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LEARNING TO SPELL BY HIGH SCHOOL STUDENTS WITH LEARNING
DISABILITIES: PERFORMANCE ANXIETY,
SELF-EFFICACY AND LEARNING STRATEGIES

by

ANITA J. BARNETT WEINTRAUB

A dissertation submitted to the Graduate Faculty in
Educational Psychology in partial fulfillment of the
requirements for the degree of Doctor of Philosophy,
The City University of New York.

1996

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Abstract

LEARNING TO SPELL BY HIGH SCHOOL STUDENTS
WITH LEARNING DISABILITIES:
PERFORMANCE ANXIETY, SELF-EFFICACY AND
LEARNING STRATEGIES

by

Anita J. Barnett Weintraub

Advisers: Professor Shirley Feldmann

Professor Marian Fish

This study investigated the effects of learning-strategy training on spelling achievement, performance anxiety and self-efficacy of learning-disabled high school students.

Three treatment conditions and a control condition were compared. Students in the first condition received direct instruction in cognitive strategies as a way to learn and review spelling words. Students in the second condition received instruction in affective strategies as a way to regulate anxiety and self-efficacy during spelling. Students in the third condition received a combination of cognitive and affective strategy training. A control condition -- using no strategy training -- was included to account for the effects of usual classroom instruction.

There were four sessions, with the second and third devoted to learning strategy training. A twenty-minute study period after strategy training was allocated for the students to study their spelling words, applying the learning strategies as they did so. An analysis of covariance (ANCOVA) was used to compare the effects of the four conditions on the posttest scores. The pretest scores and Verbal IQ were used as control variables and spelling achievement, performance anxiety, and self-efficacy as dependent variables. The effects of training in cognitive strategies, affective strategies, and a combination of strategies for improving spelling competence, regulating performance anxiety, and indirectly enhancing self-efficacy were not significant. Although the hypotheses were not supported, some interesting trends were suggested for future research. In addition, followup testing for the dependent variables was conducted one week after posttest with no study time allotted.

Dedication

This work is dedicated to the memory of my mother, Dorothy Barnett, who inspired me over the years with her confidence, ongoing support and encouragement, and everlasting love and pride.

Additional Dedication

This work is also inspired by my mother-in-law, Betty Weintraub. She always showed great belief and pride in me and my efforts and always had faith that I could and would complete this endeavor.

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Table of Contents

	Page
Copyright.....	ii
Approval.....	iii
Abstract.....	iv
Dedication.....	vi
Acknowledgements.....	vii
Table of Contents.....	viii
List of Tables.....	xi
List of Figures.....	xiii
CHAPTER	
I INTRODUCTION.....	1
II REVIEW OF THE LITERATURE.....	15
Spelling Processes.....	15
Gerber's Model.....	18
Learning Disabled Student Population.....	23
Performance Anxiety.....	26
Self-Efficacy.....	33
Learning Strategies.....	37
Integrative Section:(Strategy training in spelling with ld students).....	43
Spelling and Learning Disabled Students.....	44
Learning Strategy Training:	
Cognitive Strategy Training.....	50
Affective Strategy Training.....	54
Combined Cognitive and Affective Strategies Training.....	60
Specifics of Learning Strategies.....	67
General Conclusions.....	74
Rationale.....	79
III METHODOLOGY.....	85
Subjects.....	85
Design.....	90
Measures.....	93
Procedure.....	99
Treatment Integrity.....	113
IV RESULTS.....	115
V DISCUSSION.....	178
Future Research.....	194
VI EDUCATIONAL IMPLICATIONS.....	197

Table of Contents (Cont.)

CHAPTER	Page
Appendix A: SCRIPTS.....	200
Introduction and Orientation.....	200
Performance Anxiety Measure (Pre).....	201
Administration of Anxiety Scale.....	203
Self-Efficacy Judgments (Pre).....	205
Administration of Self-Efficacy Scale....	207
Spelling Pretest.....	209
Administration of Spelling Pretest.....	210
General Strategy Discussion.....	211
End of Day I (Experimental Groups).....	213
End of Day I (Control Group).....	214
Day II First Strategy Training Session (Cognitive Strategy).....	215
Narrative: Cognitive Strategy Condition..	216
End of Session: Cognitive Strategy Cond..	222
Day II First Strategy Training Session (Affective Strategy Condition)...	223
Narrative: Affective Strategy Condition..	224
End of Session II Affective Strategy.....	230
Day II First Strategy Training (Combined Strategy Condition)....	231
Narrative: Combined Strategy Day II.....	233
End of Session II.....	234
Beginning of Session III.....	235
Narrative Cognitive/Affective.....	236
Narrative Independent Practice.....	238
End of Day III.....	240
Combined Day III.....	241
Narrative Independent Practice.....	247
End of Session III.....	249
Beginning Session IV.....	250
Study Time for Spelling Words.....	251
Spelling Posttest.....	252
Self-Efficacy Judgments (Post).....	253
Performance Anxiety Measure (Post).....	255
Closure Statement.....	257
Appendix B: MEASURES.....	258
Anxiety Subscale (LASSI, HS).....	259
Self-Efficacy Rating Scale.....	260
Brigance Screening Test Form B.....	261
Brigance Pre/Posttest, Form A.....	262

Table of Contents (Cont.)

CHAPTER	Page
Brigance Practice Words.....	263
Kaufman (KTEA) Practice Words.....	264
Numbered Paper.....	265
Spell Words Activities.....	266
Spell Words Fill-Ins.....	267
Spell Words Applied to a Word.....	268
I Can Dialogues.....	269
I Can Fill-Ins.....	270
I Can Applied to a Word.....	271
I Can Spell Words.....	272
I Can Spell Words Dialogues.....	273
I Can Spell Words Fill-Ins.....	274
I Can Spell Words Applied to a Word.....	275
I Can Spell Words Activities.....	276
I Can Spell Words Fill-Ins.....	277
I Can Spell Words Applied to a Word.....	278
I Can Spell Words Applied to a Word	
Joined Strategies.....	279
Appendix C: FORMS.....	280
Permission letter - English	
(Parents).....	281
Permission letter - Spanish	
(Parents).....	282
Permission letter - English	
(Students).....	283
Appendix D: INFORMATION.....	284
Modified Instruction Services (MIS) I.....	285
REFERENCES.....	286

LIST OF TABLES

Table		Page
1	Special Education English Class Profile....	89
2	Measures: Before/After Strategy Training..	94
3	Procedures of the Study.....	100
4	ANOVA Comparing Groups on VIQ, PIQ, FSIQ..	117
5	Means and Standard Deviations for IQs....	118
6	Means and Standard Deviations for Spelling Self-Efficacy, and Anxiety.....	119
7	ANOVA - Pretest Spelling.....	121
8	ANOVA - Pretest Self-Efficacy.....	122
9	ANOVA - Pretest Anxiety.....	123
10	Means and Standard Deviations by Gender...	124
11	ANOVA - IQ and Gender.....	126
12	Means and Standard Deviations of Pretest Scores by Grade Level.....	127
13	ANOVA - Grade Level of Students for Pretest Spelling.....	128
14	ANOVA - Grade Level of Students for Pretest Self - Efficacy.....	129
15	ANOVA - Grade Level of Students for Pretest Anxiety.....	130
16	ANCOVA -Comparing Affective and Cognitive Groups, Posttest Spelling.....	132
17	ANCOVA -Posttest Spelling.....	133
18	ANCOVA -Comparing Affective and Cognitive Groups, Posttest Anxiety.....	135
19	ANCOVA -Posttest Anxiety.....	136
20	ANCOVA -Comparing Affective and Cognitive Groups, Posttest Self-Efficacy.....	138
21	ANCOVA -Posttest Self-Efficacy.....	139
22	Means and standard deviations for ANCOVA..	140
23	ANOVA - Follow-up Spelling.....	142
24	ANOVA - Follow-up Efficacy.....	143
25	ANOVA - Follow-up Anxiety.....	144
26	Change Scores and standard deviations for spelling.....	146 and 147
27	ANOVA - Spelling Change Scores pre-post...	148
28	ANOVA - Spelling Change Scores post-follow.....	149
29	ANOVA - Spelling Change Scores pre-follow.....	150
30	ANOVA - Self-efficacy Change Scores pre-post.....	151
31	ANOVA - Self-efficacy Change Scores post-follow.....	152

List of Tables (Cont.)

Table		Page
32	ANOVA - Self-efficacy Change Scores pre-follow	153
33	ANOVA - Anxiety Change Scores pre-post.....	154
34	ANOVA - Anxiety Change Scores post-follow.....	155
35	ANOVA - Anxiety Change Scores pre-follow.....	156
36	Correlations: Pretest Spelling, Pretest Efficacy, Pretest Anxiety and other Variables - Total Sample.....	158
37	Correlations: Cognitive Group.....	159
38	Correlations: Affective Group.....	160
39	Correlations: Combined Group.....	161
40	Correlations: Control Group.....	162
41	Means and Standard Deviations of Stages of Spelling Development by Group.....	165
42	ANOVA - Pretest for Stage of Spelling Error Development.....	166
43	ANOVA - Posttest for Stage of Spelling Error Development.....	167
44	ANOVA - at Followup for Stage of Spelling Error Development.....	169
45	Change Score means and standard devitions..	170
46	Spelling errors change scores pre-post.....	171
47	Spelling errors change scores post-follow..	172
48	Spelling errors change scores pre-follow...	173
49	Item Analysis - Mean Correct Spelling at Grade Levels by Group and Period.....	175

List of Figures

Figure		Page
1	Item Analysis of Comparisons by Mean of Correct Spellings at Grade Levels for Different Periods by Each Group	174

CHAPTER I

Introduction

Learning-disabled students often have problems in written expression, particularly with spelling. This study examined interventions that could improve spelling competence. Two types of strategy training were investigated: cognitive strategies and affective strategies.

Learning-disabled students are identified as those who manifest either general verbal problems or more specific processing problems (Levine, 1990; Wong, 1985). Their language skills have been shown to be weak, causing problems in vocabulary, reading, oral and written expression, foreign languages, and verbal memory (Levine, 1990). Because of this, school is especially difficult, frustrating, and embarrassing for them often causing strong anxiety and excessive nervousness.

Competence in writing is important for success in school, especially during the intermediate grades. It is the major means by which students demonstrate their knowledge, thoughts, and ideas, and through which teachers evaluate student performance. Written language has both composition components and spelling components. Occurring primarily in the course of producing written

communication, spelling is an important tool for facilitation of composition and expression (Gerber, 1985; Lerner, 1981).

Poor writing skills and a weak expressive ability have been shown to be major characteristics of learning-disabled students (Lerner, 1981; Mangrum & Strichart, 1984), with the most frequent writing problem being misspelling (Higgins, 1975). Spelling is a persistent and primary problem for the learning disabled, existing even after their reading skills have improved (Poplin, Gray, Larsen, Banikowski & Mehring, 1980). In fact, there is a steadily widening gap between the expected and actual spelling achievement of learning-disabled students as they progress through school (Gerber, 1984, 1985; Poplin et al., 1980). Learning disability in spelling can have a negative effect on students' success in compositions, book reports, stories, and other writing assignments. When a student realizes he/she cannot spell a word, his/her legibility becomes poorer (Levine, 1990; Velton & Sampson, 1978).

Learning-disabled students do not have a good sense of the sounds of a language and are slow at learning, understanding, and using new words (vocabulary and reading lags) (Levine, 1990). When they attempt phonetic spellings, the results often deviate from dictionary spellings (Velton & Sampson, 1978), and their poor

spelling and poor memories make it difficult for them to express their ideas (Gerber, 1985; Levine, 1990).

Adequate spelling and reading skills are especially important when integrating learning-disabled students into regular classrooms (Gerber, 1985). Such integration places heavy burdens on learning-disabled students, who are often unable to perform at an adequate level or appropriately (Swanson, 1990).

Much of the research on the spelling skills of learning-disabled students is based on cognitive psychology. It describes typical and atypical development of specific information processing abilities, and especially how those abilities influence competence in written language (Gerber & Hall, 1982). Researchers have developed several models, one of which is Gerber's developmental information-processing approach to spelling, which focuses on the spelling of learning-disabled elementary school students using a problem-solving approach. A discussion of Gerber's approach, elaborated later, is useful when examining how learning-disabled students spell.

Strategy Usage (Cognitive Area)

Learning-disabled students are frequently described as inefficient learners because they lack certain cognitive strategies, have inappropriate

cognitive strategies, and/or generally do not engage in self-monitoring behaviors (Swanson, 1990; Torgesen, 1977). They also have significant difficulties with problem solving and exhibit deficits in memory functioning, particularly in the recall of verbal information (Gerber, 1985; Levine, 1990; Swanson, 1987), which may reflect immaturity in cognition and language (Baker, Ceci & Herman, 1987; Gerber & Hall, 1987; Scruggs, 1988).

The function of cognitive strategies is to enable students to use their existing skills to facilitate learning (Whinnery & Fuchs, 1993). Typical students develop and learn to use cognitive strategies as they age and experience life (Brown, Bransford, Ferrara & Campione, 1983). Learning-disabled students do not develop or infer these same strategies naturally (Englert, Raphael, Lear & Anderson, 1988). Considerable evidence indicates that lacking these strategies puts students at a great disadvantage (Torgessen, 1982; Wong & Jones, 1982). Harris (1989) and Wong (1982) suggest that these students may have adequate strategies but lack the required training to implement them. Torgessen (1977) states that they may not be using successful strategies to compensate for their deficiencies, and Pressley and Levin (1986) suggest that learning-disabled students perform poorly on tasks that require the use of general

control processes or strategies for solution. This is supportive of Gerber's findings, which state that learning-disabled students manifest immature control of cognitive processes. Regardless, the general conclusion seems to be that learning-disabled students can be taught to use cognitive strategies to improve their academic performance (Schied, 1989). Toward that end, Nulman and Gerber (1984) propose direct instruction for students in how to recognize their weaknesses, devise appropriate strategies for resolving them, and engage in self-monitoring activities.

Strategy Training

Learning-disabled students have demonstrated an inability to direct their own studying and use effective strategies in reading and reading-like situations (Reschly & Wilson, 1990). An effective learning strategy may involve simple study skills or complex thought processes. Its goal may be to influence the learner's motivational or affective state, or the way in which he/she selects, acquires, organizes, or integrates new knowledge (Weinstein & Mayer, 1983). Whatever its form, a learning strategy is a systematic plan that helps the learner process information and perform a task (Weinstein, Goetz & Alexander, 1988), and is an active, deliberate, and teachable method (Weinstein & Mayer, 1983).

Research by Weinstein (1978) indicates that reading comprehension scores of non-learning-disabled ninth graders continue to increase over time after additional practice using cognitive learning strategies. Weintraub and Zimmerman's unpublished research (1991) compares learning-disabled and non-learning-disabled students in learning to spell. Its results show that although learning-disabled students make use of and reference to some learning strategies while learning spelling words, they may not have developed necessary strategies for studying spelling. Swanson (1989) suggests that the majority of learning-disabled strategy studies focus on students' failure to use strategies rather than on the range of strategies used. His research (1989) shows that learning-disabled students appear to develop strategic thought patterns, albeit inefficiently. In short, students may be better able to learn to spell by actively participating in their own learning through the creation, implementation, and monitoring of their strategies, thoughts, and behaviors. The possibility of devising learning procedures that would augment areas of learning deficiency, particularly in spelling, is suggested in Weintraub and Zimmerman's unpublished research (1991).

Performance Anxiety (Affective Area)

Along with cognitive strategies, also important to

the learning process are affective and motivational aspects --for example, performance anxiety and self-efficacy (Boekaerts, 1985). Affective and motivational aspects are the subjective interpretation and evaluation of the cognitive processes that facilitate or inhibit learning (Boekaerts, 1985).

One of the affective and motivational aspects that is important to the learning process is performance anxiety. Anxiety produced by a learning disability or resulting from negative affective and cognitive reactions to that disability hampers learning-disabled students over time (Access, Spring 1983; Beck & Emery, 1985; Covington, 1986; Velton & Sampson, 1978). Defined as excessive nervousness about one's performance in school and school-related situations and settings (Velton & Sampson, 1978), performance anxiety impedes academic as well as social development (Beck & Emery, 1985). After many failure episodes, the learning-disabled student thinks of his/her abilities as weak and, along with many other people in his/her life, expects such failure to continue. These negative expectations and perceptions lead to nervousness, frustration, and discouragement (Access, Spring 1983; Covington, 1986; Velton & Sampson, 1978), and inhibit successful learning (Boekaerts, 1985). Just as strong anxiety about school performance often contributes to failure and marginality,

it also negatively impacts memory, attention, perception and organization, especially when learning to spell.

Self-efficacy (Affective Area)

Defined as a personal judgment about one's capabilities to organize and implement action within various contexts (Bandura, 1986), particularly in school and school-related situations and settings, self-efficacy is the other affective and motivational aspect that is important to the learning process. Like performance anxiety, weak self-efficacy may result from failure produced by the learning disability (Velton & Sampson, 1978).

A student's knowledge, beliefs, and feelings about his/her abilities and skills play a major role in his/her performance (Boekaerts, 1991), particularly in terms of achievement behaviors and growth of intrinsic interest (Bandura, 1977, 1986; Schunk, 1984). Self-efficacy beliefs can influence thought patterns, actions, and emotional arousal (Bandura, 1977; 1986). When a student believes his/her ability is lower than that of his/her peers, performance anxiety may develop (Benjamin et al., 1981). This may result in less effective processing of information and poor academic performance, such as in spelling.

Bandura (1987; 1982) does not distinguish between

learning-disabled and non-learning-disabled students when he posits that students have become quite knowledgeable about their own capabilities in school. Because frequent failures and learning problems persist for learning-disabled students over time, and since school is a place where competence is frequently evaluated, learning-disabled students know that their skills are weak, especially in comparison with those of their peers. Therefore, it is presumed by this investigator that many of them have low levels of self-efficacy. As a result, they spend little energy at a task, persevere for a short time, set low goals for themselves, and do not persist in the face of barriers and failure (Bandura, 1986). Also, they do not use many cognitive and affective strategies nor do they have motivation to do so (Pintrich & DeGroot, 1990). Helping such students with these strategies may lessen their anxiety and improve self-efficacy as they come to experience success (Velton & Sampson, 1978).

Model of Learning

Several models attempt to explain the information processing of typical and atypical students while learning. Gerber's developmental information-processing model applies to spelling of elementary school learning-disabled students (Gerber & Hall, 1982). Research using an information-processing model with a college-level,

non-learning-disabled population is presented by Benjamin, McKeachie, Lin & Hollinger (1981). The college population seems similar to the learning-disabled high school adolescent, which has become a more researched population (Foss & Needham, 1990). High school and college populations are similar in that they face similar academic and nonacademic issues (Schumaker, Deshler & Ellis (1986), including academic expectations and performance and social and personal development.

The Benjamin et al. model (1981) is useful for studying non-learning-disabled students manifesting strong performance anxiety and those with inappropriate attributional beliefs regarding learning effectiveness (McKeachie, Pintrich & Lin, 1984). It also seems appropriate for studying learning-disabled high school students' spelling because the learning problems that such students manifest are similar to the problems identified as a result of strong performance anxiety -- problems in memory, attention, organization, and perception (Gerber, 1985). The performance deficits of typical students who have strong performance anxiety or inappropriate attributional learning beliefs are believed to be the result of problems in encoding, organizing, and retrieving information. Like learning-disabled students, these students also use less effectual learning strategies, such as repetition and rote memorization

(Benjamin et al., 1981; McKeachie et al., 1984; Mueller, 1980; Tobias, 1980; 1985). Learning-disabled students often have strong performance anxiety and inappropriate attributional beliefs. The model of Benjamin et al. (1981) seems especially applicable to spelling also because spelling is a specific cognitive process (Gerber & Hall, 1982), and, as suggested by Benjamin et al. and McKeachie et al., performance anxiety negatively impacts cognitive processes.

Benjamin et al. (1981) contend that there are interactions between ability, learning strategies, and anxiety at all stages of information processing. If a student's ability seems weaker than that of his/her peers, he/she may develop performance anxiety. This may interfere with attention to task and result in the use of less effective study habits and strategies. Consequently, there is less effective information processing and poor academic task performance, which are further damaged by anxiety during performance situations, especially in terms of memory, attention, perception, and organization. In fact, in a study by Benjamin, McKeachie & Lin (1987), two types of test-anxious college students are differentiated by their information-processing skills. The first type includes those with good study habits who have a major problem in retrieval for a test. The second type includes those with poor study habits who have

problems in all stages of processing. The latter group seems to resemble the learning disabled population on a college level.

Strategy Training for Spelling Competence

There are divergent views of how students remember spellings effectively and which are the most appropriate and effective strategy-related interventions for learning-disabled students (Ehri, 1980; Foss & Needham, 1990). Studies have shown that cognitive and affective strategies can be taught (Weinstein & Mayer, 1983), and such can influence a student's academic self-efficacy perceptions (Owen & Froman, 1992). When intervention works, it might have direct effects on the spelling performance of students with strong performance anxiety (Benjamin et al., 1981). The indirect effects may be the reduction of attention shifts and irrelevant worry (Benjamin et al., 1981). Since skilled learners rely on more than one strategy to cope with a variety of learning tasks (Boekaerts, 1985), such as spelling, it has been suggested that learning-strategy training programs should incorporate a variety of strategies (Weinstein & Mayer, 1983).

The rationale for the current study was that training in cognitive and affective learning strategies should enable learning-disabled students to improve

spelling competence, better manage performance anxiety, and indirectly influence self-efficacy during spelling. Such training would show which are the most appropriate and effective learning strategies, information that would be helpful in planning appropriate related curriculum for these students.

The next chapter contains a review of the literature. It is divided into six parts: spelling processes, learning disabled student population, performance anxiety, self-efficacy, learning strategies, and learning strategy training. In trying to help learning-disabled students improve spelling competence, it was necessary first to understand typical spelling processes, and then, more specifically, spelling processes of special populations, such as the learning disabled. This approach helped to determine which behaviors necessary for spelling competence might, in the learning-disabled population, be weak and require augmentation by strategy instruction. Because of their negative school experiences, learning-disabled students often develop performance anxiety and weak self-efficacy, which negatively impact spelling competence. Finally, it is suggested that learning-disabled students use inefficient or inappropriate learning strategies and may require additional strategic interventions, which can improve spelling competence and self-efficacy and reduce

performance anxiety.

CHAPTER II

Review of the Literature

Spelling Processes

In order to try to increase the spelling competence of learning-disabled students through strategy instruction, it was necessary first to understand the spelling of typical students. Only through a comparison of both populations could specific weaknesses that interfere with the spelling success of learning-disabled students be identified.

Spelling is a basic literacy skill that is an important part of written communication (Lerner, 1981). Learning to spell is cognitively complex, requiring visual-motor integration (the ability to integrate total visual motor skills in complex problem solving), basic vocabulary knowledge, and phonic awareness (Valett, 1974). It involves translating oral words into dictionary-determined, correctly ordered letters that stand for those sounds (Levine 1990; Simon, 1976; Velton & Sampson, 1978). When spelling a word correctly, a student knows the word or thinks of the sounds and remembers the letters that make the sounds in that word (Ehri, 1980; Levine, 1990). He/she must be able to match by shape a series of letter-names with an orally

presented word or with an internal mental image or mental sounds of the word (Ehri, 1980; Velton & Sampson, 1978).

Spelling is similar to reading in that one must attach language sounds to particular combinations of letters that stand for those sounds. Yet, spelling a word is the opposite of reading a word. When a student reads a word, he/she sees its spelling and has to find the sounds to say. When he/she spells a word, he/she knows the sounds or thinks of the sounds and has to remember the letters that make those sounds (Levine, 1990).

Ehri (1980) describes typical spelling as a sequence of visual letters bearing systematic relationships to the sound properties of the word. She proposes a stage theory of spelling development that denotes four discrete stages or periods: precommunicative, semiphonetic, phonetic, and morphemic (Ehri, 1985; 1986; 1987; Gentry, 1982).

The Precommunicative Stage (stage 0) is the earliest stage, when children notice written language and produce scribbles or strings of randomly selected letters to represent words or sentences. For example: p for tack, ko for muffin.

The Semiphonetic Stage (stage 1) is the initial reading and decoding stage when prereaders have learned

letter names or sounds of letters. Initially, only one or two of the letters may correspond to sounds, but this progresses with more experience with print. Examples are bp for buzz, pl for pickle. At this stage, children's letter choices are logical and indicate that they are trying to use what they know about letters to figure out how the spelling system works. This is similar to what older learning-disabled students do, and is examined in the discussion of Gerber's model below.

The Phonetic Stage (stage 2) is distinguished from the Semiphonetic Stage by children learning to spell vowels. They produce spellings that contain letters for all sounds in words, even to excess. For example: doktdr for doctor. At this stage children acquire phonetic awareness, the knowledge that words consist of a sequence of phonemes, which are basic units of sound by which utterances are represented (Stein, Hauck & Su, 1988). Phonetic awareness is very important for the development of reading and spelling. It enables children to analyze and store complete spellings.

The Morphemic Stage (stage 3) is the final stage which begins when students start recognizing spelling patterns that recur across words. For example, spelling past-tense verbs consistently with - ed rather than according to their sounds (woched rather than wocht for watched).

In the early school years, oral spelling helps establish a correct sequence of mental images and sounds that the student may transfer onto paper. Mental sounds or oral spelling can be drilled by having the student repeatedly spell a word aloud, eventually without looking at its written form. Mental images and mental sounds of the letters are necessary for acquiring the ability to spell and write (Velton & Sampson, 1978).

In summary, Ehri's typical spelling processes are presented in a four stage theory of spelling development precommunicative, semiphonetic, phonetic, and morphemic. She posits that learning to spell is developmental, proceeding from simple to complex and from concrete to abstract.

Gerber's Model

Gerber's developmental, information-processing problem-solving perspective explains spelling with a learning-disabled population as a delayed but developing cognitive process in terms of learning and performance behaviors. His model highlights the ability, rather than the inability, of learning-disabled students to solve a concentric array of increasingly complex spelling tasks (Gerber, 1985; Nulman & Gerber, 1984).

Gerber uses a similar developmental approach to spelling as Ehri, an approach that seems to have as a

basis the Ehri stages. Whereas Ehri uses her stages to describe spelling development of typical students, Gerber uses his stages to categorize and describe types of general spelling errors that learning-disabled students make. Gerber's stages are as follows:

1. 1st stage: preliterate (Ehri's precommunicative stage)
2. 2nd stage: prephonetic (Ehri's semiphonetic stage)
3. 3rd stage: phonetic (Ehri's phonetic stage)
4. 4th stage: transitional (Ehri's morphemic stage)
5. 5th stage: correct conventional stage

Although Gerber refers to five stages (Gerber, 1986; Gerber & Hall, 1987), the fifth stage is devoted to the correct conventional spelling level. To these stages Gerber adds some behavioral and perceptual factors: difficulties in self-management (self-control), self-perception (judgment), quantity of spelling acquisition and spelling achievement (knowledge), and error making (judgment). Examples of errors are: 8T for eighty (Gerber's preliterate stage; um or un for human (Gerber's prephonetic stage); hikt for hiked or ate for eighty (Gerber's phonetic stage); and peaked for peeked or elavator for elevator (Gerber's transitional stage).

In his approach, Gerber discusses a number of difficulties that learning-disabled students have,

including self-management (self-control), error making, weak spelling performance and slow spelling acquisition, and poor self-perception.

He suggests that because learning disabled students have normal, though delayed development, there is similarity between them and younger, non-learning-disabled students in learning to spell. Both groups develop and learn to use special adaptations of general problem-solving ability. This similarity between the two groups is manifested in immature management of cognitive processes (e.g., memory, attention), error making, slow rates of spelling acquisition, and low rates of spelling achievement (Gerber & Hall, 1987). Gerber (1985) contends that spelling ability develops in tandem with the general cognitive skills students use to solve problems. A developmental perspective of learning to spell entails shifting from overt to covert performance, from simple to complex exemplars, from prompted performance to unprompted performance, from immediate feedback to delayed feedback, from emphasis on the teacher as source of information to elicitor of new skills, and from much practice to little practice (Becker, Englemann, Carnine & Rhine, 1981).

From Gerber's perspective (Gerber, 1985), the development of spelling depends on the students' abilities to organize previously learned information,

routines, and knowledge. He contends that there is an array of potentially useful information (a knowledge base) that is stored in some organized structure in the brain. The effort required to search this array efficiently and the accuracy of retrieval and encoding depend on four factors: motivation of students to solve spelling problems (influence of self-efficacy), sufficiency and relevance of stored information (improved spelling competence), organization and integration of spelling-related knowledge (improved spelling competence), and the efficiency with which attention is controlled and allocated (management of performance anxiety and indirect influence on self-efficacy) (Gerber, 1985). Search, retrieval, and encoding processes gradually become more automatic for accurate responding in spelling (Gerber, 1985).

Good spelling ability denotes an increasing number of words that can be spelled (improved spelling competence) and an increased general competence in managing the necessary cognitive processes: memory, attention, perception, and organization (Gerber, 1985). This is accomplished by managing performance anxiety and indirectly influencing self-efficacy during spelling.

It is necessary to understand typical spelling processes (Ehri) before highlighting the spelling processes of the learning disabled (Gerber). There is a

connection between Ehri's and Gerber's models. According to Ehri, before passing from one spelling stage to the next, it is necessary that a student achieve certain spelling maturity. According to Gerber, in order to achieve this maturity, a student must have certain background knowledge and information when learning strategies or skills involved in spelling. The current study assumed that learning-disabled students are developmentally delayed in spelling, similar to younger children (Gerber), which can be seen from spelling errors, weak spelling acquisition, and low rates of spelling achievement. It is necessary that researchers be aware of what behavior is typical at each stage of spelling development (Ehri). By comparing learning-disabled students' abilities with those of typical students, educators can determine at which level students are in their spelling development, and which of their spelling abilities are weak or lacking. Such knowledge is necessary in order to develop appropriate and effective cognitive and affective strategies and related curricula.

In summary, spelling is considered cognitively complex to learn, and can be examined at developmentally to see what is involved at each level of orthography. According to Gerber, and important to this study, general competence in managing cognitive processes such as

memory, attention, perception, and organization is weak in learning disabled students. Good spelling ability, which denotes an increasing number of words that can be spelled, is developmentally delayed in these students. In addition, learning-disabled students' abilities to organize and rapidly access previously learned information, routines, and knowledge are delayed, and search, retrieval, and encoding processes are not nearly as developed or automatic. This information is most important for the development of appropriate and effective interventions. Training in cognitive and affective strategies can help such students become active, self-managing and cognitively engaged. This study investigated the appropriateness and effectiveness of certain cognitive and affective learning strategies for increasing spelling competence of learning-disabled students.

Learning Disabled Student Population

Since this study examined interventions (cognitive and affective strategies) to improve spelling competence of learning-disabled students, it was necessary to become knowledgeable about this group by focusing on these students.

The term "learning disabilities" (Wong, 1985) refers to developmental delays in speech and language

facilities, problems in visual and/or auditory perception, problems in visual-motor coordination, and academic difficulties. Learning-disabled people have intact intelligence and absence of sensory handicaps, such as blindness and deafness (Wong, 1985).

Since learning-disabled students are frequently diagnosed as such after a period of learned expectation of failure, they often develop diminished motivation to achieve (Borkowski, Weyhing & Carr, 1988; Foss & Needham, 1990; Levine, 1990), and see themselves as inadequate in comparison with their non-learning-disabled peers. They become excessively anxious when called upon to perform or respond, and do not have the sufficient skills to meet the demands of the curriculum. As time goes on, they often have more and more difficulty remembering what they have read, and being able to recall or find the right words accurately or quickly enough to participate in class discussions. And because it often does not represent the words they would like to use for what they want to say, their writing is also impeded. When accounting for outcomes, learning-disabled students attribute their successes to external causes (such as luck and task ease) and their failures to internal factors (such as effort and ability) (Groteluschen, Borkowski & Hale, 1990). Such faulty attributions and poor self-worth influence the way learning-disabled

students respond. Their choices of activities and settings --specifically in content areas in which they have had little or no experience (Hiebert, Wong & Hunter, 1982)--tend to increase the likelihood of failure and reinforce negative self-evaluations (Bryan, 1992), and they have difficulty paying attention (Access, Spring 1983; Levine, 1990).

The behavioral aspects of learning disabled students appropriate to this study include self-perceptions of inadequacy; excessive nervousness and anxiety; weak performance skills; memory, attention, and concentration problems; faulty attributions; and weak self-efficacy.

General learning characteristics such as these can affect a specific literacy area like spelling: For example, when a student has difficulty in understanding information the first time it is given and needs to have it repeated; when he/she confuses similar letters, such as b and d or p and q, and confuses the order of letters in words, such as was for saw and teh for the; when he/she does not remember which letters or combination of letters stand for a certain language sound(s) (picturing words), and misspells the same word several different ways in the same composition; when he/she does not understand which spelling rules are allowed in the language, and makes errors in terms of sounds, rules, and

visual pictures of words; when he/she has a memory overload while writing and spelling simultaneously and omits or add words; and when he misinterprets the subtleties in language, tone of voice, or social situations (Access, Spring 1983; Levine, 1990).

In summary, although learning-disabled students have intact intelligence and are free of sensory handicaps, they do have language difficulties in both oral and written language, particularly in spelling. They often have academic difficulties, reading problems, and problems in visual and/or auditory perception. In addition, especially at high school entry and thereafter, they may have developed motivational and self-worth problems that affect their realizing their goals and aspirations.

Having a knowledge of the profile of learning-disabled students can increase the appropriateness of interventions and, specifically, the effectiveness of learning-strategy instruction for improved spelling competence.

Performance Anxiety (Affective Area)

Performance anxiety is an affective aspect of the learning process, and an affective variable in this study. Competence in spelling can be negatively influenced by performance anxiety, which learning-

disabled students may develop as a result of years of experiencing failure. Performance anxiety is a form of general anxiety (Sieber, O'Neil & Tobias, 1977) that includes evaluative or test anxiety in the research and literature (Weinstein & MacDonald, 1986). It may refer to evaluation by others or self-evaluation, based on internalized standards (Sieber, et al., 1977), in comparison with one's peers. The student, like everybody else, expects that what has been happening in terms of failure and marginality is what will continue to happen. His/her discouragement, frustration, and excessive nervousness may impede academic and social development (Velton & Sampson, 1978; Wigfield & Eccles, 1989).

Performance anxiety can result from evaluation by a teacher, authority figure, or peer group; comparison of one's achievement to that with that of other class members; taking a quiz or examination; being asked to respond orally in class; and/or confrontation with a school authority (Beck & Emery, 1985; Sieber, O'Neil & Tobias, 1977).

Estimates of test anxiety among the elementary and high school-aged populations have ranged from 10 percent to 30 percent (Johnson, 1979; Wigfield & Eccles, 1989). Research on the fears and anxieties of high school students (Eccles, Midgley & Adler, 1984; King & Ollendick, 1989) indicates an age-related increase in

self-reports of fears attributed to increased exposure to tests and increased emphasis on how a student's ability compares with others'. One study comparing learning-disabled high school adolescents with others shows a much larger gap existing between academic expectations and the former's performance (Schumaker et al., 1986). In addition, many nonacademic pressures -- social and personal development, vocational competence, and successful post-school adjustment (Schumaker et al., 1986), exacerbate students' fears.

The strong performance anxiety of learning-disabled students may also be partially attributable to inadequate knowledge of the subject matter (Benjamin et al., 1981). Whatever its source, strong performance anxiety results in the use of less effective study habits, less effective processing of the information presented in class, poor academic task performance, and impairments to memory and attention (Benjamin, McKeachie & Lin, 1987; Benjamin et al., 1981; d'Yderville, 1985). It has also been shown to reduce the range of response alternatives, and the corresponding evaluation of their appropriateness (Benjamin et al., 1981; Sieber et al., 1977).

Now, let's consider more specific applications of anxiety interference from an information-processing perspective. The research of Benjamin et al. (1987) distinguishes between two types of performance-anxious

students. The first type is those with good study habits but with a major problem in information retrieval because of task-irrelevant responses occurring during the performance situation. This type has problems not in encoding and organizing the information, but in retrieving it. The second type, which learning-disabled students resemble, are those with inefficient study habits who have problems in all types of processing. Strong performance anxious students with poor study habits do poorly in nonevaluative as well as evaluative situations because they do not encode and organize material well in the first place. The Benjamin et al. research (1987) suggests that the academic performance of these students might be impacted directly by their lack of knowledge and indirectly by the cognitive distraction created by thinking about this poor knowledge in the performance situation.

Mueller (1980), using an information-processing model of performance anxiety (Sieber et al., 1977), shows the effects of test anxiety on level of encoding, organizing the information, and retrieving the information in the test (performance) situation itself. Strong performance-anxious students tend to do relatively less well on problems requiring memory; their attention tends to be focused on concerns of failure, and they have difficulty masking out irrelevant stimuli, searching for

information, self-instructing, and planning.

Weinstein, Cubberly & Richardson (1982) studied the effects of test anxiety on learning superficial and deep-level tasks. Ninety female non-learning-disabled college students, classified as either strong or low test anxious, learned a paired-associate word list using either a superficial or a deep-level processing strategy. Students in the superficial processing group were required to examine only physical, structural similarities or differences between the two words in a word pair (i.e., common spelling patterns, distinctive spelling or pronunciations, or contrasts between the number of syllables or letters). Students in the deep-level processing group were required to perform more meaningful analyses of the two words in a word pair or to find an additional word that related the two words. Performing the superficial level task did not require that the learners elaborate, or add meaningful information; therefore they needed only a small amount of cognitive capacity for successful task completion. Performing the deep-level task required the learners to elaborate by retrieving previous knowledge about the meanings of words, which called for a greater amount of cognitive capacity for successful task completion.

Results suggest that the depth of information processing required to perform a task may be a critical

variable in predicting the performance of students with varying levels of performance anxiety, presumably even more so when they are learning disabled. The significant interaction between anxiety level and processing level reveals that low test-anxious students outperform strong test-anxious students on the deep-level processing task. There is no significant difference for the shallow-level processing task. Also revealed is that the performance of strong test-anxious students using a deep-level processing strategy is significantly better than that of those using a shallow-level processing strategy. The same result is obtained for low test-anxious students.

Depth of processing refers to the degree of cognitive analysis or the strength with which information is registered in memory. Spread of encoding refers to the amount or different types of cognitive processing that the learner does or uses with the to-be learned material. Individuals may have limited information processing capacity with respect to the effects of performance anxiety (Tobias, 1984). Because it presents greater demands on cognitive information-processing capacity for performance, performance anxiety may diminish the amount of time and space for the occurrence of information processing.

Strong performance anxiety may differentially affect the acquisition or use of different cognitive

strategies. That is, cognitive demands made by relatively more difficult tasks, or by perceptions of greater difficulty and the amount of processing capacity needed, may not be met because of interference by worry or evaluative threat. More difficult tasks require greater amounts of and are seriously affected by the presence of worry and nervousness. As a result, less processing capacity remains for successful task completion.

Strong performance anxiety makes further demands on processing capacity by dividing the attention of strong performance-anxious students between task-relevant and task- irrelevant concerns (Zatz & Chassen, 1983). Attention is directed away from learning and studying and is focused inward on negative preoccupations such as self-criticism, feelings of incompetence, and expectation of failure (Weinstein et al., 1989).

In summary, performance anxiety refers to excessive nervousness brought on by failure and marginality in school and school-related situations and settings. Students expect that the failure they experience is likely to continue, so there is discouragement and frustration. Once performance anxiety becomes established, it further impedes learning in spelling by leading to ineffective study habits, poor memory and attention, less effective processing of information, and

poor academic task performance. Individuals may have a limited capacity as information processors in spelling. Those with strong performance anxiety and weak study skills are left with a reduced percentage of cognitive abilities available to cope with task demands, resulting in poor spelling performance.

In terms of interventions, it is important to consider the effects of performance anxiety on spelling and to provide for them in strategy instruction.

Self-Efficacy (Affective Area)

Competence in spelling may be negatively influenced by weak self-efficacy, which learning-disabled students often develop as a result of years of experiencing failure. Self-efficacy is an affective aspect of the learning process, and an affective variable in this study. Like performance anxiety, it can play a large part in either facilitating or inhibiting spelling competence.

The literature indicates that a person's knowledge, beliefs, and feelings about his/her abilities and skills play a major role in his/her performance (Boekaerts, 1991). Self-efficacy refers to feelings about personal competence to execute courses of action in relation to school, particularly since school is a place where evaluation is pervasive and continuous (Bryan, 1991;

Schunk, 1988). The subjective interpretation and evaluation of the cognitive processes that take place during the teaching-learning process interact with the learning process itself and may either facilitate or inhibit it (Boekaerts, 1985). Students with a strong sense of self-efficacy spend more energy at a task, persevere longer, set more challenging but realistic goals, and persist longer in the face of barriers and occasional failure than those with weak self-efficacy (Bandura, 1986).

According to Bandura (1977, 1982) and Owen & Froman (1992), a student becomes quite knowledgeable about his/her own capabilities and skills from a variety of sources: enactive information, vicarious experience, verbal persuasion, and physiological signals. Enactive information refers to efficacy cognitions emanating from direct experiences and accomplishments in the form of successes and failures (which for the learning disabled may lead to external attributions of competence). Enactive information is the most important source of efficacy information because success augments self-efficacy, which increases the likelihood of later success (Owen & Froman, 1992). Vicarious experiences refer to information gleaned through social comparison inferences, by observing models (including peers) performing a task and getting evaluated. Verbal persuasion refers to

situations in which students can be socially persuaded that they are (in)capable of achieving a specific goal. This includes statements about their present, past, or future performance or accomplishments and nonverbal information or feedback (e.g., eye contact, tone of voice) accompanying these verbal messages. Physiological signals (cues) refer to the physical arousal system (e.g., anxiety). According to Bandura (1986), schools must boost achievement and raise efficacy expectations, which in turn would elevate academic performance.

Bandura (1977, 1982), Bandura and Schunk (1981), and Owen and Froman (1992) show that a student's self-efficacy about a particular task is a good predictor of later behavior, determining how long he/she will persist in the face of obstacles and adverse experiences. In an educational setting, a student who has weak academic self-efficacy has thoughts that activate self-fulfilling prophecies. For example, he/she might think, "Because I feel inadequate at reading silently, I will avoid practicing the very task I need to rehearse. Compared with other students who approach, rehearse, and apparently enjoy silent reading, I am more likely to fail at the task in the future" (Owen & Froman, 1992). Therefore, failure and dwindling self-efficacy have reciprocal influence and presumably operate similarly in regard to learning to spell.

Self-efficacy constructs are examined in the literature, particularly in terms of learning strategies. Bryan (1991) and Schunk (1984, 1989) suggest that self-efficacy plays a kind of facilitative role in regard to cognitive engagement and regulates student motivation for a wide range of academic tasks and students' responsiveness to instruction. According to Zimmerman (1990), student perceptions of self-efficacy determine their motivation to use learning strategies, which in turn, trigger specific learning responses. Pintrich and DeGroot (1990) find that students strong in self-efficacy are significantly more likely to report use of learning strategies, and to persist at classroom academic tasks longer than students low in self-efficacy.

In summary, school is a context in which a student becomes quite knowledgeable about his/her capabilities and skills from various sources. The student's knowledge, beliefs, and feelings about his/her abilities play a major role in his/her performance, either facilitating or inhibiting it. Compared with those with weak self-efficacy, students with a strong sense of self-efficacy spend more energy at a task, use effective learning strategies, persevere longer at a task, set more challenging but realistic goals for themselves, and persist in the face of barriers and occasional failure. Learning-strategy interventions should recognize this

difference and compensate for the possible effects of weak self-efficacy on realizing spelling success.

Learning Strategies

Learning strategies can be very important for learning disabled students as interventions to help them improve their spelling competence. Information gleaned through focusing on both cognitive and affective learning strategies can be useful in the development of such interventions, helping to structure variations in learning strategies and determine which strategies are most appropriate and effective.

Learning strategies can be defined as behaviors and thoughts that are intended to influence the learner's encoding process (Weinstein & Mayer, 1983). They are systematic plans that help the learner process information and perform a task (Weinstein, Goetz & Alexander, 1988), and are active, deliberate, and teachable methods (Weinstein & Mayer, 1983). An effective learning strategy can range from simple study skills to complex thought processes. Effective learning strategies used with reading by students on the college level may include, for example, looking at an assigned chapter in a textbook to see what it is about before reading it, paying attention to paragraph headings and italicized words, asking themselves questions about what they are

reading and rereading when they do not understand something the first time, searching for key words or concepts, planning their work and making a good use of time rather than putting things off until a test is given, looking for relationships between the current assignment and previous material in the course, following more orderly procedures in taking tests, and being generally less anxious about tests (Weinstein, 1978). Cognitive learning strategies used with spelling may include locating portions of a word about which there is strong uncertainty; generating alternative spellings; using rhyming, look-alike spellings, and other analogies to create options; employing self-questioning or other verbal self-guidance techniques; and using external sources of information and assistance (Nulman & Gerber, 1984).

Learning-strategy research has a well-established empirical base. Cognitive strategies direct the learner's attention to rules and steps that are designed to improve performance (Schunk, 1989). Learners use affective strategies to focus attention, maintain concentration, manage performance anxiety, establish and maintain motivation, and manage time (Weinstein et al., 1988). Recently researchers suggest positive relations among motivation, efficacy, and strategy use (McKeachie et al., 1984; Weinstein & Mayer, 1983).

The purpose of the McKeachie et al. (1984) research was to determine whether or not developing motivation for learning and a better repertoire of learning strategies would enable students to become more effective in learning. In addition, would students as a result be less inclined to attribute failure to lack of an ability than to inappropriate choice of strategy or to inadequate effort? The college student population, although not classified learning disabled, seemed similar to the learning disabled because they lacked skills in reading, in learning from lectures, and in learning from other students in discussions and in interactions outside class. The researchers suggest that these students had not acquired effective skills and strategies for academic learning in high school, making them similar to learning-disabled students. In addition, they had strong levels of anxiety about achievement and testing, and many of them also lacked confidence, also similar to learning-disabled students. Dependent variables were a group of pre- and post-self-report measures, grade point average in future courses, and representative sample interviews to obtain better qualitative understanding of changes on post-self-report measures. Results of this research indicate positive changes on measures of learning strategies, anxiety, and cognition as well as positive correlation between scores on the post-self-reports and

later grade point averages. The hypotheses supported are that teaching learning strategies to students with strong anxiety (e.g., elaboration, questioning, looking for main ideas, self-monitoring), results in improved achievement relative to other students, increased self-efficacy, greater sense of personal control, and enhanced motivation.

Learning strategies improve immediate performance and can generalize beyond the learning context (Schunk, 1990). Weinstein & Mayer (1983) show that effective students who are active information processors, interpreters, and synthesizers use a variety of different strategies to select, encode, store, and retrieve information. Students who are more cognitively engaged in trying to learn by memorizing, organizing, and transforming classroom materials through the use of rehearsal, elaboration, and organizational cognitive strategies perform better than students who tend not to use these strategies (Weinstein & Mayer, 1983).

There is considerable evidence (Schunk, 1990; Zimmerman & Martinez-Pons, 1986, 1988) that training students to use learning strategies for attention, encoding, retrieval, and academic task performance improves their perceptions of self-efficacy, motivation, and learning and results in more successful academic task performance.

Weinstein and MacDonald's learning strategy system (1986) is composed of active study strategies and supportive strategies. However, Weinstein (1978) and Weinstein and Mayer (1983) mention cognitive learning strategies in their earlier work in relation to rehearsal and elaboration. Weinstein and Mayer (1983) also refer to affective strategies instead of supportive strategies for the same kinds of behaviors (e.g., alertness, relaxation and overcoming test anxiety). Therefore, study strategies are comparable to cognitive strategies and supportive strategies are comparable to affective strategies. Henceforth, cognitive strategies and affective strategies are the designations used in this study. The goal of cognitive strategies is to build mental connections between what is already known and what is to be learned. Another goal is to determine when learning goals or learning failures have occurred, and for the learner to correct those failures. These strategies are active because they are within the learner's control, requiring the learner's active involvement (Weinstein & MacDonald, 1986). Examples of cognitive strategies include rehearsal and elaboration, which are memory strategies and are discussed below.

Affective strategies (Weinstein & MacDonald, 1986) refer to those methods that are used by the learner to help maintain suitable internal and external learning

environments for managing anxiety, focusing attention, and being alert and relaxed. Examples of affective strategies include positive self-talk, self-monitoring, self-coaching, and thought stopping, which will be discussed below. For many years, performance or evaluative anxiety was considered as a behavioral reaction to stresses in the environment, which were debilitating and not within the learner's control. Over time, thinking has changed, and now decrements associated with strong performance anxiety are considered the products of cognitive worry, associated with perceived stress and within the learner's control. In this case, attention is directed away from learning and studying and is focused on self-criticism, feelings of incompetence, and expectations of failure.

In summary, since learning is an active process that occurs within the learner and can be influenced by the learner, systematic methods that help the learner process information, perform a task, and in general facilitate learning are important for improving spelling performance. These methods, which are called learning strategies, can range from simple to complex, and are active, deliberate, and teachable. They are cognitive, affective, or behavioral activities, thoughts and behaviors that can be used in selecting, encoding, storing, retrieving or using spelling knowledge and

information; they affect the learner's motivation or affective state for spelling competence. Learning strategies have been divided into cognitive strategies and affective strategies.

Integrative Section Strategy Training in Spelling
 with Learning Disabled
 Students.

Learning-disabled students who have normal intelligence may show delayed development in learning to spell (Gerber & Hall, 1987; Wong, 1985). They are comparable to much younger non-learning-disabled students in their rates of spelling acquisition/achievement, error making, and immature management of cognitive processes (memory, attention and concentration) (Gerber, 1985; Gerber & Hall, 1987; Poplin et al., 1980). By attributing success to luck and task ease and failure to insufficient effort and ability (Groteluschen et al., 1990), they bring on dysfunctional anxiety, motivation, and self-worth problems that inhibit their performance (Boekaerts, 1985; Bryan, 1992). This increases the likelihood of failure and reinforces their self-evaluations.

Their comparisons with peers show a larger gap existing between academic expectations and their performance, which results in performance anxiety (Schumaker et al., 1986; Velton & Sampson, 1978), which,

coupled with poor study skills, impedes their academic development (Benjamin et al., 1987; 1981). Students who have weak academic self-efficacy expend little energy at a spelling task, use ineffective learning strategies, do not persist at a spelling task, and do not set realistic spelling goals for themselves (Bandura 1982; 1987). Appropriate and effective cognitive and affective strategies might help them process spelling information and perform a spelling task as well as lower performance anxiety and increased self-efficacy.

Spelling and Learning-Disabled Students

This section focuses on spelling, comparing learning-disabled students with non-learning-disabled students. Such a comparison can be useful when developing learning strategies. In Gerber & Hall's research (1982) learning-disabled students were followed longitudinally for six months. The only training given was a twenty-minute self-questioning, self-monitoring technique, without formal training of spelling rules and patterns. The research shows that older learning-disabled students gradually acquired some stable skill knowledge and experience that they could use to improve their own performance. Their spelling attempts made gradual, though unmistakable, qualitative and quantitative improvements by better approximations to conventional,

though not correct spellings. This research suggests that learning-disabled students learn much more during spelling performance than they previously showed, and are not as passive or inattentive as formerly believed. However, their knowledge is poorly organized and is not spontaneously accessed (Nulman & Gerber, 1984).

In addition to the research results of Gerber & Hall (1982) and those of Nulman & Gerber (1984), just discussed, other research (Carpenter & Miller, 1982; Lerner, 1981) suggests that a learning disabled poor speller shows an accuracy level of words spelled of 50 percent or less, whereas a non-learning-disabled student usually spells at a 70 percent to 100 percent accuracy level. In fact, despite promising earlier research results (Nulman & Gerber, 1984), Gerber & Hall (1987) suggest that learning disabled students consistently present academic achievement profiles in which spelling is among the weakest, if not the weakest, skill. Spelling problems emerge early for the learning disabled and persist as a serious deficiency throughout secondary school (Cone, Wilson, Bradley & Reese, 1985), impeding their written communication.

In an unpublished study by Weintraub & Zimmerman (1991), learning-disabled and non-learning-disabled high school students were compared in spelling. Initially and at conclusion, non-learning-disabled students showed

significantly higher scores on spelling pretest and spelling posttest (spelling achievement), self-efficacy judgments, self-efficacy judgment for learning spelling words, and self-efficacy judgments (self-confidence judgments). It was also shown that despite their handicap, learning-disabled students showed significantly greater gains than the non-learning-disabled students in spelling learning, self-confidence judgments of personal spelling competence in general and for correctly spelled words in particular, and the effective use of study time and numerous learning strategies. However, it was noted that the significant gap between the two groups in learning the spelling words within the same time period was not closed. There are several possible reasons for the disparity between the two groups, those those attributable to the learning disability and its concomitant problems.

First, each student was seen individually by the experimenter for approximately 42 minutes to one hour. In the directions for studying words, students were neither instructed in nor told to use any learning strategies. Students studied the words in any way they wanted, using the word cards they were given. After the posttest and self-evaluation measures had been collected, strategies were addressed through discussion based on the experimenter's observations and student response to

questioning about any methods they had used to help them study the words. Learning-disabled students were compared with non-learning-disabled as well as other learning-disabled students in regard to growth over the same time. When compared to other learning-disabled students they made growth, but the level of growth was not sufficient to bring them to the same point as the non-learning-disabled students. A second reason for this disparity seems to be that the learning-disabled students were initially farther behind than the non-learning-disabled students. They spelled more words incorrectly on the pretest and would have had to master many more words than the non-learning-disabled during study time to be able to catch up with them at closure. Possibly, interventions such as training in learning strategies could help learning-disabled students improve their spelling competence. Research such as this study can help determine which strategies are most appropriate and effective for increasing spelling competence, and managing performance anxiety, and influencing self-efficacy. In summary, learning-disabled students have problems with linguistic functioning in general and spelling in particular. This impedes their writing in terms of error making and retarded rates of acquisition. The abilities of these students in written expression tasks of spelling, punctuation, and word usage are like

non-learning-disabled students who are three to four years younger. Their spelling knowledge is poorly organized and not spontaneously accessed and is at a 50 percent or less accuracy rate. Their spelling also is significantly slower than that of much younger peers. Even though they have developmental delays and problems with cognitive management that interfere with learning spelling words and managing anxiety and self-efficacy during spelling, some research (Gerber & Hall, 1982; Nullman & Gerber, 1984) shows that their spelling knowledge and attentiveness may be greater than previously believed. This study assumes that learning disabilities are due to developmental delays that cause learning-disabled students to be comparable to younger non-learning-disabled students. Thus, learning problems can be remediated by interventions that improve spelling competence. These interventions include, cognitive strategies (rehearsal and elaboration), affective strategies (positive self-talk, self-monitoring, self-coaching, and thought stopping), and combined cognitive and affective strategies (rehearsal, elaboration, positive self-talk, self-monitoring, self-coaching, and thought stopping). This study investigates which strategies are the most appropriate and effective for improving spelling competence.

Learning Strategy Training (Cognitive Strategies,
Affective Strategies)

This section contains varied and relevant learning-strategy training research, most of which is with a learning-disabled student population. Specifically, these empirical studies provide justification and support for the cognitive and affective learning strategies selected for investigation in the current study. The Weintraub and Zimmerman unpublished study (1991) is presented first and provides information about high school learning-disabled and non-learning-disabled students and the learning strategies they used to study their spelling words. Then, empirical research that focuses first on cognitive strategies and then on affective strategies is presented. Finally, research containing combined cognitive and affective strategies is addressed.

One of the processes addressed in the Weintraub and Zimmerman study (1991) is strategizing. Strategizing is approached from two perspectives: strategy use and strategy knowledge. Strategy use consists of evaluator-observed strategies, which include rehearsal strategies of saying words, saying letters, self-checking, writing, and any of the above combined as multiple strategies. Student-verbalized self-strategy use -- wherein the student reports using elaboration and rehearsal strategies that might not be seen by the evaluator -- consists of vocalization of words and letters,

segmentation, self-check techniques, rereading of words, putting words in a sentence, writing, imagery, and other strategies. Results show that significantly more learning-disabled students are observed using strategies than non-learning-disabled, and learning-disabled students also verbalize about using significantly more strategies. However, comparison of the learning-disabled and non-learning-disabled for each strategy on strategy use and strategy knowledge is not significant.

Cognitive Strategies

Cognitive strategies make up one of the interventions investigated in this study to increase spelling competence. Weinstein's research (1978; 1982) focuses on the effects of learning-strategy training programs and the learning and retention (efficiency) of, for example, 9th grade non-learning-disabled students. Learning strategies that are included are diversified imaginal and verbal elaboration strategies. The tasks used are free recall, modified serial recall, paired-associate learning, and reading comprehension tests. Results indicate that 9th graders' scores continue to increase over time after additional practice using cognitive learning strategies. Training that includes practice and feedback in the use of cognitive strategies significantly enhances their effectiveness.

Reid and Harris (1993) compare the effects of a rehearsal procedure with other procedures (self-monitoring of attention and self-monitoring of performance) on attention and academic performance. Twenty-eight elementary school learning-disabled students were taught a spelling rehearsal procedure that consisted of five steps that were operationally defined to include (1) look at the word (eyes focused on the spelling words), (2) say the word (pronouncing words on the spelling list), (3) cover the word, (4) write the word three times (writing words), and (5) check spelling accuracy (checking words on the spelling word list) and performing any step of the rehearsal strategy. If a word was misspelled, students were encouraged to practice the word again. The experimenter monitored students' performance to ensure that the procedures were correctly performed. Results show that spelling achievement and spelling maintenance are significantly higher in the rehearsal procedure. Thus, the rehearsal procedure is most effective.

In a study presented by Wong, Harris & Graham (1991), forty-five non-learning-disabled elementary school students from two classes were taught to use the cognitive strategies of rehearsal and rehearsal and elaboration in spelling respectively. This cognitive strategies approach during spelling was used to focus

attention and increase memory and awareness of spelling errors made. Specifically, students were to be helped to develop enhanced phoneme-grapheme awareness and self-checking spelling accuracy awareness. The typical method of presenting words to both experimental and control groups is as follows:

1. teacher presents the word visually
2. teacher says the word, students repeat the word
3. students copy word in their book
4. teacher checks to verify accuracy

Students in the experimental group were also given the following rehearsal and elaboration strategies:

5. cover the word in the book
6. repeat the word to him/herself and listen for the sounds
7. write the word
8. students ask themselves, "Do I have the sounds I hear?" "Does it look right?"
9. underline any part of the word not sure of
10. uncover the word and check for accuracy
11. cover the word if necessary
12. repeat for second and third spellings of each word

A twenty-minute spelling lesson was given four times a week.

A posttest was given immediately after completion of the four

sessions, and a maintenance test was administered three weeks later. The strategy condition surpassed the control condition on accuracy of words spelled. The researchers suggest that this strategy could be adapted for use with students who have learning disabilities.

Bradley (1981) developed a rehearsal spelling technique for children and adults with severe spelling problems. The methods consisted of the following series of steps for the student.

1. present a word to learn
2. correctly write the word
3. name the word saying the name of each letter as it is written
4. write the word saying the name of each letter as it is written
5. name the word again, check accuracy, and continue steps 2 through 5 until mastery

This technique is reported to enhance spelling performance.

Research by Harris, Graham and Freeman (1988) with a learning-disabled student population shows positive results using a five-step word rehearsal strategy on spelling. The strategy requires the students to:

1. say the word
2. write and say the word
3. check the word

4. trace and say the word,
5. write the word from memory and check and repeat the first five steps.

Thus, a number of studies show that cognitive strategies of rehearsal and elaboration improve spelling performance.

Rehearsal and elaboration strategies are useful for this study because they are particularly successful with memory problems. Learning-disabled students have memory problems, and spelling competence requires good memory processes.

Weinstein's study on deeper registration in memory for improved competence in reading comprehension using imaginal and verbal elaboration strategies are appropriate for improving spelling competence. Also, rehearsal and elaboration strategies used in the research of Wong et al. (1991) and Reid et al. (1993) with spelling are promising even though subjects were elementary-aged students. Bradley's (1981) and Harris et al.'s. (1988) spelling strategy research with learning-disabled students, some of whom were older, seems especially promising to improve spelling competence of high school learning-disabled students.

Affective Strategies

An affective strategy condition is one of the

interventions investigated in this study to improve spelling competence. McCombs (1984) asserts that because many learning-disabled adolescents do not use effective self-motivation strategies, such as making self-coping and affirmation statements and providing themselves with reinforcement, these strategies are explicitly taught to them. The main purpose of self-motivation training is to promote in students self-efficacy and personal control, which underlie the ability of students to take positive self-control and change negative attitudes and orientations toward learning. Learning-disabled students are trained to make positive affirmation and self-coping statements as they work through a task, use self-reinforcement and self-correction procedures, and monitor progress toward their goal. Also, many learning-disabled students have concentration difficulties that strongly affect their ability to comprehend, retain, and retrieve academic materials. Often, the result of strong anxiety interfering with attention, concentration, and memory. Some concentration difficulties and attention problems arise from the learning disability itself. To the extent that affective strategy training reduces the amount of time and energy that performance-anxious students spend in ruminating about the students are better able to concentrate during spelling examinations and to devote more attention to spelling task requirements.

Addressing math anxiety, Wong, Harris and Graham (1991) use a coping strategy of self-talk with learning-disabled students. Self-talk includes the student's expectations and attitudes about himself/herself, others, and situations. For the anxious student, these expectations seem to focus on negative self-evaluation, perfectionism, and concerns about failure or not coping. The math performance of these students is crippled by their math anxiety, which is manifested in their spontaneous generations of negative self-statements. These researchers focus on changing the negative self-statements into positive self-statements through the use of coping statements which include recognition of negative thoughts, control of negative thoughts, and self-reinforcement of positive thoughts. The researchers direct the students to assess the situation, to recognize and control the source of habitual negative thoughts, and replace them with positive thoughts.

Coping self- statements

Assessment of the situation "What is it I will have to do? I will look over the task and think about how I will work through it."

Recognizing "Ok, I feel worried and scared. I'm saying things that don't help I can stop and think more helping thoughts."

Controlling "Don't worry! Take it step by step-- look at one word at a time. Don't let your eyes wander to other words. When you feel fear coming on. . . . take a deep breath, and think I am doing just fine things are going well. I can do this, think through the words and do my best."

Reinforcing "I did really well in not letting this get the best of me. Good for me, I did a good job. I did a good job in not allowing myself to worry too much".

In order to facilitate learning of the strategy steps, the students are given two prompt cards. The first card cues them on the three strategy steps, and the second gives examples of self-statements to carry out the strategy steps. Prior to strategy training, students are provided with an oral presentation of the role of self-talk in maintaining poor academic performance. The purposes are to make the students aware of their maladaptive style of thinking and to pave the way for the coping strategy training. Students are also informed of the training goals, which include, enhancement of their math performance, coping with math anxiety, and ample practice in using the coping strategy. The results indicate that the coping strategy increases positive self-talk and math performance in the learning-disabled students and that these results are maintained over three

weeks as well. The nature of self-statements is changed from being negative to being positive. Their substantial gains in math tasks are found to correlate with their increases in positive self-talk. It seems that spelling could be substituted for math in this research, using affective strategies.

A study by Dansereau, McDonald, Collins, Garland, Holley, Diekhoff and Evans (1979) was designed to examine two alternative concentration management strategies, singly and in combination, as a way potentially to ameliorate the negative effects of nonconstructive affect in comprehension, retention, and retrieval. There were four undergraduate groups of 82 non-learning-disabled college students. Three were treatment groups and one was a control group. The three treatment groups were given 2 1/2 hours of training and the control group was not. One group (n = 17) received training in a self-initiated relaxation strategy that required the students to learn and use a combination of relaxation techniques. A second group (n = 19) received training in a self-coaching strategy, which was an extension of positive self-talk techniques. Using the analogy of an athletic coach as their framework, the researchers taught students to coach (talk) themselves into constructive study and test-taking moods and to maintain these moods by monitoring and counteracting distractions. A third group

(n = 17) was given training in a strategy that combined self-initiated relaxation with self-coaching. In this strategy, the self-coach used self-talk and relaxation strategies to create and maintain constructive internal moods. A fourth group (n = 20) was a no-treatment control. The 2 1/2 hours of training included rationale, instructor-guided exercises, examples portraying effective use of the strategy, and practice implementing the technique. Following training, all four groups studied a 3,000-word passage extracted from an undergraduate geology book under nondistracting conditions for one hour. In addition, they studied a 1,200-word passage on the biological effect of pressure under intermittent auditory distraction. Five days after studying, all participants were tested over both passages. The results indicate that students in the combined condition of self-initiated relaxation plus self-coaching strategy were most successful because the combined condition facilitated performance on the comprehension-retention tests under both distracting and nondistracting conditions. Subjective reports elicited from students participating in the treatment groups indicate that the training and strategies were perceived as valuable. In fact, many of the participants indicated that they would continue to use the strategies in their normal studying.

The results of the research containing affective strategies seem to have possibilities for increasing spelling competence as well, especially since affective and motivational factors can inhibit or facilitate learning. Positive self-talk and self-coaching are shown in the research of Wong et al. and Dansereau et al. to have positive affects on math anxiety and self-management in learning science. Thought stopping, a kind of positive self-talk, also seems to be an effective way of stopping negative and self-deprecating thoughts and turning them into positive ones. Self-monitoring is important so one can apply affective strategies to facilitate spelling learning.

Combined Cognitive and Affective Strategies

A combined cognitive and affective strategy condition is one of the interventions investigated in this study to increase spelling competence of learning-disabled students.

Study habits correlate negatively with anxiety and positively with academic achievement, and appear to contribute to academic performance independently of ability (Lin & McKeachie, 1970; Spielberger, Gonzalez & Fletcher, 1979). Therefore, it seems important to take students' study habits as their performance anxiety into account. In the test anxiety literature, each

intervention is successful in reducing test anxiety (performance anxiety), but all are relatively inefficient or inconsistent in producing changes in academic achievement. However, several studies suggest that it appears that a combination of a treatment intervention (affective strategies) with study skills (cognitive strategies) is the most effective way to both reduce anxiety and increase performance (Wilson & Rotter, 1986). Cognitive strategies can work on memory problems and affective strategies can work on attention and concentration, both of which is necessary to improve the spelling competence of learning disabled students.

Wilson and Rotter (1986) investigated whether non-learning-disabled junior high school students' test anxiety, self-esteem, and test performance would be affected by training that included anxiety management training (affective strategies) and study skills counseling (cognitive strategies), modified anxiety (affective strategies), management training, attention placebo control, and no-contact control. There were five groups of students ($n = 60$), which included four treatment conditions and a control condition. Students in the four treatment conditions met twice a week for three consecutive weeks for 45 minute sessions. The results show that each of the three singular treatment modes is effective in reducing test anxiety and, to a lesser

degree, effective in changing levels of self-esteem and test performance. The experimental treatment approach in which traditional anxiety management training methods (affective strategies) are combined with focus on study skills (cognitive skills), results in short-term and long-term treatment effectiveness for reducing anxiety, increasing self-esteem, and increasing performance.

Dansereau et al. (1979) developed and evaluated their learning strategy system in its entirety as well as evaluated its individual components. The learning strategy system consists of primary strategies (cognitive strategies) and support strategies (affective strategies). Primary strategies (cognitive strategies) are divided into comprehension retention and retrieval utilization, both using the acronym of MURDER. MURDER stands for Mood, Understand, Recall, Digest, Expand, Review, and Mood, Understand, Recall, Detail, Expand and Review, respectively. The MURDER approach has two important aspects: First, the student is encouraged to process the same text material more than once, and second, much of the focus is placed on the active recall or recitation of what has been learned. Support strategies (affective strategies) were designed to assist the student in developing and maintaining a good internal state. These can include goal setting and scheduling, concentration management, and monitoring and diagnosing

the dynamics of the learning system. These concentration difficulties stem from two general sources: attitude or mood problems (e.g., anxiety, fear, frustration) and problems in coping with distractions. Participants in the study were non-learning-disabled undergraduate college students. In the first experiment the performances of different subgroups of the class are compared with each other and with a no-treatment control group. The basis of these comparisons is scores on a series of tests over textbook material that had been studied one week earlier. In the second experiment, the performance of the class members on a set of self-report measures is compared with a separate no-treatment control group, both before and after the course. The results indicate that the strategy system and the training improve the students' learning behaviors and attitudes. Participants in the strategy training program were asked to rate informally the perceived value of each strategy component, to which they responded favorably.

Borkowski, Weyhing, and Carr (1988) studied the self system of learning-disabled students whose reading comprehension was improved through instructions about summarization strategies (cognitive strategies) and task-specific attribution retraining (affective strategies). Their notion is that even though students come to a task with long-standing maladaptive attributions, these

attributions can be changed if the students acquire new strategies and the acquisition of these new strategies is accompanied by adaptive interpretation of this learning.

Seventy-five learning disabled students, ages 10 through 14, were assigned to one of four training conditions. One condition was Reading Strategies Plus Complex Attribution, which had two phases. In the first phase, students were taught strategies that improved sort-recall and paired-associate learning. Attribution training was integrated into the instruction, and the instructor also modeled the positive self-attribution. The instructor discussed the relation between effortful strategy use and successful performance. Then the students' errors were used to stress the importance of controllable factors in outcomes. Self-attributions about uncontrollable outcomes were rephrased with positive belief statements about the role of effort. In the second phase of this condition, students were taught summarization strategies (e.g., main ideas and details, topic sentence and summarization) and given attribution retraining related to strategy-based reading. The other three conditions of the study were designed to control for each of the types of training combined in the first condition (Reading Strategies Plus Attribution, Attribution Control, Reading Strategies Control).

The results show that both attributional strategy-

trained groups improved from pretest to posttest in their summarization skills. Students in both the Combined Attribution Plus Reading Strategy Training groups showed about a 50 percent improvement in summarizing paragraphs compared with a 15 percent improvement in subjects who received only the reading strategy. Also, there was a six-month improvement in inferencing ability for main ideas in short paragraphs in the Combined Attribution Strategy Training group. This study is important because it shows how taking into account student's attributions while teaching them specific skills can have much greater impact on their reading comprehension than merely teaching them the reading strategies. Of importance is that changes in attributions were restricted to performance in the reading strategies tests and did not generalize to other content areas. It is presumed by Reid et al. (1988) that this can enhance learning disabled students' acquisition of specific subject matter and adaptive attributions about that subject. Further, it is suggested that if enough experiences of this kind take place, then possibly students' adaptive attributions may offset their general attributions.

Results from empirical research containing a combined strategy approach to intervention show that the combination of cognitive and affective strategies works to increase the subject's academic competence as well as

to maintain the subject's internal states, including reducing anxiety and enhancing self-efficacy. The increased academic competence could apply to increased competence in spelling.

In summary, empirical learning strategy training research has been presented in terms of cognitive strategies (Bradley, 1981; Harris, Graham & Freeman, 1988; Reid & Harris, 1993; Weinstein, 1978; 1982; Wong, Harris & Graham, 1991), affective strategies (Dansereau et al., 1979; Wong, Harris & Graham, 1991) and combined cognitive and affective strategy conditions (Borkowski, Weyhing & Carr, 1988; Dansereau et al., 1979; Wilson & Rotter, 1986). Promising results are shown for enhancing academic performance, attention and concentration, and the self-system through strategy usage. Student control is also suggested as being greater when these methods -- particularly the combined strategy condition and affective strategies -- are followed.

Since there is a sparse amount of empirical research available for each of these strategy conditions, various school levels are included (e.g., elementary, junior high school, high school, and college undergraduate). As much as possible, empirical learning strategy research with a learning-disabled student population is addressed. However, some of the research

has a non-learning-disabled population. One study focused on math anxiety, which is similar to spelling anxiety (performance anxiety). Research with a cognitive strategies approach is also highlighted as important for strategy training with learning disabled students in spelling. Swanson's (1989) contention that general strategy training is more effective with academics for learning-disabled students than strategies strongly embedded in a specific content area seems to underpin some of the learning strategies in the studies presented.

Specifics of Learning Strategies

Weinstein and MacDonald (1986, p. 263) offer the following guiding principles for selecting learning strategies from an information-processing model that have not been identified with any particular subject area:

1. Identify thoughts or behaviors that enable learning but that are not being manifested (e.g., be alert, be relaxed, concentrate, be motivated, have a positive self-image).
2. Identify thoughts or behaviors that are likely to interfere with learning (e.g., anxiety, poor self-esteem, weak motivation).
3. Hypothesize strategy-related intervention methods that are likely to build facilitative thoughts or behaviors, or reduce interfering

behaviors (e.g., cognitive strategies, affective strategies, combined cognitive strategies and affective strategies).

4. Carry out those strategy-related interventions first that are most likely to be successful in the shortest term.

The Importance of Memory (Levine, 1990)

Learning-disabled students often have many memory problems. Learning to read, memorizing vocabulary and/or spelling words, writing reports, solving mathematics problems: all require the use of memory.

Memory has three basic jobs to perform: (1) storing: ideas, facts, or new skills have to be stored for future use; (2) retrieving: a person has to be able to find what he/she has stored; (3) keeping ideas together while working on them (active working memory): active memory because it is being used at the moment, and working memory because it is being used to do something. Keeping ideas together in memory while working on them is important so that what is being done is not forgotten while it is being done.

Two ways of receiving information are through visual memory and auditory memory. If a student can register information through his/her eyes to his/her brain, he/she has strong visual memory. If he/she is not

good at registering visual information, but is especially keen at registering what he/she hears, he/she has a good auditory memory, or memory for spoken language.

Learning-disabled students have poor visual and/or auditory memories, which affects how they process spelling words, since visual and auditory modalities are at play in spelling competence. They do not use active and successful strategies to help compensate for immaturities and weaknesses in these areas or for deficits in strategy use. (Levine, 1990).

The Importance of Attention (Levine, 1990)

The ability to concentrate or control attention is necessary for success in school. Concentrating is difficult for learning-disabled students because their minds drift off in a classroom and they may not listen well or hear what the teacher is saying. There are two important controls over attention: choosing the most important thing to concentrate on and filtering out the unimportant things (distractions), both of which affect information entering the brain. Alertness and awareness are critical for attention as is control over moods (states). Learning-disabled students who cannot pay enough attention are likely to be thinking about the wrong things during learning, such as the negative ideas that accompany strong performance anxiety and weak

self-efficacy. Controlling these moods makes it almost impossible to concentrate in class.

Specific learning strategy information

Cognitive strategies include rehearsal and elaboration. Empirical research using these strategies by Bradley (1981), Harris, Graham & Freeman (1987), Reid & Harris (1993), Weinstein (1978) and Wong, Harris & Graham (1991) is presented.

Rehearsal (Levine, 1990) is a memory strategy that helps the student register new things in memory with enough depth of processing. It consists of two major cognitive goals: selection (helping the learner pay attention to important aspects of the word), and acquisition (helping the learner transfer these aspects into memory for further study). For each strategy, the act of rehearsal involves the learner saying, writing, or pointing to parts of the presented material. Students are told to rehearse stimuli verbally or to write, look at, go over, study, or repeat the stimuli in some other way. For example, the learner may repeat words in his/her head; actively say words to him/herself and sound them out; verbally or covertly spell them correctly; break the words into parts according to smaller words, prefixes, or suffixes found within the words and other forms of segmentation; copy the words and underline parts of them;

write the words, pointing to parts of the presented word; look at the words repeatedly and check spelling accuracy. Rehearsal improves registration of new words or forgotten words in memory through greater depth of processing.

Elaboration (Levine, 1990) is a memory strategy that can be verbal or imaginal. It involves translating concepts into one's own language, questioning, and actively trying to relate new ideas to old ones. Students are instructed to use elements of the stimulus material and can assign meaning by making an analogy, making up a phrase or sentence, or drawing a relationship based on specific characteristics found in the stimulus material. An example of elaboration might be constructing images for the spelling words to be learned. Although Weinstein's research does not use the strategies of rehearsal and elaboration together, it appears that using them together with learning-disabled students may increase the depth of registration in memory and increase and maintain the degree of task engagement.

Affective Strategies

Weinstein and MacDonald (1986) posit affective strategies that include positive self-talk, self-monitoring, self-coaching, and thought-stopping. Empirical studies using these strategies by Dansereau et al. (1979) and Wong, Harris & Graham (1991) are

presented. Affective strategies work to counteract faulty or dysfunctional thinking processes in which there are misperceptions of the demands of the environment, self-criticism, and underappraisal of personal abilities. They help students regulate their personal functioning (e.g., senses, mental images, physiology), academic behavior, performance and learning environments (e.g., internal, external) in order to improve learning (Zimmerman, 1989; 1990). Affective strategies work on focusing attention (being alert), managing anxiety and stress (being relaxed), maintaining concentration, establishing and maintaining motivation, dealing with frustration, improving negative self-image, avoiding procrastination, and organizing one's study time. Students can use affective strategies to influence their pattern of thought and redirect their thinking (specific perceptions, images, thoughts, and beliefs) toward more productive and task-oriented study.

Positive self-talk and positive self-statements are affective strategies (attention strategies) and are believed to be perceived by students as plausible and logically related to the situation at hand. Positive self-talk which is substituted for negative self-talk directly modifies faulty or dysfunctional cognitions in order to effect constructive behavior change.

Self-coaching is an affective strategy (attention

strategy) used to help students develop positive self-talk. Students are given the analogy of an athletic coach to talk themselves into undertaking effective task-relevant activities. Through it they learn to refocus their attention from self-deprecating thoughts and negative self-talk (such as "I'm too dumb, I'll never learn this material") (Weinstein & MacDonald, 1986, p. 261) to positive self-talk "OK, I'm having trouble understanding this so let's see what else I know about that could help me to make sense of this material" (Weinstein & MacDonald, 1986, p. 261). Positive self-talk helps bring students' attention back to the learning task and finding ways to reach their learning goal.

Self-monitoring is an attention strategy that requires students to keep track of their own behavior through self-observation and self-judgment or self-evaluation. Students can be taught to ask themselves periodically: "Am I paying attention?" or "Am I on task?" This technique requires them to self-assess their behaviors to determine if a certain behavior has occurred.

Thought stopping is an affective strategy (attention strategy) that is used to prevent thoughts of doing poorly from directing attention away from the material and toward fears of failure. This technique requires students to monitor their thoughts and identify

task-irrelevant thoughts that direct attention away from activities. It encourages the student to repeat the word "stop" to themselves, thus blocking an idea from consciousness.

General Conclusions

Good spelling ability is manifested by an increasing number of words that can be spelled and an increased competence in managing cognitive resources of memory, attention, and organization necessary in the cognitive processes of search, retrieval and encoding (Gerber, 1985; Gerber & Hall, 1987; Nulman & Gerber, 1984). However, learning-disabled students are developmentally delayed in their abilities to learn (Gerber, 1985; Gerber & Hall, 1982; Gerber & Hall, 1987). These developmental delays manifest in language difficulties and immaturity in cognitive self-management and/or cognitive strategies (Baker et al., 1987; Gerber & Hall, 1987; Scruggs, 1988). Spelling problems impede their writing (Lerner, 1981); they are uncertain about how to represent words they wish to write (Gerber, 1985). Their spelling abilities are similar to those of much younger peers (Cone et al., 1985; Gerber, 1985). Heavy burdens are placed on learning-disabled students in the classroom because they are often unable to perform at an adequate level or to perform in classes appropriately

(Swanson, 1990).

Their memory and attention and concentration problems are seriously at play in their lack of spelling success, which creates additional anxiety and weak self-efficacy. They now show weak cognitive components (spelling) and weak affective components (strong anxiety and weak self-efficacy). As Benjamin et al. (1981) posit, people with both kinds of problems have the most difficulties in learning spelling. There is a connection among their weaker abilities, nonusage or ineffectual usage of learning strategies, and strong anxiety, which is strengthened by years of failure (Benjamin et al., 1981; Levine, 1990; Velton & Sampson, 1978), though unsuccessfully.

Spelling and other learning problems for the learning disabled emerge early and persist (Cone et al., 1985; Poplin et al., 1980). These students experience difficulties coping over the years, resulting in excessive academic nervousness and failure and marginality in school and school-related situations and settings (performance anxiety) (Velton & Sampson, 1978). They also have self-perceptions of being academically inadequate in comparison to non-learning-disabled peers (self-efficacy) (Foss & Needham, 1990). Learning-disabled students have spelling skills that are often too weak to enable them to meet the demands of the curriculum

(Gerber, 1985). These factors contribute to less effective processing of spelling information; poor spelling task performance; encroachments on memory, attention, and organization during spelling performance; and reduction in generation of many response alternatives (Foss & Needham, 1990; Owens & Froman, 1982).

Since learning is an active process that can be controlled and influenced by the learner, interventions (cognitive and affective strategies) in which the learner engages to help him/her process spelling information, perform a spelling task, and in general facilitate spelling learning are very important for improving competence. Instruction in cognitive strategies, affective strategies, and the combination of both to compensate for problems in memory, attention, and concentration; strong anxiety; and poor self-efficacy is very important (Swanson & Cooney, 1991; Weinstein & MacDonald, 1986; Weinstein & Mayer, 1983; Wong, 1990).

The cognitive strategies of rehearsal and elaboration are used individually by Weinstein et al. (1983; 1986) to improve reading and other tasks. However, they are used together in this study as a cognitive strategy intervention package. It seems likely that this method can increase the engagement of learning-disabled students during spelling and thus improve their competence. This method seems to improve memory problems

by helping the student register things in memory with greater depth of processing. Both increased task engagement and spelling efficiency can improve spelling competence. Other evaluatory research using cognitive strategies of rehearsal or rehearsal and elaboration are presented (Bradley, 1981; Harris, Graham & Freeman, 1988; Reid & Harris, 1993; Weinstein, 1978; 1982; Wong, Harris & Graham, 1991).

Spelling problems of learning-disabled students are impacted by attention and concentration problems (Levine, 1990). These problems frequently become even more severe by the negative interference and influence of performance anxiety and weak self-efficacy. Deficiencies of attention or concentration initially reflect immaturity in language and cognition (Baker et al., 1987; Gerber & Hall, 1987; Scruggs, 1988), for which learning-disabled students usually do not use effective strategies to compensate. Learning-disabled students often have a difficult time with concentration for spelling competence in the classroom as well because their minds go out of control and drift off, away from listening or hearing what the teacher is saying (Levine 1990). These students may be thinking about negative ideas during spelling learning which accompany strong performance anxiety and weak self-efficacy. Attention in school requires alertness, awareness, and control over mood states for

concentration, necessary for spelling competence to take place.

Affective strategies can help learning-disabled students regulate their internal learning environments so that their faulty or dysfunctional thinking processes which negatively impact spelling competence (for example, self-criticism, underappraisal of their personal abilities, and misperceptions of the demands of the environment) are managed (Weinstein & MacDonald, 1986; Weinstein & Mayer, 1983). In this way, their spelling performance and spelling competence is not inhibited. It seems likely from the research that Weinstein and MacDonald's affective strategies (positive self-talk, self-monitoring, self-coaching and thought stopping) can help students effectively focus and maintain attention and concentration on spelling and improve spelling performance and competence through management of anxiety and indirectly influence self-efficacy.

Combined cognitive and affective strategy interventions appear to have promise in both improving spelling competence and reducing spelling anxiety and increasing spelling efficacy, which can facilitate spelling competence (Wilson & Rotter, 1986). It is shown that affective strategy interventions without accompanying cognitive strategy training only reduce performance anxiety about spelling with relatively little

change in spelling achievement and improved spelling competence. The combination is shown to both reduce anxiety and increase academic performance (Wilson & Rotter, 1986). Similar combination strategy interventions are studied in evaluatory research and are presented (Borkowski, Weyhing & Carr, 1988; Dansereau et al., 1979; Wilson & Rotter, 1986).

Rationale for Study

A number of researchers have examined different types of learning strategies that facilitate competence in a number of areas. Learning strategies, particularly cognitive and affective strategies, have dealt with anxiety management; weak self-esteem; poor memory, attention and concentration; and spelling performance. Learning-disabled students have some of these problems, specifically with spelling, which Gerber's research supports. It was hypothesized that cognitive and affective strategies would work with spelling competence.

Gerber's research supports low self-esteem, immature management or regulation of cognitive processes (memory, attention, concentration, and perception), slow and weak spelling achievement and spelling acquisition as reflected in the error making of learning-disabled students. Benjamin et al's research (1981; 1987) shows that strong performance anxiety impairs the performance

abilities of students who already have weak skills (learning-disabled students). Weinstein et al's research (1986; 1983) shows that cognitive and affective strategies can be taught to students and can make a difference in their academic competence (reading) and in the depth of material they process (memory). Memory is one of the weaknesses of learning-disabled students. Attention and concentration are other weaknesses of learning-disabled students as well as strong anxiety and weak self-efficacy. It was hypothesized that strategies would have an impact on these weaknesses in terms of improving spelling competence.

The aim of the study was to determine which learning strategy interventions taught to high school learning-disabled students could help them improve spelling competence and management of performance anxiety, and indirectly influence self-efficacy. The questions this study tried to answer were: First, does training learning-disabled high school students in cognitive strategies improve their spelling competence more than training in affective strategies? Second, does training learning-disabled high school students in affective strategies improve management of anxiety and indirectly influence self-efficacy during a spelling more than training in cognitive strategies? Third, does training learning-disabled high school students in

combined strategy training improve their spelling competence and management of anxiety with indirect influence on self-efficacy during a spelling task more than either of the strategy training procedures alone? Fourth, does training learning-disabled high school students in either singular or combined strategy procedures improve their spelling competence and management of anxiety and indirectly influence self-efficacy during a spelling task more than students who did not experience this training (controls)?

In this study, learning-disabled students were taught cognitive strategies for improving spelling competence (e.g., rehearsal and elaboration) and affective strategies for improving spelling competence (e.g., positive self-talk, self-monitoring, self-coaching and thought stopping) and a combined cognitive and affective strategy condition for improving spelling competence. Before this study was carried out with learning-disabled students, the strategies were field tested on a diverse sample of 55 high school students from the same outlying area and from the surrounding area. Students in the pilot test represented all grade levels (9-12), varied high schools (parochial, public, private), varied races (Black, Hispanic, White), both genders, and a mixture of varied functioning levels. Some were in special education, a fact not shared with

anyone, including the researcher. Students were placed in groups according to strategy condition and took part in the four-days of prescribed sessions. At the end of each session, students were asked to communicate privately in writing with the evaluator their thoughts and reactions about that day's session and activities. At the end of the fourth session, students were asked to repeat this evaluative activity but this time in terms of the entire project and project-related matters. The researcher gave much thought and consideration to all these communications.

Nine hypotheses were examined in the present study. This first group of hypotheses addressed spelling achievement.

- H 1 Subjects in the cognitive strategy condition would improve more in spelling achievement than subjects in the affective strategy condition.
- H 2 Subjects in the combined strategy condition would improve the most in spelling achievement.
- H 3 Subjects in any of the strategy conditions would improve more in spelling achievement than subjects who did not receive strategy training.

These hypotheses were supported by the work of

Bradley (1981), Harris, Graham & Freeman (1988), Reid & Harris (1993), Weinstein (1978; 1982), Weinstein & MacDonald (1986), Weinstein & Mayer (1983), Wong, Harris & Graham (1991).

This second group of hypotheses addressed performance anxiety.

- H 4 Subjects in the affective strategy condition would improve more in the management of performance anxiety than subjects in the cognitive strategy condition.
- H 5 Subjects in the combined strategy condition would improve the most in the management of performance anxiety.
- H 6 Subjects in any of the strategy conditions would improve more in the management of performance anxiety than subjects who did not receive strategy training.

These hypotheses were supported by the work of Dansereau et al. (1979), Weinstein & MacDonald (1986), Weinstein & Mayer (1983), Wong, Harris & Graham (1991).

The third group of hypotheses addressed self-efficacy.

- H 7 Subjects in the affective strategy condition would improve more in self-efficacy than

subjects in the cognitive strategy condition.

H 8 Subjects in the combined strategy condition
would improve the most in self-efficacy.

H 9 Subjects in any of the strategy conditions
would improve more in self-efficacy than
subjects who did not receive strategy training.

These hypotheses were supported by the work of
Borkowski, Weyhing & Carr (1988), Dansereau et al.
(1979), Weinstein & MacDonald (1986), Weinstein & Mayer
(1983), Wilson & Rotter (1986).

CHAPTER III

Methodology

Subjects

The subjects for this study were drawn from a comprehensive public high school serving a diverse socioeconomic, multiethnic, multicultural population in an outlying area of a very large urban city; all 95-100 students classified as learning disabled in special education classes comprised the population from which the sample was drawn. Learning-disabled students in special education are classified based on significant academic difficulties, developmental delays of at least two years in all academic areas including reading, communication (oral and/or written), and mathematics (N.Y.C. Board of Education, Educational Services, 1985, p. 67, 86). Full-time special education classes for learning-disabled high school students are known as MIS I (Modified Instructional Services I). (For a description, see Appendix D.)

All learning-disabled students participated in learning-strategy training in their English classes. Their participation in the proposed study was voluntary, and their anonymity was assured. Students and parents/guardians were informed that this study was being conducted and that their sons/daughters would be taught

learning strategies that would help them learn and review spelling words and regulate their behaviors during learning and performance. Written approval of this study was obtained from the New York City Board of Education, the High School administration, and the Brooklyn and Staten Island (BASIS) High Schools Superintendency. Parental (guardian) written consent was obtained (see Appendix C). Letters were in English/Spanish. One hundred letters were sent home, resulting in 90 positive responses.

All learning-disabled students were screened for spelling weakness by the Brigance Inventory of Essential Skills, Spelling Subtest Form B (see Appendix A), which is a criterion-referenced, grade level spelling placement instrument. The cut-off score for being considered a poor speller and for possible inclusion in this study was a Grade Equivalent (GE) of 7.0 or below. Information on students' age, gender, and mental ability was obtained. The subjects were in grades 9-12, chronologically aged 14-21, boys and girls, and of varied races/cultures (e.g., White, Black, Hispanic). The learning-disabled special education population for the school year 1994-1995 was similar to that for 1993-1994 in terms of the following parameters: number of students, grade levels, number of English classes at each grade level, student functioning levels (determined by reading and math

scores of the last educational evaluation), and population demographics.

Learning-disabled students were assigned to their educational programs according to decisions of the School Based Support Team (SBST/Committee on Special Education) composed of a School Psychologist, Educational Evaluator, Social Worker, and based on the student's levels of functioning derived from tests, other assessment data, observations, school staff, and parent input.

Students were placed within the special education department of the school according to the block system of grouping, which is based on their reading and math functional levels as determined by the last educational evaluation. A block comprises no more than 15 students on the same grade level who attend most of the same special education classes together. The functioning level among the students within the same block in terms of reading and math was usually comparable. However, when there were not enough students available to have high and low functioning blocks, the blocks were made up of students with varied functioning levels (mixed functioning). There were fewer special education students in the eleventh and twelfth grades so these blocks were composed of students with mixed functioning levels.

The number of English classes, grade levels, and levels of student functioning for 1993-1994 were as

follows. In grade 9, there were high and low functioning blocks of students; in grade 10, there were high, low, and middle functioning blocks of students; in grade 11, there were two mixed functioning blocks of students; in grade 12, there were two mixed functioning blocks of students. Table 1 presents the 1993-1994 profile of English classes, which it was presumed would be similar for 1994-1995.

TABLE 1 - PROFILE OF Special Education ENGLISH CLASSES, ACCORDING TO LEVEL OF FUNCTIONING AND GRADE

GRADE	LEVEL OF FUNCTIONING			TOTAL STUDENTS
9	LOW (9)		HIGH (13) = 22	54
10	LOW (14)	MIDDLE (14)	HIGH (4) = 32	51
11	MIXED (13)	MIXED (13)	= 26	51
12	MIXED (14)	MIXED (11)	= 25	

* MIXED = LOW, MIDDLE AND HIGH

The following method of sample selection was used. Eighty percent of the total learning-disabled population was assigned to the three conditions of the independent variable. The control group was smaller in size than the three treatment groups. A total of 85 subjects participated in the study. In order to have a representative sample within each learning strategy condition, stratified random sampling was used.

Design

The present study examined the effects of three conditions of one independent variable upon three dependent variables. The independent variable was strategy training, and the three strategy training conditions were cognitive strategies, affective strategies, and combined cognitive and affective strategies. There was also a control condition of no strategy training.

Cognitive Strategy Group

The students received instruction in strategies of rehearsal and elaboration taken from Weinstein & MacDonald (1986) and Weinstein & Mayer (1983) (Script, Appendix A). They were taught how to identify what was important to remember about the words and how to better remember and apply that information.

Affective Strategy Group

The students received instruction in strategies of positive self-talk, self-monitoring, self-coaching, and thought stopping, taken from Weinstein's affective strategies (Weinstein & MacDonald, 1986; Weinstein & Mayer, 1983) (Script, Appendix A). Students were taught how to regulate performance anxiety during spelling and indirectly influence self-efficacy.

Combined Strategy Group

The students received combined instruction in cognitive strategies of rehearsal and elaboration; affective strategies of positive self-talk, self-monitoring, self-coaching, and thought stopping taken from Weinstein et al. (1986; 1983); and cognitive strategies and affective strategies used separately, but suggested for combination (Script, Appendix A). They were taught both of the procedures together that were used singularly in the other two conditions. They were taught how to identify what was important to remember about the words and how to better remember and apply that information as well as how to regulate anxiety during spelling.

The training phase of the three experimental conditions took place within two class periods (42 minutes each, total of about 80 minutes), over two

consecutive days, to which the control condition was not exposed.

Control Group

There were no unusual activities that occurred during the control group sessions, and these students received no strategy training as well. During the two class sessions, they worked on proofreading which is a usual activity for them because it is taught to all English classes by the English teachers. The class worked on proofreading together throughout the semester in terms of their writing assignments. They worked with a sample teacher-made proofreading model and corrected their written products.

The three dependent variables were spelling achievement, performance anxiety, and self-efficacy. Spelling achievement was measured by a spelling test (Brigance Diagnostic Inventory of Essential Skills, Form A, Brigance 1981), which showed the number of words spelled correctly before strategy training (pretest) and after strategy training (posttest). Performance anxiety was measured by the Anxiety Scale of the LASSI HS (Learning and Study Strategies Inventory -- High School version) Weinstein and Palmer (1990). The LASSI HS Anxiety Scale showed the levels of anxiety both before and after strategy training because subjects responded to

the statements both before and after strategy training. Self-efficacy was measured by using Schunk & Hanson's rating scale (1985) before and after strategy training. Self-efficacy measured before strategy training showed ratings of self-efficacy for spelling each of the 15 words. Self-efficacy measured after strategy training showed assuredness ratings of accuracy of their posttest spellings.

Measures

Each student was evaluated using the measures listed in Table 2.

TABLE 2
Measures

BEFORE STRATEGY TRAINING

- a. performance anxiety self-report (LASSI, HS Anxiety
Scale)
- b. self-efficacy judgments (Schunk & Hanson's Self-
efficacy Scale)
- c. spelling pretest (Brigance Test of Essential Skills,
Form A)

AFTER STRATEGY TRAINING

- d. performance anxiety self-report (LASSI, HS Anxiety
Scale)
 - e. self-efficacy judgments (Schunk & Hanson's Self-
efficacy Scale)
 - f. spelling posttest (Brigance Test of Essential Skills,
Form A)
-

Anxiety self-report (before strategy training)
(after strategy training)

The anxiety measure (Anxiety Scale) was the only subscale of the Learning and Study Strategies Inventory, High School Version (LASSI HS) (Weinstein & Palmer, 1990) used in this study.

As a measure of performance anxiety, students responded to the eight-item anxiety scale of the LASSI, HS, which addresses the degree to which students worry about school and their performance. The whole inventory is a ten part, 77-item Likert-type rating inventory that measures students' use of learning and study strategies at the high school level. This single-form inventory is organized into ten separate scales -- attitude, motivation, time management, anxiety, concentration, information processing, selection of main ideas, study aids, self-testing, and test strategies -- each of which yields an individual scale score. There is no total test score. Students identify standard areas of attitudes, motivations, and study practices that might be improved with educational intervention.

Before responding to the individual anxiety items, students were instructed in how to use the anxiety scale. For each item they responded in writing with "not at all like me", "not very much like me", "somewhat like me", "fairly much like me", "very much like me". This

instruction was briefly reviewed for the anxiety posttest. Examples of anxiety items are, "I am very tense when I study," and "I get so nervous and confused when taking a test that I don't answer questions to the best of my ability."

According to the developers, the LASSI and LASSI HS are comparable in terms of scales, number of parallel items, and conceptual framework: also research is relevant to both. Several different approaches to validity have been used: validation against performance measures, repeated tests of user validity at more than 700 colleges and universities, and a multicultural and multigrade sample of 2,616 high school students in a midsize city in the Southwest, and as part of the authors' learning and study strategies semester course at the University of Texas. Test-retest correlation for the total instrument is .88. The LASSI Anxiety subscale has a Coefficient Alpha of .82. Various scales of the LASSI or the full LASSI have been used in research studies by Benjamin et al. (1987), McKeachie, Pintrich & Lin (1985), and Tobias (1984) (Script, Appendix A) (Measure, Appendix B).

Self-Efficacy Rating Sale (before strategy training)
(after strategy training)

The perceived self-efficacy measure is a 100-point scale ranging in intervals of ten units from complete

uncertainty through intermediate certainty to high certainty (Schunk & Hanson, 1985). The higher the scale value, the stronger the perceived self-efficacy. Each student judged his/her capability to spell each of a set of 15 progressively more difficult words, orally presented one at a time by the experimenter. Each student also judged his/her capability of having spelled each word correctly on the spelling posttest after strategy training and study time. All students wrote their capability judgments of spelling accuracy for each word.

Before measuring perceived spelling efficacy, students were told by the experimenter how to use numerical scale values of perceived self-efficacy, which were reviewed for the self-efficacy posttest (Script, Appendix A).

This self-efficacy rating scale is used in research studies as a pre/post measure for making self-efficacy judgments of competence. Usually there is a set of (pre) self-efficacy judgments about the degree of assuredness of a treatment of some kind, and then a set of (post) self-efficacy judgments of how capable the student feels he/she has been. The self-efficacy rating scale has been used frequently in research studies with children, and at times the same children by Schunk, Bandura, and others (Bandura, 1977; Bandura & Adams, 1978; Bandura & Schunk,

1981; Schunk, 1983; 1981; Schunk & Hanson, 1985; Schunk & Rice, 1987). In research focusing on math competency development, peer modeling, and cognitive skills this measure has been very useful, reliable, and predictive of student functioning at a level of accuracy in the .80s (Bandura, 1977). The frequency and diversity of this instrument's use in research studies attests to its reliability and validity in general (Script, Appendix A; Measure, Appendix B).

Spelling test. The spelling achievement is the Brigance Diagnostic Inventory of Essential Skills by Brigance & Brigance, 1981. This instrument is intended for use in secondary school programs serving children with special needs from grades 4 through 12. It is a criterion-referenced instrument that provides a measure of basic academic skills, one of which is spelling. Validity is not reported for spelling. However, in obtaining reading scores, a comparison between the Brigance and Wide Range Achievement Test (WRAT) showed that both instruments measure the same skill. As a result, the Brigance has a Spearman Rho Rank Order Correlation of .96. Reliability is reported as ranging between .65 and .91 in test-retest reliability coefficients. An alternate forms (A and B) reliability coefficient is .88. Reliability coefficients are listed

as acceptable. Test reviewers consider this instrument a valuable source for setting goals and monitoring progress of high school special education students at a range and quality of which few other instruments are capable.

Form A was used for the spelling pre/posttests (Script, Appendix A, Words Appendix B). Form B was used as the spelling screening instrument and for providing practice words during strategy training sessions. Students were given a spelling pretest and posttest consisting of the same ordered sequence of words as presented for self-efficacy judgments. The experimenter said each word then repeated it. The students spelled the word on a prenumbered, 8 1/2 x 11-inch sheet of lined paper. The pretest score was the number of words spelled correctly. The posttest was scored the same way.

Procedure

The procedures of the current study have been depicted in Table 3.

Table 3

PROCEDURES OF THE STUDY, BY GROUP AND SESSION

Procedures	Sessions	Groups			
		S1	S2	S3	C1
Orientation	1	x	x	x	x
Performance anxiety self-report	1	x	x	x	x
Self-efficacy judgments for spelling	1	x	x	x	x
Spelling pretest	1	x	x	x	x
Strategy training: Cognitive Strategies	2,3	x		x	
Strategy training: Affective Strategies	2,3		x	x	
Spelling study time (20 minutes)	4,5	x	x	x	x
Spelling posttest/followup	4,5	x	x	x	x
Self-efficacy judgments for spelling accuracy	4,5	x	x	x	x
Performance anxiety self-report	4,5	x	x	x	x

Legend:

S1 = Cognitive Strategy Condition (Spell Words)
 S2 = Affective Strategy Condition (I Can)
 S3 = Combined Condition (I Can Spell Words)
 C1 = Control Condition

This study was carried out in each MIS I English class over four consecutive days within one week, one period each day. The second and third sessions were devoted to learning strategy training. This schedule was observed because about 25 learning-disabled students who comprise one eleventh-and one twelfth-grade English class respectively were enrolled in the Coop program. A Coop student attends classes every other week and is employed during the alternate week at a job either within the school or within the community. While the twelfth grade Coop students are working, the eleventh-grade Coop students are attending classes with the same teachers. To meet New York State Regents guidelines in terms of total number of mandated class hours, the students must attend two periods of English each day during the week they are in school. Each class period is 42 minutes in duration. There are two full-time and two part-time Special Education English teachers. The experimenter conducted the training sessions within the classroom herself with the English teacher present. Legal guidelines set the maximum MIS I class enrollment at 15 learning-disabled students, but because of poor student attendance, cutting, dropping out of school, and low student enrollment, there are sometimes fewer students present.

Sessions of the Study

Session 1

During the first session, there was an overall orientation to the training sessions, an introduction to learning strategies, and a specific introduction to the particular training procedure (script, Appendix A). Students were seated at a reasonable distance from each other and all were given a self-report anxiety measure (LASSI HS version, Anxiety Scale) (see Appendix B) to determine level of anxiety during academic and related performance. The experimenter instructed the students on how to respond to the anxiety subscale, and read the anxiety statements and response choices aloud (script, Appendix A).

Students also were given a self-efficacy measure (Schunk & Hanson's rating scale, 1985) (see Appendix B), adapted for written response, to determine self-efficacy for spelling each of the 15 words correctly. Along with the students' own copies, the experimenter provided an enlarged copy of the rating scale to the blackboard, to which the students could refer (script, Appendix A). The experimenter said each word twice (15 words), while the students determined their level of self-efficacy for spelling the word correctly (script, Appendix A).

Students were also given a spelling pretest of 15 words (Brigance, Form A, 1981) (see Appendix B). The

experimenter said each word twice while the students wrote the word on the paper, next to the appropriate number (script, Appendix A). The meaning and value of strategies in daily problem solving and academic tasks will be defined by asking pertinent questions to develop what a strategy is (script, Appendix A; question script, see Appendix A). Appropriate salutations will be said at the end of the session (script, Appendix A).

Session 2

The second session was devoted to learning strategy training procedures. The particular strategy training condition being worked with at the time determined the strategy training procedures followed during this session. The procedures encompassed cognitive strategies, affective strategies, or combined cognitive and affective strategies, all of which followed the same general procedure.

The experimenter prepared students for the strategy training by relating the current lesson to previous learning, and providing a brief description of the focus (script, Appendix A). The experimenter demonstrated the strategy being taught in the training. Typically, the students were given a chance to model the strategies together as a group with the experimenter and to use the strategies independently (Narrative, Appendix A). The

following procedures were used during the demonstration portion of the training. The experimenter asked and answered questions aloud while showing students how to spell one of the words (excuse), using the strategy condition (script, Appendix A). The experimenter provided examples of successful application of the strategies so students could understand relations between academic outcomes and the use of strategies (Narrative, Appendix A).

The students used strategy study prompts containing the particular strategies. A study prompt is a strategy dialogue card (Narrative, Appendix A): First, the strategy dialogue was said by the experimenter to the students, which they followed along on their study prompts. Then the experimenter said the dialogue with the students, which they read from their study prompts. This dialogue was verbalized several times until it became more firmly entrenched in memory, and short, written activities were also used to further reinforce the strategies. Study prompts were kept on hand for reference.

The dialogue of each condition can be found in a separate script in Appendix A. Treatment conditions are reviewed after this Procedure section (Treatment Conditions).

After familiarization with the steps of the

particular strategy, the strategy procedure was practiced by the group together using a word, for example excuse. The students practiced their dialogue by doing what the dialogue stated in terms of spelling particular words (script, Appendix A). At the end of the session, appropriate salutations and plans for the next day were given (script, Appendix A).

Session 3

The third session was devoted to learning strategy training procedures as described at the beginning of the second session. Initially, appropriate greetings, praise, and thanks were given by the experimenter for the students' work thus far (script, Appendix A). There was a brief discussion of what was to be expected during the third session (script, Appendix A).

The particular strategy condition was reviewed using the same script as used during the first strategy training session (script, Appendix A). For the next part of the training, the students were given several words to learn for practice (Appendix B), with the experimenter and independently. During this part of the training, the experimenter watched the students' performance carefully. If there was an error, the students were told to use the strategy with the particular word again, using their study prompt for assistance (Narrative, Appendix A).

Midway through, the experimenter reviewed with the students the steps of the strategy procedure again (script, Appendix A).

During the rest of the third session, the training involved independent practice. The experimenter functioned more indirectly as a facilitator to oversee the particulars of activities, strategies, and spelling. While giving directions for the independent practice, the experimenter reminded the students to use previously learned strategies for studying spelling words (script, Appendix A, KTEA words, Appendix B). At the end of the third session, salutations and the plan for the next day were given to the students (script, Appendix A).

Session 4

At the beginning of the fourth session, the experimenter greeted the students as they returned, thanking them for working so hard (script, Appendix A). Students were seated at a reasonable distance from each other. A very brief orientation to the day's agenda was given (script, Appendix A). The study prompts were distributed. The particular strategy was reviewed by the class and experimenter (script, Appendix A). One sheet of white lined paper, two pencils with erasers, and 15 spelling word cards were given to each student to study the spelling words. The experimenter used a stopwatch to

time the students' twenty-minute study period (script, Appendix A). After twenty minutes, the spelling cards and spelling study sheets were collected. Then one sheet of white lined paper, prenumbered from 1 to 15 (numbered paper) was distributed for the spelling posttest and efficacy judgments. Students were given a spelling posttest of the same ordered 15 words (script, Appendix A). When the test was completed, students were asked to write their self-efficacy judgments about spelling each of the words next to each word (script, Appendix A). Copies of the self-efficacy rating scale were also distributed and were reviewed briefly with a model word (script, Appendix A). When this task was completed, spelling/self-efficacy posttests, self-efficacy scales, and study prompts were collected. Anxiety posttests (LASSI, HS) were also distributed, reviewed briefly, and responded to under the direction of the experimenter (script, Appendix A). When completed, the anxiety scale, anxiety posttests, and two pencils were collected. Afterward, students were thanked for participating in the study (script, Appendix A).

Followup (Session 5)

One week after the fourth session students in all groups were retested by the investigator on spelling performance, performance anxiety, and self-efficacy to

ascertain long-term effects. The students were not given a review of the strategies or provision of study time.

Treatment Conditions

Strategy training activities for the three conditions were taken from Kendall (1991); Montague, Applegate and Marquard (1993); Kendall, Kane and Siqueland (1981); Valett (1974); Weinstein & Palmer (1990); Wong et al. (1991).

Cognitive Strategies S1 (Spell Words) (rehearsal, elaboration) The first strategy training condition of this study has been focused on by Weinstein and MacDonald (1986) and Weinstein and Mayer (1983). Experimental studies addressing these strategies were included in the learning strategy training section (Bradley, 1981; Harris, Graham & Freeman, 1988; Reed & Harris, 1993; Weinstein, 1978; 1982; Wong, Harris & Graham, 1991).

Students were trained in cognitive strategies of rehearsal and elaboration because of problems they have with memory, attention, and concentration. There was a ten-step cognitive strategy procedure that they learned to use with the spelling words, according to the acronym SPELL WORDS (script, Appendix A). Each letter in the order SPELL WORDS stands for one of the ten-step procedures. The students developed a mental image of the word by using various modalities visual, verbal, and

auditory) simultaneously. They also wrote and used spelling helpers (e.g. sound alike, order of letters, etc.) (Narrative, Appendix A).

Affective Strategies, S2, (I Can)

The second strategy training condition of this study has been focused on by Weinstein and Mayer (1983) and Weinstein and MacDonald (1986). Experimental studies addressing these strategies were included in the learning strategy training section (Dansereau et al., 1979; Wong, Harris and Graham, 1991).

Students were trained in affective strategies of positive self-talk, self-monitoring, self-coaching, and thought stopping (script, Appendix A) to help with the concomitants of their learning problems (strong performance anxiety, weak self-esteem, low motivation, inappropriate attributions), which manifest in poor memory, attention, and concentration, strong performance anxiety, and weak self-efficacy. Students used the acronym I CAN. Each letter in the order I CAN stands for key words in the affective dialogues. Self-statements were changed from negative to positive. The idea was for the students to make self-coping and affirmation statements, establish one's own goals, and provide self-reinforcement. This in turn promoted a more positive perception of self-efficacy and personal control (e.g., management of performance anxiety). Affective strategies

were used because of the attention and concentration problems as well as strong performance anxiety and weak self-efficacy that impact spelling competence.

Combined Cognitive and Affective Strategies, S3
(I Can Spell Words)

The third strategy training condition of this study was used separately by Weinstein and MacDonald (1986) and Weinstein and Mayer (1983) with suggestions for combining them. Experimental studies were presented (Borkowski, Weyhing and Carr, 1984; Dansereau et al., 1979; Wilson and Rotter, 1986). The combined cognitive and affective strategies used were rehearsal, elaboration, positive self-talk, self-monitoring, self-coaching, and thought stopping.

Both strategy conditions were meshed together into one interspersed strategy condition and presented as such. The combination of cognitive and affective strategy components to address spelling competence was fitted into the same number of sessions as the singular strategy conditions. Since both types of strategies (cognitive and affective strategies) were presented, they could work together to address spelling competence and, as such, fit together into the same number of sessions. Though combined, they really represented one strategy condition, just as the singular conditions also only represent one set. As such, all treatments were fitted

into the same number of sessions (two sessions).

Students were trained in cognitive strategies and affective strategies in combination (script Appendix A), according to the acronym I CAN SPELL WORDS. This approach addressed learning problems manifested in poor memory, concentration, and attention, as well as problems of strong performance anxiety and weak self-efficacy. The format followed was for students to establish a mental image of the word using rehearsal and elaboration strategies on one day, just as the cognitive strategies group did; then, on the next day, briefly, to use some affective strategies to strengthen efficacy, motivation, and anxiety management (positive self-talk, self-monitoring, self-coaching, and thought stopping). At this time, the cognitive strategies of rehearsal and elaboration were used again to strengthen the mental registration of the word image along with the belief that they could spell the word from the affective strategies used previously. Finally, a method of self-reinforcement was fostered by positive self-talk.

Control Condition: Spelling Activity in the English
Class

Proofreading is the only activity that occurred during the control group sessions. It is a usual activity of the control condition because all English classes participate in this activity. The proofreading

activity occurs as follows.

English classes use the computer room one period a week. There are weekly computer lessons for the students' creative writing, poetry, and play projects. Every lesson involves proofreading and using a dictionary which is on the top of the computer and is operated with a delete button. The button is used to change letters or words gleaned from the dictionary.

Each writing project has a proofreading lesson in which students fix their written products before going to the computer room. The teacher makes up a proofreading sample that includes about 24 possible mistakes in terms of form, content, spelling, etc., for the students to follow when proofreading their own work. Possible errors include misspelled words, letter reversals, capital letter errors, words omitted, and wrong tenses.

The teacher tells the students to proceed slowly when reviewing their work, to recheck by focusing and looking over their work, and to use a marker to circle errors. Then they proofread a written project together on the blackboard. Each student is responsible for one sentence. When a student cannot correct a sentence, another student tries to help him/her correct it. The next day, students type their proofread written projects into the computer. They once again proofread their work for typographical spelling errors, new spelling errors,

omitted words, etc. They use the computer dictionary to refine and recheck any possible additional spelling errors. Their projects are printed, put on display, and given to significant staff.

Treatment Integrity

Anecdotes and observations by the English teachers and the researcher were used to confirm treatment integrity during the varied class trainings. There were no systematic ratings of the validity of the treatments.

It can be verified that the researcher followed verbatim all the scripts during the sessions as well as during the accompanying prescribed behaviors. The English teacher was present throughout all sessions, was given a copy of each script, and read along closely and carefully. After a session was completed, the teacher verbally acknowledged the researcher's complete faithfulness to the script. In addition, strategy charts were on display during each session to which the students could refer and were motivated to refer. Students were able to ascertain and confirm the researcher's faithfulness to the strategy scripts by consulting their own scripts and the displayed strategy charts.

The teacher and the researcher were able to confirm the students' integrity to the script by watching them follow the strategies, do the activities, and say the

dialogues accurately and appropriately. In addition, completed written products from their activities were collected and checked.

The students and teacher frequently referred to the strategy charts. This was confirmed by their eye and head movements. They verbally acknowledged the helpfulness of the large strategy chart as an accompaniment to their own scripts. Some students, those who seemed to follow the strategies accurately and appropriately, verbalized about how happy they were because the strategies helped them learn to spell and remember the spelling of the words. Behaviors that confirmed these verbalizations were smiles and hand clappings.

The teacher and the researcher also observed that some tenth- and eleventh-graders behaved inappropriately by fooling around and not following the activities exactly as prescribed. They made fun of the strategies, activities and each other. This negative behavior occurred sporadically and by a small number of students.

CHAPTER IV

Results

The results of this study are reported in the following manner. First, the descriptive statistics are presented, followed by the major analyses for the nine hypotheses, using Analyses of Covariance (ANCOVA) with two covariates (pretest scores and Verbal IQ).

Other related analyses -- including comparison of the independent and dependent variables at followup (ANOVA), comparison of changes (change scores) within the independent and dependent variables across periods for each group and between periods (pre-posttest, posttest-followup, pretest-followup) by group (ANOVA), Pearson correlations between pretest scores and other variables of interest, examination of the stage of spelling errors by group across periods and between groups at periods (ANOVA), and changes (change scores) within the stage of spelling errors across periods for each group and between periods (pre-posttest, posttest-followup, pretest-followup) by group (ANOVA), and an item analysis of correct spellings by grade level for each group across the three periods -- are presented. Whenever comparisons between the groups were statistically significant, pairwise comparisons were conducted by Scheffe Post Hoc Tests.

Descriptive Statistics

This study involved 85 subjects. Of these subjects, 54 were male and 31 were female, 27 were White, 42 were Black and 16 were Hispanic, 24 were ninth graders, 17 were tenth graders, 25 were eleventh graders and 19 were twelfth graders. The mean Verbal IQ for the subjects was 82.3 (SD = 8.9, range 70-111). The mean Performance IQ for the subjects was 81.7 (SD = 11.13, range 70-119). The mean Full Scale IQ for the subjects was 80.7 (SD = 9.4, range 70-110). (IQ sources are the Wechsler Intelligence Scale for Children, third edition, WISC III, and the Wechsler Adult Intelligence Scale-- Revised, WAIS-R.)

The subjects were assigned to one of four groups, Cognitive, Affective, Combined, and Control. The four groups were compared on Verbal IQ, Performance IQ, and Full-Scale IQ. An alpha level of .05 was used for all statistical analyses for acceptance or rejection of the null hypothesis. The comparisons using one-way ANOVAS showed the four groups were statistically comparable on IQs (Table 4). See Table 5 for means and standard deviations for these comparisons.

The four groups were also compared on pretest scores for spelling performance, self-efficacy feelings, and anxiety management. Table 6 shows the means and standard deviations for these comparisons as well as

Table 4

Analysis of Variance Comparing Groups on Verbal IQ,
Performance IQ, and Full-Scale IQ

Source	df	F
<u>VERBAL IQ</u>		
<u>Between subjects</u>		
<u>Main Effects</u>		
<u>Group</u>	<u>3</u>	<u>.62</u>
<u>error</u>	<u>81</u>	<u>(80.75)</u>
F		
<u>PERFORMANCE IQ</u>		
<u>Between subjects</u>		
<u>Main Effects</u>		
<u>Group</u>	<u>3</u>	<u>.16</u>
<u>error</u>	<u>81</u>	<u>(127.62)</u>
F		
<u>FULL SCALE IQ</u>		
<u>Between subjects</u>		
<u>Main Effects</u>		
<u>Group</u>	<u>3</u>	<u>.24</u>
<u>error</u>	<u>81</u>	<u>(91.65)</u>

Note. Values enclosed in parentheses represent mean
square error.

*p<.05. **p<.01.

Means and standard deviations appear on Table 5.

Table 5

Means and Standard Deviations for IQs for Treatment Groups

Source	N	M	SD
<u>Verbal IQ</u>			
Group			
Cognitive	25	80.36	7.57
Affective	27	83.56	11.51
Combined	27	82.74	7.26
Control	6	83.50	8.41
<u>Performance IQ</u>			
Cognitive	25	81.16	12.47
Affective	27	82.41	11.45
Combined	27	81.15	10.45
Control	6	84.00	8.07
<u>Full-Scale IQ</u>			
Cognitive	25	79.64	9.54
Affective	27	81.63	10.90
Combined	27	80.41	8.37
Control	6	82.17	8.13

Table 6

Means and Standard Deviations for Spelling, Self-efficacy and Anxiety by Treatment Group at Pretest, Posttest and Followup

Source	N	Pretest		Posttest		Followup	
		M	SD	M	SD	M	SD
<u>Spelling Performance</u>							
Cognitive	25	7.44	4.15	11.88	3.15	10.20	4.38
Affective	27	9.96	3.66	12.67	2.90	11.33	3.88
Combined	27	6.44	5.49	10.30	4.52	9.41	4.20
Control	6	6.50	5.28	12.50	2.59	8.33	5.35
<u>Self-Efficacy</u>							
Cognitive	25	79.62	21.44	90.43	14.38	84.52	20.29
Affective	27	88.80	13.48	92.47	15.18	93.43	12.91
Combined	27	69.24	21.95	77.84	25.59	75.41	25.83
Control	6	69.67	37.30	87.00	23.23	66.28	39.50
<u>Anxiety Management</u>							
Cognitive	25	21.76	5.49	21.64	5.41	20.44	6.99
Affective	27	23.59	6.36	22.22	7.04	21.07	7.54
Combined	25	19.30	5.60	18.70	5.69	17.78	5.42
Control	6	18.67	7.58	17.00	7.48	15.67	6.09

Note. Spelling Performance = number of words spelled correctly. Maximum spelling score is 15.00. Self-Efficacy feelings are in percent form. Maximum self-efficacy score is 100.00. Higher numbers indicate more efficacious subjects. Anxiety management is a self-rating scale with a maximum score of 40.00. Higher anxiety ratings indicate more anxious subjects.

means and standard deviations for posttest and follow-up scores. Differences on pretest scores for the four groups were confirmed by one-way ANOVAS, and pair-wise comparisons, described below were highlighted by Scheffe Post Hoc Tests.

Although the difference among groups on Pretest for Spelling was significant $F(3, 81) = 3.03, p = .03$ (Table 7), none of the groups had significantly higher scores than the others, according to Scheffe Post Hoc Tests. The four groups did have statistically significant difference on Pretest for Self-efficacy $F(3, 81) = 4.35, p = .01$ (Table 8). Scheffe Post Hoc Tests revealed that the Affective group was significantly higher than the Combined group. The four groups were also significantly different in Pretest Anxiety $F(3, 81) = 2.79, p = .05$ (Table 9); however, none of the pair-wise comparisons were significant by Scheffe Post Hoc Tests.

Additional comparisons were made by gender in terms of IQ scores and pretest scores. Means and standard deviations of these IQ comparisons are presented in Table 10. Research has shown that differences -- e.g., intellectual differences -- between male and female subjects can influence treatment outcomes (Sattler, 1988). The results of the comparisons confirmed that boys had significantly higher scores on Verbal IQ and

Table 7

Analysis of Variance Comparing Groups on Pretest Spelling

		<u>F</u>
Source	df	Pretest Spelling
Between subjects		
Main Effects		
Group	3	3.03*
error	81	(20.83)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

A Scheffe Post Hoc Test indicates that no two groups were significantly different.

Table 8

Analysis of Variance Comparing Groups on Pretest Efficacy

		<u>F</u>
Source	<u>df</u>	Pretest Efficacy
		Between Subjects
Main Effects		
Group	3	4.35**
error	81	(4,350,951.41)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$).

A Scheffe Post Hoc Test indicates that the Affective and Combined groups were statistically significantly different.

Table 9

Analysis of Variance Comparing Groups on Pretest for Anxiety

Source	df	<u>F</u>
		Pretest Anxiety
Between subjects		
Main Effects		
Group	3	2.79*
error	81	(35.51)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

A Scheffe Post Hoc Test indicates no two groups were statistically significantly different.

Table 10

Means and Standard Deviations for IQ Scores by Gender

Source	N	IQ (Verbal)	
		M	SD
Gender			
Male	54	83.83	9.33
Female	31	79.77	7.66
		IQ (Performance)	
		M	SD
Male	54	83.52	11.95
Female	31	78.68	8.89
		IQ (Full Scale)	
		M	SD
Male	54	82.31	9.92
Female	31	77.87	7.93

Note. M = Mean. SD = Standard Deviation. N = Number of subjects in a group.

Full-Scale IQ than girls $F(1, 83) = 4.2, p = .04$ and $F(1, 83) = 4.5, p = .04$, respectively (Table 11). However, a significant difference did not exist for gender on Performance IQ (Table 11), nor did statistically significant differences exist for gender on Pretest Spelling, Pretest Self-efficacy, and Pretest Anxiety, also shown on Table 11.

Students involved in the study came from the ninth to twelfth grades with a mean grade of 10.5 (SD = .02). One might presume that twelfth-graders are better spellers than ninth-graders and that there are differences between twelfth-graders and 9th graders in terms of self-efficacy and anxiety management skills. Table 12 contains the means and standard deviations of these comparisons. The following results were obtained, using one-way ANOVAS. The four grades (9, 10, 11, 12) did not differ significantly on the Pretest for Spelling (Table 13) or on the Pretest for Self-efficacy (Table 14). On the Pretest for Anxiety, there was a significant difference between the four grades $F(3,81) = 4.7, p = .004$ (Table 15), but the Scheffe Post Hoc Test did not indicate significant pair-wise differences among the grades.

Hypotheses Testing

The results of the comparisons of the groups for testing the hypotheses using ANCOVAS are presented in

Table 11

Analyses of Variance Comparing IQ Scores and Pretests by Gender

		Between subjects
		F
Source	df	
VERBAL IQ		
Main Effects		
Gender	1	4.20*
error	83	(76.73)
PERFORMANCE IQ		
Main Effects		
Gender	1	3.90
error	83	(119.71)
FULL-SCALE IQ		
Main Effects		
Gender	1	4.50*
error	83	(85.56)
PRETEST SPELLING		
Main Effects		
Gender	1	.03
error	83	(22.60)
PRETEST EFFICACY		
Main Effects		
Gender	1	.10
error	83	(4,924,006.34)
PRETEST ANXIETY		
Main Effects		
Gender	1	.14
error	83	(38.16)

Note. Values enclosed in parentheses represent mean square error.

*p<.05. **p.01.

Table 12

Means and Standard Deviations of Pretest Scores by Grade Level

Spelling Performance			
Grade Level	N	M	SD
9	24	8.29	4.20
10	17	7.76	3.67
11	25	6.72	5.04
12	19	8.89	5.19
Self-Efficacy			
9	24	81.67	20.45
10	17	78.83	24.15
11	25	71.05	24.66
12	19	84.17	16.90
Anxiety Management			
9	24	25.00	5.40
10	17	20.71	6.36
11	25	19.08	5.33
12	19	20.26	6.22

Note. Maximum spelling score is 15, total number of correctly spelled words. Maximum self-efficacy score is 100.00, strong feelings of self-efficacy. Maximum anxiety score is 40, indicating greater anxiety.

Table 13

Analysis of Variance Comparing Grades on Pretest for Spelling

		<u>F</u>
Source	<u>df</u>	Pretest Spelling
Between subjects		
Main Effects		
Group	3	.85
error	81	(22.49)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Means and standard deviations are in Table 12.

Table 14

Analysis of Variance Comparing Grades on Pretest for Self-Efficacy

		<u>F</u>
Source	<u>df</u>	Pretest Self-Efficacy
		Between subjects
Main Effects		
Grade	3	1.56
error	81	(47,754.62)

Note. Values enclosed in parentheses represent mean square error.

*p.05. **p<.01.

Means and standard deviations are in Table 12.

Table 15

Analysis of Variance Comparing Grades on Pretest for Anxiety

		<u>F</u>
Source	<u>df</u>	Pretest Anxiety
		Between subjects
Main Effects		
Grade	3	4.70*
error	81	(33.30)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

A Scheffe Post Hoc Test indicates that no two groups were statistically significantly different. Means and standard deviations appear in Table 12.

Tables 16-21. Observed and adjusted means and standard deviations for these comparisons are presented in Table 22.

The first hypothesis stated that subjects in the cognitive strategy condition would improve in spelling more than subjects in the affective strategy condition. An ANCOVA was performed using the pretest in spelling and verbal IQ as covariates. The results were not statistically significant $F(2, 1, 48) = .74, p = .39$ (Table 16). This hypothesis was not supported.

The second hypothesis stated that the subjects in the combined strategy condition would improve in spelling more than subjects in any other condition. An ANCOVA was performed using the pretest in spelling and verbal IQ as covariates. The results were not statistically significant $F(2, 3, 79) = 1.5, p = .23$ (Table 17). This hypothesis was not supported.

The third hypothesis stated that the subjects in any of the strategy conditions would improve in spelling more than subjects who did not receive the training. An ANCOVA was performed using the pretest in spelling and verbal IQ as covariates. The results were not statistically significant $F(2, 3, 79) = 1.5, p = .23$ (Table 17). This hypothesis was not supported.

The fourth hypothesis stated that the subjects in the affective strategy condition would improve in the

Table 16

Analysis of Covariance Comparing Affective and Cognitive Groups on Posttest Spelling using Verbal IQ and Pretest Spelling as Covariates

Source	df	<u>F</u> Spelling
		Between subjects
Main Effects		
Group	1	.74
error	48	(4.80)
		Within subjects
Covariates		
pretest spelling	1	45.00**
Verbal IQ	1	.45

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Observed mean (Observed M) and Adjusted mean (Adjusted M) spelling scores and standard deviations appear in Table 22 by group.

Adjusted M = Adjusted for the covariates of pretest spelling and Verbal IQ. No standard deviations are available for the adjustments.

Table 17

Analysis of Covariance Comparing Groups on Posttest Spelling Using Verbal IQ and Pretest Spelling as Covariates.

		<u>F</u>
Source	df	Spelling
		Between subjects
Main Effects		
Group	3	1.50
error	79	(6.80)
		Within subjects
Covariates		
Pretest spelling	1	74.93
Verbal IQ	1	.001

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Observed mean (Observed M) and Adjusted mean (Adjusted M) spelling scores and standard deviations appear in Table 22 by group.

Adjusted M = Adjusted for the covariates of pretest spelling score and Verbal IQ. No standard deviations are available for the adjustments.

management of performance anxiety more than subjects in the cognitive strategy condition. An ANCOVA was performed using the pretest in anxiety and verbal IQ as covariates. The results were not statistically significant $F(2, 1, 48) = .04, p = .84$ (Table 18). This hypothesis was not supported.

The fifth hypothesis stated that subjects in the combined strategy condition would improve in the management of performance anxiety more than subjects in any other condition. An ANCOVA was performed using the pretest in anxiety and verbal IQ as covariates. The results were not statistically significant $F(2, 3, 79) = .59, p = .62$ (Table 19). The hypothesis was not supported.

The sixth hypothesis stated that subjects in any of the strategy conditions would improve in the management of performance anxiety more than subjects who received no strategy training. An ANCOVA was performed using the pretest in anxiety and verbal IQ as covariates. The results were not statistically significant $F(2, 3, 79) = .59, p = .62$ (Table 19). This hypothesis was not supported.

The seventh hypothesis stated that subjects in the affective strategy condition would improve in self-efficacy more than subjects in the cognitive strategy condition. An ANCOVA was performed using the pretest in

Table 18

Analysis of Covariance Comparing Affective and Cognitive Groups on Posttest Anxiety Using Verbal IQ and Pretest Anxiety Scores as Covariates.

Source	<u>df</u>	<u>F</u> Anxiety
<u>Between subjects</u>		
Main Effects		
Group	1	.04
error	1	(27.90)
<u>Within subjects</u>		
Covariates		
Pretest Anxiety		18.26
Verbal IQ		.43

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Observed mean (Observed M) and Adjusted mean (Adjusted M) anxiety scores and standard deviations appear in Table 22 by group.

Adjusted M = Adjusted for the covariates of pretest anxiety score and Verbal IQ. No standard deviations are available for the adjustments.

Table 19

Analysis of Covariance Comparing Groups on Posttest Anxiety Using Verbal IQ and Pretest Anxiety Scores as Covariates.

		<u>F</u>
Source	df	Anxiety
		<u>Between subjects</u>
Main Effects		
Group	3	.59
error	79	(24.80)
		<u>Within subjects</u>
Covariates		
Pretest Anxiety	1	49.70
Verbal IQ	1	.53

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$

Observed mean (Observed M) and Adjusted mean (Adjusted M) anxiety scores and standard deviations appear in Table 22 by group.

Adjusted M = Adjusted for the covariates of pretest anxiety score and Verbal IQ. No standard deviations are available for the adjustments.

self-efficacy and verbal IQ as covariates. The results were not statistically significant $F(2, 1, 48) = .47, p = .50$ (Table 20). This hypothesis was not supported.

The eighth hypothesis stated that subjects in the combined strategy condition would improve in self-efficacy more than subjects in any other condition. An ANCOVA was performed using the pretest in self-efficacy and verbal IQ as covariates. The results were not statistically significant $F(2, 3, 79) = 1.46, p = .23$ (Table 21). This hypothesis was not supported.

The ninth hypothesis stated that subjects in any of the strategy conditions would improve in self-efficacy more than those who received no strategy training. An ANCOVA was performed using the pretest in self-efficacy and verbal IQ as covariates. The results were not statistically significant $F(2, 3, 79) = 1.46, p = .23$ (Table 21). This hypothesis was not supported.

Analyses of Follow-up Scores

There were no significant differences between groups on overall spelling, self-efficacy and anxiety at posttest using the covariates (Table 22). However, some students may have learned and performed differently even though all groups were comparable at onset (Table 4). Some students might have needed more time than other students. Therefore, groups were compared at followup for spelling performance, self-efficacy feelings, and

Table 20

Analysis of Covariance Comparing Affective and Cognitive Groups on Posttest Efficacy Using Verbal IQ and Pretest Efficacy Scores as Covariates.

		<u>F</u>
Source	<u>df</u>	Efficacy
<u>Between subjects</u>		
Main Effects		
Group	1	.47
error	48	(1,534,215.30)
<u>Within subjects</u>		
Covariates		
Pretest Efficacy	1	18.10
Verbal IQ	1	.16

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Observed mean (Observed M) and Adjusted mean (Adjusted M) self-efficacy ratings and standard deviations appear in Table 22 by group.

Adjusted M = Adjusted for the covariates of pretest self-efficacy score and Verbal IQ. No standard deviations are available for the adjustments.

Table 21

Analysis of Covariance Comparing Groups on Posttest Efficacy Using Verbal IQ and Pretest Efficacy Scores as Covariates.

		<u>F</u>
Source	<u>df</u>	<u>Self-efficacy</u>
		<u>Between subjects</u>
Main Effects		
Group	3	1.46
error	79	(1,614,592.20)
		<u>Within subjects</u>
Covariates		
Pretest Efficacy	1	20.77
Verbal IQ	1	.30

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Observed mean (Observed M) and Adjusted mean (Adjusted M) self-efficacy ratings and standard deviations appear in Table 22 by group.

Adjusted M = Adjusted for the covariates of pretest self-efficacy score and Verbal IQ. No standard deviations are available for the adjustments.

Table 22

Observed Means, Adjusted Means, and Standard Deviations for Spelling Performance, Self-efficacy Feelings, and Anxiety Management by Treatment Group at Posttest Using Verbal IQ and Pretest Scores as Covariates

Spelling Performance				
Group	N	Observed M	SD	Adjusted M
Cognitive	25	11.88	3.15	11.96
Affective	27	12.67	2.90	11.39
Combined	27	10.30	4.52	10.91
Control	6	12.50	2.59	13.09
Self-efficacy Feelings				
Cognitive	25	90.43	14.38	88.67
Affective	27	92.47	15.18	84.90
Combined	27	77.85	25.59	82.65
Control	6	87.00	23.23	91.54
Anxiety Management				
Cognitive	25	21.64	5.42	21.05
Affective	27	22.22	7.04	20.48
Combined	27	18.70	5.69	19.67
Control	6	17.00	7.48	18.36

Note. Spelling Performance = number of words spelled correctly. Maximum spelling score is 15.00. Self-efficacy Feelings are in percent form. Maximum self-efficacy score is 100.00. Higher numbers indicate more efficacious subjects.

Anxiety Management is a self-rating scale with a maximum score of 40.00. Higher anxiety ratings indicate more anxious subjects.

anxiety management using one-way ANOVAS. The means and standard deviations of these comparisons are presented in Table 6.

These comparisons showed that the four groups were not significantly different on spelling performance (Table 23) or anxiety management (Table 25) at followup. However, they were statistically different on self-efficacy feelings at followup $F(3, 81) = 4.27, p < .01$ (Table 24). A Scheffe Post Hoc Test revealed that the Affective group had significantly higher self-efficacy feelings than the Combined group.

In summary, groups were comparable on spelling performance and anxiety management at followup. However, the affective group was significantly higher than the combined group on self-efficacy feelings at followup, according to a Scheffe Post Hoc Test.

Analyses of Change Scores

There were no significant differences indicated between groups on overall spelling, self-efficacy, and anxiety using the covariates. However, some students may have performed differently with more time and practice than other students despite comparability of groups initially. There might have been some changes in scores from period to period (pre-posttest, posttest-followup, and pretest-followup) between groups. Therefore, change scores were compared from pre-posttest, posttest-

Table 23

Analysis of Variance Comparing Groups on Follow-up Spelling

		<u>F</u>
Source	<u>df</u>	Followup Spelling
		Between Subjects
Main Effects		
Group	3	1.34
error	81	(17.97)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Mean spelling performance scores and standard deviations at followup appear in Table 6.

Table 24

Analysis of Variance Comparing Groups on Followup Self-efficacy

		<u>F</u>
Source	<u>df</u>	Followup Self-efficacy
Between subjects		
Main Effects		
Group	3	4.27**
error	81	(4,859,150.75)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

A Scheffe Post Hoc Test indicated that the Affective group was significantly higher on self-efficacy feelings at followup than the Combined group.

Mean self-efficacy feelings and standard deviations at followup appear in Table 6.

Table 25

Analysis of Variance Comparing Groups on Followup Anxiety

		<u>F</u>
Source	<u>df</u>	Followup Anxiety
Between subjects		
Main Effects		
Group	3	1.93
error	81	(44.44)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Mean anxiety scores and standard deviations at followup appear in Table 6.

followup, and pretest-followup by group for spelling performance, self-efficacy feelings, and anxiety management using one-way ANOVAS. The means and standard deviations of these comparisons are presented in Table 26.

These comparisons showed that the four groups were not significantly different on changes in spelling performance for pretest-posttest (Table 27), for posttest-followup (Table 28), and for pretest-followup (Table 29). These comparisons also showed that the four groups were not significantly different on changes in self-efficacy for pre-posttest (Table 30), and for pretest-followup (Table 32). These comparisons also showed no significant differences between the groups on changes in performance anxiety for pre-posttest (Table 33), posttest-followup (Table 34), and pretest-followup (Table 35). However, the groups were significantly different on changes in self-efficacy feelings for the posttest-followup period $F(3, 81) = 3.92, p < .01$ (Table 31). A Scheffe Post Hoc Test showed that the control group had a change in self-efficacy for this period that was significantly different from the three training groups (cognitive, affective, and combined) in terms of the loss of self-efficacy that this group experienced.

Change scores for the stage of error development from pre-posttest (Table 46), posttest-followup

Table 26

Change Scores and Standard Deviations for Spelling, Self-efficacy, and Anxiety by Treatment Group for Periods

		Pretest- Posttest		Posttest- Followup		Pretest- Followup	
Source	N	M	SD	M	SD	M	SD
<u>Spelling Performance</u>							
Cognitive	25	+ 4.44	2.84	- 1.68	2.51	+ 2.76	2.40
Affective	27	+ 2.70	2.77	- 1.33	2.81	+ 1.37	2.04
Combined	27	+ 3.85	4.03	- .89	2.74	+ 2.97	4.26
Control	6	+ 6.00	4.00	- 4.17	3.54	+ 1.83	2.04
<u>Self-efficacy</u>				**			
Cognitive	25	.81	18.28	- 5.91	14.20	+ 4.90	13.78
Affective	27	+ 3.67	11.93	+ .96	8.63	+ 4.63	12.36
Combined	27	+ 8.61	16.12	- 2.44	16.79	+ 6.17	22.15
Control	6	+17.33	23.77	-20.72	24.69	- 3.39	5.28
<u>Anxiety Management</u>							
Cognitive	25	- .12	5.93	- 1.20	4.65	- 1.32	6.28
Affective	27	- 1.37	5.49	- 1.15	6.05	- 2.52	6.07
Combined	27	- .60	5.09	- .92	3.72	- 1.52	5.81
Control	6	- 1.67	3.61	- 1.33	3.61	- 3.00	2.37

Note. Change scores are mean gains or losses in scores between periods (pre-posttest, posttest-followup, pretest-followup). The plus sign equals gains, and the minus sign equals losses.

** $p < .01$. Self-efficacy changes between the groups from posttest-followup.

Spelling Performance = number of words spelled correctly. Change scores show the amount of change in the number of words that are spelled correctly or incorrectly between

Table 26 (Cont.)

Note.(Cont.)

periods. Self-efficacy feelings are in percent form. Change scores show the amount of change in terms of growth in or loss of self-efficacy feelings between periods. Anxiety management is a self-rating scale with higher anxiety ratings indicating more anxious subjects. Change scores show the amount of growth or loss in anxiety management between periods, i.e., loss indicates growth in anxiety management.

Table 27

Analysis of Variance Comparing Groups on Spelling Change Scores for the Pre-Posttest Period

Source	df	<u>F</u>
		Spelling Change Scores
Between subjects		
Main Effects		
Group	3	2.17
error	81	(11.05)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Table 28

Analysis of Variance Comparing Groups on Spelling Change Scores for the Posttest-Followup Period

		<u>F</u>
Source	<u>df</u>	Spelling Change Scores
Between subjects		
Main Effects		
Group	3	2.38
error	81	(7.59)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Table 29

Analysis of Variance Comparing Groups on Spelling Change Scores for the Pretest-Followup Period

		<u>F</u>
Source	<u>df</u>	Spelling Change Scores
Between subjects		
Main Effects		
Group	3	1.53
error	81	(9.12)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Table 30

Analysis of Variance Comparing Groups on Self-efficacy
Change Scores for the Pretest-Posttest Period

		<u>F</u>
Source	<u>df</u>	Self-efficacy change scores
Between subjects		
Main Effects		
Group	3	1.55
error	81	(2,630,252.99)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Table 31

Analysis of Variance Comparing Groups on Self-efficacy
Change Scores for the Posttest-Followup Period

		<u>F</u>
Source	<u>df</u>	Self-efficacy Change Scores
		Between subjects
Main Effects		
Group	3	3.92**
error	81	(2,117,478.44)

Note. Values enclosed in parentheses represent mean square error.

*p<.05. **p<.01.

A Scheffe Post Hoc Test showed that the control group had a change in self-efficacy for this period that was significantly different from the three training groups in terms of the loss of self-efficacy that this group experienced.

Table 32

Analysis of Variance Comparing the Groups on Self-
efficacy Change Scores for the Pretest-Followup Period

		<u>F</u>
Source	<u>df</u>	Self-efficacy Change Score
Between subjects		
Main Effects		
Group	3	.57
error	81	(2,645,192.69)

Note. Values enclosed in parentheses represent mean square error.

*p<.05. **p<.01.

Table 33

Analysis of Variance Comparing Groups on Anxiety Change Scores for the Pretest to Posttest Period

		<u>F</u>
Source	<u>df</u>	Anxiety Change Scores
Between Subjects		
Main Effects		
Group	3	.30
error	81	(29.19)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Table 34

Analysis of Variance Comparing Groups on Anxiety Change Scores for the Posttest to Followup Period

		<u>F</u>
Source	<u>df</u>	Anxiety Change Scores
Between Subjects		
Main Effects		
Group	3	.02
error	81	(23.39)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Table 35

Analysis of Variance Comparing Groups on Anxiety Change Scores for the Pretest to Followup Period

		<u>F</u>
Source	<u>df</u>	Anxiety Change Scores
		Between subjects
Main Effects		
Group	3	.29
error	81	(34.73)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

(Table 47), and pretest-followup (Table 48) for the four groups are discussed later in terms of the stage of spelling error development.

Analyses of Dependent Measures

Correlations

There were no significant differences indicated between groups on overall spelling, self-efficacy and anxiety at posttest using ANCOVAS. Nevertheless, there were possible relationships between the dependent variables for the total sample within periods and across periods and by treatment groups within periods and across periods.

Pearson correlations were performed in order to examine the overall relationships between dependent variables for the total sample and the relationships among these dependent variables by treatment group. Total sample correlations are presented in Table 36 and correlations by treatment group are presented in Tables 37 (Cognitive group), 38 (Affective group), 39 (Combined group), and 40 (Control group).

The first relationship to be examined was between pretest efficacy and pretest spelling, which proved to be positively correlated in general ($r = .74$, $p < .001$), and was statistically significant for each of the training groups as well. Pretest efficacy was also positively correlated with posttest spelling ($r = .64$, $p < .001$) and

Table 36

Correlations Between Pretest Spelling, Pretest Efficacy and Pretest Anxiety and other Selected Variables for the Total Sample

Variables		Students (N = 85)		
Pretests	Pretest Spelling	Pretest Efficacy	Pretest Anxiety	
Spelling		.74**	-.10	
Efficacy			-.14	
Anxiety				
VIQ	.25*	.24	-.23	
FSIQ	.24	.15	-.16	
PIQ	.18	.02	-.07	
Posttests		Students (N = 85)		
Spelling	.70**	.64**	-.11	
Efficacy	.64**	.70**	-.12	
Anxiety	-.21	-.12	.64**	
Followup Tests		Students (N = 85)		
Spelling	.77**	.68**	-.11	
Efficacy	.71**	.75**	-.03	
Anxiety	-.15	.02	.60**	
<u>Note.</u> *p<.05. **p<.01.				

Table 37

Correlations Between Pretest Spelling, Efficacy, and Anxiety and Other Selected Variables for the Cognitive Group

Variables	Students (N = 25)		
Pretests	Pretest Spelling	Pretest Efficacy	Pretest Anxiety
Spelling		.78**	-.05
Efficacy			-.16
Anxiety			
Posttests	Students (N = 25)		
Spelling	.73**	.50*	-.01
Efficacy	.65**	.54*	-.08
Anxiety	-.16	-.02	.41
Followup Tests	Students (N = 25)		
Spelling	.84**	.70**	-.05
Efficacy	.77**	.78**	-.14
Anxiety	-.16	-.12	.51*
Note. *p<.05. **p<.01.			

Table 38

Correlations Between Pretest Spelling, Efficacy, and Anxiety and Other Variables for the Affective Group

Variables	Students (N = 27)		
Pretests	Pretest Spelling	Pretest Efficacy	Pretest Anxiety
Spelling		.62**	-.16
Efficacy			-.25
Anxiety			
Posttests	Students (N = 27)		
Spelling	.67**	.52*	-.18
Efficacy	.64**	.66**	-.04
Anxiety	-.16	-.05	.67**
Followup Tests	Students (N = 27)		
Spelling	.86**	.53*	-.22
Efficacy	.80**	.56*	-.02
Anxiety	-.10	-.11	.63**
Note. *p<.05. **p<.01.			

Note. *p<.05. **p<.01.

Table 39

Correlations Between Pretest Spelling, Efficacy, and Anxiety and Other Variables for the Combined Group

Variables		Students (N = 27)		
Pretests	Pretest Spelling	Pretest Efficacy	Pretest Anxiety	
Spelling		.70**	-.35	
Efficacy			-.39	
Anxiety				
Posttests		Students (N = 27)		
Spelling	.69**	.75**	-.53*	
Efficacy	.62**	.78**	-.34	
Anxiety	-.52*	-.45*	.59**	
Followup Tests		Students (N = 27)		
Spelling	.64**	.62**	-.24	
Efficacy	.57**	.58**	-.15	
Anxiety	-.40	-.30	.44	
<u>Note.</u> *p<.05. **p<.01.				

Table 40

Correlations Between Pretest Spelling, Efficacy, and Anxiety and Other Variables for the Control Group

Variables		Students (N = 6)		
Pretests	Pretest Spelling	Pretest Efficacy	Pretest Anxiety	
Spelling		.87	-.35	
Efficacy			-.45	
Anxiety				
Posttests		Students (N = 6)		
Spelling	.68	.91*	-.69	
Efficacy	.55	.79	-.86	
Anxiety	-.51	-.74	.88	
Followup Tests		Students (N = 6)		
Spelling	.93*	.96*	-.36	
Efficacy	.87	.99**	-.51	
Anxiety	-.44	-.47	.96*	
<u>Note.</u> *p<.05. **p<.01.				

followup spelling ($r = .68, p < .001$) in general and for each of the training groups. There is also a significant relationship in general and for each of the training groups for spelling performance and self-efficacy at each of the three periods. For the control group, a significant relationship exists only between pretest efficacy and posttest spelling ($r = .91, p < .05$) and between pretest efficacy and followup spelling ($r = .96, p < .05$).

Pretest efficacy and pretest spelling were negatively correlated with pretest anxiety ($r = -.02, p > .05$) ($r = -.10, p > .05$), respectively, but these relationships were not significant. In fact, pretest anxiety was negatively correlated with all spelling and self-efficacy, but none of these correlations was significant. Pretest anxiety was only positively and significantly correlated with posttest anxiety ($r = .64, p < .001$) and followup anxiety ($r = .60, p < .001$), both of which were statistically significant.

In summary, correlations showed that spelling and self-efficacy were significantly related at pretest, posttest, and followup as well as across periods for the total sample and by training group. These relationships did not exist for the control group except between pretest self-efficacy and posttest and followup spelling. Anxiety was negatively correlated with spelling and self-

efficacy at all periods for the total sample and by group, but these relationships were not significant.

Analysis of Spelling Error Stages

There were no significant differences indicated between groups on overall spelling at posttest using ANCOVA. Focusing on spelling errors both for the total sample and by each group might reveal differences in terms of level of spelling error development. These levels or stages are from Ehri and Gerber and were presented and discussed previously. They are the same for both learning-disabled and non-learning-disabled students in terms of the developmental level (stage) of errors made when spelling words.

The comparison of groups on stage of spelling error development at pretest, posttest, and followup was examined using one-way ANOVAS; means and standard deviations are shown in Table 41. A Scheffe Post Hoc Test showed that the Affective group was at a significantly higher level than the Combined group on stage of spelling error development at pretest $F(3, 81) = 3.52, p < .05$ (Table 42). There was a statistically significant difference between groups on stage of spelling error development at posttest also $F(3, 81) = 2.89, p < .05$ (Table 43), but a Scheffe Post Hoc Test revealed no pair-wise comparisons. The comparison between the groups at followup was not significant

Table 41

Means and Standard Deviations of Stages of Spelling Error Development by Group at Pretest, Posttest, and Followup.

<u>Stage of Spelling Error Development</u>							
Source	N	Pretest		Posttest		Followup Test	
Group		M	SD	M	SD	M	SD
Cognitive	25	3.32	.75	3.84	.37	3.60	.50
Affective	27	3.62	.56	3.85	.36	3.81	.40
Combined	27	3.04	.71	3.52	.64	3.48	.64
Control	6	3.17	.75	3.83	.41	3.33	.88

Note. Stage 4.00 is the highest stage of spelling error development, according to Ehri's stage theory of spelling error development.

Table 42

Analysis of Variance Comparing Groups at Pretest for Stage of Spelling Error Development.

		F
Source	df	Stage of Spelling Error Development
		Between subjects
Main Effects		
Group	3	2.52*
error	81	(.46)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

A Scheffe Post Hoc Test indicates that two groups were statistically significantly different, that is the Affective and Combined groups showed significant differences on stage levels of spelling error development at pretest. The Affective group showed a significantly higher stage level of spelling error development than the Combined group.

Stage 4.00 is the highest stage of spelling error development and is close to spelling mastery, according to Ehri's stages.

Means and standard deviations for stage of spelling error development at pretest are presented in Table 41.

Table 43

Analysis of Variance Comparing Groups at Posttest for Stage of Spelling Error Development.

		<u>F</u>
Source	<u>df</u>	Stage of Spelling Error Development
		Between subjects
Main Effects		
Group	3	2.89*
error	81	(.23)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

A Scheffe Post Hoc Test indicated that there were no pair-wise comparisons.

Stage 4.00 is the highest stage of spelling error development, and is close to mastery according to Ehri's stage theory of spelling error development.

Means and standard deviations for stge of spelling error development at posttest are presented in Table 41.

(Table 44).

The comparison of groups for changes in spelling error development for pre-posttest (Table 46), posttest-followup (Table 47), and pretest-followup (Table 48) by one-way ANOVAS was not significant. Change score means and standard deviations for these comparisons appear in Table 45.

In summary, significant differences between the affective and combined groups on stage of spelling error development were indicated at Pretest, wherein the affective group was at a much higher level in stage of spelling error development. Significant differences also existed between the groups at posttest, but no pair-wise comparisons were revealed. Change scores for the stage of spelling errors between the groups for pre-posttest, posttest-followup, and pretest-followup were not significant.

Item Analysis

There were no significant differences indicated between groups on overall spelling at posttest using ANCOVA. Possibly, the groups varied on each level of word difficulty for correct spellings. Therefore, an item analysis of spelling words was completed. The mean number of correctly spelled words at grade level for pretest, posttest, and followup by each group is presented in Figure 1, and Table 49.

Table 44

Analysis of Variance Comparing Groups at Followup for
stage of Spelling Error Development

		<u>F</u>
Source	<u>df</u>	Stage of Spelling Error Development
		Between subjects
Main Effects		
Group	3	2.28
error	81	(.30)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Stage 4.00 is the highest stage of spelling error development near mastery according to Ehri's stage theory of spelling error development.

Means and standard deviations for stage of spelling error development at followup are presented in Table 41.

Table 45

Change Scores and Standard Deviations for Stage of Spelling Error Development by Treatment Group for the Pretest-Posttest, Posttest-Followup, and Pretest-Followup Periods

		Pretest- Posttest		Posttest- Followup		Pretest- Followup	
Source	N	M	SD	M	SD	M	SD
Stage of Spelling Error Development							
Cognitive	25	+.52	.59	-.24	.44	+.28	.46
Affective	27	+.22	.51	-.04	.34	+.18	.48
Combined	27	+.48	.58	-.04	.52	+.44	.64
Control	6	+.67	.82	-.50	.82	+.16	.41

Note. Change scores are mean gains or losses in scores between periods (pre-posttest, posttest-followup, pretest-followup). The plus sign equals gains, and the minus sign equals losses.

Means and standard deviations for stage of spelling error development at pretest, posttest, and followup are presented in Table 41.

Table 46

Analysis of Variance Comparing Treatment Groups on Stage of Spelling Error Change Scores for the Pretest to Posttest Period

		<u>F</u>
Source	<u>df</u>	Stage of Spelling Error Change Scores
		Between subjects
Main Effects		
Group	3	1.78
error	81	(.33)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Change score means and standard deviations are presented in Table 45.

Table 47

Analysis of Variance Comparing Treatment Groups for Stage of Spelling Error Change Scores for the Period of Posttest to Followup

		<u>F</u>
Source	<u>df</u>	Stage of Spelling Error Change Scores
		Between subjects
Main Effects		
Group	3	2.39
error	81	(.22)

Note. Values enclosed in parentheses represent mean square error.

* $p < .05$. ** $p < .01$.

Change score means and standard deviations are presented in Table 45.

Table 48

Analysis of Variance Comparing Treatment Groups for Stage of Spelling Error Change Score for the Period of Pretest to Followup

		<u>F</u>
Source	<u>df</u>	Spelling Stage of Error Change
		Between subjects
Main Effects		
Group	3	1.23
error	81	(.28)

Note. Values enclosed in parentheses represent mean square error.

*p<.05. **p<.01.

Change score means and standard deviations are presented in Table 45.

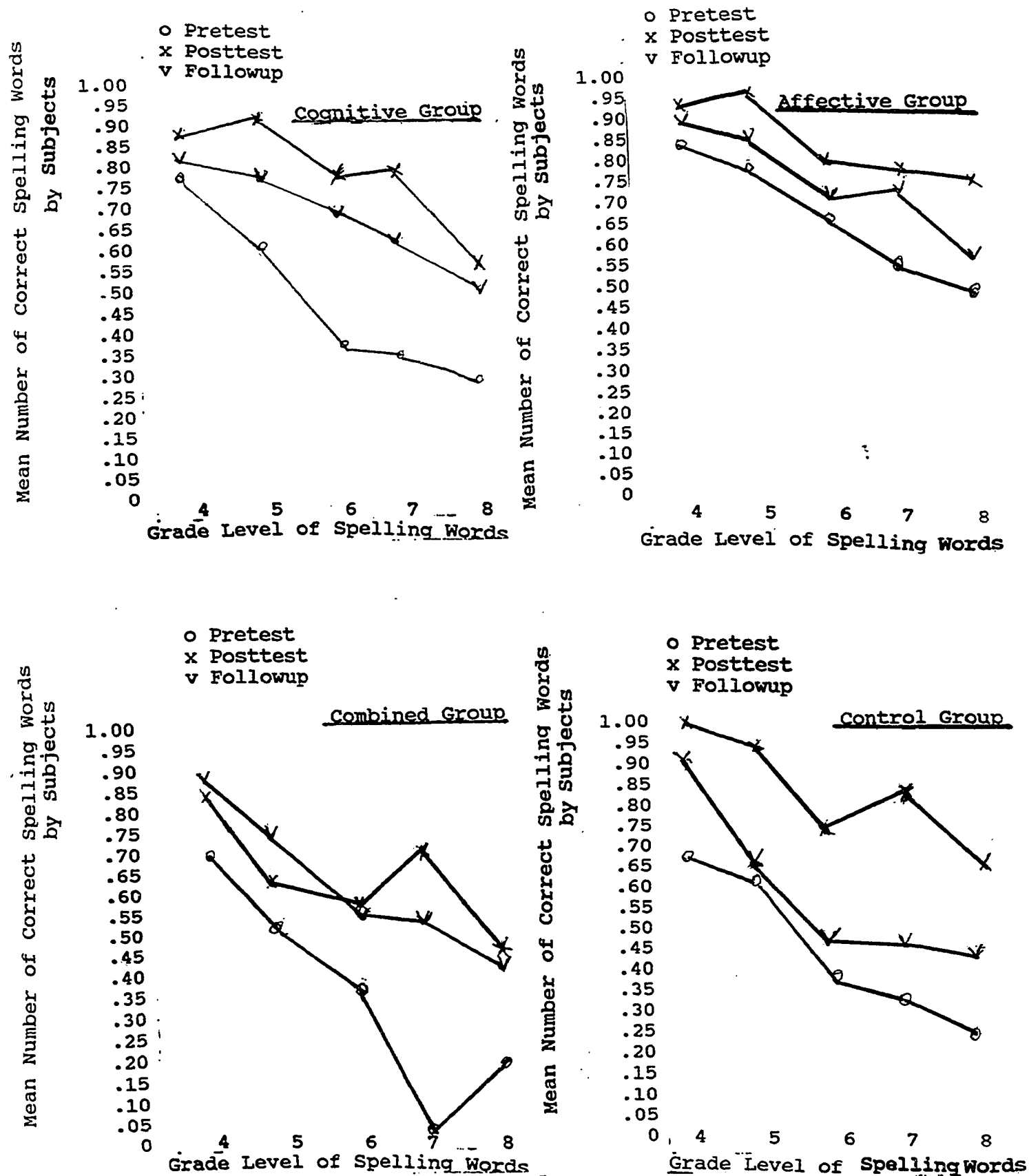


Figure 1. Item analysis in terms of comparisons by mean correct spellings at grade levels for pretest, posttest and followup by each group (cognitive, affective, combined, and control).

Table 49

Item Analysis According to Mean Correct Spelling at Grade Levels for Pretest, Posttest, and Followup by Group (Cognitive, Affective, Combined, Control)

Group	G.L.	Pretest	Posttest	Followup
Cognitive (n=25)	4	.78	.88	.82
	5	.60	.91	.76
	6	.39	.78	.67
	7	.37	.79	.62
	8	.32	.56	.52
Affective (n=27)	4	.85	.93	.89
	5	.78	.96	.85
	6	.65	.81	.71
	7	.55	.78	.73
	8	.48	.76	.56
Combined (n=27)	4	.70	.83	.87
	5	.52	.64	.74
	6	.38	.57	.55
	7	.03	.70	.53
	8	.19	.46	.43
Control (n=6)	4	.67	1.00	.92
	5	.61	.94	.67
	6	.38	.75	.46
	7	.33	.83	.46
	8	.25	.67	.42

Note. The number of spelling words at grade level is as follows: grade four has 2 words, grade five has 3 words, grade six has 4 words, grade seven has 4 words, grade eight has 2 words. Results at grade levels have been adjusted for the difference in number of words for particular grade levels.

(n=) represents the number of students in each particular training group.

Results show that after training the cognitive and affective groups improved their spelling of all words at posttest but fell on all words at followup, although not to pretest levels. The results of the training were somewhat different for the combined group at followup because only sixth-, seventh-, and eighth-grade words declined at followup. On the fourth- and fifth-grade words at followup, the spelling of the students rose beyond the levels of the posttest. For the control group, the same pattern emerged as that for the cognitive and affective groups. However, because of the difference in number of subjects in the control group (6 subjects) as compared to the treatment groups (25, 27, 27 subjects), it is difficult to make comparisons in terms of pattern of outcome (spelling improvement). The limited number of subjects in the control group compromises the degree to which one can rely on the correctness of this finding.

In summary, the cognitive and affective groups and the control group showed the same kind of results at posttest and followup. Higher levels of spelling were shown at posttest, but were not maintained at followup. However, the levels at followup were still higher than at pretest. The results for the control group should not be relied on as much as those for the other groups. After training, the combined group showed the same pattern of results for sixth-, seventh, and eighth-grade words as the

other groups. However, for fourth- and fifth-grade words, the combined group maintained the higher spelling scores at followup and the scores also rose beyond those levels.

Chapter V

Discussion

The main purpose of this study was to investigate the effectiveness of cognitive and affective learning strategies for improving spelling competence, managing performance anxiety, and indirectly strengthening self-efficacy of learning-disabled high school students. This study also investigated whether or not specific kinds of strategy training were more effective than others, or more effective than no strategy training. It was hoped that learning-strategy training would identify appropriate and effective strategies for learning-disabled students.

Summary of Findings

The results from this investigation did not support the nine major hypotheses. Posttest spelling achievement scores did not differ for the cognitive and affective training groups, nor were the spelling scores for the combined training group superior to those of the other training groups. In addition, the posttest spelling achievement score for each of these three training conditions was not superior to that of the control condition.

The second dependent variable, performance anxiety, was expected to have lower mean scores on the posttest

measure, showing the effects of anxiety management. There were, however, no differences among the means of the training groups, nor were they lower than the means of the control group.

Mean posttest scores for the self-efficacy measure did not differ for the affective training and cognitive training groups or combined training group, nor were they higher than the mean scores of the control group. Thus, the expected impact of affective strategy training or of combined strategy training on increasing self-efficacy was not supported by this study with this sample population.

Despite the literature supporting strategy training (Benjamin et al, 1981; Boekaerts, 1985; Dansereau, 1979; McKeachie et al, 1984; Reid & Harris, 1993; Weinstein et al, 1978; 1982; Weinstein et al, 1984; Weinstein & Mayer, 1983; Weinstein & McDonald, 1986; Weintraub & Zimmerman, 1991; Wilson & Rotter, 1986; Wong, Harris & Graham, 1991), none of the hypotheses was supported. There are a number of explanations for this.

First, one of the reasons for the lack of significance may have been discrepancies in the sample of the learning disabled population. All students in the special education English classes were classified learning disabled according to New York City Board of Education guidelines, but many would not have been

traditionally classified learning disabled because they were so low functioning (i.e., IQs within the Borderline Range, 70 - 79). The range of IQs of these students would not usually have resulted in classification as learning disabled. Many of the students may have needed more time for learning and studying because of their weak levels of functioning, rather than because of having any learning disability in the traditional sense. Each training group was composed of both learning disabled and low functioning students interspersed, which may have been one of the limitations of this study. Some of the characteristics may have matched each other's. However, results involving traditional learning disabled students may have been missed or compromised because of the confounds produced by the presence of these lower functioning students who may not have been truly learning disabled. True results by learning disabled students may not have been realized.

Another reason for the lack of significance may have been the type of cognitive treatment used. The cognitive treatment might have been more powerful if fewer strategies had been used that were not varied but that fit particular classes of words. Multiple instances of practice, using the strategies with these words, which were self-monitored by the students themselves might have been more effective in the spelling success of the

students. Results might have shown that more words were correctly spelled and maintained over time, which might have contributed to the decrease of anxiety and the increase of self-efficacy. The realization that using certain strategies helps the accurate spelling of particular classes of words motivates, and reinforces the use of these strategies with words from these word classes. The strategies should be used consistently with these words so that a difference can be made in their correct spelling. Using certain strategies to correctly spell words from a particular word class helps students realize that their efforts make a difference and that using certain strategies can be an effective method for spelling success.

Another speculation may be that the number of strategies used as part of a strategy condition may also make a difference in the results, especially with learning-disabled students. Using more than one type of strategy per strategy condition might be too distracting or overwhelming for learning-disabled students who have a problem with distractability, attention, organization, and memory. Weinstein's studies (1978; 1982) use only one strategy for the cognitive condition, as do Reid and Harris (1993), Bradley (1981), and Harris et al. (1988). The affective condition has one strategy in Wong et al. (1991) and Dansereau et al. (1979). Unlike these

studies, the current study uses a multiple cognitive strategy and a multiple affective strategy. However, some other studies also use a multiple strategy, that of rehearsal and elaboration (Wong et al., 1991) and that of rehearsal and self-monitoring (Reid and Harris, 1993).

In addition, another speculation for the lack of support was that there was a restricted range of possible scores of spelling test and self-efficacy measure. For the affective group, spelling performance scores clustered at or around upper scores and produced a ceiling effect on the measure. Spelling improvement on this measure was thus limited for the affective group, which also had a disproportionate number of high-functioning spellers at pretest in comparison with the other groups. Therefore, differences between the groups may have been masked.

Although two covariates, pretest spelling scores and Verbal IQ, were used to make statistical adjustment for differences, they did not account for spelling differences when post spelling mean achievement for one group was so clustered at/or near the maximum (15 words). Hence, the possibility for significant gain in pretest to posttest was limited for the affective group because of the high initial scores.

On the post-spelling measure, mean scores for the combined group were still low in comparison with other

groups after improvement. The affective group included higher-functioning spelling students, whereas the combined group included much lower functioning spelling students.

A ceiling effect may explain the lack of support for the hypotheses concerned with self-efficacy. There was a statistically significant difference between groups on Pretest for Self-efficacy, with the affective group having the highest scores (least variability among the scores in comparison with the other groups) and the combined group having the lowest scores.

The possibility of significant improvement in self-efficacy from pretest to posttest was also shown to have a similar pattern within the affective group, which confounded the results. The affective group had many high scores clustered with little variability among them because of the restricted range of scores with comparison to the other groups. This factor could have been responsible for the lack of support for the self-efficacy hypotheses. The improvement in self-efficacy from pretest to posttest was limited in the affective group with comparison to the other groups. In fact, even though the affective group had the highest self-efficacy mean at posttest, their improvement was the smallest. The scores did not have room to vary over a wide range. There was a possible ceiling effect again in that the

amount of room the scores had for improvement was limited (maximum self-efficacy score possible is 100 percent). Many of these scores were clustered much nearer to the maximum score than the scores in the other groups were.

Another speculation may be that the size of the sample was too small. A larger sample size might have allowed for a wider range of scores with greater variability among the scores (i.e., spelling performance scores and self-efficacy scores), and might have reduced the chances of a ceiling effect confounding the results.

In addition, a larger sample size would have allowed for a control group more similar to the other three training groups in terms of size. Empirical studies by Borkowski et al. (1984) and Dansereau et al. (1979) concerning strategy research with a learning-disabled junior high school sample and a non-learning-disabled college undergraduate sample both included a control group that was about the same size as the other groups. The number of groups in those studies is the same as within this study, and each compares a combined strategy with two individual strategies. In this study, however, there is a limited number of subjects in the control group because the urban school from which the subjects were drawn suffers from high absenteeism and cutting, a high dropout rate, and a limited number of students in special education classes. A larger sample

size would have allowed for greater variability among the scores.

Another possible reason for the lack of support for the hypotheses was that the sample used in this study was different from samples in prior studies. Different samples (populations) may require different approaches to strategy training, may respond differently to different activities.

Earlier research focused on college freshmen in their psychology or study skills classes or as part of a college learning center (Benjamin et al., 1981; Dansereau et al., 1979; McKeachie et al., 1984; Weinstein et al., 1983; 1984; 1986). The sample used in more recent learning-strategy research focused on elementary school students (Gerber & Hall, 1982; Reid & Harris, 1993; Wong, Harris & Graham, 1991), to some extent on junior high school students (Borkowski et al., 1981), and infrequently on the high school population (Weinstein, 1979; 1982; Weintraub & Zimmerman, 1991).

Students with varied learning ability levels were included in the samples of learning-strategy research, for example, at-risk students (Benjamin et al., 1981; McKeachie et al., 1984; Weinstein, 1979; 1982). Even though many of the at-risk students were anxious and showed weak self-efficacy and weak learning skills, none of them had been classified as learning disabled.

Research by Weintraub & Zimmerman (1991) contained subjects who, although learning disabled, were less severely learning impaired than special education students. The sample in this study is different from these other samples.

Another speculation is that the time allotted for strategy instruction and practice may have not been long enough to effect change. Gerber and Hall's research (1982) suggested that correct spellings do not emerge suddenly or by only remembering successively longer strings of letters over learning trials. Rather, extended practice over about six months seems to have promise. Weinstein's studies (1978; 1982) suggest that practice and feedback are very important and increase the effectiveness of strategies. The current study used two consecutive days for strategy training and a 20-minute study period on the following day to study 15 words using the new strategy. Though some progress was made, the training and practice period was much shorter than that used in these other studies. More time would give the students much more opportunity to develop knowledge and experience that they could use to improve spelling. The time period for learning, practicing, and studying the strategies might need to be extended in the future.

A sixth speculation regarding lack of support for the hypotheses involves the order of steps in the

strategy training, particularly in the cognitive and combined strategies in the presentation of the visual or verbal components. In the current study, the first strategy step was verbal: "Say the word." Other studies that also presented a verbal component initially were Bradley (1981) and Harris, Graham & Freeman (1988), both of which were used as a basis for the present cognitive condition. The visual modality used in this study involved eyeing the word, looking at the word, observing the word, and developing a word image, but it did not constitute the first steps of the learning strategy. Using the visual modality first might be more effective because development of a word image initially might make it easier to refer to that word image in subsequent strategy steps. In Reid and Harris' research (1993), the first strategy step used was visual: "Look at the word." Levine (1990) and Weinstein (1978; 1982) advocated developing a word image first as a way of helping the student register the correct spelling of a word in memory with enough depth of processing to remember and recall the particular word faster and more easily. Research by Wong et al. (1991) also began with a visual component, for example, "Does the word look right?"

In the Weintraub and Zimmerman study (1991), learning-disabled students and non-learning-disabled students frequently referred to using a particular

strategy of looking at the spelling of a word to "see" if the word looked correct. The students were seen staring at the word for a short time, then closing their eyes. When questioned, the students referred to "seeing" each word in their minds (mind's eye) and then checking to make sure the visual spelling image was correct. This strategy seems to be in keeping with "Develop an image of the word", which gives support for presenting the visual component of the strategy first.

An additional speculation may be that the self-monitoring component of training as part of the affective and combined strategy conditions may not provide enough emphasis or clarity. Self-monitoring as part of a strategy condition may not have enough depth of focus and may therefore contribute to the lack of support for the hypotheses.

Reid and Harris (1993) use a two-part strategy of rehearsal and self-monitoring with learning-disabled elementary school children. Research (Nulman and Gerber, 1984; Reschley and Wilson, 1990) has shown that learning-disabled students manifest immature management or control of cognitive processes and are poor in directing their own studying. It appears that the self-monitoring technique might need to be emphasized or focused more before the training sessions so that students will have more understanding of the need for

self-monitoring their behavior, feelings, and thoughts. Swanson (1990) and Torgessen (1977) have suggested that learning-disabled students need to be directly instructed in how to recognize their weaknesses and engage in self-monitoring activities. Perhaps, self-monitoring should not only be included as part of a particular strategy condition, but offered to all students on an ongoing basis.

Several explanations for the hypotheses not being supported are suggested by student behavior during the strategy training. It was observed that some students in tenth and eleventh grades behaved negatively about the words, activities, and assignments and toward each other. They said that the words were too easy and were different from words used by other students (i.e., non-learning-disabled students). Some of the students laughed at the related activities, verbally repeating the strategies too many times.

These behaviors may be explained in a number of ways. First, the spelling words were considered too juvenile by some of the students. Even though the words had been selected with the recommendation of a specialist in learning disabilities to cover the varied spelling levels of the students in special education, their simplicity embarrassed the students, who are sensitive about many things related to their learning disability

and which separate them from their peers. As a result, they acted foolish and disinterested.

Some of the negative behaviors might also have emanated from feelings that the words were not meaningful and out of context. The words were unrelated with no common theme binding them together. Greater meaningfulness may have been created by using high-interest words from their textbooks or books and from stories recommended for learning-disabled students in school. The inclusion of higher-level words and/or more words to cover all levels of spellers in one English class might also have helped. To increase the meaningfulness of the material, the spelling words may also need to emanate from their writings, including, for example, student spelling errors. This might create greater motivation and interest, especially when the misspelled words are taken from writings on critical issues of teenage life (vocational and career plans, employment, peer relationships, dating, pregnancy, drugs, HIV). It might seem more meaningful and motivating to the students to see their misspellings correctly spelled in their future writing samples.

Another reason might have been that the strategies were not embedded in any academic context. Spelling is not usually separate for these students but part of activities in English or history. The words in this

study were not related to any specific context area, and the strategies were also not embedded in any particular context. Learning-strategy research is embedded in academic contexts, for example, in math and science. Wong et al. (1991) focused on strategies involving math anxiety and math performance, which the students practiced with their math classwork. Dansereau et al. (1979) practiced strategies involving science, biology, and geology with students as part of their classwork in these academic areas. Borkowski et al. (1988) and Weinstein (1979; 1982) had students practice strategies involving reading comprehension in reading classes or as part of their English classwork.

Second, it may be that some students attempted to camouflage their fear of failure by their behavior, displaying a nonchalance and a lack of motivation. Negative feelings about their weak abilities might have caused embarrassment because they are not able to achieve, have a difficult time achieving, are not as academically successful as their nonlearning disabled peers and also require much easier material. The outcomes of this study may not really represent an accurate reflection of work by the students on improving their abilities.

Even though the hypotheses were not supported, there are some modest indications that the results leaned

in the expected direction and can be considered a beginning in this type of research.

In the current study, students in the combined group were weaker, while students in the affective group were much stronger at pretest. Therefore, the mean results by group were also compared at followup by one-way ANOVAS. In terms of the differences in the spelling performance means at followup, the combined group showed the greatest improvement and the cognitive group showed the second greatest improvement from pretest to followup. In comparison for pretest to posttest spelling improvement, the control group had the most improvement, but lost its gains by followup. Conclusions are that spelling gains from pretest to followup were more in keeping with the hypotheses, although there was no significant difference among the four groups in spelling improvement from pretest to followup.

Even though the control group had the most growth of all groups in self-efficacy from pretest to posttest, they regressed the most in self-efficacy growth at followup. Even though the affective group was the only group that did not lose any efficacy growth at all, the combined group was ahead in growth at followup. The long-term gains from pretest to followup for the combined group was the largest overall efficacy improvement. These results are in the direction expected.

Another modest indication that the results were in the direction expected was shown in the item analysis of mean correctly spelled words by grade level for the groups. The item analysis showed the following relevant findings. After the cognitive and affective groups received training, the spelling of the students improved on all words at posttest and fell on all words at followup, but not to pretest levels. Regarding the combined group, the results of the training seem somewhat different at followup because only sixth-, seventh-, and eighth-grade words declined. On the fourth and fifth grade words at followup, the spelling of the students rose beyond the levels of the posttest. For the control group, the same pattern emerged as that for the cognitive and affective groups. However, because of the difference in number of subjects in the control group compared with the treatment groups, there is a compromise in the degree to which one can rely on the correctness of this finding. Indications are that the weakest students, those in the combined group, made the greatest gains, particularly with the easier words.

The greatest growth by the combined group was also supported by its growth from pretest to followup on stage of spelling error development. This group showed the greatest improvement from pretest to followup on stage of spelling error development.

Observations and teacher report suggest that the affective strategy was the best received strategy and proved the most useful, which could not be confirmed by the data results because of the ceiling effect. This strategy seems to require less training and practice; can easily be referred to, remembered and worked with by oneself; takes up little time; and can apply to various kinds of subjects and situations for confidence building and anxiety reduction.

Future Research

The first consideration for the future is to focus on the strategy itself. Some concerns to be investigated are between single and multiple strategies, order of strategy steps, length of time for the training, and the role of self-monitoring within overall training for all groups or as a part of a strategy condition. Also, focusing on those strategies that are helpful and effective in spelling words from particular word classes is important.

Population is another issue which should be considered. Replication with varied populations of weak learners should be addressed to ascertain the effectiveness and usefulness of these strategies and to consider them generalizable for others. The population should include non-learning-disabled students, those who are at-risk, learning disabled, and multiple handicapped

learning disabled, and other classified students with different disabilities and degrees of disabilities. Such research might show that these strategies can be effective with different populations, for example, by modifying and adapting the strategies to fit the group.

Another issue for future clarification is classroom situation. Classroom situations in high schools located in cities and towns of various sizes and in different parts of the country also need examination. Such research can show the effectiveness of these strategies in different classroom situations and might show that these strategies are useful with students in other classroom situations and therefore are generalizable.

It is important also in the future to consider the issue of context. Earlier discussion focused on whether spelling was considered an academic context or as part of other academic contexts, for example, history, science, and English. Material presented within an academic context might increase the student's perception of meaningfulness and their motivation to use the strategies. These strategies should be examined within different contexts, for example, math, science, global history, American history. It is important to determine which strategies are powerful enough to use within other contexts and what modifications and adaptations are needed to ensure the strategy's effectiveness and

usefulness within other contexts.

It is important in the future to systematically and carefully monitor cognitive strategy training, affective strategy training, and combined strategy training effects in relation to the strategies themselves, population, classroom situations, and contexts. In this way, greater indications in the expected direction for these strategies can be obtained and transferred into benefits and academic success for students, particularly for special education learning-disabled students at the high school level.

Chapter VI

Educational Implications

This study provides some information to school psychologists, educational specialists and teachers, regarding learning strategies for special education high school students. First, careful scrutiny and thought should be given to students' strong sensitivities and possible embarrassment about their disabilities, as well as their negative comparisons of themselves with their non-learning-disabled peers. Because these students may misinterpret situations, behaviors, and issues and respond inappropriately, academic lessons in all content areas should be very specifically geared to and planned for such students.

Materials should be designed, planned, and presented with the perceptions of the students in mind. For example, the amount of time for training and practice, the age level of the materials used, the kinds of activities included for practice, and the order of the steps all need consideration.

Learning and instruction within a school setting is subject to many unexpected interruptions, such as messengers at the door and messages over the intercom. These may affect students negatively, but may have an even greater negative impact on learning-disabled students in special education classes. These students

are already distractable, and they take a longer time to refocus, reconcentrate, and reattend. Often frustrated, they give up easily. In a large urban high school there are many unexpected confounds which are controllable. One should try to control for the influence of these confounds by being aware of how they will affect learning-disabled students in special education classes. In this way, teachers can try to make accommodations for these confounds.

Another implication from this study is that classroom management issues should be addressed. It is important to maximize student attention and exposure to the targeted learning activities. More training sessions and possibly self-directed sessions for shorter durations might also help maximize results. The use of learning-strategy training within the context of academic skill development may also be important to consider. This would provide more of the needed repetition, review, and application.

There are indications from this study that a significant relationship exists between learning-disabled students' self-efficacy and spelling performance. Such a relationship may be found for other academic contexts too. This information would be important for educators who work with at-risk students. It would help them plan and present lessons and materials for and with these

students to help them realize greater motivation, academic success, and enhanced self-efficacy. All programs should be attentive to the motivational procedures (i.e., eliciting motivation, ascertaining what would be the motivating factors, and maintaining motivation). The sensitivities and perceptions of these students need to be considered when planning for motivational activities. Meaningfulness seems to be important and motivational and should be considered from the perceptions of the special education students. If a lesson has meaning for such a student, he/she will be more motivated to succeed educationally and academically.

APPENDIX A - Scripts

Script: Introduction and Orientation

All students received a general orientation. The experimenter greets each of the classes and explains the purpose of the study in the following way:

"Hello, my name is Mrs. Weintraub. I want to thank all of you for participating in my learning program and for letting me work with you. I want to explain what we will be doing the next four days. During the next four days, I will show you ways that can help you remember spelling words. This will not affect your English grade, but you will probably find it is very helpful with your schoolwork. I will be meeting with you for four days in a row during your English class. On the second and third days, I will be teaching you these methods. I will explain all of the details as we go along. Remember, this will not affect your English grade, but you may find it helpful with your school-work.

Today, you will show me how well you spell and tell me how you feel about spelling."

Script: Performance Anxiety Measure

The experimenter says, "O.K., let's get started! Now I am going to give you copies of statements about how people feel in certain situations when they are anxious. (Experimenter gives out copies of statements to students.) To remind us what the word anxious means, it means to be uneasy about something. Show me how you feel in each case by circling the statement that best describes your feelings. If the statement does not describe you except maybe in rare instances, circle a. 'not at all like me'. If the statement is not generally true, circle b. 'not very like me'. If the statement would be true of you about half the time, circle c. 'somewhat like me'. If the statement would generally be true of you, circle d. 'fairly like me'. If the statement would be true of you almost all of the time but not necessarily always, circle e. 'very much like me'."

"Please circle the appropriate letter that best describes how you feel in each situation. Try to rate yourself according to how well the statement describes you, not in terms of how you think you should be or what others do. There are no right or wrong answers to these statements. Please work as quickly as you can without being careless and please complete all items as I read them with you. When we have finished, turn your papers over, and they will be collected."

"Does everyone understand?" If the students do not understand, the experimenter repeats the instructions until they do understand. If there is no need for clarification, the experimenter says, "Please write your name at the top of your paper now. I will read the first two statements twice and their response choices once. After that I will only read the statements to you twice, and you will read the response choices to yourself. The response choices are the same for each statement, but for each statement you will choose the one that best describes you in that situation. Let's begin"!

Script: Verbal Administration of Performance Anxiety
Measure (LASSI, HS)

1. I worry that I will fail my classes.
(repeat)

- a. not at all like me (read once)
- b. not very much like me
- c. somewhat like me
- d. fairly much like me
- e. very much like me

2. I get discouraged because of low grades.
(repeat)

- a. not at all like me (read once)
- b. not very much like me
- c. somewhat like me
- d. fairly much like me
- e. very much like me

3. I am very tense when I study. (repeat)

- a. not at all like me
- b. not very much like me
- c. somewhat like me
- d. fairly much like me
- e. very much like me

4. Even when I am well prepared for a test,
I feel very upset when taking it. (repeat)

- a. not at all like me
- b. not very much like me
- c. somewhat like me
- d. fairly like me
- e. very much like me

5. When I begin a test, I feel pretty sure
that I will do well. (repeat)

- a. not at all like me
- b. not very much like me
- c. somewhat like me
- d. fairly like me
- e. very much like me

6. When I am taking a test, worrying about doing poorly gets in the way of keeping my mind on the task. (repeat)

- a. not at all like me
- b. not very much like me
- c. somewhat like me
- d. fairly like me
- e. very much like me

7. I feel very panicky when I take an important test. (repeat)

- a. not at all like me
- b. not very much like me
- c. somewhat like me
- d. fairly like me
- e. very much like me

8. I get so nervous and confused when taking a test that I don't answer questions to the best of my ability. (repeat)

- a. not at all like me
- b. not very much like me
- c. somewhat like me
- d. fairly like me
- e. very much like me.

"O.K., I'll collect the papers now."

(Experimenter collects papers.)

Script: Self-efficacy Judgments (before strategy training)

Before measuring perceived spelling efficacy, students are told by the experimenter how to use numerical scale values of perceived self-efficacy. (Copies of numerical self-efficacy scales (Schunk & Hanson, 1985) are passed out to each student and an enlarged self-efficacy scale is put on the wall or board.) The experimenter states "I am going to give you a number scale (Scale) which I will show you how to use so you can decide how sure you are about spelling certain words correctly. A large number scale (Scale) will also be on the wall so we can work together on this. I will explain how to use the number scale (Scale). As you work with your scale, I will use the large number scale to explain."

The experimenter states, "I am going to say some words, and after I say each word, I would like you to tell me how sure you are that you can spell the word by writing a number from the scale from 10 to 100."

"Let's use the word 'pound' as an example. If you are not sure how to spell the word (pound), you would write a 10 (pointing to the number on the board as students point to the number on their scales). If you are somewhat sure how to spell the word (pound), you would write a 40 (pointing to the number on the board as students point to the number on their scales). If you

are pretty sure of how to spell the word (pound), you would write 70 (pointing to the number on the board as students point to the number on their scales). If you are really sure how to spell the word (pound), you would write 100 (pointing to the number on the board as students point to the number on their scales). Do you understand? Any questions?" If the students do not understand, the experimenter repeats the instructions until they do understand.

The experimenter says, "Now I am going to give you a sheet of paper (Numbered Paper), numbered from 1 through 15. As I say the word that goes with the particular number, you will write down how sure you are that you can spell that word correctly. Pick the number from 10 through 100 from the scale that best describes how sure you are you can spell the word. There are no right or wrong answers. When we have finished, please turn your paper over, and we'll collect them. Now, please write your name on the top of the paper, and we'll get started."

Script: Verbal Administration of the Self-Efficacy Measure
(Pretest)

The experimenter says, "I'm going to say a word. I'd like you to write on your Numbered Paper how sure you are that you can spell that word correctly. I will say the word twice and then ask you to decide how sure you are that you can spell it. You will then pick the number on your Scale that best describes how sure you are. Please write it next to the number of the word on your Numbered Paper. Remember, there are no right or wrong answers."

"As a review, if you are not sure how to spell the word, you would write a 10. If you are somewhat sure how to spell the word, you would write a 40. If you are pretty sure of how to spell the word, you would write a 70. If you are really sure how to spell the word, you would write a 100. Does everyone understand? (In case of not understanding, the experimenter says, "OK, let's try it again"). "Now, let's get started!"

1. How sure are you that you can spell the word 'broke?
(repeat)
2. 'January'?
(repeat)
3. 'sentence'?
(repeat)
4. 'fifth'?
(repeat)
5. 'wrist'?
(repeat)
6. 'direction'?
(repeat)

7.		'activity'?
	(repeat)	
8.		'vegetable'?
	(repeat)	
9.		'gentle'?
	(repeat)	
10.		'apply'?
	(repeat)	
11.		'legal'?
	(repeat)	
12.		'satisfy'?
	(repeat)	
13.		'interfere'?
	(repeat)	
14.		'application'?
	(repeat)	
15.		'calculating'?
	(repeat)	

The experimenter says, "Please turn your papers over, and we'll collect them. We'll also collect the number scales."

Script: Spelling Pretest

The experimenter says to the students, "I am going to give you another sheet of paper numbered from 1 through 15", also called Numbered Paper. (Experimenter distributes these papers.)

The experimenter says, "I will say the same words I just said, but this time I want you to spell each word on the paper next to its number. I am going to say the number, say the word and say the word again. Then I want you to write the spelling of the word even if you are not sure how to spell the word. Write the spellings privately and please do not communicate with others. Do the best you can! Do you understand?" If there is a need for clarification, the experimenter repeats the directions until everyone understands. If there is not a need for clarification, the experimenter says, "OK, let's get started. Please write your name at the top of your paper now, (wait ten seconds). We will begin spelling the words. When we have finished, I want you to turn your papers over, and we'll collect them."

Script: Administration of Spelling Pretest

The experimenter says, "Remember, try to spell the word, even if you are not sure how to spell it".

1. broke	(broke)
2. January	(January)
3. sentence	(sentence)
4. fifth	(fifth)
5. wrist	(wrist)
6. direction	(direction)
7. activity	(activity)
8. vegetable	(vegetable)
9. gentle	(gentle)
10. apply	(apply)
11. legal	(legal)
12. satisfy	(satisfy)
13. interfere	(interfere)
14. application	(application)
15. calculating	(calculating)

The experimenter says, "OK, turn your paper over, and we'll collect them."

Script: General Strategy Discussion

The experimenter says, "Now, let's talk a little about ways to help people learn better and remember what they learn. These ways are called strategies."

The experimenter poses the following questions (with requested answers).

"How many people have heard of the word strategy?"
"What is a strategy? A strategy is another word for a way or method or plan."

"What does the word 'method' mean? The word 'method' means, planned ways of thinking and acting that may be useful to help you become more successful at what you do. Like if you're playing football, and the Giants have to go 30 yards to make that goal. They don't just pick up the ball and run down the field. They have to think of a plan, or method or strategy to make those 30 yards until they get a goal. Have you watched any football games lately? The football players might pass the ball or touch and run. They decide what's the best plan to get the job done."

"When might we use a strategy? We can use strategies when we're spelling to help us spell better in and outside of school. When we write a report, or a letter, or when we apply for a job or on the job are some of the times we can use strategies."

"How do strategies help us spell better? The

strategy gives us a plan of how to remember the word we want to spell, like the football strategy helped the Giants get their 30 yards in the football game or the hockey game or the basketball game."

"Tomorrow we will learn and practice some ways (strategies) that can help us learn and review spelling words. What do we call these ways? That's right, we call them strategies. These ways may also help us in our other classes."

Script: End of Day I (all experimental groups)

The experimenter says, "Thank you for working with me today and helping with our learning program. I am looking forward to tomorrow."

"Thanks again. Have a good day! See you tomorrow. Bye!"

Script: End of Day I (Control Group)

The experimenter says, "Thank you for working with me today and helping with our learning program. We will work together again in a few days. In the meantime, you will do the work you usually do in your English classes."

"I am looking forward to working with you again in a few days. Thanks again. Have a good day! See you soon. Bye!"

Script: Day II: First strategy training session
(Cognitive Strategies -SPELL WORDS)

The experimenter says, "Good morning! I'm glad to see you all, and I'm glad that we will be working together again. If you remember from yesterday, we wanted to see if people could learn better by teaching them ways (strategies) that might help them learn and review better.

Yesterday we said, "A strategy is a method or planned way of thinking and acting that may be useful in helping us do things better, like spelling better and remembering words we want to spell. Strategies may help us see if there's a small word inside a word that we know, or a rhyme, or if we know the beginning or the ending of the word, or the main word, it can help us to remember the spelling of a word more easily. Also sometimes strategies can help us with the order of the letters in the word which can help us with the spelling of the word or remembering the spelling of the word. I'll teach you strategies to help you spell and remember the spelling of words."

Script: Day II: Narrative: Cognitive Strategy
Condition (SPELL WORDS)

The experimenter says, "People who have little difficulty spelling do certain things when they spell words. They say different things to tell themselves what to do and do several things in their heads when they spell words. We are going to learn strategies to help us improve our spelling performance."

"We are going to learn two types of strategies, rehearsal and elaboration. Rehearsal strategies are those that help us remember words better by forming pictures in our minds, repeating words to ourselves and rhyming words. You know, like when you rehearse for a play or rehearse a song. Rehearsal helps us sharpen our memories so that spellings of words can stay in our memories better."

"Elaboration strategies make material more personal and meaningful so it stays in your memory better. These strategies can help you remember the spelling of a word. It's like you put your own interpretation on the spelling of the word to help you remember its spelling more easily."

"Now I am going to give you study prompts which you will use to help you learn the strategies. A study prompt is a useful tool that can help you study better. You will use your study prompt when learning the

strategies and spelling the words. A large study prompt is also hanging on the board which is the same as yours', so we can follow along together as we learn the strategies. (Study prompts are given out to the students.) Here's the study prompt, and the larger size one hanging on the board. "See!" (The experimenter points to both the study prompt and the large hanging study prompt.)

"The title of your study prompt is SPELL WORDS. Each letter in the order of Spell Words stands for an important activity word which begins with that letter. The SPELL WORDS letters and activity words appear on your study prompts, with an activity word in the order of SPELL WORDS beginning the sentences. Each SPELL WORDS letter and its activity word is boxed to show that they are related and to make following along easier." (Experimenter points to the SPELL WORDS letters and activity words on the large study prompt while students point to the SPELL WORDS letters and activity words on their study prompts.)

For SPELL WORDS: in SPELL, the "S" stands for you saying the word; the "P" stands for you pronouncing the word; the "E" stands for you eyeing the word; the "L" stands for you looking at the word; the "L" stands for you learning the word; in WORDS the "W" stands for you writing the word; the "O" stands for you observing the

word; the "R" stands for you remembering spelling helpers (smaller words, sound-alike words, letter order, beginnings of words, endings of words, main words); the "D" stands for you developing a word image in your head; the "S" stands for you spelling the word. Using the SPELL WORDS activities may develop and strengthen your spelling skills, and your spelling performance may improve."

"I will give you paper now which we will use soon. Pencils/pens will also be given out to those who do not have them on hand."

"But first we will all say the title SPELL WORDS two times together (SPELL WORDS, SPELL WORDS). We will always say the title SPELL WORDS two times together before we say the SPELL WORDS strategy. OK, now we are ready to use our paper. First let's write our name on the top of the paper, and then we will write the title SPELL WORDS two times."

"I will read the study prompt, which you will please follow along and repeat after me. Try to follow the SPELL WORDS letters and words because they can help you remember the activities of the strategy. But first, we will say the title SPELL WORDS two times together as we said before. Then as I say the SPELL WORDS letters, I would like you all to read the SPELL WORDS activities aloud with me two times. (This is done twice.) I would

like you all to read the letters aloud once, and I will read the matching activities. (This is done one time.) (Experimenter points to the activity on the large study prompt and focuses attention on the SPELL WORDS boxed letter for the beginning of the boxed word at the beginning of each activity sentence as the respective parts are read.) Now I will read the letters and together you will read the SPELL WORDS activities aloud once. (This is done one time.) I want you to read aloud together the letters and the activities two times. (This is done two times.)

"Now I will give you a paper with SPELL WORDS boxes that are blank. (Give out paper). Let's fill in the blanks with the SPELL WORDS activity words. You can use your study prompts if you want to for help. Try to think of the missing words to fill in the blanks by yourself first with the help of the SPELL WORDS letters. Your study prompts can help you spell the missing words." (Blanks are filled in by students.)

"I want you to watch me as I spell the word 'excuse' using the SPELL WORDS strategy. I will give you a strategy script which has the SPELL WORDS activities used with the word 'excuse'. This will help you follow me easier. I will also give you a word card (excuse) and a blank sheet of paper. (Strategy scripts, word cards and paper are given out.) (Experimenter uses the strategy

with the word 'excuse' as students follow along on their scripts.) Now together we will all say the letters and activities aloud with the word 'excuse' one time." (This is done one time.)

The experimenter says, "I am going to give you three more word cards now (ocean, because, perhaps) which we'll use for practice. (The word cards are given out.) Let's read the words on the word cards now. (Read the words aloud together.) Substitute the new words into the script, instead of 'excuse'. Don't forget to say SPELL WORDS two times first, at the beginning for the new words. We'll read the script together aloud for the new words, also using the word cards. Just follow your strategy script for this, but put in the new words instead of excuse.

"Please study these words by yourself, using the strategies to help you. Your study prompts, strategy scripts and word cards can help your studying. You have paper from before, but if you need more, you can have it. You'll have 5 minutes to study these words by yourself. Please keep studying until I stop you at the end of five minutes. (Students study alone for 5 minutes.) After 5 minutes, the experimenter will say, "Please turn your word cards over and put them on the corner of your desk. Do not look at them anymore or turn them over again. I will give you a new sheet of paper now and collect your

study paper. (Paper is collected and new paper is given out.) Write your name at the top of the paper for this practice spelling exercise. I will say each word twice, and you'll write its spelling on the paper I just gave you. (Students spell the three words.) OK, see if you spelled the words correctly. Check your spelling with the word cards."

"Let's review the SPELL WORDS strategy by saying the activities to ourselves silently one time. Don't forget to say to yourself first Spell Words, Spell Words. (Review the strategy by yourself once.) We will collect word cards, study prompts, strategy scripts and used paper. "Please put them all together, and I'll come around to collect them." (All materials are collected.)

Script: End of Session II (Cognitive Strategies
Condition)

The experimenter says, "Thank you for working with me today and helping with our learning program. We will work together again tomorrow. I am looking forward to tomorrow. Thanks again. Have a very good day!"

Script: Day II: First strategy training session -
Affective Strategies - I CAN

The experimenter says, "Good morning! I'm glad to see you all, and I'm glad that we will be working together again. If you remember from yesterday, we wanted to see if people could learn better by teaching them ways (strategies) that might help them learn and review better.

Yesterday we said, "A strategy is a method or planned way of thinking and acting that may be useful in helping us do things better, like spelling better and remembering words we want to spell. Sometimes when we can't remember, it is because we get too anxious about what will happen if we can't remember. Strategies may help us reduce these feelings and have better thoughts that keep our minds open."

"I will teach you ways to help you manage your thoughts and behaviors while you learn to spell. We know that sometimes our thoughts get in our way of doing things well and even hold us back from doing things."

Script: Narrative: Affective Strategies Condition
(I CAN)

The experimenter says, "When we feel uneasy or anxious, we think we will not be able to do things right or give the correct answers, especially if this has happened to us many times in the past. When we have to take a test or perform in front of the class, or if the teacher calls on us and we are not sure of or don't know the answer or material, we may feel very uneasy or anxious. We might feel we will be embarrassed or look very foolish in front of others. Because of these feelings, we may not be able to do our work as well. Our memory is not as sharp in remembering. Our attention and concentration are focused on negative thoughts. Sometimes we don't even try."

"Students who manage their thoughts and behavior during spelling have thoughts that help rather than hurt them. They say certain things to themselves to reduce their anxiousness and feel better about themselves. They know how to take negative thoughts and turn them into positive thoughts and how to take negative talk and turn it into positive talk. This is how learning strategies can help when we become anxious. We can learn to deal with our anxiousness by being able to manage it. We want to try and control the thoughts and ideas that interfere with our success and manage those thoughts so they don't

hurt our success.

Today we will learn how to talk more positively to ourselves during spelling, how to monitor our thoughts and behaviors during spelling, how to coach ourselves for success, like the coach of a team coaches the team players, how to stop negative thoughts about ourselves, and how to tell ourselves we are doing a good job."

"Now I am going to give you study prompts which you will use to help you learn the strategies. A study prompt is a useful tool that can help you study better. You will use your study prompt when learning the strategies and spelling the words. A large study prompt is also hanging on the board which is the same as yours', so we can follow along together as we learn the strategies." (Study prompts are given out to the students.) "See!" (The experimenter points to both the study prompt and the large hanging study prompt.)

"The title of your study prompt is I CAN. Each letter in the order of I CAN stands for an important word which begins with that letter. The I CAN letters and words appear on your study prompts in dialogues. Each I CAN letter and its dialogue words are boxed to show that they are related and to make following along easier." (Experimenter points to the I CAN letters and dialogue words on the large study prompt while students point to the I CAN letters and dialogue words on their study

prompts.)

"In I CAN, the "I" stands for I, meaning you and positive feelings you have about spelling; the "C" stands for your comfort and confidence about and during spelling; the "A" stands for your alertness and attention during spelling; the "N" stands for your not having bad thoughts and not being anxious about and during spelling; at that time (now) you will feel you can spell, and you will try hard and use whatever ways you know to help you spell correctly. Using the I CAN dialogues may develop your feelings and behaviors more positively about spelling, and your spelling performance may improve."

"I will give you paper now which we will use soon. Pencils/pens will also be given out to those who do not have them on hand."

"But first we will all say the title I CAN two times together (I CAN, I CAN). We will always say the title I CAN two times together before we say the I CAN strategy. OK, now we are ready to use our paper. First we will write our name on the top of the paper. Go ahead! Let's write the title I CAN two times."

"I will read the study prompt, which you will please follow along and repeat after me. Try to follow the I CAN letters and words because they can help you remember the dialogues of the strategy. But first, we

will say the title I CAN two times together as we said before (I CAN, I CAN). Then as I say the I CAN letters, I would like you all to read the I CAN dialogues aloud with me two times. (This is done twice). I would like you to read the letters once and I will read the matching dialogues. (This is done one time.) (Experimenter points to the dialogue on the large study prompt and focuses attention on the I CAN boxed letters for the beginning of the word in the dialogue as the respective parts are read.) Now I will read the letters and together you will read the I CAN dialogues aloud once. (This is done one time.) I want you to read aloud together the letters and the dialogues two times. (This is done two times.)

"Now I will give you a sheet of paper with I CAN boxes that are all blank. (Give out paper). Let's fill in the blanks with the I CAN dialogue words. You can use your study prompts if you want to for help, but try to think of the missing words to fill in the blanks by yourself first with the help of the I CAN letters. Your study prompts can help you spell the missing words. (This is done).

"I want you to watch me spell the word 'excuse' using the I CAN strategy. I will give you a strategy script which has the I CAN dialogues used with the word 'excuse'. This will help you follow me easier. I will also give you a word card (excuse) and a blank sheet of

paper. (Strategy scripts, word cards are given out.)
(Experimenter uses the strategy with the word 'excuse' as students follow along on their script.) Now together we will all say the dialogues aloud with the word 'excuse' one time. (This is done one time.)

The experimenter says, "I am going to give you three more word cards now (ocean, because, perhaps) which we'll use for practice. (The word cards are given out.) Let's read the words on the word cards together. (Read the words aloud together.) Substitute the new words into the script instead of 'excuse'. Don't forget to say I CAN two times first, at the beginning for the new words. We'll read the script together aloud for the new word 'ocean', also using the word cards. Just follow your strategy script for this, but put in the words instead of 'excuse'.

"Please study these three words by yourself, using whatever ways you know to study. Your study prompts, strategy scripts and word cards can help your studying. Paper is here if anyone wants a sheet for studying. You'll have five minutes to study these words by yourself. Please keep studying until I stop you at the end of five minutes. (Students study alone for five minutes.) After 5 minutes, the experimenter will say, "Please turn your word cards over and put them in the corner of your desk. Do not look at them anymore or turn

them over again. I will give you paper and collect any used paper. Write your name at the top of the paper for this practice spelling exercise. I will say each word twice, and you'll write its spelling on the paper I just gave you. (Students spell the three words.) OK, see if you spelled the words correctly. Check your spelling with the word cards that you have on your desk.

Let's review the I CAN strategy by saying the dialogues to ourselves silently one time. Don't forget I CAN, I CAN, to yourself first. (Review the strategy by yourself once.) We will collect word cards, study prompts, strategy scripts and paper. Please put them all together, and I'll come around to collect them." (All materials are collected.)

Script: End of Session II (Affective Strategies
Condition - I CAN)

The experimenter says, "Thank you for working with me today and helping with our learning program. We will work together again tomorrow. I am looking forward to tomorrow. Thanks again. Have a very good day!"

Script: Day II: First strategy training session -
(Combined Strategies -I CAN SPELL WORDS)

The experimenter says, "Good morning! I'm glad to see you all, and I'm glad that we will be working together again. If you remember from yesterday, we wanted to see if people could learn better by teaching them ways (strategies) that might help them learn and review better and remember better. Yesterday we said, "A strategy is a method or planned way of thinking and acting that may be useful in helping us do things better, like spelling better and remembering words we want to spell.

Sometimes when we can't remember, it is because we get too anxious about what will happen if we can't remember. We know that sometimes our thoughts get in our way of doing things well and even hold us back from doing things. Strategies may help us reduce these feelings and have better thoughts that keep our minds open. Strategies may also help us see if there's a small word inside a word that we know, or a rhyme, or if we know the beginning or ending of the word, or the main word, it can help us to remember the word more easily. Also sometimes strategies can help us with the order of the letters in the word which can help us with the spelling of the word or remembering the spelling of the word.

Today I'll teach you strategies to help you spell

and remember the spelling of words (SPELL WORDS).

Tomorrow I'll teach you ways to help you manage your thoughts and behaviors while you spell (I CAN).

Tomorrow we'll also put both ways (strategies) together into the I CAN SPELL WORDS strategy."

Script: Day II: Narrative: Combined Strategy Condition
(I CAN SPELL WORDS)

Day II = SPELL WORDS (Cognitive Strategy)
See pages 216 - 221 for
narrative of the Cognitive
Strategy

Script: End of Session II (Combined Strategy Condition)

The experimenter says, "Thank you for working with me today and helping with our learning program. We will work together again tomorrow. I am looking forward to tomorrow. Thanks again. Have a very good day."

Script: Beginning Session III
(Cognitive Strategy, Affective
Strategy)

The experimenter says, "Good morning! I'm glad to see you all and that we'll be working together again. You're really doing a terrific job, trying to learn to spell words. So far, you have worked on spelling different words, using these strategies which involve (For Cognitive Strategies) seeing, saying, looking at, writing and checking the words, using spelling helpers and developing a word image (For Affective Strategies), giving yourself good feelings and good thoughts about how you spell."

(The importance of strategies will now be stressed.) "Why do you think it is important to try to learn ways to help you spell words? Learning ways to help with spelling may help you do better in reading and writing and do better on your tests and exams so you can get better grades in your classes. It will also help you learn more advanced words to write for what you want to say."

"Today, we are going to practice the strategies again, learning and reviewing other words and working more independently than yesterday. I will give you the study prompts, strategy scripts, and word cards again."
(Give out study prompts, strategy scripts, and word card.)

Script: Narrative (2nd training session) Day 3
(Cognitive Strategy, Affective Strategy)

The experimenter will say, "We will review the strategies to make them very sharp in our minds before we use them with different words. We will review the strategies together one time like we did yesterday. Then we will also review the strategy with 'excuse' one time like we did yesterday. Don't forget first we say the title two times at the beginning." (SPELL WORDS, SPELL WORDS) (I CAN, I CAN) (Students refer to their study prompts, strategy scripts and word card). (This activity will be done.) (Script, 1st training session, Day II.)

Now I will give you paper and more word cards. (Students are given a sheet of paper and word cards: voices, empty, February.) Let's read the new words (voices, empty, February). Now, we'll write the title of the strategies on the paper two times like we did yesterday (e.g., I CAN) (e.g., SPELL WORDS). Together we will say the strategies one time with each word: voices, empty, February. (Review strategies aloud with each word once.) Now you will be given 5 minutes to study the words by yourself. Study until I tell you to stop. (They study for 5 minutes.) Now stop studying, turn over your word cards, and place them on the corner of your desk. We will have a practice spelling exercise of the 3 words. I will say the word and say the word again and

you will write the spelling of the word on the paper.
You will check if you spelled the words correctly by
matching your spellings with the word cards."

Script: Narrative (Independent Practice) Cognitive
Strategy, Affective Strategy - Day III

The experimenter says, "Using strategies with these words was a good warm up. Now it is time for your independent practice. I am going to give you seven more word cards. (Give out word cards.) You're going to try to learn to spell these seven words (Practice Words, Appendix B) using the strategies but without any help from me. Remember, if you come to a word that you have trouble spelling correctly, use your strategies and study prompts to help you as well as your word cards. What will you do when you come to a word you don't know how to spell? That's right, use the strategies that we've learned. You will have 10 minutes to study. I will give you some paper which you will use to study."

(Experimenter gives out paper.) Write SPELL WORDS two times on the paper. (Write I CAN, I CAN two times on the paper.)

I will read the group of new spelling words with you. (Students will use their word cards to follow along and read the words). The words are: 1. color, 2. friend, 3. custom, 4. carefully, 5. afraid, 6. necessary, 7. accident. Study the words until I tell you to stop studying. Use your word cards and strategies to help you. After 10 minutes, the experimenter says, "Stop studying. Please turn your word cards over and put them

at the corner of your desk. Do not turn them over again. You will be given a spelling practice exercise of the 7 words. I will say each word twice, and then you will write down its spelling. I will give you more paper and collect any used paper. Please write your name on the top of your paper." (Students take a spelling practice exercise.)

"Check your paper by yourself to see if you spelled the words correctly. Check them against our word cards. (Students check their work privately for accuracy.) Let's say the strategy silently to ourselves one time, saying the table first two times. I will collect the word cards, study prompts, strategy scripts and spelling papers." (These are collected.)

Script: End of Session III (2nd Strategy Training)
(for Cognitive Strategy and Affective Strategy
Groups)

The experimenter says, "Thank you for working with me today and helping with our learning program. We will work together again tomorrow when we will review what we have learned. You will be given your study prompts again to refer to if needed and spelling word cards. I am looking forward to tomorrow. Thanks again! Have a good day!"

Script: Day III: Combined Strategy Condition (I CAN
SPELL WORDS)

The experimenter says, "Good morning! I'm glad to see you all, and I'm glad that we will be working together again. So far, you have worked on spelling different words, using strategies which involve seeing, saying, looking at, writing and checking the words, using spelling helpers and developing a word image. Today I'll teach you ways to help you manage your thoughts and behavior while you spell because we know that sometimes our thoughts get in our way of success. Then later today we'll put both kinds of strategies together.

Sometimes when we can't remember how to spell a word, it is because we get too anxious about what will happen if we can't remember. When we feel uneasy or anxious, we think we will not be able to do things right or give the correct answers, especially if this has happened to us many times in the past. When we have to take a test or perform in front of the class, or if the teacher calls on us and we are not sure of or don't know the answer or material, we may feel very uneasy or anxious. We might feel we will be embarrassed or look very foolish in front of others. Because of these feelings, we may not be able to do our work as well. Our memory is not as sharp in remembering. Our attention and concentration are focused on negative thoughts.

Sometimes we don't even try.

Strategies may help us reduce these feelings and have better thoughts that keep our minds open. We will learn how to talk more positively to ourselves during spelling, how to monitor our thoughts and behaviors during spelling, how to coach ourselves for success, like the coach of a team coaches the team players, how to stop negative thoughts about ourselves and how to tell ourselves we're doing a good job.

Learning ways (strategies) that help with spelling may help you do better in reading and writing and do better on your tests and exams so you can get better grades in your classes. Also strategies may help you learn more advanced words to write for what you want to say.

Like yesterday, I'll give you study prompts. (Give out study prompts.) These are titled I CAN, and there is also a large study prompt hanging on the board titled I CAN. See! Each letter in the order of I CAN stands for an important word which begins with that letter and which appears on your study prompts in dialogues. Each I CAN letter and its dialogue words are boxed to show that they are related and to make following along easier.

(Experimenter points to the I CAN letters and dialogue words on the large study prompt while students point to the I CAN letters and dialogue words on their study

prompts.)

In I CAN, the "I" stand for I, meaning you and positive feelings you have about spelling; the "C" stands for your comfort and confidence about and during spelling; the "A" stands for your alertness and attention during spelling; the "N" stands for your not having bad thoughts and being anxious about and during spelling; at that time (now) you will feel you can spell, and you will try hard and use the Spell Words strategies to help you spell correctly. Using the I CAN dialogues which you will use later with the SPELL WORDS activities as I CAN SPELL WORDS may develop your feelings and behaviors more positively about spelling, and your spelling performance may improve also.

First we will all say the title I CAN two times together (I CAN, I CAN,) and then we'll write I CAN two times on the paper I just gave you. (Give out paper.) First, let's write our names at the top of the paper. If you don't have a pen/pencil on hand, I'll lend you one.

We'll read the I CAN study prompt together, the letters and dialogues. Try to follow the I CAN letters and words because they can help you remember the dialogues of the strategy. First, we'll say the title I CAN two times together as we said before. Then as I say the I CAN letters, I would like you all to read the I CAN dialogues aloud with me once. (This is done once). I

want you to read the letters and the dialogues aloud together once. (This is done once).

Now, I'll give you the SPELL WORDS study prompts that we worked with yesterday. (Experimenter gives these materials to the students.) Both I CAN and SPELL WORDS large study prompts are hanging on the board. See! Before we combine the I CAN and SPELL WORDS strategies into the I CAN SPELL WORDS strategy, let's review the SPELL WORDS strategy once. Let's read the strategy together from the SPELL WORDS study prompt, after we say SPELL WORDS two times first. (Read the SPELL WORDS title two times and the SPELL WORDS strategy together once.)

Now, we're ready to try to combine both strategies. We'll put our I CAN SPELL WORDS scripts in the right order. Please put the I CAN script first, and then the SPELL WORDS script behind it. We'll keep the 'excuse' word card in front of us as we say both parts of the script (I CAN SPELL WORDS). First, we'll say the I CAN script and then immediately after, we'll say the SPELL WORDS script. But first, let's say the title I CAN SPELL WORDS two times and write I CAN SPELL WORDS two times. (I CAN SPELL WORDS is said and written two times, and the I CAN SPELL WORDS strategy is said once with 'excuse'.)

The experimenter says, "I am going to give you

three more word cards now (1. voices, 2. empty, 3. February) which we'll use for practice. (The word cards are given out.) Let's read the words on the word cards together. (Read the words aloud together.) For practice, let's substitute the word 'voices' into the script instead of excuse and say I CAN SPELL WORDS with 'voices' one time. Keep the 'voices' word card in front of you. First, we'll say I CAN SPELL WORDS two times. (Say I CAN SPELL WORDS 2 times and say the I CAN SPELL WORDS strategy with the word 'voices' once.) Let's also do this with the word 'empty'. Don't forget the 'empty' word card. You know we'll say I CAN SPELL WORDS two times first before we read the I CAN SPELL WORDS script for the word 'empty'. (Say I CAN SPELL WORDS two times and say the I CAN SPELL WORDS strategy with the word 'empty' one time.)

Now please study these three words by yourself, using the strategies to help you study. Your study prompts, strategy scripts and word cards can also help your studying. I will give you paper which you need for studying. You'll have five minutes to study these words by yourself. Please keep studying until I stop you. (Students study alone for five minutes.)

After 5 minutes, the experimenter says, "Stop! Please turn your words cards over and put them on the top corner of your desk. Do not look at them anymore or turn

them over. I'll give you new paper and collect the study paper. Please write your name at the top of the new paper. We'll have a practice spelling exercise of the 3 words (voices, empty, February). I'll say the word and say the word again and you'll write the spelling of the word on the new paper. After we've spelled these words, you'll check if you spelled them correctly by matching your spellings with those on the word cards. Then we'll collect the paper and word cards." (Paper and word cards are collected.)

Script: Narrative (Independent Practice) Combined
Strategy Day III

The experimenter says, "Using strategies with these three words was a good warm up. Now it's time for your independent practice when you work by yourself. I am going to give you seven more word cards. (Give out word cards.) We'll read the seven words together now. They are: 1. color, 2. friend, 3. custom, 4. carefully, 5. afraid, 6. necessary, 7. interfere (KTEA, Appendix B). Please try to learn these seven words using the strategies but without help from me. Remember, use your strategies and study prompts to help you as well as your word cards. What will you do when you come to a word you don't know how to spell? That's right, use the strategies that we've learned. You will have 10 minutes to study. Please keep studying until I tell you to stop. I will give you some more paper for studying."

After ten minutes, the experimenter says, "Please stop studying. You will turn your word cards over and put them in the corner of your desk. Do not turn them over again until I tell you to do so. You will be given a spelling practice exercise of these 7 words. I will say each word twice, and then you will write down its spelling. I will give you more paper and collect the used paper. (Paper is given out and used paper is collected.) Now please write your name at the top of the

paper, and we'll begin our spelling practice exercise. (A spelling practice exercise is given.)

Let's check our papers by ourselves to see if we spelled the words correctly. We will check them against our words cards. (Students check their work privately for accuracy.) I will collect the word cards, study prompts, and spelling papers." (These are collected.)

Script: End of Session III (Combined Strategy)

The experimenter says, "Thank you for working with me today and helping with our learning program. We will work together again tomorrow when we'll review what we have learned. You will be given your study prompts and strategy scripts again to refer to if needed and also spelling word cards. I am looking forward to tomorrow. Thanks again! Have a good day!"

Script: Beginning of Session IV

The experimenter says, "Thanks for your time, help and interest in our learning program. You are really doing a good job, trying to spell words. Today, we are going to review the strategies once together. I will give you your study prompts and strategy scripts to use if needed." (Study prompts and strategy are given out.)

Script: Study Time for Spelling Words (Session 4)

The experimenter says, "You will now be given 15 spelling words to study. Let's see how well you have learned and can use the strategies".

(The experimenter says to the control group, "I am going to give you spelling words to study.")

(The experimenter gives out to each student 15 word cards in the same ordered sequence as the pretest words.) The experimenter also gives out paper and pencils. The experimenter says, "Please do not turn the spelling cards over until I ask you to do so. When I ask you to turn the cards over, study the words carefully. Use as many of your strategies as possible to remember your spellings. Some of the strategies may work easier for you than others. You can use the paper to write the words for practice. Please do not mark on the spelling cards. You will be given 20 minutes to study the words. Let's begin!"

After twenty minutes, the experimenter says, "Please stop studying. Our word cards and study prompts will be collected." (Word cards and study prompts are collected.)

Script: Spelling posttest

The experimenter says to the students, "I am going to give you a sheet of paper called Numbered Paper with numbers from 1 through 15. I'd like you to write your name on the top of the paper. I am going to say the words you just studied. I will say the word and say the word again, and then you will write the word next to the appropriate number on your paper. Try to recall the strategies as you spell the words. This exercise will not count toward your English grade. Work on your own. Do the best you can! Do you understand?"

(If there is a need for clarification, the experimenter repeats the instructions until everyone understands.)

Script: Self-efficacy Judgments (after strategy training)

The experimenter passes out copies of the number scale to each student and an enlarged number scale appears on the board as before during the first session (self-efficacy judgments before strategy training). The experimenter says, "I have just given you a number scale, which has the title SCALE. Right after each word, I want you to tell me how sure you are that you've spelled each word correctly by writing a number from the scale from 10 through 100 as the experimenter says the word. For example, if you are not sure that you spelled the word correctly, you would write 10 (the experimenter will point to the number 10 on the board as the students point to the 10 on their scale). If you are somewhat sure that you have spelled the word correctly, you would write 40 (the experimenter will point to the 40 on the board as the students point to the 40 on their scales). If you are pretty sure you have spelled the word correctly, you would write 70 (the experimenter will point to the number 70 on the board as the students point to the number 70 on their scales). If you are really sure that you have spelled the word correctly, you would write 100 (the experimenter will point to the number 100 on the board as the students point to the number 100 on their scales).

"Do you understand?" (If there is a need for

clarification, the experimenter repeats the instructions until everyone understands.) The experimenter says, "When we're finished, please turn your papers over, and they will be collected with the scales."

The experimenter says, "Let's begin! As I say the word, write how sure you are that you spelled it correctly next to that word."

Script: Performance Anxiety Measure (after strategy training)

The experimenter says "Now I am going to give you copies of statements about how people feel in certain situations when they are anxious like the statements I gave you the other day. You will respond to each statement in the way that best describes how you feel in each situation. If the statement does not describe you except maybe in rare instances, circle a. 'not at all like me'. If the statement is not generally true, circle b. 'not very like me'. If the statement would be true of you about half the time, circle c. 'somewhat like me'. If the statement would generally be true of you, circle d. 'fairly like me'. If the statement would be true of you almost all of the time but not necessarily always, circle e. 'very much like me'."

"Please circle the appropriate letter that best describes how you feel in that situation. For example, circle the d. if you feel that the statement is fairly like you."

"Try to rate yourself according to how well the statement describes you, not in terms of how you think you should be or what others do. There are no right or wrong answers to these statements. Please work as quickly as you can without being careless and please complete all items as I read them with you. When we have

finished, I want you to turn your papers over so that they can be collected."

"Do you understand?" (If the students do not understand, the experimenter repeats the instructions until they do understand.) If there is no need for clarification, the experimenter says, "Please write your name at the top of your paper now".

Script: Closure statement

After all papers are collected the experimenter says, "Thank you for participating in this study. The words that were used are often words that are misspelled by even the best spellers so you should not feel badly if you feel you did not spell them correctly. It is not unusual to miss several of these words. You should try to remember these strategies so you can use them in the future in and out of school to help you remember things."

APPENDIX B - Measures

Anxiety Subscale of the LASSI, High School Version
adapted for independent administration.

1. I worry that I will fail my classes.
2. I get discouraged because of low grades.
3. I am very tense when I study.
4. Even when I am well prepared for a test, I feel very upset when taking it.
5. When I begin a test, I feel pretty sure that I will do well.
6. While I am taking a test, worrying about doing poorly gets in the way of keeping my mind on the task.
7. I feel very panicky when I take an important test.
8. I get so nervous and confused when taking a test that I don't answer questions to the best of my ability.

Schunk and Hanson's Self-efficacy Scale (1985)
adapted for written response

10	20	30	40	50	60	70	80	90	100
Not Sure			Somewhat Sure			Pretty Sure			Really Sure

Source: Brigance Spelling Grade Level Placement
Screening Test (Form B)

1. work	15. empty
2. bed	16. general
3. fire	17. necessary
4. dry	18. accident
5. clear	19. weight
6. street	20. carefully
7. light	21. mysterious
8. walk	22. custom
9. follow	23. original
10. check	24. courageous
11. February	25. communicate
12. body	26. significant
13. perhaps	27. unimaginable
14. voices	28. exceptional

Spelling Pretest/Posttest Words

Source: Brigance Spelling Grade Level Placement Words
(Form A)

1. broke
2. January
3. sentence
4. fifth
5. wrist
6. direction
7. activity
8. vegetable
9. gentle
10. apply
11. legal
12. safety
13. interfere
14. application
15. calculating

Spelling Practice Words

Source: Brigance Spelling Grade Level Placement Screening
Test (Form B)

1. clear
2. street
3. walk
4. follow
5. check
6. February
7. empty
8. voices
9. perhaps
10. general
11. necessary
12. accident
13. carefully
14. custom
15. original

More Spelling Practice Words

Source: Kaufman Test of Educational Achievement (KTEA),
Comprehensive Form, GE 5 - 7, (Kaufman & Kaufman).

1. bring
2. said
3. wagon
4. reach
5. does
6. color
7. friend
8. because
9. ocean
10. afraid

Numbered Paper

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SPELL WORDS

Activities

- S → Say the word.
P → Pronounce the word.
E → Eye the word.
L → Look at the word.
L → Learn the word.
- W → Write the word.
O → Observe the word.
R → Remember spelling helpers
 - sound alike
 - smaller words
 - letter order
 - beginnings of words
 - endings of words
 - main words
- D → Develop a word image.
S → Spell the word.

SPELL WORDS FILL-INS

[S] → [] the word.

[P] → [] the word.

[E] → [] the word.

[L] → [] at the word.

[L] → [] the word.

[W] → [] the word.

[O] → [] the word.

[R] → [] spelling helpers.

- sound alike
- smaller words
- letter order
- beginnings of words
- endings of words
- main words

[D] → [] a word image.

[S] → [] the word.

Script: SPELL WORDS (Cognitive) Strategy applied to a word (excuse, e.g., Please excuse me for feeling this way.)

What is the first thing I will do to study the word 'excuse' for spelling? I will think about the SPELL WORDS strategy.

- [S] 1. I will say the word 'excuse'.
- [P] 2. I will pronounce the word 'excuse' (x q s).
- [E] 3. I will eye the word: 'excuse', 'excuse', 'excuse'.
- [L] 4. I will look at the word 'excuse' several times.
- [L] 5. I will learn the word 'excuse'.
- [W] 6. I will write the word 'excuse' 3 times correctly.
- [O] 7. I will observe the correct spelling of the word 'excuse'.
- [R] 8. I will remember spelling helpers. Spelling helpers can help me spell this word 'excuse'! Maybe a sound-alike word, or little words, or letter order, or beginnings of words, or endings of words, or main words. I know the beginning of the word (excuse) 'ex' means out of or from. I also know how to spell the word, 'fuse' which sounds like the second part of excuse. I will underline these parts.
- [D] 9. I will develop a word image of 'excuse' in my head.
- [S] 10. I will spell the word 'excuse' to myself.

(Extra Practice: If I misspell the word 'excuse', I will practice the word 'excuse' two more times.)

I CAN Dialogues

[I] → [I] want to spell.
[I] can spell.

[C] → [I] feel comfortable.
[I] feel confident.

[A] → [I] will stay alert.
[I] will pay attention.

[N] → [I] will not have bad thoughts.
[I] will not get anxious.
Now, I feel I can spell

I 'CAN' FILL-INS

☐ → ☐ Want to spell.
☐ Can spell.

☐ → I feel
I feel .

☐ → I will stay
I will pay .

☐ → I will ☐ have bad thought:
I will ☐ get anxious.
☐, I feel I can spell.

Script: I CAN (Affective) Strategy as applied to a word
(excuse, e.g., Please excuse me for feeling this
way.)

What is the first thing I will do to study
the word 'excuse' for spelling? I will
think about the I CAN strategy.

[I] [I] want to spell this word, 'excuse'.
[I] I can spell as well as most other people.

[C] I feel comfortable about myself.
I feel confident that I can learn to spell the word
'excuse'.

[A] If I pay attention and stay alert, I will be able to
do well in spelling the word 'excuse'.

[N] I will make sure I do not have bad thoughts and do
not get anxious while I study the word 'excuse' so
that I can spell 'excuse' correctly.

[Now] I feel I can spell, and I will try hard and use
whatever ways I know to study the word 'excuse'.

(Extra Practice: If I misspell the word 'excuse',
I will try to keep calm and pay attention and spell
the word 'excuse' correctly two more times.)

I CAN SPELL WORDS

I CAN Dialogues

[I] → [I] Want to spell.
[I] can spell.

[C] → [I] feel comfortable.
[I] feel confident.

[A] → [I] will stay alert.
[I] will pay attention.

[N] → [I] will not have bad thoughts.
[I] will not get anxious.
NOW, I feel I can spell

I 'CAN' FILL-INS

☐ → ☐ Want to spell.
Can spell.

☐ → I feel
I feel .

☐ → I will stay
I will pay .

☐ → I will ☐ have bad thought
I will ☐ get anxious.
☐ I feel I can spell.

Script: I CAN (Affective) Strategy as applied to a word
(excuse, e.g., Please excuse me for feeling this
way.)

What is the first thing I will do to study
the word 'excuse' for spelling? I will
think about the I CAN strategy.

[I] [I] want to spell this word, 'excuse'.
[I] I can spell as well as most other people.

[C] I feel comfortable about myself.
I feel confident that I can learn to spell the word
'excuse'.

[A] If I pay attention and stay alert, I will be able to
do well in spelling the word 'excuse'.

[N] I will make sure I do not have bad thoughts and do
not get anxious while I study the word 'excuse' so
that I can spell 'excuse' correctly.

[Now] I feel I can spell, and I will try hard and use
whatever ways I know to study the word 'excuse'.

(Extra Practice: If I misspell the word 'excuse',
I will try to keep calm and pay attention and spell
the word 'excuse' correctly two more times.)

SPELL WORDS

Activities

- S → Say the word.
P → Pronounce the word.
E → Eye the word.
L → LOOK at the word.
L → Learn the word.
- W → Write the word.
- O → Observe the word.
- R → Remember spelling helpers
 - sound alike
 - smaller words
 - letter order
 - beginnings of words
 - endings of words
 - main words
- D → Develop a word image.
- S → Spell the word.

SPELL WORDS FILL-INS

S → the word.

P → the word.

E → the word.

L → at the word.

L → the word.

W → the word.

O → the word.

R → Spelling helpers.

- sound alike
- smaller words
- letter order
- beginnings of words
- endings of words
- main words

D → a word image.

S → the word.

Script: SPELL WORDS (Cognitive) Strategy applied to a word (excuse, e.g., Please excuse me for feeling this way.)

What is the first thing I will do to study the word 'excuse' for spelling? I will think about the SPELL WORDS strategy.

- [S] 1. I will say the word 'excuse'.
- [P] 2. I will pronounce the word 'excuse' (x q s).
- [E] 3. I will eye the word: 'excuse', 'excuse', 'excuse'.
- [L] 4. I will look at the word 'excuse' several times.
- [L] 5. I will learn the word 'excuse'.
- [W] 6. I will write the word 'excuse' 3 times correctly.
- [O] 7. I will observe the correct spelling of the word 'excuse'.
- [R] 8. I will remember spelling helpers. Spelling helpers can help me spell this word 'excuse'! Maybe a sound-alike word, or little words, or letter order, or beginnings of words, or endings of words, or main words. I know the beginning of the word (excuse) 'ex' means out of or from. I also know how to spell the word, 'fuse' which sounds like the second part of excuse. I will underline these parts.
- [D] 9. I will develop a word image of 'excuse' in my head.
- [S] 10. I will spell the word 'excuse' to myself.
(Extra Practice: If I misspell the word 'excuse', I will practice the word 'excuse' two more times.)

Script: I CAN SPELL WORDS (Combined) strategy as
applied to a word (excuse, e.g., Please excuse
me for feeling this way.)

What is the first thing I will do to
study the word 'excuse' for spelling?
I will think about the I CAN SPELL
WORDS strategy.

APPENDIX C Forms

Permission Letters (English/Spanish)

Staten Island, New York
September, 1994

Dear Parent (Guardian),

As part of my dissertation requirements at the City University of New York (CUNY), I am planning to research ways to help students do better in spelling.

This research project involves teaching students methods to help improve their spelling and will take about four periods of your child's special education English class.

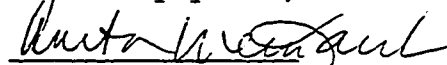
Your child will be given spelling tests and two questionnaires to determine learning strategies and how students feel about themselves. Most children find the experience to be interesting and helpful.

All information obtained in this study will be kept confidential. Participation is totally voluntary and your child can withdraw from the study at any time.

Please indicate your permission below, sign this letter and have your child return it to class this week.

Thank you for your cooperation. If you have any questions, please call me at 273-7380 ext. 233.

Sincerely yours,



Anita Weintraub
School Psychologist

Please check the box:

You have my permission,

You do not have my permission,

to let my child _____ participate in
name
this spelling study.

Signature parent (guardian)

Staten Island, Nueva York
Septiembre, 1994

Estimado padre (guardian),

Como parte de los requisitos para mi tesis para la Universidad de la Ciudad de Nueva York (CUNY), pienso investigar maneras para ayudar a estudiantes a mejorar su deletreo.

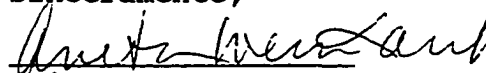
Este proyecto (de investigacion) concierne la ensenaza de metodos para ayudar a los estudiantes a mejorar su deletreo y requerira mas o menos cuatro periodos de las clase de ingles de educacion especial de su hijo. Se le dara a su hijo exámenes de deletreo y dos cuestionarios para determinar estrategias de aprendizaje y como los estudiantes se sienten acerca de su propia persona. La mayor parte de los jovenes encuntran la experiencia interesante y beneficiosa.

Se mantendra en confidencia toda informacion obtenida en este estudio. Participacion es completamente voluntaria y su hijo podra salir del programa en cualquier momento que desee.

Tenga la bondad de indicar su permiso abajo, de firmar la carta y tiene su hijo la volver a clase esta semana.

Le agradezco su cooperacion. Si tiene usted cualquier pregunta, haga el favor de llamarme a 273-7380 extension 233.

Sinceramente,



Anita Weintraub
Psicologa de Escuela

Por favor indique la caja:

Usted tiene mi permiso,

Usted no tiene mi permiso,

para permitir a mi hijo-a _____
nombre
participar en este estudio de deletreo.

Firma padre/madre (guardian)

_____, 1994
Staten Island, New York

Dear Student:

As part of my dissertation requirements at the City University of New York (CUNY), I am planning to research ways to help students do better with spelling.

The project involves teaching the students methods to help them improve their spelling. I would like you to participate in this study, for which I need you to sign your agreement.

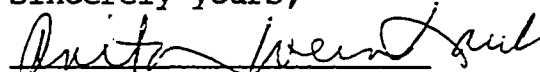
The spelling project will take about four hours, one hour a day (four days). Most students find the experience to be interesting and helpful. Your results will be kept confidential.

Participation is completely voluntary. You can withdraw from the study at any time.

Please indicate your agreement below to participate in this study and please sign this letter.

Thank you for your cooperation.

Sincerely yours,


Anita Weintraub
School Psychologist

Please check the box:

You have my agreement,

You do not have my agreement,

for me _____ to participate in
(name)
this spelling study.

Signature of student

APPENDIX D Information

Modified Instructional Services I - Special
Education (MIS I)

MIS I classes are taught by special education teachers in a classroom with 15 learning disabled students within a comprehensive public high school. The purpose of this program is to work with each student at his/her functional level and pace because of his/her learning disability. In addition, the aim is toward reentry into the mainstream in those academic areas which the student can handle successfully with possibility for eventual resource room and full mainstream. Special education classes are much smaller.

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