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The effects of modeled strategies and attributions on students' self-regulated learning and spelling achievement

Telzer, Ellen Gail, Ph.D.

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U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

THE EFFECTS OF MODELED STRATEGIES AND ATTRIBUTIONS ON STUDENTS' SELF-REGULATED LEARNING AND SPELLING ACHIEVEMENT

by

Ellen Telzer

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4/28/93
Date

Barry J. Zimmerman
Chair of Examining Committee

4/28/93
Date

David Kuhn
Executive Office

Professor Shirley Feldman

Professor Marian Fish

Supervisory Committee

THE CITY UNIVERSITY OF NEW YORK

Abstract

THE EFFECTS OF MODELED STRATEGIES AND ATTRIBUTIONS ON STUDENTS' SELF-REGULATED LEARNING AND SPELLING ACHIEVEMENT

by

Ellen Telzer

Advisor: Professor Barry J. Zimmerman

The purpose of this study was to compare the effectiveness of three types of modeling (i.e., coping, mastery, and no modeling) and two types of strategy attribution (i.e., with attributional experiences and without attributional experiences) on students' use of self-regulated learning process (self-efficacy and self-evaluation) and spelling achievement. Using Zimmerman's model of self-regulated learning as the framework for the investigation, 50 sixth and seventh grade students who had been identified as having difficulty in learning how to spell served as subjects. The subjects were randomly assigned to one of five treatment groups according to a 2 (coping vs mastery modeling) X 2 (attribution vs. no attribution) design. A control group formed the fifth group. The study involved four phases: a training phase, a pre-test phase, a learning phase, and a post learning phase. During the training phase subjects in the treatment groups observed a videotape of a peer model demonstrating a strategy for learning how to spell. The pre-test phase consisted of subjects

rating their self-efficacy for spelling and taking a spelling pre-test. During the learning phase subjects practiced the observed strategy. The posttest phase consisted of a spelling posttest and subjects' self-evaluative judgement. The dependent measures were: self-efficacy for spelling, spelling pre-test, self-efficacy for learning, spelling posttest and self-evaluation for spelling.

Results of the study showed that for two of the dependent measures, posttest and self-evaluation, modeling and type of modeling (i.e., coping) each affected student spelling performance and levels of self-efficacy. Attribution training did not significantly affect spelling performance or self-efficacy. An additional finding was that observing a coping model using a strategy with attribution had a significant effect on posttest spelling performance and self-evaluative judgement. Contrary to expectations, there were no significant interactions between type of modeling and use of strategy attribution. Results were discussed as supporting a social learning view of self-regulated learning.

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Learning to Spell

The relationship between learning how to read and learning how to spell is not fully understood (Barron, 1980). Children acquire reading skills from various sources including specific instructional methods presented to them during the course of their schooling. Successful readers are individuals who have learned to internalize certain processes and have been able to utilize specific metacognitive strategies that promote efficient reading (Paris & Byrnes, 1989). There is some evidence that suggests that successful spellers also utilize metacognitive strategies (Barron, 1980), and that increasing the use of these strategies is associated with greater spelling achievement (Nulman, 1986).

Although it has been suggested that students who view spelling as an active process are more likely to be effective spellers, there have been few training studies of self-regulated learning processes and spelling achievement. There is some encouraging descriptive data that indicates that successful spellers use recall strategies and self-evaluation processes more frequently than poor spellers (Gerber & Hall, 1987). Furthermore, there is little research on teaching older under-achieving students to spell (Gerber, 1984).

Recently, researchers interested in the processes that students use to

initiate and direct their efforts to acquire knowledge and skills have begun to conduct investigations on self-regulatory academic learning processes and general academic achievement. Zimmerman has described self-regulated learning as the degree that students "are metacognitively, motivationally, and behaviorally active participants in their own learning process" (p.329). Self-regulated students utilize specific strategies to achieve academic goals on the basis of perceptions of self-efficacy (Zimmerman, 1986). In several recent studies, social-cognitive researchers have shown the importance of teaching students to become self-observant, appropriately self-judgmental and effectively self-reactive (Zimmerman, 1990).

Results of these studies and others concerned with self-regulatory learning skills have not been incorporated into educational programs. According to Wang and Peverly, (1986), several reasons exist for this disparity, however, two in particular stand out. They are (a) the lack of a data base that includes detailed descriptions of how a learner behaves in the learning process, and (b) the absence of an understanding of the reasons as to how varied students' ability to function in this active learning role affects the learning outcome with regards to systematic instructional planning for students. (Wang & Peverly, 1986,)

Recently researchers have shown an interest in investigating ways of improving the effectiveness of students' learning potential (Schunk, 1989). The notion that students can become more active in their own learning has

created an interest in investigating self-regulated learning processes that might have an effect on academic learning and academic achievement including spelling. Investigators have stressed the value of learning what methodology and processes successful students utilize in their own learning that sets them apart from other students (Schunk, 1989).

Additionally, we now have more detailed descriptions of how students function in this active learning process as an individual difference variable (Zimmerman, 1986, 1989, 1990). Several conceptual models have been developed (Schunk, 1989, Zimmerman, 1989) that have guided several studies that provide information about the role of the learner in the learning process (Zimmerman & Martinez-Pons, 1986, 1988, 1990).

There is a growing body of literature regarding the processes of learning and effective teaching that point to the educational value of developing attitudes and abilities that enable students to learn in an active, directed manner (Wang & Peverly, 1986, Zimmerman, 1990). Students who show an ability to learn independently are usually successful students and are characterized as being active, resourceful and deliberate in their ability to acquire new knowledge and skills (Wang & Peverly, 1986). Drawing from a cognitive social-learning view of self-regulated academic learning processes, it is now possible to devise a training study to examine such processes as strategy use, strategy attribution, and self-efficacy. This appraisal will be used to improve the learning effectiveness of students who are deficient in their

spelling skill.

Theories of Academic Self-Regulation

For several years, psychologists and educators have studied various aspects of the academic learning process such as the role of learning environments, learning rates, learning influences, and learning differences. Theories have been advanced successfully to describe specific facets of "the learning process"--a notion often colored by the educational assumptions of the era. For example, during the sixties the notion of early intellectual experiences and influence in the home environment of children spurred a number of theorists to suggest that the school should become a place of nurturing and acceptance (Zimmerman, 1989). In this setting, students would develop socially and learn how to compensate for the lack of intellectual stimulation at home. Academic learning was viewed as an environmentally controlled process and the individual was viewed as a passive recipient of culturally relevant information.

Some attention has been given to the idea that students could or might choose to exert some personal control over their own learning. Although the notion of personal control has been discussed by educational psychologists for years, it has been assumed by many educators, that students play a primarily reactive role during learning and instruction. Since the early 1960s this perspective has been changing and recently there has been an increase the

amount of research involving students' personal control over their own learning (Schunk, 1981, 1983a, 1984, 1985, 1986; Zimmerman, 1986, 1989, 1990). Increasingly, students are being viewed as capable of regulating their own learning. This idea of looking at students and learning has focused on specific processes used by students who display self-directedness. Among the most prominent of these processes are the use of learning strategies. Strategies can enable students to change, energize and direct their own learning despite adverse social and academic situations (Zimmerman & Schunk, 1989).

A number of perspectives have been advanced to explain student self-regulation of academic functioning i.e., Operant, Phenomenology, Volitional, Vygotskian, Cognitive and Social Cognitive. Operant theorists define self-control processes as specific actions that change the environment at a particular time that affects behavior at a later time (Mace & Kratchowill, 1985). They stress the importance of self-recording or self-instruction, and self-reinforcement actions as valuable in becoming a self-regulated learner. Operant theorists believe that self-recording increases student self-reactiveness which is often manifested in greater initiative. Self-instructive statements are oral or written stimuli that are memorized and produced to aide in the execution of specific tasks. Self-reinforcement can involve immediate and/or delayed personal given rewards or punishment. Operant theorists believe that self-regulated behavior is similar to other behavior in that it is ultimately controlled by the environment.

Another perspective is provided by the phenomenologists who focus on the self-concept of learners. A person's self-concept is seen as both "domain-specific and global" (McCombs, 1989, p. 58). Drawn from one's global self-concept which is both integrated and multi-faceted, an individual's overall thoughts and beliefs about himself form a unified core that directs learning.

Recently, several phenomonologists have begun to study the "who" aspects of self in relation to self-regulated learning. The "who" refers to a process and a structure that enables the self to be presented as both the 'known and the knower'. The process includes goal selection, planning, strategy selection, and behavioral execution. Self-concept is seen as a crucial variable in the smoothness of the whole self-regulated learning process (Markus, & Nurius, 1987).

Volitional theorists such as Corno, Mandinach, and Kuhl, view self-regulation in terms of intention control strategies. Corno (1989) suggests that the six volitional strategies that Kuhl (1984) has outlined are highly metacognitive. Included in Kuhl's categories are attention control, encoding control, and information-processing strategies, as well as motivation control, emotional control, and environmental control strategies.

The Russian psychologist, Vygotsky, (1962), developed a theory that emphasized the relationship between thought and speech. Although Vygotsky did not describe in detail the process of self-regulation, he included in his theory the idea that inner speech served as a source of knowledge and self-

control. This relationship led other psychologists such as Meichenbaum and Goodman, (1979), to incorporate aspects of Vgotsky's theory into their own writings and research. According to Rohrkemper (1989), the process most related to self-regulated learning is egocentric speech. Vygotsky defined egocentric speech as that produced by a child, for himself or herself without any desire for a response by anyone else. Egocentric speech is believed to become internal speech, and internal speech, in turn, makes self-direction possible. Self-regulatory skills develop from social experiences with other adults. Vygotsky believed that inner speech made it possible for man to control his destiny.

As cognitive constructionists, Paris and Brynes (1989) stress the importance of cognitive processes on self-regulation. Their approach is based primarily on Piaget's notions of schemata (Zimmerman, 1989). According to Paris and Byrne, (1989), learning is viewed as being controlled by a number of theories that are "constructed" by individuals. Included are personal theories of academic tasks, self-competence, effort, and instrumental strategies. The latter strategies refer to specific mental and physical actions designed to encode and retrieve information as well as monitor emotions, manage motivation, and handle time constraints. To constructivists, self-regulation is achieved through an individual using self-prompting questions such as; Can I self-regulate?, Why should I?, What do I have to do, and How much effort will it take?

According to a social cognitive perspective (Bandura, 1986), human self-regulation is a result of triadic influences: personal (self), behavioral, and environmental. Bandura originally developed this theory to explain modeling influences on human functioning but later expanded it to include self-regulatory processes. He emphasized the reciprocal directionality of the three influences--each influence is both a cause and effect of the other two. For example, personal cognitive and affective processes are not only causative of environmental and behavioral factors but they are responsive to them as well.

A Social Cognitive Model of Academic Self-Regulation

Zimmerman (1989) has proposed a model of self-regulated academic learning that incorporates much of Bandura's writings on self-regulation but extends this theory into the area of academic learning. This formulation has several advantages over other cognitive theories of self-regulation. It is more comprehensive: it includes an environmental and a behavioral dimension of learning experiences (Markus & Wurf, 1987) as well as a cognitive dimension. By linking social learning experiences to behavioral as well as cognitive processes in self-regulation, this approach can be used to guide educational applications. Specifically, the theory directs "attention to identifying the sources of intrinsic motivation and regulative skill needed for students to self-initiate and self-direct their learning, and describes the specific socialization processes through which this level of functioning is attained" (Zimmerman,

1990).

Zimmerman defines self-regulated learning as "how learners represent contemporary actions and conditions in terms of strategies for reaching subsequent goals. It assumes a motivational orientation by learners that is sustained by continuing self-perceptions of efficacy when performing a specific task. Thus, in order for students' strategic actions to be described as self-regulated, one must know their academic goals and perceptions of efficacy" Zimmerman, 1989, p. 329).

Zimmerman (1989) further states that students can be labeled as self-regulated to the extent that they exert a certain amount of metacognitive and motivational control over their learning as well as exhibit behavioral manifestations of this control. Zimmerman (1989) uses the term metacognitive to describe those decision-making processes that manage and monitor the choice and utilization of different forms of knowledge. Self-regulated students make decisions about learning that allow them to acquire knowledge without having to depend on other individuals in their instructional environment.

Zimmerman's theory of self-regulated learning is based on Bandura's (1977b, 1986) supposition that there are three processes that influence self-regulated learning: personal, environmental and behavioral. Agreeing with Bandura (1986) on the reciprocality of these processes, Zimmerman (1989) suggests that personal, environmental and behavioral determinants combine to effect self-regulated learning. Zimmerman (1989) states that the key to

understanding the triadic relationship as shown in Figure 1, is Bandura's statement "Behavior is therefore, a product of both self-generated and external sources of influence." (Bandura, 1986, p. 454). Self-regulated learning, according to Zimmerman (1989), occurs when students are able to personally utilize specific strategies to affect learning. These strategies are based on self-efficacy perceptions which are a major variable in Zimmerman's model.

Zimmerman (1989) suggests three types of strategies that influence how effective a person's self-regulatory processes will be: strategies that are used to manage the environment, behavior, or cognitive/affective processes. A student who utilizes a self-checking strategy for determining the correctness of spelling words will be able to decide whether or not to continue or stop the strategy. This decision to use a specific strategy is affected by the important personal process of self-efficacy.

Self-efficacy perceptions are key elements in Zimmerman's (1989) proposed theory of self-regulated learning. Self-efficacy is the judgement by an individual of one's capabilities in a given context. Perceived self-efficacy can influence choice of activities, effort, persistence, and task achievements (Schunk, 1985). Self-efficacy is assumed by many social cognitive theorists (Bandura, 1986, Schunk, 1986, Zimmerman, 1986) to be linked to the use of learning strategies and to self-monitoring based on a feedback loop. Research (Diener & Dweck, 1973; Kuhl, 1985; Schunk, 1984) has shown that students with higher efficacy exhibit more self-monitoring of their learning outcomes

and obtain higher academic goals than students with low efficacy. In addition, self-efficacy perceptions have been shown to be positively related to task choice (Bandura & Schunk, 1981), task persistence (Schunk, 1981), effective study activities (Thomas, Iventosch & Rohwer, 1987) skill acquisition (Schunk, 1984), and academic achievement (Thomas et al., 1987). Zimmerman (1989) suggests that self-efficacy beliefs play an important role in students' choice of learning environments.

Zimmerman (1989) also includes in his triadic theory of self-regulated learning three classes of sub-processes which according to social cognitive theorists are also assumed to be related to self-regulated learning: self-observation, self-judgement, and self-reaction. Zimmerman (1989) labels these three processes as important classes of performance-related influences. In addition, Zimmerman (1989) offers two major types of environmental influences as important variables in self-regulated learning: physical context and social experience. All of the processes within and between triadic influences mentioned are assumed to be interdependent. Zimmerman, (1989) assumes that self-regulated learning is contextual by nature and does not depend on an absolute state of functioning but is rather a reflection of social and environmental contexts.

According to Zimmerman (1989), personal influences include self-regulative knowledge which involves both procedural and declarative forms. A student's use of strategies depends not only on awareness of strategies but

on decision-making abilities about when to use these strategies and on expectations about performance outcomes. Strategies guide decisions about learning and are influenced by reciprocal feedback from behavioral and environmental events. Another personal influence, metacognitive functioning, involves two levels: planning, which represents a more generic level of self-regulation, and behavior control, which is more specific. Behavior control regulates actual behavior such as attentiveness, persistence and monitoring of specific responses in specific contexts. Another personal influence in Zimmerman's model is the learners' affective state. For example, anxiety can affect a student's metacognitive functioning (Zimmerman, 1989).

Behavioral influences as discussed by Zimmerman (1989) are thought to be affected by personal and environmental influences in reciprocal fashion. Three behavioral processes are assumed to be of particular importance to self-regulated learning: self-observation, self-judgement, and self-reaction. Self-observation refers to the selective observation of one's own functioning. Self-judgement involves comparisons between one's functioning and some standard or goal. Self-reaction refers to the response by a student to his or her own performance outcomes. All of the three behavioral processes depend on personal processes such as goal setting and self-efficacy perceptions.

Environmental influences play an important role in changing students' perceptions of efficacy and in ensuring better retention of knowledge. Bandura (1989) has repeatedly stressed the importance of enactive experience to

learners because it provides critical personal information for perceptions of self-efficacy. That is, a student's choice of a specific strategy and decision to continue using that particular strategy rests on an important question the student must ask, "Will this strategy work for me at this particular moment?" If the answer is yes, the student will continue the strategy, however, if the answer is no then the student will discontinue use of the strategy (Zimmerman, 1989).

According to Zimmerman (1989), research on modeling has played a critical role in social cognitive formulations. For example, Bandura (1986) has shown that modeling can help improve the self-efficacy perceptions of students who had experienced failure and therefore had feelings of low self-efficacy. Modeling of effective self-regulation strategies can provide students with a vehicle to increase their feelings of self-efficacy especially if the model is perceived to be similar to the learner (Zimmerman & Martinez-Pons, 1992).

A student's level of self-regulation depends upon the degree to which strategies are used that incorporate personal, behavioral, and environmental influences in order to obtain specific academic goals. There is a dearth of formal training programs that address this issue especially for students who are considered to be at academic risk (Wang & Peverly, 1989; Zimmerman, 1990). Developing self-regulatory skills in students is a priority for educators who are interested in optimizing learning.

According to Gerber and Hall, (1982), there has been high regard for

students who are competent and accomplished spellers. However, these students' self-regulation techniques and spelling achievement have not been studied in detail. It might be expected that this subject would be better understood by educators and researchers if an understanding of (a) why learning to spell is often a tedious chore for some students especially students who are classified as poor spellers and, (b) what processes are involved in successful spelling learning outcomes.

Spelling is an area that requires attention from researchers interested in improving spelling instructional effectiveness. In addition, students who are at academic risk often experience great discomfort at having to learn to spell new words. It is critical that an understanding of how students' self-regulatory abilities specifically the use of strategies and strategy attributions and the use of a peer modeling as an instructional tool can improve spelling. A study that addresses these issues would be useful in developing self-instructive skills in underachieving students and designing classroom environments that facilitate the self-instructive process.

CHAPTER II

REVIEW OF LITERATURE

Learning how to Spell and Self-Regulated Learning

Learning how to read is an important part of becoming a literate individual. Competent readers are individuals who have internalized the reading process and have utilized metacognitive strategies to obtain information (Paris & Byrnes, 1989). Reading involves understanding both task-specific and general rules, applying effective strategies, and transferring those strategies to different reading contexts. In addition, students who monitor their own performance during reading and correct their work achieve more.

There is a strong relationship between reading and spelling ability in young children (Ehri, 1987), however, unlike the world of reading, there is relatively little agreement as to what instructional procedures are most effective for teaching spelling. Both learning to read and learning to spell tap metacognitive processes. It is very likely that some of the same processes are involved in both areas. Just as reading involves understanding how strategies affect competence, learning to spell can be viewed as a strategic procedure (Gerber & Hall, 1987). Additionally, spelling also involves understanding both task-specific and general rules, applying the rules and utilizing effective strategies. However, there are few training studies that treat spelling in terms

of metacognitive processes; more often, spelling is regarded as a by-product of general academic achievement. This empirical neglect of spelling skill is paralleled by neglect in schools: Relatively few hours spent in a school day are spent purposely on spelling instruction (Gerber & Hall, 1987). To compound matters, Fitzsimmons and Loomer (1980), suggest that even when teachers are aware of the limited evidence of the effectiveness of these specific strategies (dividing words into parts, rewriting words, using instructional aids, kinesthetic tools, computer programs, specialized tapes), they typically disregard them and revert to traditional commercial approaches.

As an area of acquired intellectual competence, spelling merits further research. Students often must face this difficult task after formal instruction ceases. The importance of spelling skills should not be underestimated: teachers perceive poor spellers as poor students (Gerber & Hall, 1987).

Gerber and Hall (1987) have proposed an information processing approach for studying two specific spelling deficiencies characteristic of learning disabled students: (a) error making and (b) impaired rates of spelling acquisition. They suggest that these spelling failures may be a reflection of coding and strategy generalization failures--similar to information processing notions about reading failure. Gerber and Hall propose that viewed from a "top-down" process, spelling encoding can be expedited by initial recognition and processing of information about word difficulty and the requirements needed for processing (i.e. necessity for efficient scanning, repression of

potential distractors or uncommon mnemonic effort. Viewed from a "bottom up" process the authors propose that in spelling, different types of mnemonic activation processes may be used depending upon the expectancy, speed, coding capacity and monitoring level accessible to the student. Gerber and Hall (1987) suggest that learning disabled students may develop into accurate spellers in a delayed and lumbered manner, but they do not develop spontaneously sufficient speed in basic processes that can be coded and stored as complex processing instructions. The authors suggest that without processing strategies, the spelling knowledge base is not easily accessible and new information may be added in an unorganized and unuseful way. Gerber and Hall (1987) explore the question as to how do the components of strategic search during spelling (such as coding, phonetic analysis and problem solving) and the structure of spelling knowledge relate to each other.

In their earlier research, Gerber, Hall, and colleagues investigated specific spellings by learning disabled students and the strategies underlying these spellings. They also studied student self-reports of ability to detect errors in certain words. The authors focused on the quality and quantity of cognitive processes underlying spelling proficiency. They investigated the relationships between components of strategic search during spelling such as phonetic analysis, coding and problem solving and the organization of spelling knowledge (Gerber & Hall, 1987). Their information processing approach represented a departure from previous studies which had treated spelling as a

linguistic process that involved phonetic accuracy. Interestingly, Gerber and colleagues included certain processes emphasized by social-cognitive theory in their studies. For example, Nulman and Gerber (1984) trained learning disabled students in various self-correction techniques intended to improve the students' self-monitoring and spelling performance. This training sought to focus students' attention on using orthographic and word recognition information more effectively. The self-monitoring training required the subject to first read the incorrect spelling aloud, and then to correct the spelling both in a written and oral manner. Instruction and feedback was given on sound-symbol relationships of the incorrectly spelled words and students were encouraged to practice the word by reading it aloud. This self-monitoring procedure improved the quality of the students' spelling.

Concerned with the implications of fixed views of spelling deficiencies, Nulman and Gerber, (1984) suggest that viewing spelling failure as a reflection of cognitive and linguistic immaturity, rather than an underlying neuro-psychological disability, can have advantages with learning disabled students. For example, they found evidence that learning disabled students have particular difficulty with both management and monitoring functions. Specifically, learning disabled students did not utilize strategies that focused on orthographic and word recognition information, problem solving techniques or self-correcting methods. There was some evidence that the students did not use monitoring techniques which, according to Pressley and

Ghatala (1990), is an important process that activates and deactivates other processes. Monitoring functions on line as an immediate evaluation of thought processes as they happen. In addition, Fitzsimmons and Loomer (1980) reviewed experimental research on spelling performance and concluded that self-correction of spelling tests accomplished by the student with guidance from a teacher is the most important factor in learning to spell.

Training Research in Spelling

Several researchers have sought to use modeling techniques to enhance spelling achievement. For example, Kauffman, Hallahan, Has, Brame, and Boren (1978) were interested in examining how modeling could be used to teach academic skills. Previous studies (Smith & Lovitt, 1975) had revealed the highly effective nature of a modeling technique in the teaching of spelling. Kauffman et al. (1978) compared the effects of teacher modeling of correct answers alone to modeling answers with imitation of children's spelling error.

In the first experiment, two subjects aged eight years old, were given 10 new words each week for a total of six weeks. Phonetically irregular words of four letters were selected form the subjects' reading material. These words were chosen due to their prior difficulty for both students. Instruction involved a different activity for each day of the week. The design of the study was an ABAB arrangement in which the experimental teaching methods were alternated weekly. In a Model Only phase, each subject was praised for correct spelling. For each incorrect spelling the teacher said, "Here is the way

you write this word," and wrote it correctly beside the misspelled word. The child then copied the correct word. In the Imitation Plus Model phase, the child was praised for each correct spelling. For each incorrect word, the teacher said, "This is how you spelled the word" and wrote the word exactly as the child had written it. Then the teacher wrote the word correctly, and the child copied the corrected word. Results indicated that during the Imitation Plus Modeling phase the two students produced higher levels of spelling performance and faster acquisition than during the Modeling Only phase.

A second study was conducted (Kauffman et al., 1978) to investigate the effectiveness of the Imitation Plus Modeling method on retention of spelling words. A twelve-year-old was given daily spelling instruction for 30 minutes a day for 20 days. The design was identical to the first experiment except that a posttest was given one week after the last day of the final experimental phase on the entire list of words. Results indicated that the Imitation Plus Modeling method was superior to the Model Only method on all variables.

Nulman and Gerber (1984) were interested in further exploring the effectiveness of the Imitation Plus Modeling technique developed by Kaufman et al. (1978). In addition, the former researchers were interested in studying qualitative changes that occurs in spelling over repeated trials. The subject was an 8.5-year-old learning disabled student. The study was conducted at his home after school and during the weekends. The subject was given a pretest

of 10 words. If the word was spelled correctly, the subject was told that the word was correct. If the word was incorrectly spelled, the teacher repeated the misspelling, wrote the misspelled word, stated the correct spelling and wrote the correct spelling which the subject then copied. Learning trials were given for nine days during which spelling words were randomly administered. The words were presented orally, and the subject was required to say and to write the word on paper. If a word was misspelled, the error was contingently imitated as in the pretest. A self-monitoring procedure, instructing the subject to read the incorrect spelling aloud, was introduced to control the student's attention.

The subject's spelling errors were analyzed for each trial using two different qualitative methods. One method represented distinct development of levels of orthographic knowledge and the other evaluation method measured letter sequences. Results indicated that spelling performance improved as a function of contingent imitation and number of trials.

In a follow-up study (Gerber, 1984), eleven learning disabled students ranging in age from 7 to 12 years old were given two new lists after achieving the mastery of a first list. During the second list, the subjects were not given any orthographic or phonetic informational cues either regarding spelling List 1. The same Imitation Plus Modeling and Modeling Only methods were utilized. Results indicated that the Imitation Plus Modeling method was superior to the Modeling Only method and that the spelling attempts on the

first trial of List 2 were superior to the attempts produced on the first trial of List 1. Gerber concluded that learning disabled students could improve spelling performance by receiving corrective feedback involving contingent imitation and modeling. Additionally, Gerber (1984) found that students needed to be overtly prompted to utilize what they had learned so that their performance would improve.

In a subsequent study by Gerber (1986), eleven learning disabled students were identified as having severe problems in spelling skills. Three lists were administered which included words that varied only by an initial consonant, a blend, or a subsequent consonant. After the presentation of the first list, the experimenters imitated the students' errors and modeled the correct spelling. Subjects received acknowledgement from the experimenters concerning the correct spelling but no praise was given. List 2 was given to probe for spontaneous generalization. List 3 was presented after the subjects were shown the similarity between list 2 and 3 and were given some helpful information concerning specific orthographic features of the words of List 1 and List 2.

Results indicated that the subjects reached criterion performance in fewer than 11 days (each day involving a separate trial). In analyzing the data further, the investigators concluded that identifying specific, orthographic features was central to problem-solving. Gerber (1986) concluded that given corrective feedback, specific instruction, sufficient time and strategies that

emphasized identifying certain orthographic features, learning disabled students can improve their spelling skills and achievement. It is likely that the population of the present study can benefit from similar procedures and techniques.

Nulman and Gerber (1984) concluded that for them the study of remedial instruction for spelling problems of learning disabled students should include the use of a contingent imitation/modeling procedure. These techniques are used in the present study. According to Nulman and Gerber (1984), these techniques afford students the opportunity to approach spelling in a problem-solving manner. The authors argued that a "problem-solving 'set' induces students to inspect the organization of letters in a word and to generate strategies which can help to recall appropriate letter sequences at some later time. These strategies involve use of various categories of phonological and orthographic information implicit in our writing system" (Nulman & Gerber, 1984, p. 332).

Strategies and Self-Regulated Learning

According to some cognitive psychologists,(e.g. Paris et al., 1982), one of the most important achievements of cognitive development is the acquisition of strategies during the formative years (Paris et al., 1982). Children learn to direct their attentiveness to improving study time, to creating ways of communicating, and to improving their self-monitoring skills which increase their understanding of reading and problem-solving. "A common thread

among these diverse strategies for tackling and solving problems is the self-management of one's cognitive resources." (Paris, Newman & McVey, 1982, p. 490).

In defining self-regulation, Zimmerman (1990b) states that "It is important to distinguish between self-regulated learning processes such as self-monitoring and strategies designed to optimize these processes." Strategies such as recordkeeping, notetaking and seeking assistance serve to enhance and strengthen self-monitoring processes. In Zimmerman's model, self-regulated learners are identified by their awareness of how strategies can influence outcomes and by their willingness to utilize these strategies to attain academic goals (Zimmerman, 1990b). The distinguishing qualities of students who are self-regulated is their recognition, awareness, and understanding of the importance of being strategic (Pressley et al., 1984b). Self-regulated learners have learned to use various specific strategies in different contexts to optimize learning. A strategic learner understands the nature of the problem and applies appropriate steps. According to Zimmerman (1990b), self-regulated students use academic learning strategies in a cyclic manner as they monitor environmental factors, personal factors, and behavioral factors. For example, in a school where a rigid code of classroom conduct exists, certain forms of self-regulated learning such as self-reward, student planning or verbal self-monitoring may be suppressed. Therefore, a student who practices self-regulatory behavior may have to adapt the use of certain strategies to the

immediate environment. However, given an environment that does not impose strict codes, a student's use of self-regulatory strategies may be utilized. A student who is self-regulated can make the necessary adaptations.

Over the past twenty years, a number of effective self-regulated learning strategies have been identified. These include reviewing notes, or textbooks (Wang, 1983), keeping records and self-monitoring (Spates & Kanfer, 1977), environmental structuring (Thoresen & Mahoney, 1974), rehearsal and memorizing (McCombs, 1984), seeking peer, teacher, or adult assistance (Zimmerman, 1986), organizing and transforming (Corno & Mandinach, 1983), seeking information (Wang, 1983), goal setting and planning (Bandura & Schunk, 1981) and self-consequences (Mace & Kratchowill, 1985). There is general consensus among educators that use of self-regulation strategies can increase learning and improve perception of self-efficacy.

Generally, all learners will employ self-regulated learning skills to some degree during their academic career, however, only certain learners are able to consistently utilize specific strategies to optimize learning. It is critical to learn how this consistency is achieved. It is suggested by several social-cognitive theorists that students' use of self-regulated learning strategies influences self-efficacy which often leads to consistent self-regulation (Schunk, 1989).

Empirical Research on Learning Strategies

In a study by Cavanaugh and Borkowski (1979), strategy training was

examined in relationship to metamemory scores. Pretests and posttests of metamemory were obtained, and subjects in the treatment group were given two training sessions that involved using a rehearsal strategy with clusters of items. Two weeks after the training sessions, half of the training group received feedback about the value of the strategy. A maintenance test followed reception of feedback. Children in the control group received no feedback. Subjects who continued to rehearse scored higher on the posttests than did subjects who did not. The metamemory test was significantly correlated with the use of strategy as well as with recall on the maintenance test.

In another study, Paris, Newman and McVey (1982) tested the hypothesis that strategy training can assist in efficient learning but is not necessarily a precondition to it. Because using a strategy requires an awareness of its function, the authors suggest that children's memory performance should be closely related to awareness of mnemonic actions. Subjects aged 7 and 8 years old were divided into two groups. The first group received a traditional non-elaborated training, and the second group received elaborated training in addition to information about the utility of the strategy. Results indicated that achievement improved when students understood the value of the strategy. One's understanding of the strategy's value increased monitoring of the means and goals of the effective mnemonic action.

Pressley, Ross, Levin, and Ghatala (1984) investigated whether

children can be taught to monitor the results of strategy selection and to modify their future strategic decisions. Eighty children, aged 10 to 13, were taught two strategies for learning vocabulary meanings. One method the keyword method was suggested to be more effective than a naturalistic contextual method. The keyword method is a potent mnemonic technique for acquiring the meanings of unfamiliar vocabulary terms. A learner first encodes the new vocabulary word which becomes the "keyword"; as an example, a good keyword for handsel which means small payment would be hand (Pressley et al., 1984). First, the mnemonic is established between the keyword and the new vocabulary word and then a meaningful context is established between the keyword and the meaning of the new word. For example, the boy delivered the small payment in his hand.

The other strategy taught was one associated with classroom vocabulary exercises. Children were asked to devise sentences with the vocabulary items used correctly (Pressley et al., 1984).

The hypothesis that guided the study was that children often do not make full use of the strategy efficacy information that they possess unless they are given prompting and feedback (Pressley et al., 1984). Control subjects were given both strategies but were not given any practice time. Three other groups were presented with individual strategies and were given practice with each strategy. Results of the study showed that only when students were prompted during the practice did an increase in the use of the more effective

strategy occur. Simple feedback about the usefulness of the strategy did not produce improved strategy selection. Pressley et al., (1984) concluded that children can be prompted to reflect cognitively on their use of strategies.

According to Zimmerman and Martinez-Pons (1990), students' selections and use of strategies is directly related and dependent on their perceptions of their academic efficacy and on self-monitoring through a feedback loop. Higher self-efficacy perceptions result in more efficient self-monitoring. Self-monitoring involves processing feedback in a continuous manner. Pressley & Ghatala (1989) suggest that students' metacognitive processes such as self-monitoring play an increasingly important role in strategy selection and strategy monitoring.

In a subsequent study, Ghatala, Levin, Pressley, and Goodwin, (1986), investigated the idea that after strategy monitoring training, students would be able to derive for themselves information about the relative effectiveness of particular strategies. The subjects were 180 second-grade children aged 6.9 to 8.8 years old. The children were given either (a) zero, one, two, or three components of information concerning the effectiveness of two memory strategies after practice sessions with the strategies or (b) strategy-monitoring information to enable them to discover the strategy-utility knowledge components themselves. The three components of the training devised by Lodico et al. (1983) consisted of informing the subjects (1) which strategy is the most effective, (2) why the strategy is the most effective, and (3) how to

apply the strategy in a practice session. In addition, feedback was given. The study showed that subjects who simply practiced with effective strategies did not glean much usable metacognitive knowledge about strategy-monitoring. Only students who participated in the three component training made effective choices. When the training involved information concerning attributional effects of strategies, subjects exhibited more self-monitoring of their strategy choice. According to Ghatala et al., (1986), practice with strategies does not necessarily enable a learner to increase metacognitive knowledge.

Kurtz and Borkowski (1984) suggest that students who have a clear and accurate understanding of how strategies work should be more successful, more persistent, more knowledgeable about strategy deployment, and more self-controlling. These researchers examined the idea that failure of students to utilize a specific strategy had to do with a failure in metacognitive knowledge concerning the effectiveness of a particular strategy. The purpose of the study was to investigate the importance of children's ideas about the power of strategies either during training sessions or ideas that were preexisting. Sixty first and third grade children aged 6 and 8 years old were divided into three treatment groups that received either task-specific strategy instructions appropriate for a memory problem, general metacognitive information, or both strategy training and metacognitive training. Pretests and posttests were given and measures of attributional assessment were reported.

Results indicated that students who already exhibited a certain degree of

metacognitive awareness benefitted from a training package that included both metacognitive and strategy training. This training package highlighted new ways of transferring strategies to different tasks. Metamemory predicted strategy transfer when the training package included specific strategies as well as general knowledge components about the dynamics of mental functioning (Kurtz & Borkowski, 1984). Children initially high in metamemory who received metamemory instruction, transferred the experimenter-trained strategies to new tasks better than children initially lower in metamemory levels.

Kurtz and Borkowski (1984) suggested that strategic behavior emerges as children learn how to master difficult tasks. Along with metacognitive knowledge, beliefs about the efficacy of strategies develop as well as reasons for success and failure. "In turn, metacognition and corresponding beliefs about mental functioning influence, for good or ill, self-initiative, performance and self-esteem" (p. 352).

Several investigators have examined strategy use in transfer situations involving metamemory and memory tasks (Brown & Campione, 1977; Brown, Campione, & Barclay, 1979; Kendall, Borkowski, & Cavanaugh, 1980). Strategy use in a transfer situation involves decision-making, self-monitoring, and knowledge about the usefulness of the strategy. According to Zimmerman (1989), the purpose of using strategies is ultimately to improve students' self-regulation of their personal processes, academic performance, and their

environment.

In several studies by Brown, Campione and colleagues (Brown & Campione, 1977; Brown, Campione, & Murphy, 1977; Brown, Campione, & Barclay, 1979), the effects of training specific mnemonic strategies were assessed with educable retarded children. Although the tests differed in type of strategy presented, the design for all studies was the same. Pretests, strategy training and transfer tests, and posttests were given to children aged 6 and 8 years old. All children responded to the strategy training and improved their monitoring skills, however, only the 8 year old children exhibited the same level of skill in subsequent trials, irrespective of the type of memory monitoring strategy under investigation. This was true for rather simple task requirements like span estimation (Brown, Campione, & Murphy, 1977) as well as for more complicated ones like recall readiness (Brown, Campione, & Barclay, 1979), and study time apportionment (Brown & Campione, 1977).

Schunk (1982, 1984, 1985,) has suggested that verbal rehearsal helps to foster improved self-regulated learning skills, which in turn, leads to higher achievement levels. Schunk, (1982) investigated how different forms of verbalization instructions would affect math problem-solving ability. Subjects were divided into four treatment groups. One group verbalized only explicit steps (e.g., "check," "subtract,") while solving problems; a second group verbalized on their own (free verbalization); a third group verbalized the explicit steps and verbalized on their own (combined); and subjects in the

fourth group did not verbalize (Schunk, 1985). All subjects received practice and instruction over several sessions. It was found that subjects who verbalized on their own and utilized specific instructions obtained the highest achievement score as well as the highest self-efficacy score. Strategy verbalization by itself, led to no benefits compared with no verbalization. Schunk suggested that because strategy verbalization was not "oriented toward actual application of the strategy to problems, children may have learned the descriptors without fully understanding how to apply them. Verbalizing a strategy, along with its application, may have created a sense of control over learning, which can promote self-efficacy (Schunk, 1986, p. 358).

In a subsequent study, Schunk and Rice (1985), investigated verbalized strategies and reading comprehension. Children aged 10 and 11 years of age received instruction and practice to increase reading comprehension skills. Subjects were given steps to follow before reading passages that included instruction (e.g. "Read the questions," "Look for key words"). Subjects who received strategy verbalization instructions achieved higher achievement on reading comprehension scores than other subjects.

Schunk and Cox (1986) explored how strategy verbalization would affect learning disabled students' subtraction solving ability as well as self-efficacy perceptions. Subjects aged 12 to 15 were divided into two treatment groups. The first group received instruction in problem solving strategies that the subjects verbalized aloud. The subjects also received instructions on

applying the strategies in particular problem-solving contexts, throughout the training. The second group received either verbalization during the first part of the training or no verbalization instructions at all. Results indicated that subjects who received the continuous verbalization achieved higher self-efficacy scores as well as higher achievement scores. Schunk (1986) suggested that students who were no longer instructed to verbalize aloud had difficulty internalizing the strategy in order to continue self-regulating their behavior. He further suggested that students who received continuous verbalization treatment may have been highly sensitive to the effectiveness of the strategy and their ability to utilize the strategy in a successful manner.

Zimmerman and Martinez-Pons (1986) hypothesized that higher achieving students would display greater use of certain self-regulation strategies than students who were lower achieving. In a structured interview, the authors investigated student use of a variety of self-regulation strategies in classroom and non-classroom situations. Eighty sophomores at a middle class suburban high school participated in the study. Students were randomly selected from the advanced achievement tract and from other lower tracts. Their achievement tract placement was based on entrance test scores to high school, grade point average, and teachers' and counselors' recommendations. According to the authors, 14 classes of self-regulated behavior were identified on the basis of prior research and theory.

Fourteen learning strategies identified were; self-evaluation, organizing

and transforming, goal-setting and planning, seeking information, environmental structuring, self-consequences, reviewing records from tests, notes or textbooks, seeking information, seeking social assistance from peers, teachers and adults (Zimmerman & Martinez-Pons, 1986). These strategies are defined in Table 1. Six different learning contexts were utilized for the interview: In classroom situations, at home, when completing writing assignments outside class, when completing mathematics assignments outside class, when poorly motivated and when preparing for tests and taking tests. Students were encouraged to indicate the methods or procedures they used in class, to study and to complete their assignments in each of the six learning contexts.

The categorical data was divided using three different procedures. Strategy use (SU) was determined by whether the strategy had been used. Strategy frequency (SF) measured how often a particular strategy was used. Strategy consistency (SC) was measured by the student's estimate of frequency of use. The SC measure proved to be the most effective. Results indicated that 93 percent of the subjects could be classified into the high or low achievement groups on the basis of their score on the self-regulated learning measure. The self-regulated strategies of "seeking information," keeping records and monitoring" and organizing and transforming."

In a follow-up study Zimmerman and Martinez-Pons (1988) investigated the validity of a strategy model of student self-regulated learning

as a theoretical construct. Eighty tenth-grade students were randomly selected who represented a broad range of achievement levels. Using self-report inventories and teacher ratings, 14 self-regulated learning strategies in 6 different contexts were studied. Students were asked to describe the students' self-regulated learning behavior in class. Achievement test results in mathematics and English along with teacher ratings were analyzed factorially. A single self-regulated learning factor emerged that accounted for 80 percent of the variance as well as two smaller factors that were named Student Verbal Expressiveness and Achievement. The 14 self-regulated learning strategies identified were: self-evaluation, organizing and transforming, goal setting and planning, seeking information, keeping records, environmental structuring, self-consequences, rehearsing and memorizing, seeking peer assistance, seeking teacher assistance, seeking adult assistance, reviewing tests, reviewing notes, and reviewing texts. Correlated with teacher's ratings were students' reports of use of these learning strategies. Rehearsing and transforming and organizing and transforming were most highly correlated with the teachers' ratings.

In a third study, Zimmerman and Martinez-Pons (1990) investigated the use of self-regulated learning strategies among gifted students as well as their perception of mathematical and verbal efficacy. Ninety students from 4 different schools were randomly selected. Equal number of subjects were chosen from one gifted school and three regular schools. Students were

selected from the fifth, eighth and eleventh grades. Subjects were asked to respond to a structured interview that investigated what particular methods students would use in different learning contexts. The learning contexts included questions concerning homework, studying for various types of exams in different subjects, studying arrangements and techniques for organizing. Two academic efficacy scales were also administered to the subjects.

Results indicated that high school students' academic efficacy surpassed that of junior high school students and the academic efficacy of the junior high school students surpassed that of the elementary students. Gifted students scored higher on the efficacy scales than non-gifted students. Self-regulated learning strategies were utilized more by girls than boys. Gifted students exhibited greater organizing and transforming, self-consequating, seeking peer assistance, and reviewing notes. In addition, gifted students showed more willingness to seek assistance from adults than regular students of the fifth grade. The authors suggested that girls appear to be better users of strategies than boys but are less efficacious than boys.

The authors concluded that students' attempts to strategically monitor their learning was associated with higher self-perceptions of mathematical and verbal efficacy. As students advance in school, they displayed greater perceptions of efficacy and greater use of learning strategies.

Self-Efficacy and Self-Regulated Learning

As noted earlier, self-efficacy refers to students' perceptions of their

abilities to organize and implement certain behavior in order to attain specific performance goals. In Zimmerman's model (in press) of self-regulatory academic learning, self-efficacy plays an important role in motivating students to learn by themselves. According to Bandura, "Among the different aspects of self-knowledge, perhaps none is more influential in people's everyday lives than conceptions of their personal efficacy" (Bandura, 1986, p. 390). Bandura (1977a, 1982b, 1986) suggests that performance capabilities in a particular domain may contain novel, unpredictable and possibly stressful factors. Bandura (1977b) emphasized the role of self-efficacy in human motivation and action. Perceptions of efficacy play a critical role in human motivation and action because they take into account limitations in one's personal skill and knowledge (Bandura, 1978).

Self-efficacy is hypothesized to affect such learning outcomes as task persistence, task choice, study habits. academic achievement and strategy use (Zimmerman, 1989). A student's sense of self-efficacy for learning can be influenced by several factors such as instructional methods, student's ability, prior experiences, and attitudes toward learning (Schunk, 1989). Students who have a low sense of efficacy for completing a task may decide to avoid the task rather than to attempt to accomplish it. Students with a high sense of efficacy will attempt to accomplish the task due to a feeling of control and success. Self-efficacy has also been shown to be related to effort expenditure and persistence (Bandura, (1982b). Students who have strong perceptions of

self-efficacy will expend more effort and will persist longer in the face of difficulty than students with weak perceptions of efficacy. "When beset with difficulties, people who are plagued by self-doubts about their capabilities slacken their efforts or give up altogether, whereas those who have a strong sense of efficacy exert greater effort to master the challenge" (Bandura, 1986, p. 394). Efficacy judgements that appear to be the most useful are those that are slightly higher than what a person can actually perform in a given context (Bandura, 1986).

Bandura (1986) suggests that people's cognitive self-efficacy is cultivated and validated during their school years. It is during this period in one's life that he or she develops problem-solving skills and cognitive competency that create skills necessary for successful functioning in society (Bandura, 1986). Research has shown that many low-achieving and learning disabled students have a low sense of efficacy for learning and performing. Teachers can influence students' sense of efficacy by making judgements about students' potential rather than their performance behavior (Gerber, 1984, Schunk, 1989).

According to Zimmerman (1989), perceptions of self-efficacy are related to two critical aspects of the reciprocal feedback loop: self-monitoring and students' use of learning strategies. Results of studies indicate that students with high degrees of self-efficacy show more self-regulatory learning skills than students with low self-efficacy perceptions (Zimmerman & Martinez

Pons, 1988, 1990).

Empirical Research on Self-Efficacy

In a study with young elementary school children, Zimmerman and Ringle (1981) showed that self-efficacy was an important factor in determining whether these youngsters would continue a task or not. Subjects were presented with a problem-solving task that involved separating two interlocking wires. However, the investigators structured the puzzle in such a way that a solution was impossible. Pretest and posttest levels of self-efficacy were assessed. Subjects were divided into two groups: a control group that received no modeling and a group that received either optimism or pessimism from a model concerning solving the puzzle. Subjects in the control group obtained lower post self-efficacy scores than subjects that received verbal optimism from the model. On a transfer test that involved a word puzzle similar results were presented.

Schunk (1981) investigated the relationship between self-efficacy and modeling and attributional effects on mathematic achievement. Fifty-six subjects aged 9 to 11 years old were divided into two groups. One group received modeling of division operations, the other group received didactic instructions, and then both groups were given a practice session. Effort attribution for success and difficulty were given to half of the children in each instructional group. Both groups showed increased accuracy, greater persistence and obtained higher perceived self-efficacy scores than the control

group. However, cognitive modeling produced greater arithmetic accuracy. Across all levels of task difficulty and modes of treatment, perceived self-efficacy proved to be an accurate predictor of arithmetic performance.

In a subsequent study, Schunk and Hanson (1985) explored the relationship between self-efficacy and achievement through the use of a peer modeling framework. The subjects were 72 children aged 8 to 10 years old. Subjects were divided into two groups: a mastery model group where a peer model demonstrated rapid learning of a particular set of operations or a coping model group where a teacher model demonstrated subtraction operations. The subjects in the control group did not observe a model. All of the children were given self-efficacy for subtraction tests and received subtraction training. Results indicated that subjects who observed a peer model had higher achievement scores, higher self-efficacy for learning, and higher post-test efficacy scores than subjects in either of the other groups. However, subjects who observed the teacher model had higher scores than no-model subjects on all measures.

Modeling and Self-Regulated Learning

Social cognitive theorists consider modeling an important vehicle for acquiring specific skills, ideas and novel behaviors (Schunk, 1989). Modeling occurs when changes in affective, behavioral, and cognitive behavior occur through observation of another person. "By observing others, one forms rules of behavior and on future occasions this coded information serves as a guide

for action. Because people can learn approximately what to do through modeling before they perform any behavior, they are spared the costs and pain of faulty effort" (Bandura, 1986, p. 47). Bandura (1986) postulated that observational learning occurs when prior to modeling, observers did not exhibit certain behaviors. However, after modeling, observers are able to produce behavior that had a zero chance of occurrence before this experience. Bandura noted also that modeling may strengthen or weaken the performance of previously learned behaviors.

Learning through observation of a model is thought to be composed of four subprocesses: motivation, production, attention and retention (Bandura, 1986). Motivation refers to increases in effort or persistence resulting from vicarious experiences. Production involves the translation of symbolic and visual ideas of modeled events into overt behaviors. Attention refers to the observer attending to important environmental events in order for them to be meaningfully perceived (Schunk, 1989). Retention involves cognitively rehearsing information and the coding and transforming of modeled information for storage in memory.

According to Zimmerman (1990), social cognitive researchers have conducted numerous studies of children's acquisition of a great variety of rules, concepts, or strategies through observation of abstract models. Although these investigations did not specifically focus on self-regulatory learning processes, they did highlight how children gained knowledge,

linguistic skill, problem solving strategies, and use standards of judgement important for adult functioning. Zimmmerman suggests that abstract modeling can provide learners with important cognitive rules for self-regulatory learning. The influence of modeling on self-regulation is widely accepted by social cognitive theorists (Zimmerman, 1989). Self-efficacy perceptions can by affected by vicarious experiences through observing other people similar to oneself (Bandura, 1986). Observers persuade themselves that they are capable of mastering certain tasks. They feel that if others who are similar to themselves can do the task, then they too should be successful at accomplishing the task. However, observing similar models who fail on a task can decrease perceptions of self-efficacy (Zimmerman & Ringle, 1981). According to Bandura (1986), the self-efficacy of individuals who have experienced failure and exhibit poor perceptions of self-efficacy can be increased by the modeling of successful coping strategies.

Modeling seems to be ideally suited for classroom instruction. Modeling can focus students' attention to specific problem-solving techniques and strategies displayed by teachers or peers. Modeling can foster development of self-efficacy which is crucial to motivate self-regulated learning.

Research on Instructional Modeling

Denny and Turner (1979) investigated the cognitive performance of children within a strategy modeling context.. Children aged 3, 4, 5, 6, 8, and

10 were randomly divided into three groups: control, strategy modeling, or strategy modeling with verbalization. Thirty subjects were given training on four separate tasks that were administered to each child in three separate sessions. The activities involved a signal task where children were instructed to look at the color of a page and then either touch it or skip it depending on the color. The second task was a match to standard where subjects were instructed to find the picture on the bottom that was exactly like the picture on the top of the page. The third task involved a twenty-question activity. The children were told that the experimenter was thinking of one of the pictures facing the subject. The child had to select the correct picture by a question and answer game that involved only answering questions either "yes" or a "no". The last task was a paired-associate game where the subjects were shown one pair of pictures at a time, each for 10 seconds and were told to remember the pictures that went together. A pretest, training, and a posttest were given to all subjects. Results indicated that strategy modeling alone and strategy modeling with overt verbalization were both effective instructional methods on all of the cognitive tasks included in the study.

Schunk (1981) investigated the relationship between modeling and attributional effects on arithmetic achievement. The purpose of the study was to test several hypotheses from social cognitive theory as they relate directly to mathematical achievement. The author was interested in investigating the effects of modeling, corrective feedback, and self-directed mastery on skill

acquisition and self-efficacy.

One group of subjects received cognitive modeling of problem-solving strategies. This treatment involved children observing an adult model who verbalized aloud specific cognitive procedures as they engaged in arithmetic problem-solving methods. The children then had an opportunity to practice the strategies imitatively. Corrective modeling procedures were applied to any procedure the children failed to grasp. The other group received the same instructions as the first group but did not receive modeling of the strategies. Didactic instructions were given with the same amount of practice and feedback for accuracy.

Effort attributional effects were also investigated. According to Schunk (1981) effort attribution can affect achievement and self-efficacy because it can mediate the effort made by children. According to attribution theorists (e.g. Dweck, 1975), when students ascribe a failure to a lack of effort rather than to a lack of ability, they will increase their persistence.

Fifty-six subjects aged 9 to 11 years old were divided into two groups. One group received modeling of division operations and the other group received didactic instructions. Both groups were given a practice session. Effort attribution for success and difficulty were given to half of the children in each instructional group. Both groups showed increased accuracy, greater persistence, and higher perceived self-efficacy scores. However, cognitive modeling produced greater arithmetic accuracy. Across all levels of task

difficulty and modes of treatment, perceived self-efficacy proved to be an accurate predictor of arithmetic performance. The effort attribution variable was nonsignificant in contributing to the explained portion of the variability of posttest accuracy. However, those subjects who received effort attribution and modeling were more likely to accurately assess their capabilities than subjects who received modeling alone (Schunk, 1981).

Schunk, Hanson, and Cox (1987) investigated how characteristics of peer models influenced achievement behaviors among subjects who had experienced few prior successes in arithmetic specifically with fractions. A coping model and a mastery model were utilized in two experiments. According to the authors, the notions of mastery and coping models evolved from the therapeutic literature. These models were employed to reduce avoidance behaviors in certain clients who were experiencing severe anxiety. "Coping models initially demonstrate the typical fears and deficiencies of observers but gradually improve their performance and help them gain self-confidence, whereas mastery models demonstrate faultless performance from the outset" (Schunk, Hanson, Cox, 1987).

The investigators suggest that although adults can serve as effective models, behaviors that are influenced by ability might be conveyed more appropriately through a peer modeling technique. They postulated that for children who previously had experienced difficulty in mastering certain arithmetic operations, observing a mastery model such as a teacher might not

promote self-efficacy. These students are likely to view the teacher as having much superior skills unlike the student. Schunk and Hanson (1985) reported that students who observed a same sex peer model developed higher self-efficacy skills for learning to subtract.

Eighty subjects aged 9 to 12 years old participated in the first study. The children had been classified as underachieving in mathematics. A pretest on fractions self-efficacy was administered, and children were asked to assess their self-efficacy for correctly solving different types of fraction problems. The fraction test was administered immediately following the efficacy test. Subjects were then randomly assigned to four treatment groups depending on sex: male mastery-model, male coping-model, female mastery-model and female coping-model. Videotapes were used rather than live modeling so that standardized presentation across subjects would be achieved.

In the mastery-model conditions, the peer model performed all operations perfectly and worked at an average pace. Attributions relating performance to high self-efficacy, high ability, low task difficulty, and positive attitude were given. In the coping-model conditions, the model made errors and was hesitant. When the errors did occur, the teacher supplied a prompt or referred to the problems already done. The peer model verbalized attributions referring to low self-efficacy, low ability high task difficulty, and negative attitudes. Measures of interest, perceived similarity in competence, and self-efficacy for learning were gathered. The self-efficacy for learning measure

consisted of a scale similar to the pretest but asked the children to assess their certainty of learning how to solve different types of fraction problems rather than their certainty of being able to solve them. Subjects received a posttest directly after the last training session which had occurred on the six previous school days.

Results indicated that observing a coping model led these underachievers to feel significantly higher self-efficacy for learning to solve fraction problems than their counterparts observing a mastery model. Observing a coping model also improved the children's mathematical skills. Finally, youngsters who observed the coping model reported higher similarity judgements with the model than children who observed a mastery model.

In a follow-up study by the same investigators, 80 subjects aged 9 to 13 years old were randomly assigned within sex to four treatment conditions: single mastery model, single coping model, multiple mastery models and multiple coping models. All of the subjects observed peer models who were of the same sex as the subjects. The same training, testing, videotape materials, and procedures of the first experiment were utilized. Pretesting, training, and posttesting were assessed in the same manner as Experiment 1.

The single-model conditions were similar to the versions used in Experiment 1. The multiple-model conditions consisted of tapes that had been spliced together with segments of the appropriate single-model tapes. Each multiple-model tape showed three peer models of the same sex. The authors

felt that three peer models would be enough of a diversity for assessing perceived similarity in competence and also to allow for several problem solving examples.

Results indicated that all eight experimental conditions experienced a significant gain in math self-efficacy and skill. Observing a coping model led to significantly higher perceived similarity judgements than did observing a mastery model. On the measure of self-efficacy for learning, single coping model, multiple mastery model, and multiple coping model conditions yielded higher scores than single mastery model.

In discussing the results of the study, the researchers suggested that the type of modeled behavior had important effects in achievement settings. Additionally, they felt the peer model's coping techniques conveyed the importance of concentrating and working hard even though the teachers did not instruct the peer models regarding these matters. Such beliefs can lead to increased self-efficacy perceptions (Schunk, Hanson, & Cox, 1987). The benefits of coping models might be even greater when utilized with students who are low achieving academically. Historically, low achievers find academic tasks to be anxiety producing. Observing a coping model might lower anxiety and enable low achievers to be more successful during learning experiences. In contrast, mastery modeling might be more beneficial for normal learners, who display far less anxiety because only correct responses are conveyed.

Schunk, Hanson, and Cox (1987), concluded that teaching students to place greater emphasis on effort as a cause of successes and failures can enhance motivation, self-efficacy and skills. They added that once students develop skills, ability attributions exert stronger effects on achievement behaviors.

Conclusions

Although previous studies have investigated coping and mastery models, no effort has been made to examine the additional effects of strategy attribution to these types of modeling specifically with students who are poor spellers. Students may achieve higher expectations for success if failure is attributed to ineffective strategies rather than ability. Successful outcomes that are derived from a successful utilization of specific strategy steps may be a more powerful link between increased self-efficacy perceptions and enactive experiences. An exploration of this relationship between increased self-efficacy perceptions and increased achievement might prove to be beneficial in creating instructional intervention techniques that would foster increased self-efficacy perceptions especially with poor spellers. In addition, when utilizing strategy attributions as opposed to effort attributions, some students may create the sense that it is the strategy that is not successful as opposed to the students' behavior. Strategy training may also influence self-efficacy by creating a greater sense of control over learning for students. In addition, the acquisition of self-regulated learning processes of self-efficacy and self-evaluation have

not been examined in the area of spelling to date with students who are perceived as underachieving or poor spellers. As an area that reflects intellectual capability and skill, the study of spelling achievement and self-regulated learning processes merits research. Students must spell. As part of any curriculum, spelling is often measured as an indicator of academic success. Moreover, students must continue to develop spelling proficiency after formal instruction ceases which is often by sixth grade. This task is often difficult and tedious for poor spellers.

Statement of the Problem

Spelling is an area of personal competence that is often developed throughout life by virtue of various experiences. For poor spellers, this area may never be fully developed. At present, very little empirical evidence exists on how people learn to self-regulate their spelling acquisition and increase their perceptions which in turn may increase spelling ability, spelling confidence and spelling achievement. The notion that certain strategies can be taught to underachieving students that would enhance and strengthen their spelling ability needs attention in the field of educational research.

Purpose of Study

The purpose of this investigation is to compare the effectiveness of coping and mastery models in conveying a spelling learning strategy and attributions to that strategy on student's use of self-regulated learning processes (self-efficacy and self-evaluation) and spelling.

Rationale

There is some evidence that modeling procedures can enhance self-monitoring and spelling skill (Gerber & Hall, 1987), however, there have been no efforts to date to examine two components of modeling: coping strategies and strategy attributions in spelling. These variations can be expected to increase the effectiveness of modeling on students' self-efficacy perceptions especially for students who are perceived as poor spellers.

School children learn many skills by observing others perform. Coping models' performances have been found to convey valuable information about learning efficacy in mathematics for learning disabled students and can be expected to be effective in conveying efficacy about learning to spell as well. Research on modeling and spelling achievement with learning disabled students has shown that improved spelling performance can be a result of the use of effective modeling techniques (Nulman & Gerber, 1984). Recent research points to the powerful relationship between certain self-regulatory processes and academic learning. Zimmerman (1990) has suggested that when learners can be selective about their observations, monitor their judgements and react in a positive and effective manner, they have become successful self-regulating individuals who can adapt to any change in environmental conditions, behavioral capabilities or covert personal processes. Although Schunk, (1983, 1984, 1986, 1989) has shown in previous research on mathematics and reading that students' degree of self-regulation is determined by how fully their use of

strategies influences their achievement, there has been little attempt to study these processes with spelling and students who are poor spellers. This proposal study seeks to address the gap in the literature.

CHAPTER III

METHODOLOGY

Subjects

Pupils from sixth and seventh grade classes in an urban junior high school were invited to participate in the present study. The school was located in an ethnically and economically mixed neighborhood in Brooklyn. Permission was obtained from the Community School District Superintendent and the Building principal (in consultation with classroom teachers) to use the school as a test site. The pool of 125 children attending a special education resource room program were screened for possible participation in the study. The subjects who were invited to participate in the study were identified by their teachers as having difficulty in learning how to spell. The sample that emerged consisted of 65 students. Initially, the classroom teachers distributed cover letters and consent forms to the students. (See Appendices A and B for copies of cover letter and consent form.) The latter, which required the signature of both student and parent, had been prepared in accordance with the guidelines of Ethical Principles in the Conduct of Research with Human Participants (American Psychological Association [APA], 1988). The consent form described the following aspects: the purpose of the proposed study, the voluntary nature of participation and withdrawal, a description of risks and

benefits, a guarantee of confidentiality, and a debriefing procedure.

A total of 58 pupils consented to take part in the study. Sampling mortality was due to two factors: the absence of five students and the exclusion of three students who had been referred for a full-time special education program. The subjects (thirty-six boys and fourteen girls) ranged in age from 11 years, 3 months to 14 years, 9 months. Their mean age was 12 years, 6 months. The sample was composed of 26 Hispanic, 15 White, and 9 Afro-Americans pupils. Subjects were randomly assigned to one of five treatment groups.

Dependent Measures

Student Spelling Efficacy Scales. Following Bandura's (1986) suggestion that level of task be varied when self-efficacy is being assessed, each self-efficacy scale involved spelling a list of words that increased in difficulty. (See Appendix G). For each word, the students rated their efficacy for learning to spell the word or for spelling the word, using a scale that ranged from 0% (completely unsure) to 100% (completely sure.)

Spelling Achievement Test. The spelling test (list b) (See Appendix H) consisted of eight words taken selected from a pool of twenty-five words that had been pilot tested. The twenty-five words were pooled from the Brigance Diagnostic Comprehensive Inventory of Basic Skills, (1983), Classroom Reading Inventory, (1981) and the. The words were similar in their morphological structure (i.e., prefix, root word and suffix). Pilot testing

occurred over a 6 week period. Initial pilot testing consisted of a group of 10 students and a list of 15 words taken from the larger pool or words. The list of 15 proved to be too long and difficult for the students to sustain interest in the task. Several researchers suggest that children acquire an internalized knowledge of orthographic structure which is obtained through their early spelling attempts or misspellings (Beers, 1980; Henderson & Beers, 1980; Gentry, 1978;). In addition, Englert et al, (1985) suggest that active word study and the extraction of familiar word patters to spell unfamiliar words increased students achievement level and the orthographic knowledge to a greater extent.

Materials

Modeling Videotape. Four rehearsed and edited videotapes of an peer model demonstrating the use of a specific spelling strategy were created. The length of the videotapes ranged from 8.5 to 15 minutes. The spelling strategy involved the peer model dividing words from a list of eight words into smaller parts with and attributing success or failure to the division strategy. The four videotapes depicting the peer model used were: a coping model using a spelling strategy with strategy attribution, a coping model demonstrating the strategy without a strategy attribution, a mastery peer model demonstrating a spelling strategy with attribution, and a mastery model demonstrating a spelling strategy without a strategy attribution. The narration was be done by

Figure 1. Data Collection Design

Groups	Training	Pretest	Learning	Post-Learning
		Phases		
Mastery With Attribution	Tape 1	self-efficacy for spelling learning, spelling pretest	practice words	spelling posttest self-evaluation
Mastery Without Attribution	Tape 2	self-efficacy for spelling learning, spelling pretest	practice words	spelling posttest self-evaluation
Coping With Attribution	Tape 3	self-efficacy for spelling learning, spelling pretest	practice words	spelling posttest self-evaluation
Coping Without Attribution	Tape 4	self-efficacy for spelling learning, spelling pretest	practice words	spelling posttest self-evaluation
Control	No Tape	self-efficacy for spelling learning, spelling pretest	practice words	spelling posttest self-evaluation

the peer model as he was performing the strategy.
(See Appendix C for transcripts of the videotapes).

Supplies. Each student was given practice paper and pencils for the learning phase.

Procedure

Each subject was randomly assigned to one of the following experimental groups: mastery modeling with strategy attribution, coping modeling with strategy attribution, coping modeling without strategy attribution and a control group (See Table 3). During an initial training phase all experimental subjects were taught a spelling strategy. Videotapes of a peer displaying either a coping or mastery model was used to ensure standardized presentation across subjects. After viewing one of the tapes, subjects were given the opportunity to practice the words and were subsequently given a test which included several words from the model's practice list (list a, See Appendix I). The control group was given the same list of words (list a) and was told to study the words. Students in the control group were also given a test on the words.

After this initial training phase, the pretest phase began. First all students were given a new list of words orally (list b, See Appendix H) and were asked to rate

their spelling confidence (percentage of confidence/self-efficacy). Second, the subjects were asked to spell each word (Pretest list b). Third, students were asked to rate their confidence in spelling the words if given a chance to study them (self-efficacy for learning). Next the students were told that they were going to be given an opportunity to study the words. During the learning phase students studied the words with pen and paper and practicing the strategy if they so chose to (list b-learning phase). During a post-learning phase, students were given another opportunity to spell list b words and to rate their confidence in their attempts (self-evaluation). (See Appendix J for procedures)

Research Design and Hypotheses

The design for this study was a 2 X 2 analysis of variance model with the following independent factors: (i.e., coping and mastery) and attribution (i.e., with attribution or without attribution) and a control group. The dependent measures included: Self-Efficacy for Spelling, Spelling Pretest, Self-Efficacy for Learning, Spelling Posttest, and Self-Evaluation for Spelling. Significant univariate tests were followed with post-hoc comparisons. Specific hypotheses were examined using a priori t-tests.

The following hypotheses were tested:

H 1: The mean of subjects who viewed the modeling videotapes would significantly exceed the mean of subjects who did not view a modeling videotapes for all dependent measures.

H 2: The mean of subjects who viewed videotapes depicting strategy instruction with strategy attribution would significantly exceed the mean of subjects who viewed videotapes depicting strategy instruction without attribution for all dependent measures.

H 3: The mean of subjects who viewed the videotapes depicting a coping model would significantly exceed the mean of subjects who viewed videotapes depicting a mastery model.

H 4: The mean of subjects who viewed the videotape depicting the coping model with strategy attribution would exceed the mean of the control group subjects.

In addition to Hypotheses 1, 2, 3, and 4, the interaction effect between the

two levels of modeling (i.e., coping and mastery) and the two levels of attribution (i.e., with attribution and without attribution) was tested.

CHAPTER IV

RESULTS

Results are divided into two sections: section one is descriptive; section two contains results of the hypotheses testing.

Summary Description of training group outcomes

The present study compared the effectiveness of three types of modeling (i.e., coping, mastery, and no modeling) and two types of strategy attribution (i.e., with attributional experiences and without attributional experiences) on students' use of self-regulated learning processes (self-efficacy and self-evaluation) and spelling achievement. The means and standard deviations for each dependent measure for the five experimental groups are presented in Table 1. Scores ranged between 60.4% and 73.0 % for the self-efficacy for spelling measure; 54.5% to 77.2% for the self-efficacy for learning measure; and 65.0% to 85.9% for the self-evaluation measure. The pretest spelling scores ranged between 34% and 36.5% whereas the spelling posttest scores ranged from 51.6% to 81.5%. A low confidence level was defined as a response between 0 and 40, somewhat confident between 40 and 70, high confidence between 70 and 85 and extreme confidence between 86 and 100. Consistent with the literature, the range of scores for the experimental groups

Table 1

Group Means and Standard Deviations for Self-Efficacy, Spelling, and Self-Evaluation Measures

			Dependent Measures		
Group	Self-Efficacy spelling	Pretest	Self-Efficacy for learning	Posttest	Self-Evaluation
Coping with attribution n=10	60.4	35.2	62.6	81.5	85.9
sd	22.2	19.3	21.3	18.2	13.2
Coping without attribution n=10	65.9	36.3	61.8	68.9	82.6
sd	22.2	19.2	13.8	23.8	11.2
Mastery with attribution n=10	65.0	36.5	71.4	66.4	76.1
sd	17.5	14.9	11.0	21.3	13.5
Mastery without attribution n=10	73.0	36.4	77.2	63.9	81.3
sd	15.8	21.5	11.5	25.9	9.5
Control n=10	68.6	34.0	54.5	51.6	65.0
sd	11.6	14.5	22.3	13.6	13.9

Self-Efficacy and Self-Evaluation measures reflect levels of confidence from 0% to 100%.

Pretest and Posttest scores reflect percentage of words spelled correctly.

for the self-efficacy measures extended from confidence levels of slightly confident (54.5%) to highly confident (85.9%).

Tests of Specific Hypotheses

Hypothesis One predicted that the four groups of modeling subjects would perform significantly better than the no modeling subjects for each dependent measure. A priori t-tests (Kirk, 1969) for pairwise comparisons were used to ascertain whether the four modeling groups were, in fact, higher on the dependent measures than the control group. The results revealed the following mean scores for dependent measures using modeling and no modeling respectively: self-efficacy for spelling, 66.3, 68.6; spelling pretest, 40.3, 34.0; self-efficacy for learning, 68.2, 54.5; spelling posttest, 70.1, 51.6; and self-evaluation, 81.2, 78.2. The modeling group performed significantly better than the control group on the posttest measure, ($p < .02$) and on self-evaluation measure, ($p < .001$). However, no significant differences were attained on the other measures. Thus, some limited support was provided for the final two measures.

Hypothesis Two predicted that there would be a significant difference between the group means of the attribution treatment groups. Specifically, it was predicted that the two attribution groups would display higher mean scores than the two non attribution groups for all dependent measures. This hypothesis was tested by the main effect for attribution in the summary analysis of variance (ANOVA). Recall that this effect did not reach statistical

Table 2

ANOVA of Modeling Effects by Attribution

Source Table					
Main Effects	Sum of Squares	df	Mean Square	F	p
Effects on Self-Efficacy for Spelling					
Coping/Mastery	342.225	1	398.925	1.07	.39
Attribution	455.625	1	455.625	1.42	.24
Coping/Mastery x Attribution	15.625	1	15.625	.49	.83
Effects on Pretest					
Coping/Mastery	4.900	1	4.900	.01	.91
Attribution	2.500	1	2.500	.01	.93
Coping/Mastery x Attribution	3.600	1	3.600	.01	.99
Effects on Self-Efficacy for Learning					
Coping/Mastery	1464.100	1	1464.100	6.06	.01
Attribution	62.500	1	62.500	.28	.59
Coping/Mastery x Attribution	108.900	1	108.900	.49	.48

Source Table

Main Effects	Sum of Squares	df	Mean Square	F	p
Effects on Posttest					
Coping/Mastery	1010.025	1	1010.025	1.92	.16
Attribution	570.025	1	570.025	1.12	.29
Coping/Mastery x Attribution	255.025	1	255.025	.50	.27
Effects on Self-Evaluation					
Coping/Mastery	308.025	1	308.025	1.12	.34
Attribution	9.025	1	9.025	.63	.84
Coping/Mastery x Attribution	180.625	1	180.625	1.23	.27

significance for any of the five dependent measures: self-efficacy for spelling, $F(1, 36) = 1.42$, $p < .24$; spelling pretest, $F(1, 36) = .01$, $p < .93$; self-efficacy for learning, $F(1, 36) = .28$, $p < .60$, spelling posttest, $F(1, 36) = 1.13$, $p < .30$; and self-evaluation, $F(1, 36) = .06$, $p < .80$.

Hypothesis Three predicted that there would be a significant difference between the group means of the two modeling groups. Specifically it was predicted that the two coping model groups would display a higher mean score than that of the two mastery model groups. This hypothesis was tested by the main effect for coping in the summary analysis of variance (ANOVA). There was a statistically significant main effect of modeling for the self-efficacy for learning measure. However, an examination of the means involved in Hypothesis Three revealed that the students who observed the mastery videotapes reported higher confidence levels for learning the spelling words than students observing the coping model. Mean scores for all dependent measures revealed the following results using mastery and coping respectively: self-efficacy for spelling, 69, 63.2; spelling pretest, 35.9, 35.8; self-efficacy for learning 74.3, 62.2 ; spelling posttest, 65.1, 75.2; self-evaluation, 78.7, 84.3. Thus, the self-efficacy results were opposite to expectations. As a result of the analysis, Hypothesis Three was not supported.

Hypothesis Four predicted that mean scores of the coping with attribution group would significantly exceed the mean scores of the subjects of the control group on all dependent measures. An a priori t-test revealed that the coping with attribution group was significantly higher on the posttest measure ($p < .001$) and the self-evaluation measure ($p < .003$) than the control group.

However, no significant differences were attained with the other measures. Thus, only limited support was provided for the Hypothesis Four.

Summary Analyses

To investigate the data for findings other than those hypothesized, supplementary analyses were performed. Summary analyses of the data in the four treatment groups were conducted using a 2 x 2 analysis of variance (ANOVA) to assess the overall effects of treatment on each of the dependent variables. Tests of each hypothesis were conducted using a priori t-tests (Kirk, 1969). The independent variables in the ANOVA were the two levels of modeling by the two levels of strategy attribution. The results of this analysis are given in Table 2. The analysis of variance yielded only one significant effect, namely that the subjects who viewed a mastery model exhibited a significantly higher level of self-efficacy for learning than did the coping subjects, $F(1, 36) = 6.06$, $p < .01$.

CHAPTER IV

DISCUSSION

Modeling Effects

It was predicted that observing a videotape of a peer model who presented a strategy for learning spelling words would heighten subjects' perception of their own efficacy and enable them to perform higher on spelling achievement measures. According to Bandura (1977a, 1981, 1982b), modeling can be a vicarious source of efficacy information. Modeling can convey that students who possess some of the same capabilities as the model will be successful if they perform the same sequence of actions (Schunk, 1984).

It was found that subjects who viewed the model using the spelling strategy displayed significantly higher achievement on the spelling posttest and self-evaluation judgement than children in a no modeling control group. It will be recalled that the spelling strategy involved dividing words into smaller parts, writing the parts down and checking accuracy. (See Appendix C for narration of videotape). These two measures (spelling posttest and self-evaluation) were the final two measures administered during the study. Schunk (1987) also found that observing a peer model enhanced posttest self-efficacy and skillful performance on a task involving math multiplication problems. Although modeling did not significantly affect the earlier experimental measures, an examination of the means reveals that children in the modeling group did report higher levels of self-efficacy for learning than the youngsters in the no modeling group (Modeling, $M = 68.2\%$, $p < .62$,

No Modeling, M = 54.5%, p < .93). Thus there was some evidence, albeit nonsignificant, that subjects' sense of self-efficacy for learning was heightened by observing the modeling videotapes. This heightened sense of efficacy was associated with significantly higher posttest spelling scores (Modeling Group, M = 71.7%, No Modeling, M = 51.6%, p < .02), and self-evaluation scores (Modeling Group, M = 81.5%, No Modeling, M = 65.0%, p < .001),).

According to self-efficacy theory (Bandura, 1977), active engagement in activities promotes development of skills and self-efficacy even more than modeling does (Bandura, 1986). It is interesting to note that modeling subjects spent time practicing the modeled spelling strategy after reporting how confident they were in learning to spell the words. They wrote the words down on paper, attempted to divide the words into smaller parts and spent more time checking their spelling accuracy than subjects in the control group. Thus, it appears that the addition of enactive experience to modeling training was critical in strengthening the students' spelling skills. In contrast to the modeling group, subjects in the control group did not appear to utilize any strategy as they attempted to read the spelling words. Some subjects in the control group wrote the words down but did not self check the accuracy of their spelling, and many subjects rushed through the task.

According to Bandura (1986), motivation is thought to be one of the subprocesses influenced by observation of a model. Not only did the modeling subjects achieve higher spelling scores, they appeared to persist on the task longer than did subjects in the no modeling group (Time spent on task:

Modeling, M = 10.2 minutes, No Modeling, M = 4.2 minutes). This was not tested statistically. As Zimmerman and Ringle (1981) showed that a model's persistence can directly influence the problem solving efforts of observing children.

Effects of Coping and Mastery Models

It was hypothesized that subjects observing a coping model would exhibit higher self-efficacy judgements and demonstrate more skillful performance than would subjects who observed a mastery model. In this way, this study explored whether the effects of peer models differed depending on the type of modeled behavior. According to Schunk and Hanson (1987), coping models portray how a determined effort to overcome difficulties can gradually improve performance and can enhance confidence in one's abilities. Mastery models, who exhibit faultless performance from the onset, are expected to be less effective because they suggest either that the task is easy or that they are unusually competent.

Contrary to predictions, subjects in the coping group did not report a significantly higher degree of self-efficacy or improved skillful performance for any of the treatment measures. In fact, it can be seen in Table 1 that the degree of self-efficacy reported by these subjects was actually lower than that reported by mastery group.

Such findings as these are inconsistent with a number of studies demonstrating the increase in individuals' reported self-perceived efficacy and skillful performance as a function of observing a coping model (Schunk & Hanson, 1985: Schunk, Hanson, & Cox, 1987). Part of the discrepancy

between the findings of the present study and the results of other social learning investigations may be due to the perceived difficulty of the spelling task and the subjects' own perceptions of their competence. If the subjects perceived the task as easy and/or themselves as competent, then an error-free mastery model might be more influential than a coping one. The pretest scores on the self-efficacy measure was 68% for the control group which is very close to the lower level of the high confidence interval (70%) on the efficacy scales. This in part corroborates the notion that the control group in the present study did not see the task as difficult.

In support of this interpretation, there was a statistically significant main effect of modeling on the self-efficacy for learning measure. An examination of the means reveals that the mastery model group perceived themselves as more efficacious on the self-efficacy for learning measure than did the coping group. This measure specifically addressed how competent the subjects felt about learning the words and spelling them correctly on a posttest following a practice study time.

On the videotape, the mastery model verbalized only positive attributions of success (e.g., "I got it right because I followed the steps"). The mastery model simply performed the strategy for each word and then noted that it was correctly spelled. In other words, the model exhibited success. In contrast, the coping model verbalized both positive attributions and attributions that reflected errors (e.g., "I got it wrong because I did not follow the steps"). According to Bandura (1982), the advantages of mastery models might be short lived. The increased self-efficacy brought about by observing a

successful model will be tempered by the results of subsequent enactive performances.

There is evidence that this occurred in the present study. The mastery model group's performance was highest for the self-efficacy for learning measure (Mastery group, M = 74.3%). However after the subjects had to perform the strategy, study the words, check their spelling accuracy and determine confidence levels, the coping model's performance seems to have had more of an effect on spelling posttest achievement (Mastery group, M = 65.1%, Coping group, M = 75.2%) and self-evaluative judgement (Mastery group, M = 78.7% , Coping group, M = 84.3%). Bandura (e.g. 1986) has argued that enactive experiences are ultimately the most influential in increasing subjects' self-efficacy perceptions. Therefore, the mastery groups exhibited higher initial self-efficacy scores (self-efficacy for spelling (Mastery group, M = 69%, Coping group, M = 63.2%) and self-efficacy for learning (Mastery group, M = 74.3%, Coping group, M = 62.2%) because they believed that they too could be successful. However, these beliefs were short-lived because they were eventually undermined by the subjects' actual experiences.

Strategy and Strategy Attributions

It was hypothesized that subjects who observed a peer model performing a strategy and attributing success or failure to that strategy would report heightened perceptions of their own self-efficacy as well as increased skill performance. According to Schunk (1987), strategy training can influence self-efficacy by creating a greater sense of control over learning for

individuals. Winne (1985) has defined a strategy as a cognitive plan that involves a set of sequenced cognitive operations that students apply to information to complete a task. In the present study, the modeled strategy presented involved dividing unknown spelling words into smaller parts, verbalizing the steps out loud and making overt attributions to the strategy.

One explanation for the failure of the subjects in the present study to overtly attribute their success to correct use of the strategy steps during practice enactments may be that the dependent measures were gathered not in individual sessions but in small groups of two and three subjects. It is possible that verbalizing strategy attributions aloud might have been perceived by the subjects as having negative consequences with their peers. Subjects would not deliberately call attention to themselves by overtly practicing the spelling strategy. However, subjects could practice the spelling strategy covertly without much negative attention. From the above perspective, it may be wise in future investigations to include individual sessions and specific instructions by the model so as to eliminate the perception of possible negative peer consequences.

In addition, some investigators (Borkowski & Cavanaugh, 1979; Schunk, 1985; Schunk and Rice, 1984, 1985; Schunk & Cox, 1986) suggest that students benefit from verbalizing aloud the component steps while applying them to a task because verbalization may help children attend to important task features and aid in improving self-monitoring skills. Modeled verbalization can facilitate learning because it directs students' attention and helps students work in a systematic fashion. It will be recalled that in the present study the

peer model verbalized the steps aloud as well as the self-correcting procedures and the attributional statements. In this manner, the modeling groups' performance seems to have been strengthened by the strategy training and the verbalization techniques. It is interesting to note that higher posttest and self-evaluation scores were reported by subjects in the modeling group for the final two measures which directly followed the strategy enactment practice where the subjects had an opportunity to practice the modeled strategy. During the enactment practice, modeling subjects were observed to verbalize aloud parts of the strategy steps. As noted above, the modeling groups expended more practice time, exhibited knowledge of the component parts, and persisted longer at the task than did subjects who did not observe a modeled strategy.

According to Schunk (1987), attributions, or perceived causes of successes and failures, are thought to influence efficacy in several ways. Achievement outcomes have been attributed to such causes as effort, ability, task difficulty, and luck (Weiner, 1985). Additionally, according to Anderson and Jennings (1980), when students are taught to attribute failure to ineffective strategies rather than ability, higher expectations for success are achieved. In the present study, attributions were directly linked to a strategy rather than to the traditional attributions (effort or ability). The peer model attributed success to following the specific strategy steps.

In the present study, all of the subjects were classified as having a learning disability. Learning disabled students often experience attentional and distractibility difficulties (Johnson & Myklebust, 1967). Moreover, learning disabled students often lack the necessary repertory of learning strategies that

successful students possess in order to enhance academic achievement. In the present study, it is possible that the manner in which the strategy was presented (overt verbalization) may have exceeded the subjects' capacity to assimilate it. Moreover, the subjects may have viewed the verbalizations as an additional task that they had to perform. The attribution may have interfered with the practice. It was observed that during study time, the attribution subjects were, in fact, using the strategy but without overtly verbalizing the steps. According to Clifford (1986), the success of strategy attributions is dependent on the number of strategies a student frequently knows or uses. Learning disabled students often lack knowledge concerning strategy utility, strategy application and strategy attribution application. It may be wise for future investigators to emphasize the usefulness of the strategy within the context of the strategy presentation.

Directions for future research

It is conceivable that individuals' levels of self-efficacy and skillful performance may have not been heightened in the present study because of a limitation of the wording of the strategy attribution and the specific instructions attached to the strategy being modeled. In the present study, the model did not give specific sequenced steps to follow (i.e., first, I am going to write the word down in this column and second, etc.). The model did not review the steps of the strategy which may have a positive effect on students' future use of a spelling strategy. The wording of the strategy could have included some specific reference to the mistake the model made (i.e.,"I got it wrong because I did not break the word up into three parts"). In the future, researchers may wish to investigate the effect of modeling strategy training that includes specific time instructions for overt verbalization of strategy attribution (i.e., The model states "In step 3, the word is written down or in step 4 the word is said aloud"). It may be wise also to include a written set of instructions that parallel the verbal instructions with specific time instructions for verbalizing the strategy at specific times. Subjects could be directed to read the written set of instructions along with observing the model. This visual enhancement may positively affect use of the strategy. Investigators may wish to use words that directly link success to strategy attribution, i.e., "This strategy works and therefore I was successful." or "I got it right because the strategy works for me". It is not clear that, in the present study, the strategy attribution was perceived as having positive effects.

The present study included eight items per spelling list. Schunk (1985), by contrast, has presented up to twenty-five problems in a similar study. It is possible that in the present study, the subjects did not have ample time to practice the strategy given the number of words. Additionally, students who have experienced failure with spelling may need to have greater enactive experiences in greater lengths practicing a spelling strategy. Future researchers may wish to investigate the results of presenting longer spelling lists for initial model presentation and increasing timed subject practice periods for dependent measure reporting. Such research may also include presenting practice spelling lists consisting of words with different features, i.e., investigators may seek to present a strategy for spelling words that are not only morphologically but phonetically similar. Some students have great difficulty with phonetically unfamiliar words. For these students a strategy that addresses a linguistic approach may have greater affect on perceptions of self-efficacy and skillful performance i.e., using word families instead of prefixes, root words, and suffixes. In the present study, the strategy modeled involved dividing morphologically similar words into smaller parts, writing them down and then checking the spelling accuracy. Future research may concentrate on strategies that strengthen memory, rehearsal and retrieval skills.

Future research is needed to examine the modeling process in greater detail to determine how children's self-efficacy is influenced by model characteristics and children's perceptions of models. Students are exposed to many models. Knowing what characteristics of models students attend to and use in forming self-efficacy judgements would be extremely beneficial.

Investigators may wish to delve more deeply into the question of how peer models serve to influence performance. Are there certain features of peer models that are more influential and exert greater effect on children's perceived self-efficacy than others? For instance, do sex and age make a difference in how a peer model is perceived?

Some degree of effort might be expended toward resolving the question of whether overt self-verbalization will facilitate or interfere with the performance of children who experience failure and children who experience success. It may be interesting, for instance, to attempt to measure whether the performance of gifted students as well as learning disabled students would be facilitated or interfered with by overtly verbalizing a strategy.

Additionally, increasing the number of subjects in the study may reveal significant findings for the hypotheses predicted. This method can prove to be a powerful technique to find significance.

Implications for Education

The major hypotheses of the present study were partially supported by the empirical data. Specifically, it was demonstrated that individuals' perceived self-efficacy judgements and skillful performance could be heightened through the use of peer modeling and strategy training. It may, therefore, be reasonably assumed that strategy training and enactive experiences should become instituted as part of the educational curriculum applied in classroom teaching. Colleges that specialize in teacher-training programs should be encouraged to incorporate the research findings of this and other studies dealing with the positive effects of strategy training and enactive experiences.

Explicit strategy training and enactive experiences fosters acquisition and utilization of strategies that, in turn, help to develop self-efficacy. Helping students achieve successful outcomes (as opposed to meeting with repeated failure) should serve to increase children's self-efficacy, task interest, and subsequent motivation. Students, especially those who experience repeated academic failure, may benefit from educators who foster self-regulated learning strategies in the classroom. Teachers who include in the curriculum lessons involving organizing and transforming notes, self-evaluating, goal setting and planning, and keeping and reviewing records may increase students' perceptions about self-efficacy and may improve students' skillful performance. Additionally, teachers who include knowledge about the utility of the strategy as well as about when and where to use a strategy may positively effect a change in students' perception of self-efficacy and achievement level. Teachers should consistently include enactive experiences as part of a daily regime whenever a strategy or rule is being taught. The impact of enactive experiences on students' perceived self-efficacy judgements is a powerful tool for teachers to use in order to ensure successful learning for students. Some researchers suggest that training students in using the strategies they already know may serve the same purpose as presenting new strategies. For optimum effect, strategies could be presented by peer models who are perceived by students as similar to themselves.

An enduring concern of educational psychologists and educators in general is how to optimize children's ability to profit from instruction. Educators may benefit from this study in terms of its support of the notion of the effectiveness

of presenting instructional applications through the use of a peer model. Teachers often model the application of cognitive skills during classroom presentations. Combining explanations with cognitive peer modeling should promote skill development. Teachers need to be aware of the powerful effect of modeling as a vicarious source of efficacy information. Modeling seems to convey the message to students that they possess the capabilities to succeed and will succeed given the opportunity to perform the modeled sequence of actions. Instructional presentation through the use of a coping model for students who are deficient in basic academic skills (i.e., spelling, reading, language, and writing) may serve as a way to increase self-efficacy for learning. Educators should consider systematically incorporating peer models into their daily instruction plans. Providing a rich variety of enactment experiences for students should also be part of a daily instruction plan. Only through experience will students encounter those successful experiences that will increase self-efficacy skills.

Conclusions

Strategy training through the use of a peer model apparently elevated perceptions of self-efficacy and increased achievement for the students in the study. The difference in types of peer models (coping vs. mastery) did not appear to enhance reported levels of self-efficacy to any appreciable degree, a result that was expected according to self-efficacy perspective. However, the posttest scores and self-evaluation perception of the modeling groups did significantly increase during the study. It is possible that the coping model reflected a sense of failure as opposed to one of eventual success.

There is some evidence that students' level of self-efficacy may be increased by introducing a strategy for learning a task. Additionally, higher performance on achievement scores may be attained from strategy training by a peer model. Presumably this occurs because of heightened self-efficacy, although further research on this issue is needed.

APPENDIX A: COVER LETTER TO PARENTS

2 Grace Court
Brooklyn, New York,
11201
Date

Dear Parent or Guardian,

I am a doctoral student at the City University of New York's Graduate School and University Center. In order to earn my degree I must carry out a research project. I have chosen "The Effects of Modeled Strategies and Their Attributions on Self-Regulated Learning Processes and Spelling Achievement". This study will be conducted under the supervision of Professor Barry Zimmerman.

(Name of principal), principal of (Name of School), has graciously agreed to allow the school to be a study site. The attached information sheet outlines the purpose and the procedures of the study. As noted in the summary, the project involves minimal disruption to the school routine.

If you are willing to have your child participate would you and your child please sign the attached consent forma nd have your child return it to the teacher.

If you decide not to have your child participate, he (she) will not be penalized in any way. If you have any questions, please feel free to call me at (718) 935-3567 after 7 p.m.

Thank you for considering my request.

Very truly yours,

Ellen Telzer

APPENDIX B: CONSENT FORM

INFORMATION

The Effects of Modeled Strategies and Their Attributions on Students' Self-regulated Learning Processes and Spelling Achievement

INVESTIGATOR
Ellen Telzer
Doctoral Student
Educational Psychology Department
The Graduate School and University Center
33 West 42 Street
New York, New York 10036-8099

PURPOSE

To investigate various self-regulated learning processes and their effect on spelling achievement

PROCEDURES

The project will consist of two procedures, to be conducted on the same day:
1. A videotape presentation of a specific spelling strategy and an opportunity to practice the strategy.
2. Several self-regulated learning tests to be administered individually to each student.

RISKS

Students will not be exposed to any risks. No testing will occur without the consent of the parents/guardians and their children. Any child who agrees to be tested and subsequently decides against doing so may withdraw from the study without any penalty. All test scores will be kept confidential and will not become part of school records. Furthermore, after each test administration, Ms. Telzer will transform scores to data coding sheets that will not include the students' names. All test data will be stored in a locked file by Ms. Telzer.

BENEFITS

Students who participate may learn new ways to improve their performance in classroom tests as well as other academic areas.

QUESTIONS

Should any questions arise before, during, or after participation in the study, families are encouraged to contact Ms. Telzer at (718) 625-2772.

CONSENT

I have read the above description of the study and discussed the procedures with my child. I give consent for my son/daughter to participate in the study. In addition, my son/daughter voluntarily consents to participate.

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(Signature of Parent of Guardian) (date)

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(Signature of Student) (date)

Student's Date of Birth----------

APPENDIX C: TRANSCRIPT FOR MASTERY MODELING WITH ATTRIBUTION VIDEOTAPE

Cast

Peer Model (PM)

Transcript

PM: Hi, I used to have trouble learning how to spell. Then I learned this new way. Here's how it works. (Model turns to blackboard where the words are listed vertically). Let's say I want to learn how to spell the word pretesting. The first thing that I am going to do is rewrite the word (Model writes the word on the space next to the word). I will then try to break the word into at least 3 parts and cover each part as I say that word part and write the parts down in the next three columns. (The model did the following: pre (said it, spelled it out loud, covered it and wrote the part down), test (said it, spelled it out loud, covered it and wrote the part down), ing (said it, spelled it out loud, covered it and wrote the part down). Now I am going to write the whole word down without looking back at the parts. (The model then covered the entire word and wrote the whole word down in the fourth column without looking back at the word). If the word is correct I will put a check next to it. Yes, the word is correct. I got it right because I followed the steps. (Model continued in this manner for all of the words on the blackboard).

APPENDIX D: TRANSCRIPT MASTERY MODEL WITHOUT ATTRIBUTION VIDEOTAPE

C..st

Peer Model (PM)

Transcript

PM: Hi, I used to have trouble learning how to spell. Then I learned this new way. Here's how it works. (Model turns to blackboard where the words are listed vertically). Let's say I want to learn how to spell the word pretesting. The first thing that I am going to do is rewrite the word (Model writes the word on the space next to the word). I will then try to break the word into at least 3 parts and cover each part as I say that word part and write the parts down in the next three columns. (The model did the following: pre (said it, spelled it out loud, covered it and wrote the part down), test (said it, spelled it out loud, covered it and wrote the part down), ing (said it, spelled it out loud, covered it and wrote the part down). Now I am going to write the whole word down without looking back at the parts. (The model then covered the entire word and wrote the whole word down in the fourth column without looking back at the word). If the word is correct I will put a check next to it. Yes, the word is correct. (The model then went on to the remaining words on the list)

APPENDIX E: TRANSCRIPT FOR COPING MODEL WITH ATTRIBUTION VIDEOTAPE

Cast

Peer Model (PM)

Transcript

PM: Hi, I used to have trouble learning how to spell. Then I learned this new way. Here's how it works. (Model turns to blackboard where the words are listed vertically). Let's say I want to learn how to spell the word pretesting. The first thing that I am going to do is rewrite the word (Model writes the word on the space next to the word). I will then try to break the word into at least 3 parts and cover each part as I say that word part and write the parts down in the next three columns. (The model did the following: pre (said it, spelled it out loud, covered it and wrote the part down), test (said it, spelled it out loud, covered it and wrote the part down), ing (said it, spelled it out loud, covered it and wrote the part down). Now I am going to write the whole word down without looking back at the parts. (The model then covered the entire word and wrote the whole word down in the fourth column without looking back at the word). If the word is correct I will put a check next to it. Yes, the word is correct. I got it right because I followed the steps. (Model moves over to the beginning section on the blackboard). The next word on the list is retreated. The first thing that I am going to do is rewrite the word (Model writes the word on the space next to the word). I will then try to break the word into at least 3 parts and cover each part as I say that word part

and write the parts down in the next three columns. (The model did the following: re (said it, spelled it out loud, covered it and wrote the part down), treat (said it, spelled it out loud, covered it and wrote the part down), ed (said it, spelled it out loud, covered it and wrote the part down). Now I am going to write the whole word down without looking back at the parts. (Model makes a mistake in the spelling of treat. He writes tret instead of treat). If the word is correct I will put a check next to it. No, the word is not correct. I am going to circle the word and do it again. I got it wrong because I did not follow the steps. I am going to rewrite the word (Model does so in the column) and break it up into three parts and say each part as I am writing the word down. Now I am going to write the word again without looking and check it. Yes it is correct. I am going to check it. I got it right because I followed the steps. (The model continues alternating between successful and unsuccessful attempts following the same pattern).

APPENDIX F: TRANSCRIPT COPING MODEL WITHOUT ATTRIBUTION VIDEOTAPE

Cast

Peer Model (PM)

Transcript

PM: Hi, I used to have trouble learning how to spell. Then I learned this new way. Here's how it works. (Model turns to blackboard where the words

are listed vertically). Let's say I want to learn how to spell the word pretesting. The first thing that I am going to do is rewrite the word (Model writes the word on the space next to the word). I will then try to break the word into at least 3 parts and cover each part as I say that word part and write the parts down in the next three columns. (The model did the following: pre (said it, spelled it out loud, covered it and wrote the part down), test (said it, spelled it out loud, covered it and wrote the part down), ing (said it, spelled it out loud, covered it and wrote the part down). Now I am going to write the whole word down without looking back at the parts. (The model then covered the entire word and wrote the whole word down in the fourth column without looking back at the word). If the word is correct I will put a check next to it. Yes, the word is correct. (Model moves over to the beginning section on the blackboard). The next word on the list is retreated. The first thing that I am going to do is rewrite the word (Model writes the word on the space next to the word). I will then try to break the word into at least 3 parts and cover each part as I say that word part and write the parts down in the next three columns. (The model did the following: re (said it, spelled it out loud, covered it and wrote the part down), treat (said it, spelled it out loud, covered it and wrote the part down), ed (said it, spelled it out loud, covered it and wrote the part down). Now I am going to write the whole word down without looking back at the parts. (Model makes a mistake in the spelling of treat. He writes tret instead of treat). If the word is correct I will put a check next to it. No, the word is not correct. I am going to circle the word and do it again. I am going to rewrite the word (Model does so in the column) and break it up into

three parts and say each part as he wrote the word down). Now I am going to write the word again without looking at it. Yes it is correct and I am going to check it. (The model continues in this way alternating between successful and unsuccessful attempts following the same pattern).

APPENDIX G: SELF-EFFICACY SCALES

WORDS	%
1. PRETESTING	_____
2. RETREATED	_____
3. DEPARTING	_____
4. PRECOOKING	_____
5. IMPARTING	_____
6. MISCOUNTED	_____
7. REWINDING	_____
8. TRANSACTION	_____

APPENDIX H: SPELLING LIST A

1. IMPORTING _____
2. DETRACTING _____
3. RECOOKING _____
4. RETESTED _____
5. DELIGHTED _____
6. MISTRUSTFUL _____
7. DISCOUNTED _____
8. PREVIEWING _____

APPENDIX I: SPELLING LIST B

1. PRETESTING _____
2. RETREATED _____
3. DEPARTING _____
4. PRECOOKING _____
5. IMPARTING _____
6. MISCOUNTED _____
7. REWINDING _____
8. TRANSACTION _____

APPENDIX J: DATA COLLECTION PROCEDURES

Mastery modeling with strategy attribution. During training, subjects assigned to this condition viewed the videotape in small groups. An adult proctor introduced each videotape by stating that it would show a student demonstrating how to spell a group of unfamiliar words by using a specific spelling strategy. (See Appendix D for the transcript.) This learning strategy incorporates organization, rehearsal, and self-evaluation elements. The peer model began by saying "I used to have difficulty spelling but then I learned this new way. Here's how it works." The model turned to the blackboard and read the first word which appeared on the first line of the first column. The blackboard was divided into four columns. The spelling words to be learned were written in the first column. The model stated, "Let's assume the word I want to learn is pretesting. The first thing I will do is write the word down in the second column. I will then try to break it into at least 3 parts and cover each part as I say that word part and write the part down in the next column." The model did the following: pre (said it, spelled it out loud, covered it and wrote the part down), test (said it, spelled it out loud, covered it and wrote it down), ing (said it, spelled it out loud, covered it and wrote it down), The model then covered the entire word and said, "I am going to write the whole word down in the fourth column without looking back at the word. If the word is correct I will put a check next to it." After checking the word, the model went on to the next word. This same technique was used for the entire list of 8 words. After each attempt, the model gave the following

attribution, "I got it right because I followed the steps in the right order." After viewing the videotape, the subjects were given a list of words consisting of some new words and some words from the model's list. The adult proctor said to the subjects, "Now you can have a chance to learn some words. Try to learn them as best you can". Each subject was given study time and then was given a written test on the words.

Mastery modeling without strategy attribution. Subjects assigned to this group viewed a videotape showing a model performing the same steps as the previous condition except that no strategy attributional statements were given after each successful attempt. (See Appendix E for transcript). The model corrected each attempt by checking the final word and then went on to the next word. After viewing the videotape, the subjects were given a list of words consisting of some new words and some words from the model's list. The adult proctor said to the subjects, "Now you can have a chance to learn the words. Try to learn them as best you can". Each student was given practice time and was then given a written test on the words.

Coping modeling with strategy attribution: Subjects assigned to this condition viewed the videotape in small groups. An experimenter introduced the tape by stating that it would show a teacher demonstrating how to spell a group of unfamiliar words by using a specific spelling strategy. (See Appendix F for transcript). The model began by saying, "Today, we are going to learn how to spell a list of words". The model turned to the blackboard and read the first word that appeared on the first line of the first column. The blackboard was divided into four columns. The spelling words

to be learned were written in the first column. "Let's say the word I want to learn is pretesting. The first thing I will do is write the word down in the second column. I will then try to break it into at least 3 parts, cover each part as I say that word part, and write the part down in the next column." The model did the following: pre (said it, spelled it out loud, covered it and wrote the part down), test (said it, spelled it out loud, covered it and wrote it down), ing (said it, spelled it out loud, covered it and wrote it down). The model then covered the entire word and said, "I am going to write the whole word down in the fourth column without looking back at the word. If the word is correct I will put a check next to it." The model completed the steps for the first word and spelled the word correctly. For the second word, the model proceeded through the same steps, but misspelled the word on the final step. The model put a circle around the word and stated, "I got this wrong because I did not follow the correct steps, or I got this wrong because I did not break the word into enough parts." The model attempted the word again getting it correct on the second attempt. The model incorrectly spelled alternate words on the list and attributed the error to not following the steps of the strategy. The model immediately corrected the word and gave an attributional statement. After viewing the videotape, the subjects were given a list of words consisting of some new words and some words from the model's list. The experimenter said to the subjects, "Now you can have a chance to learn the words. Try to learn them as best you can". Each subject was given practice time and was given a written test on the words.

Coping modeling without strategy attribution. Subjects assigned to this

condition viewed the videotape in small groups. An adult proctor introduced the tape by stating that it would show a teacher demonstrating how to spell a group of unfamiliar words by using a specific spelling strategy. (See Appendix G for transcript). The model began by saying, "Today, we are going to learn how to spell a list of words." The model turned to the blackboard and read the first word that appeared on the first line of the first column. The backboard was divided into four columns. The spelling words to be learned were written in the first column. "Let's say the word I want to learn is pretesting. The first thing I will do is write the word down in the second column. I will then try to break it into at least 3 parts and cover each part as I say that word part and write the part down in the next column." The model did the following: pre (said it, spelled it out loud, covered it and wrote the part down), test (said it, spelled it out loud, covered it and wrote it down), ing (said it, spelled it out loud, covered it and wrote it down). The model then covered the entire word and said, "I am going to write the whole word down in the fourth column without looking back at the word. If the word is correct I will put a check next to it." If the word is correct I will put a check next to the word." The model completed the steps for the first word and spelled the word correctly. For the second word, the model proceeded through the same steps, but misspelled the word on the final step. The model put a circle around the word and stated, "I got this wrong." The model then went on to the next word either checking the correct spelling or circling the wrong spelling. The model correctly spelled alternate words. After viewing the videotape, the subjects were given a list of words consisting of some new

words and some words from the model's list. The experimenter said to the subjects, "Now you can have a chance to learn the words. Try to learn them as best you can". Each subject was given practice time and was then given a written test on the word.

Control. Subjects in this group were given the same list of words as the treatment groups were given to practice. Subjects were told to study the list and learn them as best as they could. Practice time was given. Control subjects were given a test at the end of the practice time.

Pretest Phase

The experimenter gave the following directions to all subjects, "I am going to say some words, and after I say them, I would like you to tell me how sure you are that you can spell the words by giving me a number on a scale from 1 to 100 (the experimenter pointed to the self-efficacy scale). For example, if you are not sure how to spell a word, you would say 10 (the experimenter pointed to this number on the scale). If you are somewhat sure of how to spell a word you would say 40 (experimenter pointed to this number). If you are pretty sure of how to spell a word you would say 70 (the experimenter pointed to this number on the scale). If you are really sure how to spell a word you would say 100 (the experimenter pointed to the number on the scale). The experimenter asked the subject if he/she understood. If the subject did not, the instructions were repeated until all subjects expressed understanding. Then the experimenter continued. "How sure are you that you can spell the word _____? (the practice word). After subject responded, for example, 100, the experimenter said, "That means you are really sure of the

word. Is that right?" If subject said yes the experimenter continued. "Good I am going to say some more words, and I want you to tell me how sure you are that you can spell these words by giving me a number on the scale" (experimenter pointed to scale) "Ready" The experimenter continued to read the words from list a, and recorded the number on the form. The experimenter continued in this fashion until the list was completed. The experimenter gave the subjects a piece of paper and stated "I am going to say some words and as I say the words, try to write the words on this paper even if you are not sure how to spell them. The experimenter read the list of words (list a) on the record form without allowing the subjects to see the words. When the subjects finished writing the words, the experimenter went on to the next word. If the student remained on a word after 30 seconds, the experimenter instructed the student to go on to the next word. After the subject finished, the experimenter tested for self-efficacy for learning. Subjects were asked to look at the words and to record in the same manner how sure they were that the subject could learn to spell these words correctly if they had a chance to study them. The experimenter reviewed the previous recording system. Subjects looked at the word list they had written and recorded how sure they were that they could learn the words.

The control group followed the same instructions for self-efficacy testing as the experimental groups.

Learning Phase

Each subject in the experimental groups was given a notebook with each of the spelling words written on separate pieces of paper. The experimenter said

"I have some words written on separate sheets. Study these words. Do the best that you can. You will have as much time as possible." The subjects continued in this manner until they finished with all of the words.

Subjects in the control group were given the same word list and the same instructions as subjects in treatment groups.

Post-learning Phase

For a spelling posttest, the experimenter gave subjects a piece of paper and stated "Now you are going to have a chance to spell the words that you have just studied. Please number from 1 to 8. Here are the words." The experimenter read the list of words (list a) and the subjects spelled each one. A sufficient amount of time was given for each word.

The control group followed the same spelling posttest instruction as the experimental groups.

To test spelling self-evaluation judgement, the subjects were asked to rate their certainty that the words were spelled correctly. The experimenter said "Tell me how sure you are that you spelled the words correctly by giving me a number on the scale hat we used earlier". The experimenter presented the scale, reviewed it and had subjects record the number pertaining to each word.

The control group received the same instructions for spelling self-evaluation as treatment groups.

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