perceptions of their verbal and mathematical self-efficacy were correlated significantly with strategy use in each domain. According to Ormrod (2006), children at grade levels three through five have demonstrated improved competency in using self-control (such as attention control) and self-evaluation processes/strategies and can work on short assignments independently; other processes, such as planning and self-motivation, are highly metacognitive and emerge later in middle school and high school years but can emerge earlier through such methods as scaffolding and guided learning. As a result of the lack of research on SRL of younger children, the current study is aimed to investigate what parents can do to foster SRL of fifth graders. In addition, Marsh (1986) suggested that children used their parents as primary sources of academic assistance before eighth grade, indicating that it is particularly appropriate for studying the relationship between parental involvement and SRL on fifth graders.

Theoretical Model and Research Questions

The review of relevant literature suggests an inadequate understanding of (a) what dimensions of parental involvement are more effective in promoting SRL among children and (b) whether parental involvement practices affect children's academic achievement through influencing their self-regulating effort. This inadequate understanding provides a basis for further studying the relationships among parental involvement, self-regulated learning, and academic achievement. The literature review also suggests that fifth graders have demonstrated the use of most of the self-regulatory processes, such as self-control and self-evaluation, and it is appropriate to test the relationships among parental involvement, SRL, and academic achievement on fifth graders. Figure 2.3 displays the conceptual model of this study. As shown in Figure 2.3, the model depicts the relationship between parental involvement practices, SRL, and reading achievement. In



Figure 2.3 Conceptual Model of the Study.

this model, parental involvement variables are hypothesized to influence student reading achievement both directly and indirectly through SRL. The arrows in the model indicate potential causal relationships. The study was tested using the fifth grade data from the ECLS-K.

Three research questions were addressed in this study. The purpose of question 1 was to test whether a total effect exists for each dimension of parental involvement on student reading achievement. Question 2 was to identify the parental involvement dimensions that are likely to contribute to SRL of fifth graders. Question 3 was aimed to test the mediation effect: whether the indirect effect of parental involvement on student reading achievement through SRL, if exists, differs significantly from zero. The three research questions are:

- 1. What dimensions of parental involvement affect fifth graders' reading achievement?
- 2. What dimensions of parental involvement affect fifth graders' aptitude for SRL?
- 3. Does SRL mediate the relationship between parental involvement and student reading achievement?

CHAPTER III

METHODOLOGY

The research design and methodology are explained in five sections. In the first section, an overview of the Early Childhood Longitudinal Study: Kindergarten Class of 1998-1999 (ECLS-K) is provided, with a focus on its sample design, data collection, and data availability. In the second section, the key variables used in the current study along with the variable selection process are discussed. In the third and the fourth sections, analytical issues associated with complex survey data, including weighting, design effects, and missing data, are addressed. The statistical analysis plan is presented in the fifth and final section.

The ECLS-K

In this dissertation study, data from the ECLS-K were used to estimate the degree to which specific dimensions of parental involvement are associated with self-regulated learning (SRL) and student reading achievement. Sponsored by the U.S. Department of Education, National Center for Education Statistics (NCES), the ECLS-K is the first longitudinal study that collects information on children's early schooling experience through following a nationally representative sample of children from kindergarten through eighth grade. The ECLS-K provides multifaceted and longitudinal data on

children's physical, cognitive, and social-emotional development as well as children's home and school environment. As such, it allows researchers to study how various factors (personal, home, school, and community) influence children's physical, social, and cognitive development. The ECLS-K database is particularly suited for this study because it includes specific measures on the variables of interest: parental involvement practices, SRL, and student academic achievement. It is also the most recent nationally representative data appropriate for this study.

Sample Design and Data Collection

The ECLS-K employed a multistage cluster sampling. In the base year, a nationally representative sample of approximately 22,000 children attending kindergarten in 1998-99 was selected through three stages. In the first stage, the primary sampling units (PSUs) were determined to be 1335 geographic regions (counties or groups of counties) from which 100 geographic regions were then selected. In the second stage, 1280 public and private schools offering kindergarten programs were sampled. In the third and final stage, an average of 23 kindergarteners was selected from each of the sampled schools. Asians and Pacific Islanders were over-sampled to ensure sample sizes large enough for subgroup analyses. As a result of the sampling process, the sampled geographic areas become clusters in the ECLS-K.

The ECLS-K data were collected using direct child assessments, parent interviews, teacher and school administrator questionnaires, student records, and school facility checklists. To date, the ECLS-K has finished seven waves of data collection, which were conducted in the kindergarten year (fall of 1998 and spring of 1999), the first grade (fall

of 1999 and spring of 2000), the third grade (spring of 2002), the fifth grade (spring of 2004), and the eighth grade (2007).

The sample design of the ECLS-K was modified for each wave of data collection. During the spring of first grade (1999-2000), the sample was freshened to obtain a nationally representative sample of all first-graders by including first-graders who were not enrolled in kindergarten in the base year of 1998-99. These children either skipped kindergarten, attended kindergarten programs outside of the U.S. in 1998-1999, or they repeated first grade in 1999-2000. Therefore, they had no chance of being selected in the ECLS-K base year sample. During the spring first grade, 21,331 children participated in the ECLS-K study. No new students entered the sample after the first grade wave of data collection. Because 26 sampled children in first grade did not participated in the firstgrade study but participated in the third-grade study, the sample size for the third grade was 21,357, larger than the first grade sample by 26. In the fifth grade, the children were sampled at different rates based upon the longitudinal data available for them. All sampled children had their reading teachers fill out child-level questionnaires. Half of the children were randomly selected. For these children, their math teachers filled out childlevel questionnaires. The other half of the children had their science teachers fill out the questionnaires. The spring fifth grade sample included 16,143 children. The sample size decreased due to sample attrition (e.g., nonresponse and change in eligibility status). Of the 16,143 sampled children, 90% were in fifth grade, and 10% were in other grades. Because the sample was not freshened in the fifth grade, it is not representative of the fifth grade population in 2003-04. In stead, it is representative of the cohort of Kindergarteners in 1998-99 and first graders in 1999-2000. It was estimated that the fifth

grade sample represented approximately 83% of the fifth grade population in 2003-2004.

Because of nonresponse during data collection, the fifth grade database includes only

11,820 of the 16,143 sampled children.

Data Availability

A number of ECLS-K data files have been released for analysis, and they are

displayed in Table 3.1.

Grade Level	Data file	Description
К	ECLS-K Base Year Data Files (three main files and four supplementary files)	<u>Main files</u> : the child-level file, the teacher-level file, and the school-level file; <u>Supplementary files</u> : the teacher salary and benefits file, the special education file, the student record abstract file, and the
		Head Start Verification Study file
1 st grade	ECLS-K First-Grade Restricted- and Public-Use Data Files	Available only as a child level file
	Longitudinal Kindergarten- First Grade (K-First Grade) Public-Use Data File	Available only as a child level file; combines data from the base and first-grade years; contains cross-year weights to be used in examining children's growth and development between kindergarten and first grade.
3 rd grade	ECLS-K Third-Grade Restricted- and Public-Use Data Files	Available only as a child level file
	Longitudinal Kindergarten– Third Grade (K–Third Grade) Public-Use Data File	Available only as a child level file; combines data from the base, first-grade, and third-grade years; contains cross-year weights to be used in examining children's growth and development between kindergarten and third grade.
5 th grade	ECLS-K Fifth-Grade Restricted- and Public-Use Data Files	Available only as a child level file
	Longitudinal Kindergarten- Fifth Grade (K-fifth grade) Public-Use Data File	Available only as a child level file; combines data from the base, first-, third-, and fifth-grade years; contains cross-year weights to be used in examining children's growth and development between kindergarten and fifth grade

Table 3.1 List of the Available ECLS-K Data Files

As shown in Table 3.1, the ECLS-K data files are available in two forms: a publicuse data file and a restricted-use data file. The use of the ECLS-K data involves no cost. The public-use data files can be ordered on CD-ROM from <u>www.edpubs.org</u>. The restricted-use data files are available only to researchers who have a NCES license. The difference between the public- and restricted-use data files is that the values for a few variables identified as posing a great disclosure risk were altered or masked in the publicuse data files. By modifying data values for such variables, the NCES intended to protect the identity of individual respondents (schools, teachers, parents, or children). While public-use data files are sufficient for most analytic purposes, users who study certain rare populations (e.g., children with disabilities or language minorities) might find that the restricted-use files contain a few more variables with a wider range of data values (Tourangeau, Nord, Lê, Pollack, & Atkins-Burnett, 2006).

<u>Variables</u>

This study included three sets of key variables: (a) parental involvement variables, (b) SRL, and (c) reading achievement. These variables were either selected directly from the ECLS-K or derived through a principal component analysis of the variables in the ECLS-K.

Parental Involvement Variables

Through a careful review of the items in the ECLS-K Parent Interview, 28 items were selected based upon their content relevance to the six parental involvement variables: *Parent-Child Communication, School Involvement, TV Rules, Homework,*

Parental Education Expectations, and *Extracurricular Activities*. See Appendix A for the list of parental involvement items selected for the study.

Binary (yes/no) items were reverse coded so that a high score represents a high degree of parental involvement. To determine which items group together empirically, a principal component analysis (PCA) with orthogonal (varimax) rotation was performed on responses to the 28 items about parental involvement. PCA is a data reduction technique used to reduce a large number of variables/ items into a manageable number of components and can be used to guide scale construction (Cureton & D'Agostino, 1983). Cases with missing data on one or more items were excluded from the PCA. Thus, the analysis included 10,219 of 11,820 cases that had completed data on all 28 items. Orthogonal rotation was used to minimize inter-component correlation so that the chance of multicollenarity will be reduced in further analyses that use the derivative variables from the PCA. Multicollinearity refers to strong linear correlation (r > 0.80) among two or more predictor/explanatory variables in a multiple regression model; the existence of multicollinearity makes it difficult to assess the effects of predictor/explanatory variables on the response variable (Kutner, Nachtsheim, Neter, & Li, 2004). An oblique (promax) rotation was also performed and resulted in a similar pattern of component loadings.

The PCA resulted in exclusion of two of the 28 items about parental involvement in children's library use because their component loadings were smaller than 0.30. Statisticians conventionally consider a factor loading of 0.30 or above as meaningful (Hair, Anderson, & Tatham, 1987). In the present study, one item with a loading of 0.291 was not omitted for two reasons: First, the loading was not considerably lower than 0.30.

Second, conceptually, the item could be grouped with other items on the corresponding component.

Five parental involvement components were derived from the PCA. Table 3.2 displays the 26 items that loaded on the five components. For clarity of writing, the five components will be referred to as five parental involvement variables in subsequent analyses. Each of the variables is measured by the items loaded on its corresponding component.

Following the PCA, Cronbach's Alpha was computed to assess the internal consistency reliability of the five parental involvement variables. It is important to perform reliability tests when derivative variables are used in subsequent analyses (Santos, 1999). The original Cronbach's Alpha for each variable was displayed in Table 3.2. To improve the reliability of parental involvement variables, five of the remaining 26 items were dropped from their corresponding scales.

The original Alpha for the scale, *Parent-Child Communication*, was 0.75, indicating an acceptable degree of internal consistency (alpha greater than 0.70) (Nunnally, 1978). Thus all five items on the scale were retained. For the *School Involvement* scale, the original alpha was 0.61. The item concerning "parent-child conversation about the child's school day" was dropped. Exclusion of this item raised the value of alpha slightly, and discussion about school day is conceptually different from involvement in schools. For the scale of *TV Rules*, two items about "whether parents have family rules for TV watching and for how late a child can watch TV" were deleted, and the deletion of the two items raised the value of alpha to an acceptable level. For the scale of *Extracurricular Activities*, the item about parental educational expectations was dropped

	Variable		
Component	Name	Item Number/Description	Loadings
	P6TLKALC	P6 HEQ421B OFT TLK ABOUT ALCOHOLIC BVRG	0.823
Parent-Child	P6TLKDRG	P6 HEQ421D OFTEN TALK ABOUT DRUGS	0.808
Communication	P6TLKSMK	P6 HEQ421A OFT TLK ABOUT SMKING/TOBACCO	0.792
(Alpha = 0.75)	P6TLKSEX	P6 HEQ421C OFTEN TALK ABOUT SEX	0.628
	P6TLKFRD	P6 HEQ420B OFTEN TALK ABOUT FRIENDS	0.291
	P6ATTENB	P6 PIQ020A1 ATTENDED OPEN HOUSE	0.618
	P6ATTENS	P6 PIQ020D1 ATTEND SCHOOL EVENT	0.609
	P6VOLUNT	P6 PIQ020E1 ACTED AS SCH VOLUNTEER	0.574
School Involvement	P6FUNDRS	P6 PIQ020F1 PARTICIPATED IN FUNDRAISING	0.527
(Alpha = 0.61)	P6ATHLET	P6 HEQ020B PARTCP IN ATHLETIC EVENTS	0.464
	P6PARGRP	P6 PIQ020C1 ATTENDED PARENT-TEACHER CONF	0.446
	P6ATTENP	P6 PIQ020B1 ATTENDED A PTA MEETING	0.376
	P6OFTTLK	P6 HEQ420A OFTEN TALK ABOUT DAY AT SCH	0.334
	P6FRNUMH	P6 HEQ075C FAM RULES - HRS WEEKDAY TV	0.830
TV Rules	P6FRHRWK	P6 HEQ075D FAM RULES - HRS EACH WEEK TV	0.793
(Alpha = 0.65)	P6TVRUL2	P6 HEQ075B TV RULE HOW LATE WATCH TV	0.539
	P6TVRULE	P6 HEQ075A FAMILY RULES FOR TV	0.503
	P6ORGANZ	P6 HEQ020F PARTCP IN ORGANIZD PERFORMING	0.699
	P6DANCE	P6 HEQ020A TAKES DANCE LESSONS	0.613
Extra-Curricular	P6MUSIC	P6 HEQ020D TAKES MUSIC LESSONS	0.550
(Alpha = 0.40)	P6ARTCRF	P6 HEQ020E TAKES ART LESSONS	0.434
	P6CLUB	P6 HEQ020C PARTICP IN ORGANIZED CLUBS	0.327
	P6EXPECT	P6 PIQ070 WHAT DEGREE EXPECTED OF CHILD	0.324
Homowork	P6OFHLPR	P6 HEQ095 OFTEN HELP WITH READING HW	0.861
(Alnha = 0.66)	P6OFHLPM	P6 HEQ098 OFTEN HELP WITH MATH HW	0.859
(1 iipiiu – 0.00)	P6OFTDHW	P6 HEQ090 OFTEN CHILD DOES HOMEWORK	0.515

Table 3.2 Principal Component Analysis of Parental Involvement Items

Note. The parent weight, C6PW0, was used in the principal component analysis.

to raise the value of alpha. Moreover, parental educational expectations and extracurricular participation are conceptually different from each other. Although the item about parental educational expectations was dropped from the scale of *Extracurricular Activities*, it was included in further analysis as an independent parental involvement variable because it has been shown to be a strong positive predictor to student academic achievement (Fan & Chen, 2001). Given its strong effect on academic achievement, parental education expectations may have a strong impact on student SRL. Finally, the item about "how often a child does homework" was dropped from the scale of *Homework* to raise the value of alpha, but this item was retained in further analysis as an independent parental involvement variable because of the differential effects of doing homework and homework help. Children doing homework has been found to promote SRL and academic achievement (Hoover-Dempsey et al., 2001; Martinez-Pons, 2002; Xu & Corno, 2003; Zimmerman & Kitsantas, 2005). More homework help, however, is associated with lower achievement (Bembenutty, 2006).

Table 3.3 displays the reliability coefficients of the revised parental involvement scales/variables. As shown in Table 3.3, the 21 items were divided into five parental involvement scales, and three of the five scales have acceptable levels of reliability (alpha greater than 0.70) (Nunnally, 1978). The *School Involvement* and the *Extracurricular Activities* scales have a relatively low level of reliability (alpha equals 0.61 and 0.46, respectively). These two scales were retained for further analysis because they captured two important dimensions of parental involvement. As a result of this variable selection process, seven parental involvement variables were obtained and included in this study.

Scale	Variable Name	Item Number/Description	Cronbach's Alpha
Parent-Child	P6TLKALC	P6 HEQ421B OFT TLK ABOUT ALCOHOLIC BVRG	0.75
Communication	P6TLKDRG	P6 HEQ421D OFTEN TALK ABOUT DRUGS	
	P6TLKSMK	P6 HEQ421A OFT TLK ABOUT SMKING/TOBACCO	
	P6TLKSEX	P6 HEQ421C OFTEN TALK ABOUT SEX	
	P6TLKFRD	P6 HEQ420B OFTEN TALK ABOUT FRIENDS	
School	P6ATTENB	P6 PIQ020A1 ATTENDED OPEN HOUSE	0.61
Involvement	P6ATTENS	P6 PIQ020D1 ATTEND SCHOOL EVENT	
	P6VOLUNT	P6 PIQ020E1 ACTED AS SCH VOLUNTEER	
	P6FUNDRS	P6 PIQ020F1 PARTICIPATED IN FUNDRAISING	
	P6ATHLET	P6 HEQ020B PARTCP IN ATHLETIC EVENTS	
	P6PARGRP	P6 PIQ020C1 ATTENDED PARENT-TEACHER CONF	
	P6ATTENP	P6 PIQ020B1 ATTENDED A PTA MEETING	
TV Rules	P6FRNUMH	P6 HEQ075C FAM RULES - HRS WEEKDAY TV	0.76
	P6FRHRWK	P6 HEQ075D FAM RULES - HRS EACH WEEK TV	
Extracurricular	P6ORGANZ	P6 HEQ020F PARTCP IN ORGANIZD PERFORMING	0.46
Activities	P6DANCE	P6 HEQ020A TAKES DANCE LESSONS	
	P6MUSIC	P6 HEQ020D TAKES MUSIC LESSONS	
	P6ARTCRF	P6 HEQ020E TAKES ART LESSONS	
	P6CLUB	P6 HEQ020C PARTICP IN ORGANIZED CLUBS	
Homework	P6OFHLPR	P6 HEQ095 OFTEN HELP WITH READING HW	0.77
	P6OFHLPM	P6 HEQ098 OFTEN HELP WITH MATH HW	

Table 3.3 Revised Scales of Parental Involvement

Self-Regulated Learning

Self-regulated learning was measured through the ECLS-K variable, T6LEARN, which was the score on the *Approaches to Learning Scale*. This scale included seven items that asked fifth grade reading teachers how often the child demonstrated the use of

certain learning related skills: attentiveness, task persistence, eagerness to learn, learning independence, flexibility, organization, and following classroom rules. Individual items on the scale are not available for review. The content of the seven items are described in Table 3.4.

Scale Items	Corresponding SRL Processes	
Shows eagerness to learn new things	Self-motivation	
Pays attention well	Self-control	
Persists in completing tasks	Self-control	
Keeps belonging organized	Self-control	
Follows classroom rules	Self-control	
Easily adapts to changes in routine	Self-reaction/evaluation	
Works independently	Indicating the use of various SRL	
	processes or strategies	

Table 3.4 SRL Processes Measured by the Approaches to Learning Scale

As shown in Table 3.4, the seven items measure three of the SRL processes: selfmotivation, self-control, and self-reaction/evaluation. Individual items on the scale were scored using a 4-point Likert scale of 1 (never), 2 (sometimes), 3 (often), to 4 (very often). Scores for the seven items were averaged to calculate the scale score. The split-half reliability for the scale score was 0.91, indicating a very high degree of internal consistency.

Reading Achievement

Reading achievement was assessed by the fifth grade reading Item Response Theory (IRT) scale scores. The spring fifth grade reading assessment was designed to measure children's language and literacy skills. The assessment included questions from the following proficiency levels: *literal inference* (making inferences using cues in text); *extrapolation* (identifying clues used to make inferences); *evaluation* (demonstrating understanding of author's craft and making connections between similar life problems); and *evaluating non-fiction* (comprehending biographical and expository text). The reliability theta for the spring-fifth grade reading IRT scores was 0.93, demonstrating a high degree of internal consistency of the scale (Tourangeau et al., 2006).

As a result of the variable selection process, nine key variables (either factor analytically derived or selected directly from the ECLS-K) were included in further analysis. These variables are displayed in Table 3.5.

Adjusting Weights and Design Effects

In the ECLS-K, the precision of population estimates is affected by the use of complex sample design. Specifically, the two main issues that cause loss in precision relative to a simple random sample design are (a) differential sampling rates/weights for subgroups of the population (e.g., Asians and Pacific Islanders were sampled at a higher rate) and (b) clustering of schools and students within the sampled geographic areas. To address these two issues in analysis, two broad categories of approaches can be used: designed-based approaches, which use statistical adjustment to obtain correct estimates that are representative of the population cohort; and model-based approaches, which use multilevel analyses to take into account nested data structures (Thomas, Heck, & Bauer, 2005). The choice of analysis approach is determined partially by the aims of the research (Thomas et al., 2005). Because the aims or research questions of this study involve modeling relationships only from the level of individual students but not from the level of

Variable Name	Description	
Parent-Child Communication	An average score of five items regarding the frequency of parent-child conversation about friends, sex, alcoholic beverage, smoking, and drugs	
School Involvement	An average score of seven items about whether parents are involved in school activities	
TV Rules	An average score of two items about whether parents have family rules restricting TV watching	
Homework Help	An average score of two items about how often parents help the child with his/her math and reading homework	
Parental Education Expectations	The item about how far parents realistically expect the child to go in school	
Homework Frequency	The item about how often a child does homework	
Extracurricular Activities	An average score of five items about whether parents support the child in participation in extracurricular activities	
Self-Regulated Learning	Measured by the ECLS-K variable, T6LEARN, which is an average scale score of the seven items on the Approaches to Learning scale	
Reading Achievement	Measured by the ECLS-K variable, C6R3RSCL, which is the reading IRT scale score	

Table 3.5 List of Key Variables Used in the Study

clusters, such as schools or geographic areas, it is appropriate to adopt a designed-based approach.

To address the effect of weighting using a designed-based approach, this study first needed to choose appropriate weights for analysis. The ECLS-K database includes five types of cross-sectional weights, and each of the weights is appropriate for a different set of data or combination of sets of data. These weights are refined sampling weights, which compensate for differential probabilities of selection, use of diverse instruments, and nonresponses. For the current investigation on the relationship between parental involvement, SRL, and reading achievement, the appropriate weight was C6CPTR0.

To address the design effect (e.g., clustering) on computing correct estimates of population variances using a design-based approach, either the Jackknife or the Taylor series methods can be used. There are advantages and disadvantages of both methods. The Jackknife method is the most appropriate technique to be used in variance estimation, but it requires the specialized software (e.g., WesVar, AM, SUDAAN), which is often not available. The Taylor series method has been used by both the specialized software (e.g., SUDAAN, Stata, and AM) and the popular general-purpose statistical packages (e.g., SAS and SPSS), but it is a simplified procedure for estimating variance, which does not incorporate the variance related to Durbin sampling method, adjustments for nonresponse, or the sample-based raking procedures used in the ECLS-K (Tourangeau et al., 2006).

All analyses for this study were conducted using SAS. The SAS survey procedures (e.g., SURVEYREG and SURVEYMEANS) have the capability to incorporate sampling weights and to compute variance estimates based on the Taylor series method. This method of variance estimation required the use of the variance stratum identifier, C6CPTRST, and the variance unit identifier, C6CPTRPS, in the ECLS-K database.

Missing Data and Multiple Imputation

To conduct valid analyses with incomplete data, the pattern of missing data was examined, followed by a multiple imputation (Rubin, 1996) procedure to impute the missing values. First, the values of -1, -7, -8, and -9 in the ECLS-K database indicate missing values and were recoded. Second, the cases with missing values on all seven parental involvement variables were deleted, and the nine key variables (SRL, reading achievement, and seven variables about parental involvement) were tabulated to examine the pattern of missing data. The tabulation shows that there are 9557 complete cases (86.91% of the 10996 cases) and 1439 cases with missing values on one or more of the nine key variables. See Appendix B for the missing data patterns. The rates of missing data for the nine variables are displayed in Table 3.6.

Variable Name	Missing Count	Percentage Missing (N=11820)
Parent-Child Communication	867	7.34%
School Involvement	833	7.05%
TV Rules	903	7.64%
Extracurricular Activities	835	7.06%
Homework Help	1143	9.67%
Homework Frequency	854	7.23%
Parental Education Expectations	857	7.25%
Self-Regulated Learning	1035	8.76%
Reading Achievement	555	4.70%

Table 3.6 Missing Values of Key Variables

As shown in Table 3.6, all the nine variables have some percent of missing data, ranging from 4.70% to 9.67%. Prior to imputation, the cases with missing values on all seven parental involvement variables were deleted from the data set.

Next, multiple imputation was performed on the nine key variables using the SAS procedure PROC MI and resulted in five completed data sets (estimated sample size = 10,996). Instead of filling in a single value for each missing value, a multiple imputation procedure replaces each missing value with a set of plausible values to generate multiple complete data sets, and five imputations are often sufficient in multiple imputation (Rubin, 1996). Because the goal of imputation was to obtain unbiased inferences, the imputed values were not rounded although the values might look implausible (e.g., having decimals for categorical variables). Following the multiple imputation, all key analyses were performed on the five data sets using standard statistical procedures. The results of analyses performed on the five data sets were then combined for inferences using the SAS procedure, PROC MIANALYZE. The process of combining results of analyses results in valid statistical inferences that reflect the uncertainty due to missing values.

Data Analysis

Path analysis and Sobel test were performed to answer the three research questions of this study. Path analysis is a statistical method used to test causal relationships between a number of observed variables (Hatcher, 1994). Using path analysis has the following advantages: First, it measures the size of a hypothesized causal influence, so the importance or contribution of different parental involvement variables can be compared. Second, it allows the researcher to trace complex paths by which one variable affects another. Therefore, the indirect effect of parental involvement on student reading achievement through SRL can be tested. *Assumptions for path analysis.* The use of path analysis assumes the satisfaction of the following important requirements concerning the nature of the data and the path model: First, all *endogenous* (dependent) variables should be assessed on at least an interval level of measurement; *exogenous* (independent) variables may be assessed at a nominal level if they are dummy-coded; and endogenous variables should be continuous and have at least a minimum of four values. Second, all independent variables should be free of measurement error. Third, the data should assume a multivariate normal distribution. Fourth, relationships between variables should be linear and additive (not interactive). Fifth, the variables included in a path model should be free of multicollinearity (strong correlation: r > 0.80). Finally, path analysis requires large sample sizes, and the minimum required sample size is at least 200 (Hatcher, 1994). The second and third assumptions are often violated in social science research as it is the case in the current study.

The hypothesized theoretical model for this study is displayed in Figure 3.1. As shown in Figure 3.1, the path model depicts the relationships among parental involvement variables, SRL, and reading achievement. In this path model, the seven parental involvement variables are *exogenous* variables; SRL and reading achievement are *endogenous* variables. The boxes in Figure 3.1 are connected to one another by either curved, double-headed arrows or straight, single-headed arrows. Curved, double-headed arrows represent correlation or covariance between variables; straight, single-headed arrows symbolize unidirectional causal paths. The model in Figure 3.1 shows that each of the seven parental involvement variables is hypothesized to have both direct and indirect effects on reading achievement. The arrow goes from each of the parental

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Figure 3.1 A Structural Model of Relationship between Parental Involvement, SRL, and Reading Achievement.

involvement variables directly to reading achievement, suggesting a direct effect of parental involvement on reading achievement. The arrow also goes indirectly from each of the parental involvement variables to SRL and then to reading achievement. Therefore, SRL is hypothesized as a mediator that mediates the relationship between parental involvement variables and reading achievement. In other words, SRL is one of the links for the association between parental involvement and student reading achievement. In addition to the causal paths, two correlations were added to the path model: the correlation between *Homework Help* and *Homework Frequency* and the correlation between *Parental Education Expectations* and *Extracurricular Activities*. The items about homework help and homework frequency loaded on the same component of homework in the PCA, suggesting a meaningful correlation between *Homework Help* and *Homework Frequency*. The item about parental educational expectations loaded on the component of *Extracurricular Activities*, suggesting a nontrivial correlation between *Parental Education Expectations* and *Extracurricular Activities*.

To incorporate weighting and design effects, the path analysis was operationalized using three regression models through the procedure, PROC SURVEYREG. The regression coefficients resulted from the first regression model show the "total effect" of each of the parental involvement variables on reading achievement. In a mediation model, total effect is the sum of direct effect and indirect effect. The regression coefficients resulted from the other two multiple regression models are the path coefficients to be computed. The statistical significance of all the three models is required to identify a potential mediation effect. In addition, the two correlation coefficients, which cannot be computed using PROC SURVEYREG, were estimated using the PROC CALIS procedure. This procedure presently has no capability to incorporate sampling weights so that the weight, C6CPTR0, was not used in estimation of the two correlation coefficients.

The Sobel Test for testing the indirect effects. The results from the path analysis using three regression models can at most indicate whether there exist possible mediation (indirect) effects in the path model, and there is a need to test directly the significance of the indirect effects, which is also called a mediation test. The aim of a mediation test is to

assess the effect of a proposed cause on some outcome through a proposed mediator (e.g., the effect of parental involvement on reading achievement through SRL). Among the existing methods for assessing indirect/mediation effects, the Sobel test has been shown to have superior performance with respect to power and intuitive appeal but requires a large sample size; alternately, a nonparametric approach, bootstrapping, can also be performed as a complementary and sensitivity test to the Sobel test (Preacher & Hayes, 2004; Sobel, 1982).
CHAPTER IV

RESULTS

This study was undertaken to gain a better understanding about which dimensions of parental involvement are more effective in promoting SRL and reading achievement. Additionally, this study also tested whether SRL mediates the relationship between parental involvement and SRL. The results from this study are presented in six sections. In the first section, descriptive statistics of the nine key variables used in this study are provided. Then the results of the path analysis and the Sobel test will be presented in sections two through six to address the three research questions of this study or to compute additional path coefficients. The chapter concludes by summarizing the results from the path analysis and the Sobel test. All analyses were conducted on the five imputed data sets, and the results were then combined together using the PROC MIANALYZE procedure.

Descriptive Statistics of Key Variables

To describe the sample of fifth graders and the ECLS-K data used for this study, the mean and standard error of the nine key variables were computed for each of the five imputations (see Appendix C). Then the SAS procedure, PROC MIANALYZE, was used

to combine the results of the five imputations. The combined results are displayed in Table 4.1.

Variable	Ν	Mean	Std Error
Reading Achievement	10120	136.91	0.623
SRL	10120	3.00	0.014
Parent-Child Communication	10120	3.36	0.010
School Involvement	10120	1.65	0.006
TV Rules	10120	1.47	0.011
Homework Help	10120	3.27	0.020
Parental Education Expectations	10120	3.94	0.025
Homework Frequency	10120	4.33	0.023
Extracurricular Activities	10120	1.20	0.005

Table 4.1 Descriptive Statistics of the Nine Key Variables

As shown in Table 4.1, the mean score of *Reading Achievement* is 136.91, which means fifth graders would have answered correctly approximately 137 of the 186 items if they had been tested on all of the 186 items in reading assessment in all rounds of data collection (K-5). The reading achievement scores are often not integers because they are probabilities of correct answers. The mean sore of SRL is 3.00, suggesting that fifth graders have "often" demonstrated the use of SRL processes. The value range for SRL is 1-4. The mean score of *Parent-Child Communication* is 3.36, indicating that parents and their children have frequently engaged in discussions of the health-risk behaviors: sex, alcohol, tobacco, drugs, and friends. The possible value range for *Parent-Child Communication* is 1-4. The possible value range for both *School Involvement* and *TV*

Rules is 1-2. Therefore, the mean score of 1.65 on School Involvement reveals that parents are more likely to involve in schools; the mean score of 1.47 on TV Rules suggests that parents are more likely to have TV rules for their children in fifth grade. The mean score for *Homework Help* is 3.27, which means parents often help fifth graders with their homework. The possible value range for *Homework Help* is 1-5. For the variable, Parental Education Expectations, the possible value range is from 1 (To receive less than a high school diploma) to 6 (To finish a Ph.D., MD or other advanced degree). The value code 3 means "To attend two or more years of college," and the value code 4 stands for "To finish a four- or five-year college degree." Thus, the mean score of 3.94 on this variable suggests that parents expect their children to have college level education. The mean score of *Homework Frequency* is 4.33, revealing that fifth graders do homework frequently. The possible value range for this variable is 1-5. The mean score of *Extracurricular Activities* is 1.20, which means parents of fifth graders are likely to support their children to engage in extracurricular activities. The possible value range for *Extracurricular Activities* is 1-2.

Following this section, the results of the path analysis and the Sobel test will be reported to answer the three research questions of this study. The path analysis was operationalized using three multiple regression models. The regression coefficients resulted from the first regression model show the "total effect" of each of the parental involvement variables on reading achievement. In a mediation model, total effect is the sum of direct effect and indirect effect. The regression coefficients resulted from the other two multiple regression models are the path coefficients to be computed. The regression coefficients reported in this study are all standardized. The statistical significance of all the three models is required to identify a potential mediation effect. In addition, the two correlation coefficients estimated using the PROC CALIS procedure will also be presented in the final path model.

Research Question 1

What dimensions of parental involvement affect fifth graders' reading achievement?

This research question was addressed using a multiple regression model in which the seven parental involvement variables (dimensions) were used to predict/explain reading achievement of fifth graders. The regression was performed on each of the five imputed data sets. The results of the five imputations are provided in Appendix D. Then the SAS procedure, PROC MIANALYZE, was used to combine the results of the five imputations. The combined results are displayed in Table 4.2.

Parameter	Estimate	Std Error	DF	t Value	$\Pr > t $
intercept	-0.05	0.0212	407.5	-2.46	0.0141
Parent-Child Communication	-0.02	0.0179	429.38	-0.85	0.3932
School Involvement	0.22	0.0185	437.83	12.11	<.0001
TV Rules	-0.05	0.0170	427.21	-3.13	0.0019
Homework Help	-0.25	0.0191	356.14	-13.26	<.0001
Parental Education Expectations	0.22	0.0165	430.84	13.34	<.0001
Homework Frequency	0.08	0.0235	328.67	3.21	0.0015
Extracurricular Activities	0.12	0.0175	430.72	6.78	<.0001
(R-Square = 0.24)					

Table 4.2 Regression Model: Parental Involvement and Reading Achievement

As shown in Table 4.2, the R-square for this model is 0.24. Thus, the seven parental involvement variables explain approximately 24% of the variance in reading achievement. This result is consistent with previous research (e.g., Martinez-Pons, 1996) about the effect of parental involvement on student academic achievement. The regression coefficient for *Parent-Child Communication* is not statistically significant (t = -0.85, pvalue = 0.3932), and the regression coefficients for the remaining six parental involvement variables are statistically significant. Among the remaining six parental involvement variables, two have negative effects on reading achievement. The effect of TV Rules on reading achievement is negative, suggesting that fifth graders are less likely to achieve success in reading if their parents set rules for watching TV. The effect of Homework Help on reading achievement is also negative, indicating that the more often parents help with their children's homework, the less likely children would achieve success in reading. The other four parental involvement variables, School Involvement, Parental Education Expectations, Homework Frequency, and Extracurricular Activities, are statistically significant and positive predictors for student reading achievement. According to these positive effects, involvement in schools, parental educational expectations for children, engaging children in homework, and encouraging children's extracurricular participation would all promote children's reading achievement. Among the six statistically significant predictors, School Involvement and Parental Education *Expectations* have the greatest positive effects on student reading achievement (both regression coefficients = 0.22), and Homework Help has the greatest negative effect on reading achievement (regression coefficient = -0.25). In short, the results from this model show that all the dimensions of parental involvement as defined in this study, except

Parent-Child Communication, are statistically significant predictors for fifth graders' reading achievement.

Research Question 2

What dimensions of parental involvement affect fifth graders' aptitude for SRL?

To answer research question 2, a second multiple regression model was built on each of the five imputations. In this regression model, the seven parental involvement variables (dimensions) were used to predict/explain SRL of fifth graders. The results of the five imputations are provided in Appendix E. The SAS procedure, PROC MIANALYZE, was used to combine the results of the five imputations. The combined results are displayed in Table 4.3.

Parameter	Estimate	Std Error	DF	t Value	Pr > t
intercept	-0.04	0.0201	439.76	-2.12	0.0347
Parent-Child Communication	0.00	0.0173	300.98	-0.1	0.9182
School Involvement	0.12	0.0195	212.01	6	<.0001
TV Rules	-0.07	0.0166	437.23	-4.36	<.0001
Homework Help	-0.20	0.0158	148.48	-12.64	<.0001
Parental Education Expectations	0.16	0.0189	400.47	8.68	<.0001
Homework Frequency	0.10	0.0206	266.36	4.88	<.0001
Extracurricular Activities	0.09	0.0197	235.51	4.75	<.0001
(R-Square = 0.13)					

Table 4.3 Regression Model: Parental Involvement and SRL

As shown in Table 4.3, the R-square for this model is 0.13, and the seven parental involvement variables explain approximately 13% of the variance in SRL. This R-square

is comparable to previous research (e.g., Hoover-Dempsey & Sandler, 2005; Martinez-Pons, 1996) concerning the effect of parental involvement on proximal student outcomes (e.g., SRL). The regression coefficient for *Parent-Child Communication* is not statistically significant (t = -0.1, p-value = 0.9182), and the regression coefficients for the remaining six parental involvement variables are statistically significant. Therefore, *Parent-Child Communication* is a not a statistically significant predictor for student SRL. Two of the six parental involvement variables, TV Rules and Homework Help, have negative effects on SRL, suggesting that fifth graders are less likely to be more selfregulated if their parents are more likely to set rules for watching TV or if their parents help with their homework more frequently. The other four of the six parental involvement variables, School Involvement, Parental Education Expectations, Homework Frequency, and *Extracurricular Activities*, have positive effects on SRL. These positive effects suggest that more parental involvement in these four dimensions would promote children's SRL. Among the six statistically significant predictors, Parental Education Expectations and School Involvement are most likely to foster children's SRL, and *Homework Help* is mostly likely to hinder their SRL.

To summarize the results from this regression model, it was found that six of the seven parental involvement dimensions are statistically significant predictors for SRL, and that three dimensions (*Parental Education Expectations, School Involvement*, and *Homework Help*) play a greater role in predicting fifth graders' aptitude for SRL.

Computation of Additional Path Coefficients

To compute the path coefficients that represent the direct effects of parental involvement and the effect of SRL on reading achievement, a third multiple regression

model was built. In this model, SRL and the seven parental involvement variables were used to predict/explain reading achievement of fifth graders. The results from this regression model can be used to assess the effect of SRL on reading achievement while controlling for parental involvement. The results can also be used to examine the effect of parental involvement on reading achievement while controlling for SRL.

The regression was performed on each of the five imputed data sets. The results of the five imputations are provided in Appendix F. Then the SAS procedure, PROC MIANALYZE, was used to combine the results of the five imputations. The combined results are displayed in Table 4.4.

Parameter	Estimate	Std Error	DF	t Value	$\Pr > t $
intercept	-0.04	0.0216	394.13	-1.92	0.055
SRL	0.25	0.0153	250.03	16.54	<.0001
Parent-Child Communication	-0.01	0.0180	426.77	-0.83	0.409
School Involvement	0.19	0.0180	413.94	10.77	<.0001
TV Rules	-0.04	0.0167	428.81	-2.1	0.036
Homework Help	-0.20	0.0184	363.54	-11.02	<.0001
Parental Education Expectations	0.18	0.0153	400.38	11.68	<.0001
Homework Frequency	0.05	0.0237	275.12	2.1	0.037
Extracurricular Activities	0.09	0.0180	435.39	5.26	<.0001
(R-Square = 0.29)					

Table 4.4 Regression Model: Parental Involvement, SRL, and Reading Achievement

As shown in Table 4.4, the R-square for this regression model is 0.29, suggesting that SRL and the seven parental involvement variables explain approximately 29% of the

variance in reading achievement. It was found in the first regression model that the seven parental involvement variables have explained 24% of the variance in reading achievement. Therefore, adding SRL to the first model can explain additional 5% of the variance in reading achievement. Similar to the results from the first two regression models, the regression coefficient of *Parent-Child Communication* is not statistically significant (t = -0.83, p-value = 0.409), and the regression coefficients for SRL and the remaining six parental involvement variables are statistically significant. The two variables, TV Rules and Homework Help, are statistically significant and negative predictors for student reading achievement, which means that more TV rules or more homework help hinders reading achievement among children who demonstrate the same degree of SRL. The four variables, School Involvement, Parental Education Expectations, Homework Frequency, and Extracurricular Activities, are statistically significant and positive predictors for reading achievement even after controlling for SRL. These positive effects suggest that a higher degree of parental involvement as measured by the four dimensions would help children achieve higher in reading. In addition, SRL is a significant predictor for student reading achievement even after controlling for all the seven parental involvement variables. Therefore, SRL makes a distinct contribution to student reading achievement after controlling for the effects of parental involvement variables.

Among the statistically significant predictors in this regression model, SRL has the greatest effect on reading achievement (regression coefficient = 0.25); the next two greatest positive effects are *School Involvement* (regression coefficient = 0.19) and *Parental Education Expectations* (regression coefficient = 0.18); and the greatest

negative effect is *Homework Help* (regression coefficient = -0.20). The results from this model show that the "direct effects" of parental involvement on reading achievement are statistically significant.

To summarize, it can be concluded that fifth graders' aptitude for SRL makes a distinctive contribution to their reading achievement after controlling for parental involvement variables, and that each of the parental involvement variables, except *Parent-Child Communication*, is a statistically significant predictor for reading achievement after controlling for student aptitude for SRL.

The Final Path Model

The results from the path analysis conducted by using three multiple regression models suggested no compelling evidence for the effects of *Parent-Child Communication* on SRL and reading achievement. Therefore, this variable was dropped from the original path model. The path coefficients (standardized regression coefficients) and the two correlation coefficients are presented in the revised path model in Figure 4.1. The two correlation coefficients were estimated using the PROC CALIS procedure. As shown in Figure 4.1, the data supported the path model: All the path coefficients in the revised model are statistically significant. The statistical significance of the three regression models and all the path coefficients indicate the potential indirect effects of parental involvement variables on reading achievement. However, there is a need to test directly the significance of the indirect effects in order to conclude whether SRL mediates the relationship between parental involvement and reading achievement. Question 3 asks whether the indirect effect of each of the dimensions of parental





involvement on reading achievement through SRL is different from zero, and it is addressed in the following.

Research Question 3

Does SRL mediate the relationship between parental involvement and student reading achievement?

The Sobel test was conducted to answer research question 3. This test evaluated directly whether the indirect effect of each of the parental involvement variables on student reading achievement through SRL was significantly different from zero. If the indirect effects differ from zero, it can be concluded that SRL is a mediator that mediates the relationship between parental involvement and reading achievement. The results of the Sobel test are displayed in Table 4.5.

Table 15	Desvelte	of the	Calcal	Tast
Table 4.5	Results	of the	Sober	rest

Parameter	Indirect Effect	Standard Error of Indirect Effect	Test Statistic (Z)
Parent-child communication	-0.00	0.004	-0.10
School involvement	0.03	0.005	5.63
TV rules	-0.02	0.004	-4.21
Homework help	-0.05	0.005	-10.03
Parental education expectations	0.04	0.005	7.68
Homework frequency	0.03	0.005	4.68
Extracurricular activities	0.02	0.005	4.56

As shown in Table 4.5, all the parental involvement variables, except *Parent-Child Communication*, have a statistically significant (Z > 1.96) indirect effect (positive or negative) on reading achievement. Therefore, the effect of each of the six parental involvement dimensions (not including *Parent-Child Communication*) on reading achievement shrinks significantly after controlling for the effect of SRL on reading achievement, and it can be concluded that SRL is a mediator that mediates the relationship between parental involvement and student reading achievement.

<u>Summary</u>

Several key findings emerged from the path analysis and the Sobel test. First, each of the dimensions of parental involvement, except *Parent-Child Communication*, is a statistically significant predictor or explanatory factor for students' SRL. Among the parental involvement dimensions as defined in this study, *Parental Educational Expectations* and *School Involvement* have the greatest positive effect on students' SRL, and *Homework Help* has the greatest negative effect on SRL. Second, SRL makes a distinctive contribution to students' reading achievement after controlling for the effect of parental involvement, and the effects of parental involvement on reading achievement are statistically significant after controlling for SRL. Finally, the results of the Sobel test suggest that all the indirect effects of six of the parental involvement variables on students' reading achievement through SRL are statistically significant. Therefore, it can be concluded that SRL mediates the relationship between parental involvement and student reading achievement.

CHAPTER V

DISCUSSION AND CONCLUSIONS

The purpose of this study was to identify parental involvement dimensions that foster SRL of fifth graders as well as to test whether SRL is a mediator between parental involvement and student reading achievement. The data were drawn from the ECLS-K database. To prepare data for analysis, a principal component analysis was first conducted to summarize the 28 parental involvement items and to guide the scale construction. Multiple imputation was then performed at the scale level so that conventional statistical packages, such as SAS, could be used for analysis. All analyses, except for the computation of correlation coefficients, incorporated the fifth grade crosssectional weights, which were refined sampling weights that also adjusted for other factors, such as nonresponse rates and the use of different instruments. Finally, path analysis and Sobel test were performed to test the theoretical model and answer the three research questions. The results of this study were presented in Chapter IV. In this chapter, the interpretations of the key results and implications for practice will be provided in the first four sections, followed by a discussion of future research directions stemming from these results.

SRL of Fifth Graders

In most school systems, fifth grade is most commonly a transitional stage from elementary to middle school. Despite recent research (Marsh, 1986; Ormrod, 2006; Zimmerman & Martinez-Pons, 1990) indicating the developmental foundation of SRL in this age group, very little empirical research has been conducted on the factors underlying SRL (Zeidner, Boekaerts, & Pintrich, 2000). The current study contributes to the literature by examining SRL of fifth graders using a nationally representative data set.

In the current study, SRL assessed three processes (self-motivation, self-control, and self-reaction/evaluation) and was scored on a 4-point Likert scale of 1 (never), 2 (sometimes), 3 (often), to 4 (very often). The results presented in Chapter IV showed that fifth graders had an average score of 3 for SRL, suggesting that children in fifth grade have "often" demonstrated the use of at least the three SRL processes as assessed by the ECLS-K data. This finding supports previous research (e.g., Ormrod, 2006), which suggests that fifth graders are developmentally ready to use some of the SRL processes, such as self-control and self-evaluation, and can work independently on short assignments. In the next section, the degree of parental involvement will be discussed to confirm the importance of studying its relationship with SRL.

The Degree of Parent Involvement

Marsh (1986) suggested that children use their parents as primary sources of academic assistance before eighth grade. Consistent with Marsh's (1986) study, the results presented in Chapter IV indicate that parents show a high degree of involvement in the education of fifth graders:

- The average score for *Parent-Child Communication* is 3.36 (the possible maximum value is 4), suggesting that parents and their children frequently engaged in discussions about friends, sex, alcoholic beverage, smoking, and drugs.
- Parents also showed a high degree of school involvement (the average score for *School Involvement* is 1.65, and the possible maximum value is 2).
- The average score for *Television Rules* is 1.47. The value codes for each item on the scale *TV Rules* are 1 (no) and 2 (yes), and the possible maximum value is 2. Thus, a score of 1.47 suggests parents are more likely to have TV rules for their fifth graders.
- The average score for *Homework Help* is 3.27, and the possible maximum value is 5. A score of 3.27 suggests that parents often help fifth graders with their homework (about 2 to 3 times a week).
- Fifth graders were found to do homework frequently. The average score is 4.33, and the maximum value for *Homework Frequency* is 5 (5 or more times a week).
 A score of 4.33 suggests that these children did homework 4 to 5 times a week.
- Most parents expected their children to have college level education. The average score for *Parental Education Expectations* is 3.94, between 3 (To attend two or more years of college) and 4 (To finish a four- or five-year college degree).
- The average score for *Extracurricular Activities* is 1.20, and the possible maximum value is 2. Parents scored relative low on this scale, indicating parents show a relatively low degree of involvement in extracurricular activities than in other activities.

Given the overall high degree of parental involvement in fifth grade, it is critical to gain a better understanding of the effects of various dimensions of parental involvement on SRL of fifth graders. The knowledge of the differential effects of various dimensions of parental involvement on SRL would help parents participate in children's education processes more effectively.

Parental Involvement Dimensions That Foster SRL of Fifth Graders

The current study investigated which dimensions of parental involvement are more likely to be associated with SRL and, therefore, are more likely to be effective in fostering SRL. Overall, this study found that parental involvement facilitates the development of SRL skills, but some dimensions (e.g., homework help) were found to hinder SRL. The results for each dimension of parental involvement are discussed in the subsections that follow.

Parent-Child Communication

The results in Chapter IV demonstrate that the effects of *Parent-Child Communication* on SRL and reading achievement were not statistically significant. These results are contradictory to the previous findings. For example, Martinez-Pons (1996) indicated that parental communication may provide opportunities for parents to induce positive values, beliefs, and SRL standards, indicating that it would be reasonable to expect a positive correlation between parent-child communication and increased SRL skills. Previous research also found strong associations between low academic achievement and health-risk behaviors in late childhood (Chewning et al., 2001; Cox, Zhang, Johnson, & Bender, 2007; Riesch, Anderson, & Krueger, 2006), suggesting a positive association between *Parent-Child Communication* and increased student academic achievement.

Although contradictory, it is not surprising that the results of the current study did not support the potential beneficial effect of parent-child communication on student SRL and reading achievement. The effects of communication may depend on how parents communicate, and what these discussions entail. Some types of communication may be more effective than others on SRL.

Therefore, one possible explanation for this result concerns the topics of parentchild discussion. The variable, parent-child communication, addresses the health-risk behaviors: sex, tobacco, alcohol, drugs, and friends. Discussions of these topics may promote SRL strategies in more complicated manners but may have relatively limited value to SRL compared with discussions regarding learning strategies, motivation techniques, and resilience building.

Another possible explanation for this result may be that the variable of *Parent-Child Communication* in the ECLS-K did not provide information about how parents communicated with their children. The effects of *Parent-Child Communication* on SRL and reading achievement may be determined by the specific methods or modes of communication, especially when some of the topics were sensitive and when fifth graders had begun developing independence from parents. According to Ormrod (2006), one way to help students develop SRL skills is to give them opportunities to practice self-imposed contingency (self-reinforcement or self-punishment following a behavior), especially self-reinforcement. Negative conversations, such as "Don't" or "No," might mean control and hinder children's development of self-imposed contingencies. Some children may

even feel offended and do the opposite. Therefore, children may need to be given choices and to practice choice-making instead of being instructed "no" all the time. Moreover, Martinez-Pons (1996) found that modeling is one important method for parents to induce self-regulation in children. In the current study, some parents might only talk but not model. Their action and talking might not be congruent, and this is probably another explanation for this contradicting result. This result regarding *Parent-Child Communication* may suggest a need for providing parents with communication training so that they can communicate with their children more effectively. However, caution must be exercised when explaining the results pertaining to the variable of *Parent-Child Communication* given what this variable measures in this study.

School Involvement

The results of this study suggest that *School Involvement* leads to increased SRL and reading achievement in the fifth grade. Specifically, this study found that *School Involvement* has the largest positive effect on reading achievement and the second largest positive effect on SRL among the dimensions of parental involvement.

The beneficial and relatively strong effect of school involvement on reading achievement of fifth graders confirms previous findings. In a study with a large representative sample of U.S. middle school students, Sui-Chu and Willms (1996) indicated that parental school participation had a moderate effect on reading achievement. A meta-analysis of the effects of parental involvement on student academic achievement by Fan and Chen (2001) suggested that parental involvement at school had greater correlation with student academic achievement than parental home supervision (e.g., home rules for watching TV, doing homework, etc.). The substantial effect of parental school involvement on SRL probably can explain its strong effect on reading achievement. Another possible explanation for the strong effect of school involvement on reading achievement may be that the degree of school involvement may also reflect the overall investment parents place in their children's education. Therefore, school involvement is a good indicator of parental involvement.

The implication for the substantial effect of school involvement on SRL and reading achievement is to engage more parents in schools. Single or working parents may have limited time or resources to volunteer in schools or attend to school work. This may place their children at disadvantage. Therefore, one way to promote children's learning is to conduct email conversations or online group/community communications so that more parents, who cannot be physically present, can participate in school activities electronically. This way of virtual school involvement probably can be called E-school involvement.

TV Rules

Although television viewing has been found to hinder student academic achievement (Cooper, Valentine, Nye, & Lindsay, 1999; Fan & Chen, 2001; Keith, Reimers, Fehrmann, Pottebaum, & Aubey, 1986) probably by reducing study time and increasing mental passivity and impulsiveness (Nary, 2004), this study found that setting TV rules hinders SRL and reading achievement. It is not clear why having TV rules did not stimulate student SRL and reading achievement. One possible explanation may be that rules may often communicate a negative signal of "No" but not a message of "choice." Such rules may hinder children from developing self-imposed contingencies, and, in turn, their development in SRL (Ormrod, 2006). Differences in study design may also lead to the mixed findings. For example, Bembenutty (2006) studied TV rules in relation to academic achievement and found that having TV rules promotes math achievement of tenth graders. The current study investigated the relationship between TV rules and reading achievement and suggested the negative effect of TV rules on academic achievement of fifth graders. The difference in grade level and subject domain could lead to the mixed findings, and this needs to be further examined in future research. In addition, although encouraging family rules to restrict TV viewing has been continuously suggested for children's school performance and well-being (Davis, 2004; Odland, 2004; Zutphen, Bell, Kremer, & Swinburn, 2007), the results of this study suggest that the effect of TV rules on children's SRL and academic achievement is complicated.

Homework Frequency and Homework Help

The results of this study suggest that the frequency of doing homework leads to increased SRL and reading achievement, but homework help for children has a negative affect on SRL and reading achievement. In addition, the results also showed a statistically significant and positive correlation between *Homework Frequency* and *Homework Help* (r = 0.27).

The result that doing homework promotes SRL and reading achievement is consistent with previous findings regarding the benefits of doing homework (e.g., Zimmerman & Kitsantas, 2005). One possible explanation for such benefits could be that doing homework provides children with opportunities to practice SRL skills and to better understand what has been learned.

This study found homework help is a negative factor for both SRL and reading achievement. Bembenutty (2006) found that parental involvement in homework (frequency of checking homework and offering help) was negatively related to math achievement of tenth graders. This study confirms this negative effect of parental involvement in homework on student reading achievement in fifth grade. Despite the negative effect of homework help on children's academic achievement, it is so intuitive and generally agreed that students benefit when their parents are involved in their homework process. Previous research suggested that parents' involvement in homework appeared to influence student academic achievement through supporting the development of attitudes and attributes (e.g., motivation and self-regulation) that support learning (Hoover-Dempsey et al., 2001; Martinez-Pons, 2002; Xu & Corno, 2003). Therefore, one possible explanation for the negative effect in this study could be that high-achieving fifth graders might need less help, and that more self-regulated fifth graders might need less help. This explanation does not contradict the significant correlation between Homework Frequency and Homework Help. If children rarely engage in homework, they are probably less likely to need help with homework. Another possible interpretation for the negative effect of homework help relates to the question: How should parents help? Different answers to this question might have contributed to the inconsistency of findings in the previous literature. Parental help can be divided into two categories. First, parents may provide the materials and set the conditions for children to work on their homework. Second, parents may do homework for children, such as rewriting a child's paper or conducting the science project for a child. When parents do children's homework, children have less opportunity to develop independency, self-directedness, or selfimposed contingencies. Moreover, children may either feel controlled or develop dependency on parents but not an interest in homework.

The results about homework (i.e., the positive correlation between *Homework Frequency* and *Homework Help* and their opposite effects on SRL and reading achievement) suggest: To foster children's SRL and academic achievement, the effective homework help should probably communicate "choices" and allow children to actually complete their own homework.

Parental Education Expectations

The results in Chapter IV suggest that *Parental Education Expectations* has the largest beneficial effect on SRL and the second largest beneficial effect on reading achievement. *School Involvement* was found to have the largest beneficial effect on fifth graders' reading achievement.

The finding that *Parental Education Expectations* is the most important factor for SRL is probably due to its positive influence on children's self-motivation and selfevaluation standards. According to Bandura (1986), goals and aspirations not only reflect self-standards that are necessary to maintain "a given level of behavior," but also affect self-motivation (p. 350). Another possible explanation for the important effect of parental educational expectations may be that it indicates the amount of investment parents place in children's education. For example, parents with higher levels of educational expectations may also invest more in children's extracurricular activities, as indicated by the statistically significant correlation between *Parental Education Expectations* and *Extracurricular Activities* (r = 0.20). Therefore, *Parental Education Expectations* is a good index of parental involvement. It may not only contribute to the level of student motivation and self-standard but also reflect the degree of parental involvement or the amount of parental investment in education.

This study found that *School Involvement* plays a greater role than *Parental* Education Expectations in promoting fifth graders' reading achievement. This finding seems to be contradictory to the strong effect of parental educational expectations in previous literature. According to the meta-analysis by Fan and Chen (2001) parental expectations for children's education attainment had the strongest correlation with student academic achievement (r = 0.40) among all indicators of parental involvement. Considering the statistical analysis methods used in Fan and Chen (2001) and the current study, the results from the two studies are not much different. The meta-analysis by Fan and Chen (2001) synthesized empirical findings in the form of bivariate correlations between parental involvement variables and student academic achievement. The current study reported relationships in the form of path coefficients or standardized regression coefficients, which are necessarily influenced by other parental involvement variables in the model. For example, parental education expectations may relate to SRL differently than school involvement in important ways. Specifically, both the effects of *Parental Education Expectations* and *School Involvement* on reading achievement are mediated by SRL. Although School Involvement has greater direct effect on reading achievement, Parental Education Expectations has greater indirect effect on reading achievement. The direct effects of *Education Expectations* and *School Involvement* on reading achievement are 0.18 and 0.19, respectively (See Table 4.4-b or Figure 4.1). The indirect effects of Education Expectations and School Involvement on reading achievement through SRL are 0.04 and 0.03, respectively (See Table 4.5). Despite these slight differences in direct

and indirect effects, the total effect for both *Education Expectations* and *School Involvement* on reading achievement is the same (0.22) (See Table 4.2-b).

Therefore, the results from the current study are comparable to the results from Fan and Chen (2001). Both studies agree that *Parental Education Expectations* is one of the most important dimensions of parental involvement that contribute to children's academic achievement. The results of this study not only confirm this finding but also contribute to the literature by identifying the importance of school involvement to student SRL and achievement. Specifically, both *School Involvement* and *Parental Education Expectations* have the greatest effect on student reading achievement; with respect to fostering children's SRL skills, the results suggest that *Parental Education Expectations* is the most important dimension of parental involvement.

Extracurricular Activities

The results of this study showed that participation in extracurricular activities has a positive effect on student SRL and reading achievement, and this is consistent with previous findings. According to the review of research on extracurricular participation by Eccles and Templeton (2002), previous research has examined mostly extracurricular participation in secondary schools. Among the few studies on extracurricular participation in elementary grades, Dumais (2006) reported that the number of extracurricular activities in which kindergarteners and first graders participate determines their gains in reading achievement. The current study contributes to previous research by demonstrating the positive effect of extracurricular participation on reading achievement in the fifth grade. Moreover, the results suggested that extracurricular participation is an important and meaningful factor that contributes to children's SRL development. This is

probably because extracurricular activities provide children with supplemental learning experiences that can be translated into increased SRL and academic achievement (Eccles & Templeton, 2002). Finally, extracurricular participation has a smaller effect on SRL and reading achievement than other dimensions of parental involvement although it may have more important effects on other aspects of development in fifth grade.

To summarize, all the aforementioned dimensions of parental involvement, except *Parent-Child Communication*, have statistically significant effects on fifth graders' SRL and reading achievement. The results confirm the "social origins" of SRL and the essential roles that parents play in fostering children's SRL and academic achievement (Schunk & Zimmerman, 1997; Zimmerman, 2000). Moreover, both positive and negative effects of dimensions of parental involvement have practical implications.

First, educational expectations for children's education attainment and parental school involvement were found to have the strongest beneficial effects on student SRL and reading achievement among the dimensions of parental involvement. The strong and positive effects of these two dimensions of parental involvement suggest directions for parents' involvement effort. To help children become more self-regulated and achieve higher, parents need to have higher educational expectations for their children and participate more in schools.

Second, some dimensions of parental involvement, including *Homework Help* and *TV Rules*, were found to have negative effects on SRL. In addition to the reasons discussed earlier in each subsection (e.g., the ECLS-K data did not provide information about patterns of involvement), another possible explanation for these negative effects may be that the development or use of SRL skills is an interaction effect of three sets of

factors: self, behavior, and social environment. This interdependence among the three types of factors is known as triadic reciprocal causation (Bandura, 1986, 1989). According to the triadic reciprocal causation, there is a bidirectional relationship between learning environment and SRL. This study focused on only the one-way relationship from parental involvement to SRL but did not examine the relationship in the opposite direction. As learning environment affects students' use of SRL skills, students may also shape and adapt to the learning environment. The practical implication of this explanation is: When we encourage parental involvement and home support for students, we should be aware of the reciprocal relationship by helping parents to give their children more ageappropriate choices. Parents should provide their children with choices and give feedback on the appropriateness of choices that children make (Boekaerts, 1999). By practicing choice-making, children may develop self-imposed contingencies that help them become more self-regulated.

SRL as a Mediator between Parental Involvement and Student Reading Achievement

Voluminous research has been conducted to discover whether or to what extent parental involvement relates to student academic achievement (Epstein, 1995; Fan & Chen, 2001; Hoover-Dempsey & Sandler, 1995, 1997; Hoover-Dempsey & Sandler, 2005; Timothy Z. Keith & et al., 1993; Reynolds & Clements, 2005; Sheldon & Epstein, 2005; Walker, Wilkins, Dallaire, Sandler, & Hoover-Dempsey, 2005). However, the aim of education research extends beyond discovering the association between parental involvement and student achievement. An in-depth understanding needs to be gained regarding the process by which parental involvement produces the effect of increased student achievement. Therefore, one aim of this study was to understand whether parental

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involvement leads to increased student achievement by affecting students' use of SRL skills.

The results of this study suggest that parental involvement influences student reading achievement by affecting students' use of SRL processes. Therefore, SRL is the mechanism through which parental involvement affects student reading achievement; or SRL is one of the links for the association between parental involvement and student reading achievement. The mediation effect of SRL may explain why some patterns of parental involvement are effective and others are not. Therefore, the mediation effect of SRL provides a framework for parents, educators, and policymakers to help children achieve academically.

By taking into account the mediation effects of SRL between parental involvement and student reading achievement, educators and policymakers can engage parents in children's education process more effectively. Specifically, parental involvement that leads to increased student reading achievement should be the pattern of involvement that does not hinder students' SRL development. As such, educators and policy makers may consider promoting children's self-directedness when they intend to engage parents in the education process. The reason is that the involvement that promotes children's selfdirectedness will lead to increased learning.

By considering the mediation effect of SRL, parents may provide a home environment that can engage children in homework rather than doing the work for them. The kind of homework help that leads to increased student reading achievement should be the kind of help that does not hinder students' SRL development. To make homework help effective in boosting student achievement, the help should allow children to do their own work. During the process of doing their own homework, students learn to assume responsibility and take control of their learning process. With respect to the factor of parental education expectations, higher expectations do not automatically increase student reading achievement. Rather, it may enhance learning by contributing to students' development in SRL. In addition to the practical implications, future research directions stemming from these results are discussed in the next section.

Future Research

The results of this study suggest further research endeavors in the following areas/directions: (a) comparison of SRL of students across grade levels, (b) differential effects of patterns of parental involvement on SRL and academic achievement, (c) parental roles in guiding children's technology use, (d) the transfer of SRL strategies across academic domains, and (e) using SRL as a framework to design effective education programs.

First, it would be interesting to compare SRL of fifth graders with that of eighth graders if the ECLS-K eighth grade data become available. Only three SRL processes (self-motivation, self-control, and self-reaction/evaluation) were gauged by the ECLS-K fifth grade data. Instead of using the ECLS-K data, future research may also be designed to measure more SRL processes because children may be capable of using more SRL processes after fifth grade.

Second, the ECLS-K data did not provide in-depth and detailed information for patterns of parental involvement, and future research may be conducted to examine the effects of various patterns of involvement by collecting more information about parental involvement. For example, parent-child communication was found to have no statistically significant effect on SRL and reading achievement. In this study, parent-child communication was assessed only by how often parents discuss with their children certain health-risk behaviors (e.g., sex, tobacco, alcohol, drugs, and friends). Future research needs to be conducted to examine the effects of different patterns of communication on student SRL and academic achievement. In addition to discussing the health-risk behaviors, future research needs to assess parent-child communication in terms of learning related factors, such as study strategies and motivation techniques. Discussions of such factors may have a greater effect on children's SRL and academic achievement than the health-risk behaviors measured in the ECLS-K.

As another example, homework help was found to have a negative effect on fifth graders' SRL and reading achievement. In the ECLS-K, homework help is measured by the items about how often parents help the child with his/her homework, but the data did not assess how parents help with children's homework (e.g., providing resources, direct instruction, or doing homework for them). Future research may be needed on how to help with children's homework in order to foster student SRL and achievement. Instead of studying whether homework help may lead to increased student achievement, future research may examine how different patterns and dimensions of homework help affect SRL and academic achievement. Additionally, the results in Chapter IV suggest that the seven parental involvement variables explain approximately only 13% of the variance in SRL. Although this R-square is comparable to previous findings about the effect of parental involvement on proximal student outcomes (e.g., self-efficacy, intrinsic motivation to learn, and self-regulatory strategy use (Hoover-Dempsey & Sandler, 2005; Martinez-Pons, 1996), improvement in definitions and measurement of parental

involvement dimensions could help discover more meaningful parental involvement practices that foster children's SRL.

Third, future research may examine the parental roles in guiding children's use of other technologies in addition to television. Today children have access to many forms of technology, such as computer technology. The advancement in technology has expanded possibilities for education but also added to the complexity of parenting. Parents may need to think about how to help children take advantage of learning opportunities of technology use and reduce distractions associated with it. Therefore, in addition to study the effect of TV rules, possible research could focus on how parents guide children's use of other technologies and the effect of such parental guidance on SRL and academic achievement.

Fourth, academic achievement in this study was assessed by reading achievement due to the domain specific feature of SRL. While SRL strategies are often domain specific, self-regulation also means to develop knowledge and skills that can be transferred from one subject domain to another and from academic learning to work and personal life contexts (Boekaerts, 1999; Zeidner et al., 2000). While the role of transfer is not the emphasis of the current study, it is an interesting area for future research. Additional quantitative and qualitative research could be conducted on the role of transfer across academic domains, such as the transfer of SRL strategies from reading to math and from reading to science.

Finally, the statistical significance of the mediation effect of SRL suggests that SRL can be used as a framework to increase student academic achievement. Future research needs to be conducted to discover how to use SRL as a framework to design effective

education programs in the areas, such as study strategies, student success seminars, and effective goal setting and implementation.

Conclusion

In conclusion, this study identified six dimensions of parental involvement that are likely to foster SRL of fifth graders: *School Involvement, TV Rules, Homework Help, Homework Frequency, Parental Education Expectations, and Extracurricular Activities.* Among them, three dimensions (*Parental Education Expectations, School Involvement, and Homework Help*) were found to play a greater role in fostering student SRL and reading achievement than other dimensions. Moreover, parental involvement affects student reading achievement through SRL. The mediation effect of SRL may explain why some patterns of parental involvement are effective why others are not. By taking into account the differential effects of parental involvement dimensions on SRL, educators and policymakers can engage parents in their children's education process more effectively by helping parents to foster their children's SRL.

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APPENDICES

APPENDIX A

LIST OF PARENTAL INVOLVEMENT ITEMS

Parent-Child Communication

Variable Name in the ECLS-K	Item Number/Description	Response Codes		
P6OFTTLK P6TLKFRD	In the past month, how often have you talked with {CHILD} about HEQ.420A {His/her} day at school? HEQ.420B What {he/she} does with {his/her} friends?	 1 = Not at all 2 = A few times a month 3 = Few times a week 4 = Every day 		
	In the past year, how often have you talked with {CHILD} about			
P6TLKSMK	HEQ.421A The subjects of smoking or tobacco use?			
P6TLKALC	HEQ.421B The subject of drinking alcoholic beverages, such as beer, wine, or liquor?	1 = Not at all 2 = Once		
P6TLKSEX	HEQ.421C Topics related to sex, such as sexual activity or sexually transmitted diseases?	3 = Twice4 = Three or more times		
P6TLKDRG	HEQ.421D The subject of drug use, such as marijuana, inhalants, or cocaine?			

School Involvement

Variable Name in the ECLS-K	Item Number/Description	Response Codes
P6ATTENB	PIQ.020A1 Attended an open house or back-to-school night?	
P6ATTENP	PIQ.020B1 Attended a meeting of a PTA, PTO, or Parent-Teacher Organization?	
P6PARGRP	PIQ.020C1 Gone to a regularly scheduled parent-teacher conference with {CHILD}'s teacher or meeting with {CHILD}'s teacher?	1=Yes
P6ATTENS	PIQ.020D1 Attended a school or class event, such as a play, sports event, or science fair?	2=No
P6VOLUNT	PIQ.020E1 Volunteered at the school or served on a committee?	
P6FUNDRS	PIQ.020F1 Participated in fundraising for {CHILD}'s school?	

Television Viewing Rules

Variable Name in the ECLS-K	Item Number/Description	Response Codes
	Are there family rules for:	
P6TVRULE	HEQ.075A What programs {CHILD} can watch?	
P6TVRUL2	HEQ.075B How early or late {he/she} may watch TV?	
	HEO 075C How many hours {he/she} may watch TV	1=Yes
P6FRNUMH	on weekdays?	2=No
P6FRHRWK	HEQ.075D How many hours {he/she} may watch TV each week?	

Homework

Variable Name in the ECLS-K	Item Number/Description	Response Codes
P6OFHLPR	HEQ.095 During this school year, how often did someone help {CHILD} with {his/her} reading, language arts or spelling homework?	1 = Never 2 = Less than once a week
P6OFHLPM	HEQ.098 During this school year, how often did someone help {CHILD} with {his/her} math homework?	3 = 1 to 2 times a week 4 = 3 to 4 times a week 5 = 5 or more times a
P6OFTDHW	HEQ.090 How often does {CHILD} do homework either at home or somewhere else outside of school?	week

Parental Education Expectations

Variable Name in the ECLS-K	Item Number/Description	Response Codes
		1= To receive less than a high school diploma
		2= To graduate from high school
	PIQ.070 How far in school do you expect {child} to go?	3= To attend two or more years of college
P6EXPECT		4= To finish a four- or five-year college degree
		5= To earn a master's degree or equivalent
		6= To finish a Ph.D., MD or other advanced degree?

Extracurricular Activities

Variable Name in the ECLS-K	Item Number/Description	Response Codes
	Outside of school hours in the past year, has {CHILD} participated in:	
P6DANCE	P6 HEQ020A Dance lessons?	
P6ATHLET	HEQ.020B Organized athletic activities, like basketball, soccer, baseball, or gymnastics?	
P6CLUB	P6 HEQ020C Organized clubs or recreational programs, like scouts?	
P6MUSIC	P6 HEQ020D Music lessons, for example, piano, instrumental music or singing lessons?	1=Yes
P6ARTCRF	P6 HEQ020E Art classes or lessons, for example, painting, drawing, sculpturing?	2=No
P6ORGANZ	P6 HEQ020F Organized performing arts programs, such as children's choirs, dance programs, or theater performances?	
P6CLBCRD	P6 HEQ024 Does {CHILD} have {his/her} own library card?	
P6LIBRAR	P6 HEQ026 In the past month, that is, since {MONTH} {DAY}, has anyone in your family visited a library with {CHILD}?	

APPENDIX B

MISSING DATA PATTERNS

Group	School Involvement	Home Frequency	Parental Education Expectations	Extracurricular Activities	Parent-Child Communication	TV Rules	Homework Help	SRL	Reading Achievement	Freq	Percent
1	x	x	x	x	x	x	x	x	x	9557	86 91
2	x	x	x	x	x	x	x	X	21	86	0.78
2	X	X	X	X	X	X	X	11	· X	506	4.6
4	x	x	x	x	x	x	x	•		422	3 84
5	X	x	X	X	x	X	71	· v	· X	 	2.04
5	X	X	X	X X	X X	X X	•	x	Λ	10	0.09
0	Λ V	A V	A V	Λ V	л v	л v	•	Λ	· v	10	0.09
/ 0	Λ V	A V	Λ V	Λ V	Λ V	Λ V	•	•	Λ	10	0.13
0	A V	A	A V	A V	A	Λ	•	•	•	14	0.15
9	Х	Х	Х	Х	Х	•	Х	Х	Х	38	0.35
10	Х	Х	Х	Х	Х	•	Х	•	Х	12	0.11
11	Х	Х	Х	Х	Х		Х	•		4	0.04
12	Х	Х	Х	Х	Х			Х	Х	4	0.04
13	Х	Х	Х	Х		Х	Х	Х	Х	14	0.13
14	Х	Х	Х	Х		Х	•	Х	Х	1	0.01
15	Х	Х		Х	Х	Х	Х	Х	Х	25	0.23
16	Х	Х		Х	Х	Х	Х	•	Х	4	0.04

Group	School Involvement	Home Frequency	Parental Education Expectations	Extracurricular Activities	Parent-Child Communication	TV Rules	Homework Help	SRL	Reading Achievement	Freq	Percent
17	Х	Х		Х	Х	Х	Х	•		1	0.01
18	Х	Х		Х		Х	Х	Х	Х	1	0.01
19	Х		Х	Х	Х	Х		Х	Х	3	0.03
20	Х		Х	Х	Х	Х	•	•	•	2	0.02
21	Х		Х	Х		Х		Х	Х	4	0.04
22	Х		Х	Х				Х	Х	8	0.07
23	Х		Х	Х				Х	•	1	0.01
24	Х		Х	Х			•	•	•	1	0.01
25	Х		Х	•				Х	Х	9	0.08
26	Х		Х						•	1	0.01
27	Х			•				Х	Х	1	0.01
28		Х	Х	Х	Х	Х	Х	Х	Х	1	0.01
29		Х	Х	Х	Х	Х	Х		Х	1	0.01
30		Х	Х	Х	Х	Х	Х	•	•	3	0.03
31		Х	Х	Х	Х	Х			Х	2	0.02
32		Х	Х	Х		Х	Х	Х	Х	1	0.01
33		Х		Х		Х	Х	Х	Х	1	0.01

Appendix B (Continued)

Note. N=10996 after deleting the cases with missing values on all seven parental involvement variables.

An "X" means that the variable is observed, and a "." means that the variable is missing.

APPENDIX C

DESCRIPTIVE STATISTICS FROM FIVE IMPUTATIONS

SURVEYMEANS							
Imputation							
Number	Variable	Ν	Mean	Std Error			
1	Reading Achievement	10120	136.90	0.622			
	SRL	10120	3.01	0.015			
	Parent-Child Communication	10120	3.36	0.010			
	School Involvement	10120	1.65	0.006			
	TV Rules	10120	1.47	0.011			
	Homework Help	10120	3.28	0.020			
	Parental Education Expectations	10120	3.94	0.025			
	Homework Frequency	10120	4.34	0.023			
	Extracurricular Activities	10120	1.20	0.005			
2	Reading Achievement	10120	136.90	0.629			
	SRL	10120	3.01	0.014			
	Parent-Child Communication	10120	3.36	0.009			
	School Involvement	10120	1.65	0.006			
	TV Rules	10120	1.46	0.011			
	Homework Help	10120	3.27	0.020			
	Parental Education Expectations	10120	3.94	0.025			
	Homework Frequency	10120	4.33	0.023			
	Extracurricular Activities	10120	1.20	0.005			
3	Reading Achievement	10120	136.94	0.608			
	SRL	10120	3.00	0.014			
	Parent-Child Communication	10120	3.36	0.009			
	School Involvement	10120	1.65	0.006			
	TV Rules	10120	1.47	0.011			

Appendix C (Continued)

SURVEYMEANS							
Imputation							
Number	Variable	Ν	Mean	Std Error			
	Homework Help	10120	3.27	0.019			
	Parental Education Expectations	10120	3.94	0.025			
	Homework Frequency	10120	4.33	0.023			
	Extracurricular Activities	10120	1.20	0.005			
4	Reading Achievement	10120	136.89	0.620			
	SRL	10120	3.00	0.014			
	Parent-Child Communication	10120	3.36	0.010			
	School Involvement	10120	1.65	0.006			
	TV Rules	10120	1.47	0.011			
	Homework Help	10120	3.28	0.019			
	Parental Education Expectations	10120	3.94	0.025			
	Homework Frequency	10120	4.33	0.023			
	Extracurricular Activities	10120	1.20	0.005			
5	Reading Achievement	10120	136.94	0.635			
	SRL	10120	3.00	0.014			
	Parent-Child Communication	10120	3.36	0.010			
	School Involvement	10120	1.65	0.006			
	TV Rules	10120	1.47	0.011			
	Homework Help	10120	3.27	0.020			
	Parental Education Expectations	10120	3.94	0.025			
	Homework Frequency	10120	4.34	0.023			
	Extracurricular Activities	10120	1.20	0.005			

APPENDIX D

PARENTAL INVOLVEMENT AND READING ACHIVEMENT

Imputation Number	Results of Regression							
1	(R-square = 0.2358)					D :		
	Parameter	Estimate	Standard Error	t Value	$\Pr > t $	Design Effect		
	Intercept	-0.05	0.0210	-2.48	0.0134	5.15		
	Parent-Child Communication	-0.01	0.0182	-0.69	0.4918	3.62		
	School Involvement	0.22	0.0187	12.01	<.0001	3.98		
	TV Rules	-0.05	0.0172	-2.92	0.0037	3.51		
	Homework Help	-0.25	0.0190	-13.31	<.0001	3.99		
	Parental Education Expectations	0.22	0.0165	13.39	<.0001	3.09		
	Homework Frequency	0.07	0.0222	3.25	0.0012	5.67		
	Extracurricular Activities	0.12	0.0173	6.88	<.0001	3.16		
2	(R-square = 0.2374)							
	D		Standard	. 37 1		Design		
	Parameter	Estimate	Error	t Value	Pr > t	Effect		
	Intercept	-0.06	0.0210	-2.69	0.0075	5.18		
	Parent-Child Communication	-0.01	0.0175	-0.82	0.4102	3.34		
	School Involvement	0.22	0.0182	12.23	<.0001	3.77		
	TV Rules	-0.05	0.0170	-3.13	0.0019	3.44		
	Homework Help	-0.26	0.0188	-13.73	<.0001	3.97		

Imputation Number	Results of Regression								
	Parental Education Expectations	0.22	0.0164	13.33	<.0001	3.05			
	Homework Frequency	0.08	0.0235	3.49	0.0005	6.36			
	Extracurricular Activities	0.12	0.0174	6.74	<.0001	3.24			
3	(R-square = 0.2344)								
	Parameter	Estimate	Standard Error	t Value	$\Pr > t $	Design Effect			
	Intercept	-0.05	0.0205	-2.58	0.0101	4.98			
	Parent-Child Communication	-0.02	0.0181	-0.94	0.3502	3.58			
	School Involvement	0.22	0.0184	12.08	<.0001	3.88			
	TV Rules	-0.05	0.0164	-3.29	0.0011	3.2			
	Homework Help	-0.26	0.0184	-13.95	<.0001	3.78			
	Parental Education Expectations	0.22	0.0159	13.94	<.0001	2.89			
	Homework Frequency	0.07	0.0204	3.52	0.0005	4.82			
	Extracurricular Activities	0.12	0.0175	6.7	<.0001	3.28			
4	(R-square = 0.2350)		Circu dand			During			
	Parameter	Estimate	Standard Error	t Value	Pr > t	Design Effect			
	Intercept	-0.05	0.0208	-2.49	0.0132	5.08			
	Parent-Child Communication	-0.02	0.0177	-0.94	0.3465	3.38			
	School Involvement	0.22	0.0182	12.24	<.0001	3.74			
	TV Rules	-0.06	0.0169	-3.26	0.0012	3.38			
	Homework Help	-0.25	0.0186	-13.47	<.0001	3.85			
	Parental Education Expectations	0.22	0.0163	13.55	<.0001	3.01			
	Homework Frequency	0.07	0.0231	3.1	0.002	6.13			
	Extracurricular Activities	0.12	0.0173	7	<.0001	3.19			

Appendix D (Continued)

Appendix D	(Continued)
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Imputation Number	Results of Regression							
5	(R-square = 0.2340)							
	Parameter	Estimate	Standard Error	t Value	$\Pr > t $	Design Effect		
	Intercept	-0.05	0.0215	-2.24	0.0258	5.44		
	Parent-Child Communication	-0.02	0.0174	-0.91	0.3608	3.31		
	School Involvement	0.23	0.0185	12.15	<.0001	3.92		
	TV Rules	-0.05	0.0170	-3.18	0.0016	3.44		
	Homework Help	-0.25	0.0189	-13.29	<.0001	3.96		
	Parental Education Expectations	0.22	0.0169	12.91	<.0001	3.25		
	Homework Frequency	0.08	0.0249	3.18	0.0016	7.11		
	Extracurricular Activities	0.12	0.0173	6.78	<.0001	3.19		

APPENDIX E

PARENTAL INVOLVEMENT AND SRL

Imputation						
Number	Results of Regression					
1	(R-square = 0.1248)					D .
	Parameter	Estimate	Standard Error	t Value	$\Pr > t $	Effect
	Intercept	-0.04	0.0206	-2.11	0.0354	4.46
	Parent-Child Communication	0.00	0.0165	0.16	0.8735	2.67
	School Involvement	0.11	0.0195	5.57	<.0001	3.89
	TV Rules	-0.07	0.0175	-4.13	<.0001	3.27
	Homework Help	-0.20	0.0149	-13.34	<.0001	2.22
	Parental Education Expectations	0.16	0.0191	8.41	<.0001	3.73
	Homework Frequency	0.10	0.0202	4.85	<.0001	4.21
	Extracurricular Activities	0.10	0.0192	5.22	<.0001	3.53
2	(R-square = 0.1305)					
	Parameter	Estimate	Standard Error	t Value	Pr > t	Design Effect
	Intercept	-0.04	0.0202	-2.03	0.0427	4.32
	Parent-Child Communication	-0.01	0.0172	-0.46	0.6472	2.93
	School Involvement	0.12	0.0180	6.46	<.0001	3.31
	TV Rules	-0.07	0.0170	-4.14	<.0001	3.1
	Homework Help	-0.20	0.0141	-14.43	<.0001	2.03

Appendix E (Continued)

Imputation Number	Results of Regression					
	Parental Education Expectations	0.17	0.0185	0.00	< 0001	3 57
	Homework Frequency	0.17	0.0202	9.09 4.64	< 0001	1.32 1.32
	Extracurricular Activities	0.09	0.0202	4.98	<.0001 <.0001	4.28 3.43
3	(R-square = 0.1295)					
	Parameter	Estimate	Standar d Error	t Value	$\Pr > t $	Design Effect
	Intercept	-0.04	0.0198	-2.16	0.0313	4.16
	Parent-Child Communication	0.00	0.0175	0	0.9981	3.02
	School Involvement	0.12	0.0185	6.7	<.0001	3.51
	TV Rules	-0.07	0.0164	-4.44	<.0001	2.87
	Homework Help	-0.20	0.0149	-13.64	<.0001	2.26
	Parental Education Expectations	0.16	0.0185	8.82	<.0001	3.55
	Homework Frequency	0.11	0.0194	5.54	<.0001	3.94
	Extracurricular Activities	0.09	0.0188	4.56	<.0001	3.43
4	(R-square = 0.1263)					
	Parameter	Estimate	Standar d Error	t Value	$\Pr > t $	Design Effect
	Intercept	-0.04	0.0199	-2.11	0.0354	4.15
	Parent-Child Communication	0.00	0.0167	-0.08	0.9358	2.71
	School Involvement	0.12	0.0184	6.49	<.0001	3.44
	TV Rules	-0.07	0.0159	-4.61	<.0001	2.7
	Homework Help	-0.19	0.0150	-12.77	<.0001	2.25
	Parental Education Expectations	0.16	0.0184	8.87	<.0001	3.47
	Homework Frequency	0.10	0.0196	5.12	<.0001	3.98
	Extracurricular Activities	0.10	0.0188	5.1	<.0001	3.36
5	(R-square = 0.1294)					
	Parameter	Estimate	Standar d Error	t Value	$\Pr > t $	Design Effect
	Intercept	-0.04	0.0198	-2.2	0.0282	4.21

Appendix E (Continued)

Imputation Number	Results of Regression					
	Parent-Child Communication	0.00	0.0161	-0.15	0.8843	2.57
	School Involvement	0.12	0.0185	6.39	<.0001	3.53
	TV Rules	-0.07	0.0159	-4.58	<.0001	2.73
	Homework Help	-0.20	0.0147	-13.58	<.0001	2.18
	Parental Education Expectations	0.17	0.0188	8.83	<.0001	3.66
	Homework Frequency	0.10	0.0197	5.23	<.0001	4.03
	Extracurricular Activities	0.09	0.0187	4.94	<.0001	3.37

APPENDIX F

PARENTAL INVOLVEMENT, SRL, AND READING ACHIEVEMENT

Imputation Number	Estimated Regression Coefficient	nts				
1	(R-square = 0.29)		Standard			Decian
	Parameter	Estimate	Error	t Value	$\Pr > t $	Effect
	Intercept	-0.04	0.0213	-1.93	0.0541	5.7
	SRL	0.25	0.0147	17.19	<.0001	2.61
	Parent-Child Communication	-0.01	0.0182	-0.72	0.469	3.89
	School Involvement	0.20	0.0179	11.02	<.0001	3.88
	TV Rules	-0.03	0.0167	-1.91	0.0564	3.54
	Homework Help	-0.20	0.0183	-11.06	<.0001	3.84
	Parental Education Expectations	0.18	0.0150	12.01	<.0001	2.69
	Homework Frequency	0.05	0.0224	2.12	0.0343	6.14
	Extracurricular Activities	0.09	0.0179	5.23	<.0001	3.61
2	(R-square = 0.2893)					
	Paramatar	Estimata	Standard	t Voluo	$\mathbf{D}_{\mathbf{r}} \times \mathbf{t} $	Design Effect
	Intercent		0.0214		$\Gamma I > l $	5 74
	Intercept	-0.05	0.0214	-2.10	0.031	5.74
	SRL	0.25	0.0147	16.92	<.0001	2.58
	Parent-Child Communication	-0.01	0.0174	-0.72	0.474	3.55

Appendix F	(Continued)
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Imputation Number	Estimated Regression Coefficien	nts				
	School Involvement	0.19	0.0178	10.91	<.0001	3.8
	TV Rules	-0.04	0.0166	-2.16	0.0312	3.48
	Homework Help	-0.21	0.0184	-11.32	<.0001	3.89
	Parental Education Expectations	0.18	0.0150	11.79	<.0001	2.66
	Homework Frequency	0.06	0.0236	2.48	0.0133	6.81
	Extracurricular Activities	0.09	0.0179	5.25	<.0001	3.63
3	(R-square = 0.2878)					
	Parameter	Estimate	Standard Error	t Value	Pr > t	Design Effect
	Intercept	-0.04	0.0209	-2.03	0.0433	5.54
	SRL	0.25	0.0145	17.27	<.0001	2.54
	Parent-Child Communication	-0.02	0.0182	-0.93	0.3518	3.88
	School Involvement	0.19	0.0182	10.55	<.0001	3.98
	TV Rules	-0.04	0.0161	-2.22	0.0271	3.31
	Homework Help	-0.21	0.0178	-11.51	<.0001	3.67
	Parental Education Expectations	0.18	0.0146	12.33	<.0001	2.56
	Homework Frequency	0.04	0.0210	2.14	0.0331	5.43
	Extracurricular Activities	0.10	0.0181	5.3	<.0001	3.74
4	(R-square = 0.2910)		Stondord			Decian
	Parameter	Estimate	Error	t Value	$\Pr > t $	Effect
	Intercept	-0.04	0.0211	-1.95	0.0524	5.62
	SRL	0.26	0.0149	17.22	<.0001	2.69
	Parent-Child Communication	-0.02	0.0179	-0.91	0.3643	3.76

Appendix F (Continued)

Imputation Number	Estimated Regression Coefficier	nts				
	School Involvement	0.19	0.0174	11.01	<.0001	3.66
	TV Rules	-0.04	0.0168	-2.16	0.0312	3.55
	Homework Help	-0.20	0.0177	-11.39	<.0001	3.63
	Parental Education Expectations	0.18	0.0152	11.76	<.0001	2.75
	Homework Frequency	0.05	0.0228	2.01	0.045	6.39
	Extracurricular Activities	0.10	0.0180	5.39	<.0001	3.66
5	(R-square = 0.29)					
-	(Standard			Design
	Parameter	Estimate	Error	t Value	Pr > t	Effect
	Intercept	-0.04	0.0218	-1.69	0.0919	6.03
	SRL	0.26	0.0147	17.56	<.0001	2.58
	Parent-Child Communication	-0.02	0.0174	-0.88	0.3775	3.55
	School Involvement	0.19	0.0178	10.94	<.0001	3.84
	TV Rules	-0.04	0.0166	-2.12	0.0344	3.52
	Homework Help	-0.20	0.0182	-10.97	<.0001	3.81
	Parental Education Expectations	0.18	0.0154	11.34	<.0001	2.85
	Homework Frequency	0.05	0.0246	2.14	0.033	7.4
	Extracurricular Activities	0.09	0.0178	5.25	<.0001	3.63