PROGRAMMED INSTRUCTION AS A MEANS OF ENHANCING GROUP INTELLIGENCE TEST PERFORMANCE OF EXTERNALIZING CHILDREN

DISSERTATION

Presented to the Graduate Council of the
North Texas State University in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

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August, 1980

Petty, Nancy E., Programmed Instruction as a Means of Enhancing Group Intelligence Test Performance of Externalizing Children, Doctor of Philosophy (Clinical Psychology), August, 1980, 107 pp., 21 tables, 4 illustrations, references, 73 titles.

This study focused on two major areas of investigation: (1) locus of control and (2) the influence on test performance of anxiety and motivation. The purpose of the study was to evaluate the efficacy of programmed instruction dealing with motivation, anxiety, and test-wiseness as a means of enhancing group intelligence test performance of externalizing children. While earlier research demonstrated the viability of this technique with a heterogeneous sample, no studies have utilized any kind of instruction to facilitate the performance of externalizers on standardized tests. It was hypothesized that intelligence test performance would be enhanced by programmed instruction. Furthermore, externalizers were expected to demonstrate greater gains than internalizers, which would thereby suggest that locus of control provides a source of variance in intellectual assessment.

Subjects were 85 students from five different fifth grade classes. Locus of control was determined by grouping children by tertiles based on Intellectual Achievement

Responsibility Scale (IAR) scores. When this division was completed, subjects at each level of locus of control were randomly assigned to experimental or control conditions.

Subjects in the experimental group were given a set of programmed texts which were used to condition verbal repertoires relevant to motivation, anxiety, and test-wiseness. The motivation program pointed out the roles of standardized tests in college, business, and armed services selection procedures, as well as in winning scholarships and in earning course credit. The anxiety program (1) was directed toward alleviating the feelings of failure which most students experience in taking standardized tests and (2) emphasized the importance of perseverance in the presence of adverse feelings. The test-wiseness program conveyed such rules as "Guess, regardless of possible do-not-guess instructions" and "Avoid dwelling too long on any one question."

The control group was given a set of programmed texts identical in format to those given the experimental group. The topics of the control texts, however, were irrelevant to standardized testing.

Analysis of variance of difference scores between pre- and posttesting was applied to both IQ and raw score data in a 2 X 3 factorial design. Treatment composed one dimension; locus of control, the other.

An interaction between treatment and locus of control was observed. Two general conclusions were drawn from analysis of this interaction. First, the programmed texts failed to enhance intelligence test performance for any of the three experimental groups, and, relative to the control group, the performance of internalizers was actually hampered. Second, intelligence test performance improved with only practice for internalizers, but deteriorated for externalizers.

Results appeared to be confounded, and it was suggested that future investigation of the programmed texts in enhancing intellectual performance is likely to prove fruitful. This seemed to be particularly the case for externalizers for whom there were indicants that the texts may have prevented performance decrement. Future research may also examine other age groups, other means of rule presentation, and the degree to which the effect of verbal programming is maintained over longer periods of time.

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PROGRAMMED INSTRUCTION AS A MEANS OF ENHANCING GROUP INTELLIGENCE TEST PERFORMANCE OF EXTERNALIZING CHILDREN

This study was primarily concerned with two major areas of investigation. First, locus of control was examined to assess the behavioral effects of both the incorrect description of contingencies of reinforcement and the restructuring of attributions antagonistic to responding. From this research have evolved useful therapeutic strategies for helping unassertive (Dawley & Wenrich, 1976) and depressed clients (Seligman, 1975) and underachieving school children (Dweck, 1975). Included within the context of locus of control was a summary of research on learned helplessness because helplessness is a construct from experimental psychopathology which is germane to the study of locus of control. Second, the influences of anxiety and motivation on test performance as well as the means for reducing these sources of variance were explored.

Although previous research has been equivocal in its establishing a relationship between locus of control and intellectual performance, instructions promoting the need for effort have consistently effected diverse behavioral manifestations, including increased effort by externalizers (Dweck, 1975) and improved intelligence test performance in heterogeneous groups (Petty & Harrell, 1977). Thus, the primary purpose of the present study was to assess the efficacy of programmed instruction stressing test perseverance in improving intellectual performance of externalizing children. Also, the study expanded upon earlier investigations of sources of variance in intellectual assessment.

Locus of Control

The locus of control construct was developed from Rotter's (1954) social learning theory. According to Rotter, the effectiveness of a reinforcer is partly dependent upon whether or not the individual perceives it to be contingent upon his behavior. An internal-external locus of control scale, the I-E Scale, was constucted by Rotter (1966) and his associates to assess individual differences in generalized expectancies for internal versus external control of reinforcement. A statement expressing the belief that the consequences of one's behavior result from luck, chance, fate, or the behavior of others was scored as external control. Conversely, a statement indicating consequences to be contingent upon one's behavior was scored as internal control.

Various other instruments have also been developed to assess individual differences in attribution of causality. Some locus of control scales for children include the Stanford Preschool Internal-External Scale (Mischel, Zeiss, & Zeiss, 1974), the Bialer Scale (Bialer, 1961), the

Children's Picture Test of Internal-External Control (Battle & Rotter, 1963), the Nowicki-Strickland Locus of Control Scale (Nowicki & Strickland, 1973), and the Intellectual Achievement Responsibility Scale (Crandall, Katkovsky, & Crandall, 1965).

In the process of constructing their instruments, scale developers have obtained modest construct validity coefficients by correlating one scale with another. For example, the Bialer Scale correlated .42 with the Children's Picture Test of Internal-External Control (Battle & Rotter, 1963).

Evidence of discriminant validity is also cited. For example, locus of control scores are reportedly related neither to measures of social desirability (Nowicki & Strickland, 1973) nor intelligence (Cardi, 1962, cited in Hersch & Scheibe, 1967; Nowicki & Strickland, 1973).

A cautionary note, imperative at this point, is that the literature is equivocal in regard to the relationship between locus of control and intelligence. In contrast to those studies negating any relationship between intelligence and locus of control, Bialer (1961) and Dweck (1975) both noted that locus of control did appear to influence intellectual performance.

Numerous personality and behavioral correlates of locus of control have also been investigated. Externalizers have demonstrated less self-esteem (Ryckman & Sherman, 1973), less self-confidence (Lefcourt, 1966), and have described themselves as less active, striving, achieving, and effective than internalizers (Hersch & Scheibe, 1967). Achievement levels (Nowicki & Strickland, 1973; Weiner, Heckhausen, Meyer, & Cook, 1972; Weiner & Kukla, 1970) and intellectual efficiency (Hersch & Scheibe, 1967) decreased in accord with the degree of externality. Externalizers took longer than internalizers to make choices on skill-related tasks (Rotter & Mulry, 1965) and demonstrated less persistence in activities (Ducette & Wolk, 1972). Externalizers appeared more maladjusted on the California Personality Inventory and checked more unfavorable self-descriptive adjectives than did internalizers (Hersch & Scheibe, 1967). Externality and anxiety were also positively correlated (Ray & Katahn, 1968; Watson, 1967). In a study correlating test anxiety, locus of control, and frustration reactions, Butterfield (1964) noted that frustration reactions became less constructive as locus of control became more external ($r = -.86$). Furthermore, debilitating anxiety reaction scores increased with externality ($r = .61$), and facilitating anxiety reactions decreased ($r = -.82$).

Utilizing retrospective self-reports of college students, Yates, Kennelly, and Cox (1975) investigated potential determinants of locus of control. Punishment reported to be independent of childhood misbehaviors was related to an external locus of control. Conversely, these authors observed no relationship between contingency of parental rewards and locus of control.

Socioeconomic correlates of locus of control may also have some etiological significance. Battle and Rotter (1963) noted that lower-class children were more external than middle-class children.

An abbreviated review of the literature on learned helplessness is introduced at this juncture because induction of helplessness provides an experimental analogue which suggests a determinant of external attributions; i.e., a history of noncontingent negative reinforcement causes the external attributions which are correlates of helpless behavior. Hiroto (1974) provided evidence for similarity between the effect of helplessness induction and an external orientation. He found that escape-avoidance learning was impaired by helplessness induction, by instructions that success and failure were chance phenomena, and by selecting externalizing subjects. Hiroto speculated that operative under all three independent variables is an expectancy that responding and reinforcement are independent.

Although the inhibiting effects of inescapable shock had been previously investigated (Mowrer & Viek, 1948), it was not until Seligman and his associates labeled the phenomenon "learned helplessness" that research into the effects of noncontingent adversity proliferated. The initial work of Seligman and Maier (1967) and Overmier and Seligman (1967) demonstrated that dogs exposed to inescapable shock did not learn a subsequent shuttlebox escape response which was easily learned by dogs exposed to identical amounts of escapable shock and by naive dogs. Furthermore, it proved difficult for the helplessness-induced dogs to learn the escape response, even when the experimenters prompted the dogs by dragging them across the barrier and away from the shock. After many trials, the dogs offered less resistance when they were dragged away from the shock, but only after an inordinate amount of this "therapy" did they finally learn the escape response (Seligman, 1969). Learned helplessness has since been demonstrated with a variety of other species, including cats (Seward & Humphrey, 1967), rats (Braud, Wepman, & Russo, 1969; Maier & Testa, 1975; Seligman & Beagley, 1975; Seligman, Rosellini, & Kozak, 1975), goldfish (Padilla, Padilla, Ketterer, & Giacalone, 1970), and human beings (Benson & Kennelly, 1976; Hiroto & Seligman, 1975; Klein & Seligman, 1976). The construct, learned helplessness, has also been used in theoretical formulations of causes of depression (Seligman, 1975), schizophrenia (Seligman, 1969) and underachievement in school children (Dweck, 1975; Dweck & Reppucci, 1973).

Learned helplessness induction techniques used with human subjects have included both inescapable aversive stimuli (Geer, Davison, & Gatchel, 1970; Hiroto, 1974; Hiroto & Seligman, 1975) and insoluble tasks (Feather, 1966; Gatchel, Paulus, & Maples, 1975). As an example of the latter induction technique, exposure to insoluble anagrams had a deleterious effect on mean performance on soluble anagrams (Feather, 1966). In general, with insoluble cognitive tasks for human subjects, the magnitude of experimental effect is small. For example, response latencies for Hiroto and Seligman's (1975) helpless subjects exceeded latencies of control subjects by less than one second. Moreover, one study (Thornton & Jacobs, 1972) found that helplessness induction actually facilitated performance on an intelligence test.

Emotional correlates of helplessness induction in human beings have been investigated in several studies. Increased feelings of depression, anxiety, and hostility follow helplessness induction (Gatchel, Paulus, & Maples, 1975; Miller & Seligman, 1975; Roth & Kubal, 1975). Additional evidence of emotionality is provided by studies which have demonstrated that helpless subjects become electrodermally hypoactive (Gatchel & Proctor, 1976; Krantz, Glass, & Snyder, 1974).

Several studies have demonstrated the generalization of helpless behavior. Douglas and Anisman (1975) found that failure on a simple task disrupted performance on tasks both similar and dissimilar to the original task. Hiroto and Seligman (1975) noted that insoluble anagrams induced helplessness in learning a subsequent tone-avoidance response, and the inescapable tone induced helplessness in solving a subsequent cognitive task.

Although focusing on the generalization of helpless behavior, both of these last two studies also cited evidence of discrimination. Douglas and Anisman observed that only initial failure on a simple task induced helplessness; failure on a complex task did not. Hiroto and Seligman noted that their subjects were aware that both tasks were part of the same experiment.

Dweck and Reppucci (1973), however, focused on discriminated helpless behavior. Children were exposed to initial failure with one experimenter and initial success with a second experimenter. When the "failure experimenter's" problems became soluble, some children continued to fail, even though they continued to perform well on the "success experimenter's" problems. Dweck and Reppucci observed that children with the largest performance decrements accepted less personal responsibility for the outcomes of their actions. Additionally, when these children did take responsibility for the outcomes of their actions, they attributed their successes and failures to ability rather than effort. In contrast, children who persisted in the face of prolonged failure emphasized the role of effort in determining the outcomes of their behavior.

Dweck and Bush (1976) noted a sex by evaluator interaction in exposing children to noncontingent failure feedback. Failure feedback from an adult evaluator enhanced performance for boys, but impaired performance for girls. Conversely, when a peer evaluator was used, boys' performance was unaffected, but girls' performance was enhanced. An additional observation was that boys attributed failure to lack of effort with the adult evaluator and to lack of ability with a peer. The reverse was true for girls.

Although implications for therapy may be extrapolated from the preceding studies, several researchers have directly investigated specific therapeutic procedures for helplessness. One procedure, immunization against helplessness by means of initial success experiences, has proven effective with both animal (Seligman, 1969) and human subjects (Douglas & Anisman, 1975). Another procedure, attribution retraining, teaches subjects to attribute failure to lack of effort and to assume responsibility for their failures. Part of attribution therapy involves making failure a cue to do something different or something additional (Dweck, 1975). Dweck (1976) noted that the criticism for task-irrelevant behavior that most children encounter in growing up is a kind of attribution therapy. The data on success experiences as a means of innoculation against helplessness combine with data on attribution retraining to caution against developing overly simplistic therapeutic strategies.

Dweck (1975) instituted attribution retraining with 12 children, 8-13 years old, who exhibited the most extreme reactions to failure out of 750 children in two different schools. Attribution retraining proved far more useful in preventing helpless behavior on difficult problems than did immunization with success experiences. Children initially given only easy tasks performed well only as long as they encountered no difficulties. Dweck concluded that teaching children how to cope with failure is an important component of remedial education programs.

An animal analogue pertinent to Dweck's observations is provided by Terrace (1963). He noted that one of his two pigeons initially exposed to errorless discrimination training was considerably handicapped, compared to naive animals, when a new discrimination was to be learned without using the errorless discrimination methodology. This bird made 2,609 errors before meeting the discrimination criterion; the two naive birds and the other pigeon initially exposed to errorless discrimination training made less than 475 errors to meet the same criterion. An additional result was that of the four birds that learned their first discrimination without errors and the second discrimination with errors, all began making errors on the first discrimination on which they had never erred previously. Kennelly (1975) interpreted these data to suggest that making errors and learning to cope with them establishes a learning set important to successful performance in the "real world."

The sampling of literature on locus of control and learned helplessness is now completed. Because much of the literature concerned with personality correlates of impaired test performance seems germane to data presented on externalizers, the other major area of research reviewed analyzes these sources of variance in intellectual assessment. Various strategies for reducing these sources of variance are also detailed.

<u>The Influence of Anxiety and Motivation on Test Performance</u>

Research has shown that motivational factors, anxiety, and personality traits introduce systematic sources of variation in educational and psychological measurement. For example, do-not-guess instructions alone tend to introduce such personality variables as risk-taking (Slakter, 1969), submissiveness (Votaw, 1936), and maladjustment (Sherriffs & Boomer, 1954). Additionally, several authors noted that do-not-guess instructions hamper the performance of good students more than that of poor students even when the usual correction for guessing is applied (Flaugher & Pike, 1970; Hritz & Jacobs, 1970; Votaw, 1936). Phillips (1971) noted that in test situations, anxious, negativistic, self-derogatory children tend to adopt stereotyped patterns of responding which deteriorate test performance. The point to be made is that anxiety, general maladjustment, and lack of effort are characteristic of both those individuals who do not perform optimally in testing situations and those who are externalizers.

Various means of enhancing test performance have been reported. Within this context, there are numerous studies which have attempted to manipulate motivational variables. Although some studies reported lack of significant results when money, praise, reproof, and candy were offered as incentives for improved test scores (Clifford, Cleary, & Walster, 1972; Tiber & Kennedy, 1964), the greater part of the evidence indicated the opposite. For example, Tuinman, Farr, and Blanton (1972) found that prizes for improved test scores significantly increased the number of items attempted and the number of items answered correctly. Another study found an interaction between extrinsic motivation, socioeconomic status, and ethnic origin; i. e., although lower class whites improved in intelligence test performance with either feedback or monetary reinforcement, middle-class whites and lower-class Blacks did not (Sweet & Ringness, 1971). In another case, improved performance on the WAIS resulted from the specification of response quality and instructions to be thoughtful (Burhenne, Kaschak, & Schwebel, (1973).

Numerous studies have reported that the modification of test anxiety has enhanced test performance. Meichenbaum (1972), using cognitive behavior modification with test-anxious college students, demonstrated improved test scores, grade point averages, and self-report measures of anxiety. He taught his subjects that test anxiety is the result of their own self-defeating thoughts and verbalizations. Then they were taught incompatible self-instructions and relaxation. Furthermore, subjects were taught to image becoming anxious and then coping. In another study, Smith, Ascough, Ettinger, and Nelson (1971) improved test performance by introducing humorous items to relieve tension. Hammer (1954) improved test performance with posthypnotic suggestions of increased ease, confidence, motivation, and ability. Heisler and Schill (1972) demonstrated that reassuring, positive expectation-eliciting instructions enhanced aptitude test performance. And finally the literature was replete with studies reporting successful systematic desensitization of test-anxious subjects (Dawley & Wenrich, 1973; Donner & Gurney, 1969; Emery & Krumboltz, 1967; Suinn, 1968).

The final study in this series demonstrated the efficacy of programmed texts in enhancing intelligence test performance (Petty & Harrell, 1977). It is reported in detail because the programmed texts used in that study were also used in the present one. The texts addressed that variance due to motivation, anxiety, and test-wiseness. One text explained the role of standardized tests in selection procedures, in winning scholarships, and in earning course credit. A second text stated that standardized tests usually give people the impression that they are failing, and that it is important to persevere even in the presence of adverse feelings. The third text conveyed several basic rules for taking tests, including instructions to guess, regardless of do-not-guess instructions.

In the Petty and Harrell study, no single programmed text generated a mean IQ gain which was significantly greater than the control group's mean gain of 1.70. However, the combination of the three texts resulted in a significant mean IQ gain of 5.37. IQ gains of more than five points were attained by 17% of the control group and 59% of the group receiving the complete set of programs. In the latter group, 14% of the children made gains of more than ten IQ points. In contrast, none of the control group demonstrated an IQ gain greater than ten points.

Analysis of raw score data revealed greater improvement by children below the group median on the pretest. A similar but nonsignificant trend was observed in the IQ data.

The purpose of the present study was to assess the efficacy of these programmed texts in improving the intellectual performance of externalizing children. The magnitude of the expected changes could readily affect selection decisions determining the individual's educational environment and job opportunities as well as the demands made upon him. Consequently, a more valid assessment of potential intellectual performance of externalizing children is particularly important, for the preferred treatment of these children is not giving them less demanding tasks, but teaching them to cope with failure.

In conclusion, it was hypothesized that intelligence test performance would be enhanced by the programmed instruction. Furthermore, externalizers were expected to demonstrate greater gains than internalizers, which would thereby suggest that locus of control provided a source of variance in intellectual assessment.

Method

Subjects

The subjects were 85 students from five different fifth grade classes. At the time of pretesting, they ranged in age from 10 years, 5 months, 24 days to 12 years, 4 months, 16 days. A review of school records which listed parents' occupations suggested that most of the children came from upper-lower to lower-middle class homes. Approximately 5% of the students were Black.

Of the 111 students who began the study, 26 did not complete all four experimental sessions. Since no make-up sessions were offered, these students were dropped from the study. There were ten children who completed the Intellectual Achievement Responsibility Scale (IAR), but did not complete the final two sessions of the study. Of these, two had been assigned to the external locus of control group; four, to the middle group; and four, to the internal group. Thus it appeared unlikely that loss of subjects related to locus of control.

Materials

Consent form. Children were given a consent form (Appendix A) to be signed by a parent or guardian. The form suggested the general purpose of the study and detailed time and response requirements of participants. A standard paragraph required by the Human Investigations Committee, University Medical Center, waived the medical center's responsibility for illness or injury resulting from the experiment.

Of 139 children, 111 children (80%) returned a signed consent form. Only those children who returned a signed consent form participated in the study. The number of nonparticipants per class ranged from four to ten with a mean of seven. The proportion of nonparticipants per class ranged from 14% to 34%. Four of the 28 children who did not return the consent form reported fear of injury or illness as was suggested by the standard paragraph required by the Human Investigations Committee.

Children who did not participate in the study remained in the classroom and worked quietly at their desks. Nonparticipants were not segregated from participants during experimental sessions.

Internal-external locus of control measure. The Intellectual Achievement Responsibility Questionnaire (IAR) is composed of 34 forced choice items (see Appendix B). It was developed by Crandall, Katkovsky, and Crandall (1965) in order to assess the degree to which a child attributes his intellectual achievements and failures to internal or external determinants. The total score is the sum of items for which the child assumes responsibility.

Crandall et al. established norms for grades three through twelve. At the fifth grade level, the IAR had a mean of 24.19, a standard deviation of 3.83, and a range of 15-32.

Children in the present study generated a mean of 23.24, a standard deviation of 4.42, and a range of 9-33. As shown in Table 1, means at the different levels of locus of control differed by about a standard deviation or greater.

The IAR differs from other measures of locus of control in three respects. First, it strives to assess children's beliefs in efficacy of effort only within academic and intellectual achievement situations. Second, the IAR limits the source of external control to people or tasks with which the child actually comes in contact, e.g. teachers, peers, tests, and puzzles. It does not assess belief in external forces such as luck or fate. Third, the IAR samples an equal number of positive and negative events. Sample items are:

If you solve a puzzle quickly, is it

____a. because it wasn't a very hard puzzle, or

____b. because you worked on it carefully?

When you don't do well on a test at school, is it

____a. because the test was especially hard, or

Table 1

IAR Means and Ranges

	Locus of Control		
	External	Middle	Internal
Control Group			
Mean (Range)	18.67 (9-21)	23.5 (22-26)	27.96 (26-33)
Experimental Group			
Mean (Range)	18.47 (12-21)	23.77 (21-26)	27.81 (26-31)

____b. because you didn't study for it.

When you forget something you heard in class, is it

____a. because the teacher didn't explain it very well, or

____b. because you didn't try very hard to remember?

Children were instructed to "pick the answer that best describes what happens to you or how you feel." They were told that there were no right or wrong answers. They were also assured that their responses would not be seen by their teacher or parents.

Intelligence test. The Otis-Lennon Mental Ability Test (OLMAT), Elementary II Level, Form J, is a group intelligence test which was used for pre- and post-testing. The OLMAT has a mean of 100, a standard deviation of 16, and standard errors of measure of approximately 4.5. Split-half, Kuder-Richardson, and alternate form reliability coefficients for fifth graders range from .92 to .96. The Elementary II level is recommended for students in Grades 4-6. Children in the present study generated a pretest OLMAT mean and standard deviation of 104.93 and 13.77, respectively.

Experimental programmed texts. The experimental group was given a set of programmed instructions about standardized tests (see Appendix C). Each program was in a 3" X 11½" booklet.

An introductory program gave directions and practice sets for the use of programmed material. It stated that the booklet provided reading material, questions, and answers. Students were cautioned to take one page at a time and to write the answer to a question before looking at the answer on the next page.

After this introductory program were three instructional programs, each consisting of 425-431 words of reading material, followed by ten questions to be answered in a sequence and which shaped increasingly more complex responses. Each question was presented in a frame with the correct response given in the following frame.

The topics of these three programs related to test-taking motivation, test anxiety, and test-wiseness. The first program was directed toward alleviating the feelings of failure which many students experience in taking standardized tests. The program stated that, because of the way the tests are constructed, standardized tests usually give people the impression that they are failing. It goes on to say that when some people feel such despair, they stop trying. The program then emphasized the importance of perseverance in the presence of these adverse feelings. Sample items from this program were:

If you're missing half of the questions on a standardized test, you're probably _________

a. doing well

b. about average

c. really messing up

On a standardized test, you're probably doing b_____ than you think.

The best advice here is, no matter how you feel,

____

a. Keep trying.

b. Hang in there.

c. Don't quit.

d. All of the above.

The second program explained the use of standardized tests in selection procedures, in winning college scholarships, and in earning course credit. Additionally, it suggested that each testing situation be viewed as an opportunity to practice taking standardized tests. Sample items from this program were:

High school seniors can win m____ in the form of scholarships to college with high standardized test scores.

Many col_____ make you take entrance tests.

People who drop out of high school can earn a dip__ma with a standardized test.

The third program offered some basic rules for taking standardized tests. For example, the students were instructed to guess, regardless of do-not-guess instructions, and to avoid dwelling too long on any one question. Sample items from this program were:

Research shows that smart, c___ful people are hurt the most by do-not-guess instructions.

If you m__k the questions you skip, you can find them quickly later if you have some extra time.

Another way of losing time is spending too much time on one q_______.

The last frame of each program stated, "If you answered each question perfectly, or missed only one, you really did great and may go on to your next activity. If you missed more than one question, read this booklet again. Then try to see if you can get them all right or miss no more than one."

Control programmed texts. The control group was given a set of programmed texts identical in format to those given the experimental group (see Appendix D). The control group received the same instructions on the use of programmed material as did the experimental group. After the introductory program were three instructional programs, each of which began with reading material followed by ten questions and answers. The topics of these three programs were color, causes of the seasons, and causes of rain. Sample items were:

Paints, crayons, and dyes are p__ment colors.

Winter at the North Pole is both cold and dark because the earth's ____ tilts.

The windward side of the mountain may have thick forest, and the lee side of the same mountain may be a desert.

The control group was also required to meet a 90% correct criterion. The last frame of each program instructed students to begin their next activity if they had missed no more than one question or to read the booklet again if they had not met the criterion.

Most children in both experimental and control groups met the 90% criterion the first time through the text. As can be seen in Tables 2 and 3, group averages were all above 90% correct. Tables 4 and 5 present mean numbers of correct answers; Tables 6 and 7, standard deviations. As shown in the latter two tables, there was little variability in performance.

Children scored their own answers as they worked through the programmed texts. Reliability checks performed later yielded a range of 96-100% agreement between subject and experimenter scoring. These reliability data are presented in Tables 8 and 9.

Procedure

The order of this section is based on a progression from general procedures applied throughout the course of the study to session-specific procedures ordered chronologically.
Three general procedures were followed. (1) The same individual conducted all testing and training sessions. (2) The experimenter met with each class separately. (3) All materials, except the consent form, were delivered to the children in 9 X 12 inch envelopes individually addressed for

Table 2

Percent of Correct Answers to Control Programmed Texts Upon Subjects First Time Through Text

	Group			
Text	XC	MC	IC	Total
1	94.0	96.9	97.9	96.2
2	90.7	96.2	92.9	93.1
3	94.7	95.4	95.7	95.2
Total	93.1	96.2	95.4	94.8

Table 3

Percent of Correct Answers to Experimental Programmed Texts Upon Subjects' First Time Through Text

	Group			
Text	XC	ME	IE	Total
Intro	95.0	100.0	100.0	98.3
1	96.7	98.0	95.4	96.7
2	96.0	95.3	96.2	95.8
3	96.7	97.3	97.7	97.2
Total	96.3	97.3	96.8	96.9

Table 4

Mean Number of Correct Answers to Control Programmed Texts Upon Subjects' First Time through Text

	Group			
Text	XC	MC	IC	Total
1	9.4	9.7	9.8	9.6
2	9.1	9.6	9.3	9.3
3	9.5	9.5	9.6	9.5
Total	9.3	9.6	9.5	9.5

Table 5

Mean Number of Correct Answers to Experimental Programmed Texts upon Subjects' First Time through Text

	Group			
Text	XC	MC	IC	Total
Intro	3.8	4.0	4.0	3.9
1	9.7	9.8	9.5	9.7
2	9.6	9.5	9.6	9.6
3	9.7	9.7	9.8	9.7
Total	9.6	9.7	9.7	

Table 6

Standard Deviations--Control
Programmed Texts

	Group		
Text	XC	MC	IC
1	1.02	.60	.71
2	1.24	.62	.70
3	.88	.63	.62
Total	1.07	.62	.69

Table 7

Standard Deviations--Experimental
Programmed Texts

	Group		
Text	XC	MC	IC
Intro	.40	.00	.00
1	.60	.40	.93
2	.61	.62	.49
3	.60	.44	.57
Total	2.59	2.50	2.52

Table 8

Percent Agreement between Subject-Scored Answers and Experimenter-Scored Answers to Control Programmed Texts

	Group			
Text	XC	MC	IC	Total
1	99	99	100	99
2	99	99	96	98
3	99	99	100	99
Total	99	99	99	99

Table 9

Percent Agreement Between Subject-Scored Answers and Experimenter-Scored Answers to Experimental Programmed Texts

	Group			
Text	XC	MC	IC	Total
Intro	97	100	98	98
1	98	99	99	99
2	99	100	100	100
3	99	99	100	99
Total	98	99	99	99

each subject. At the beginning of each session, the children removed the contents of their envelopes and followed instructions appropriate for that session. When the task for the session was completed, the materials were returned to the envelope and passed back to the experimenter. This general format was followed for all sessions of the study.

The study began with administration of the OLMAT, Form J, to all subjects. The only deviation from standardized procedure was that the test was passed to the students in envelopes and returned to the experimenter in the same envelopes.

Five days later, each class was given the IAR. Locus of control was determined by grouping 95 children using tertiles based on IAR scores. When this division was completed, subjects at each level of locus of control were randomly assigned to experimental or control conditions. Ten children who had been assigned to a group failed to complete the study; however, failure to complete the study was related neither to locus of control nor to experimental treatment.

Twelve days following the initial administration of the OLMAT, the programmed texts were given out. Students wrote their answers on a piece of notebook paper and used a cover sheet in order not to gain additional cues from previously answered questions. Children who did not meet the criterion of 90% accuracy had to repeat the entire program until this criterion was met.

The following day, the OLMAT, Form J, was readministered according to standardized directions. The second OLMAT was administered at the same time of day as was the first OLMAT.

Results

Two 2 X 3 analyses of variance (ANOVA) of difference scores were applied to both the IQ and raw score data presented in Tables 10 and 15, respectively. Treatment composed one dimension; locus of control, the other.

The ANOVA on change in IQ scores demonstrated a significant interaction, $\underline{F}$ (2,79) = 3.41, $\underline{p} < .05$. As is shown in Table 11, locus of control also reached significance, $\underline{F}$ (2,79) = 3.94, $\underline{p} < .05$, but was uninterpretable because of the interaction.

For the IQ data, simple effects for locus of control and treatment were represented geometrically in Figures 1 and 2, respectively. The Newman-Keuls was used to test differences between means, and these data are presented in Tables 12-14. The Newman-Keuls across treatment verified the suggestion of the graph that the Internal-Control group (IC) demonstrated significantly greater gain than did the Internal-Experimental (IE) group, $\underline{p} < .01$. In fact, Group IE numerically showed an IQ loss of 1.69 points between pre- and posttesting. The Newman-Keuls across locus of control also verified the suggestion of the graph that Group IC was significantly higher in gain, $\underline{p} < .01$, than the External-Control group (XC) which which demonstrated a loss of 4.07 IQ points. No other

Table 10

IQ Means and Mean Gains

	Locus of Control		
	External	Middle	Internal
Control Group			
Pre-test	99.80	107.62	108.64
Post-test	95.73	109.54	113.71
Gain	-4.07	1.92	5.07
Experimental Group			
Pre-test	101.87	106.73	105.62
Post-test	100.40	107.67	103.92
Gain	-1.47	.93	-1.69

Table 11

Analysis of Variance of Difference Scores between Pre- and Post-test IQ's

Source of Variation	Sum of Squares	*df*	Mean Square	*F*
Treatment	64.0761	1	64.0761	1.41
Locus of Control	358.3771	2	179.1885	3.94*
Interaction	310.8263	2	155.4131	3.41*
Error	3,596.2209	79	45.5218	

$p < .05$

Table 12

Newman-Keuls across Treatment for Differences in Mean IQ Change

Internal	IE	IC		
Ordered Means	-1.69	5.07	r	Critical Value, $p < .01$
IE	--	6.76*	2	6.73
Middle	ME	MC		
Ordered Means	.93	1.92	r	Critical Value, $p < .05$
ME	--	.99	2	5.08
External	XE	XC		
Ordered Means	-4.07	-1.47	r	Critical Value, $p < .05$
XE	--	2.60	2	5.08

$*p < .01$

Table 13

Newman-Keuls across Locus of Control for Differences in Mean IQ Change

Control Group	XC	MC	IC		Critical Value	
Ordered Means	-4.07	1.92	5.07	r	$p < .05$	$p < .01$
XC	--	5.99	9.14*	3	6.10	7.65
MC	--	--	3.15	2	5.08	6.73

Experimental Group	IE	XE	ME		Critical Value, $p < .05$
Ordered Means	-1.69	-1.47	.93	r	
IE	--	.22	2.62	3	6.10
XE	--	--	2.40	2	5.08

*$p < .01$

Table 14

Newman-Keuls across All Groups for Differences in Mean IQ Change

	Group							
	XC	IE	XE	ME	MC	IC		
Ordered Means	-4.07	-1.69	-1.47	.93	1.92	5.07	r	Critical Value
XC	--	2.38	2.60	5.00	5.99	9.14*	6	7.45
IE	--	--	.22	2.62	3.61	6.76	5	7.13
XE	--	--	--	2.40	3.39	6.54	4	6.70
ME	--	--	--	--	.99	4.14	3	6.10
MC	--	--	--	--	--	3.15	2	5.08

*$p < .05$

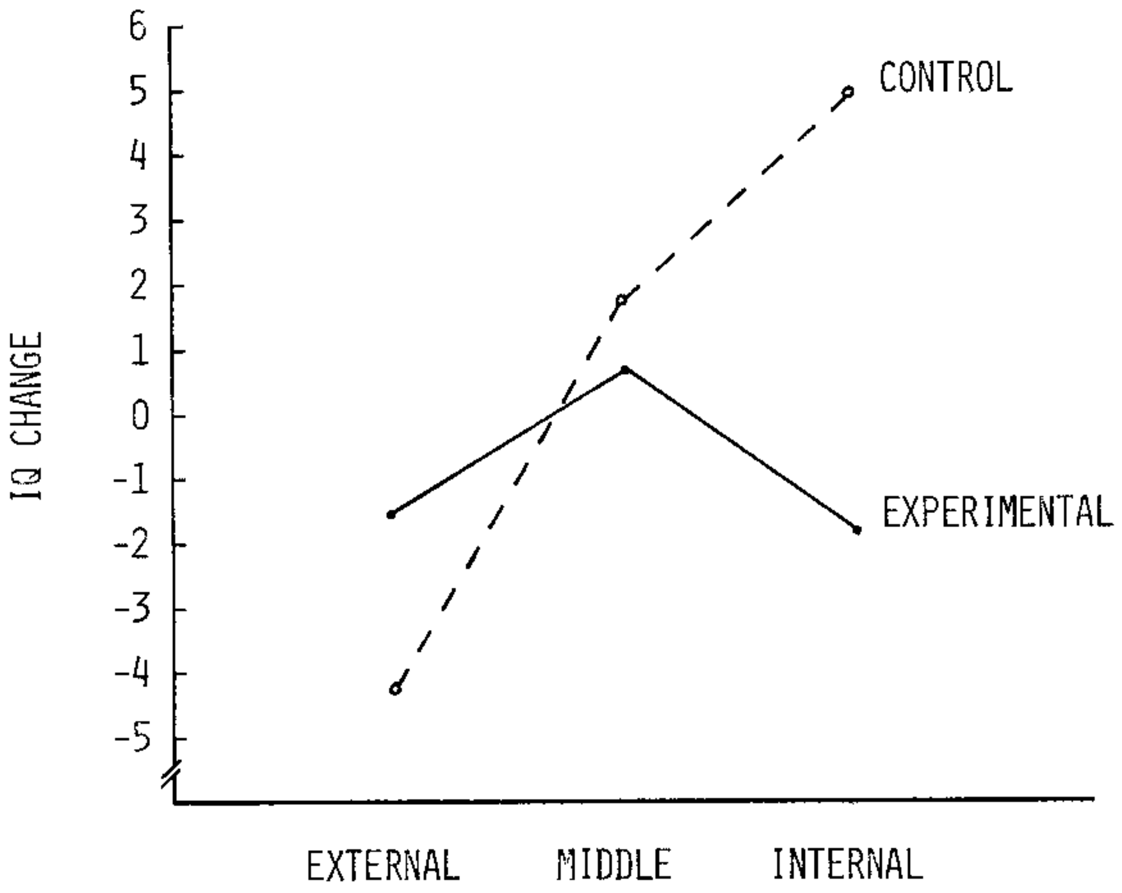

Figure 1. Profiles of simple effects for IQ change and locus of control.

significant differences were found, either across treatment or across locus of control. When the Newman-Keuls was applied to the ordered means of all six groups, IC continued to demonstrate significantly greater gain than XC, $p < .05$; however, IC under this analysis failed to demonstrate significantly greater gain than IE.

As is shown in Table 16, the ANOVA on change in raw scores demonstrated a significant effect for locus of control $F\ (2,79) = 3.83$, $p < .05$. The interaction effect approached,

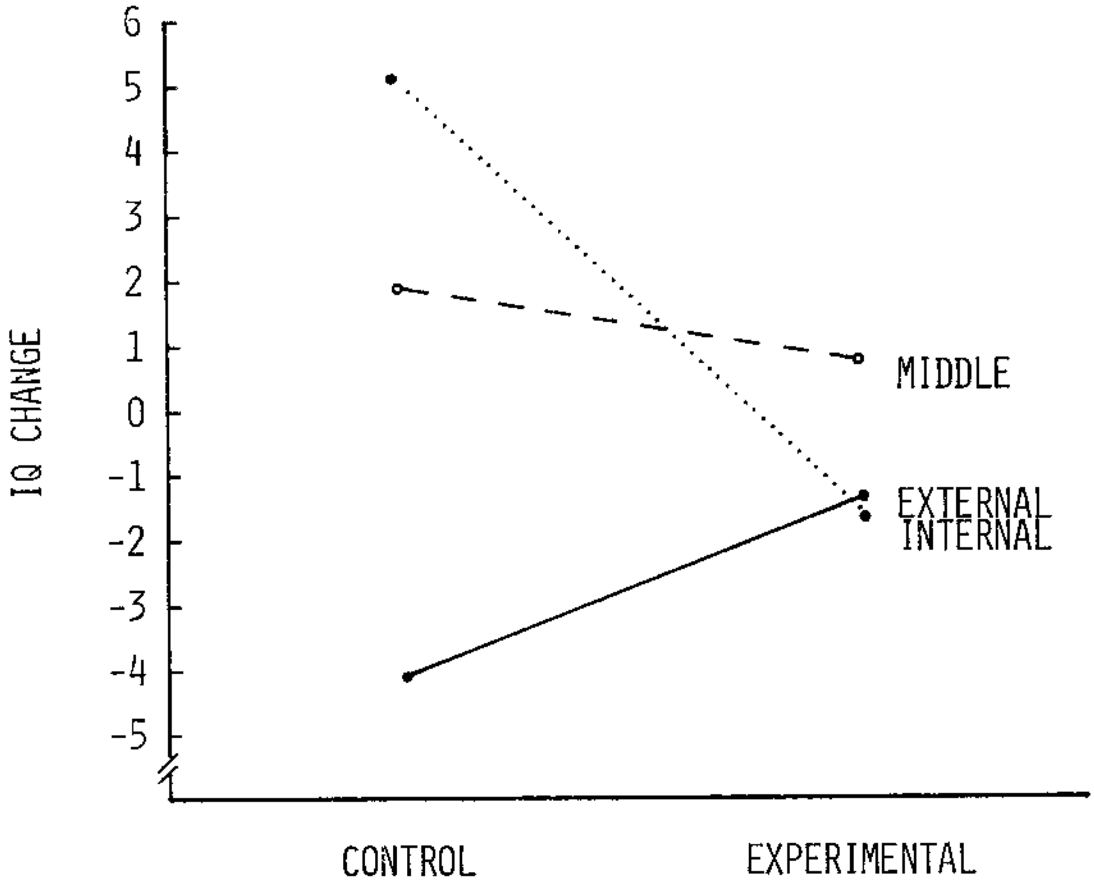

Figure 2. Profiles of simple effects for IQ change and treatment.

but did not reach significance. The Newman-Keuls (Table 17), moreover, failed to determine where lay any differences in locus of control.

At this point, it was deemed appropriate to use the Newman-Keuls to make individual comparisons among means in the fashion which would have been clearly indicated had the interaction reached significance. Four observations combined to suggest the appropriateness of this action. First, the interaction effect for the raw score data was very close to being statistically significant. The $\underline{F}$ attained was 3.07,

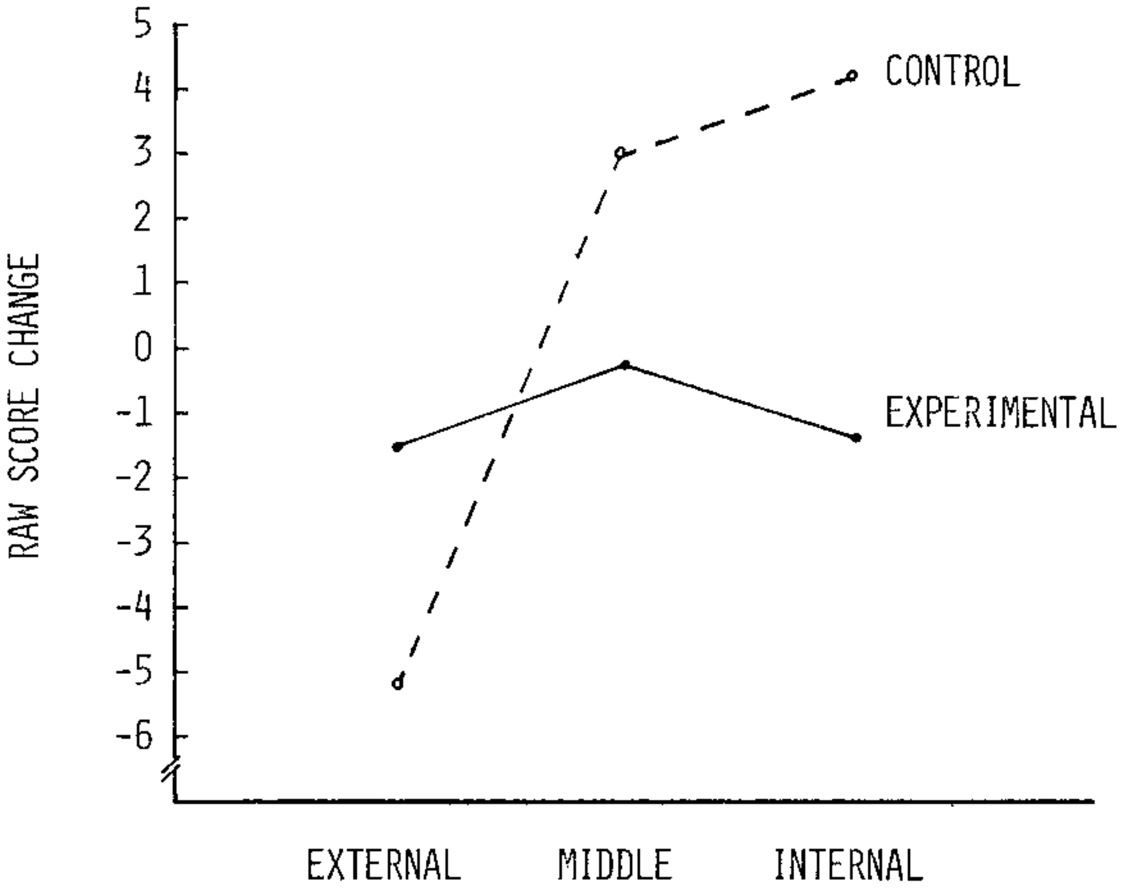

Figure 3. Profiles of simple effects for raw score change and locus of control.

and the F required for significance was 3.12. Second, the IQ data produced a significant interaction. Third, as can be seen in Figures 3 and 4, graphing the raw score data produced an apparent interaction in a shape similar to that of the graphed IQ data. Fourth, the Newman-Keuls was unable to specify where differences lay across locus of control.

The Newman-Keuls used to make comparisons among means did indeed demonstrate some statistically significant differences which provided more evidence for a valid interaction. These data are presented in Tables 18-20. The Newman-Keuls

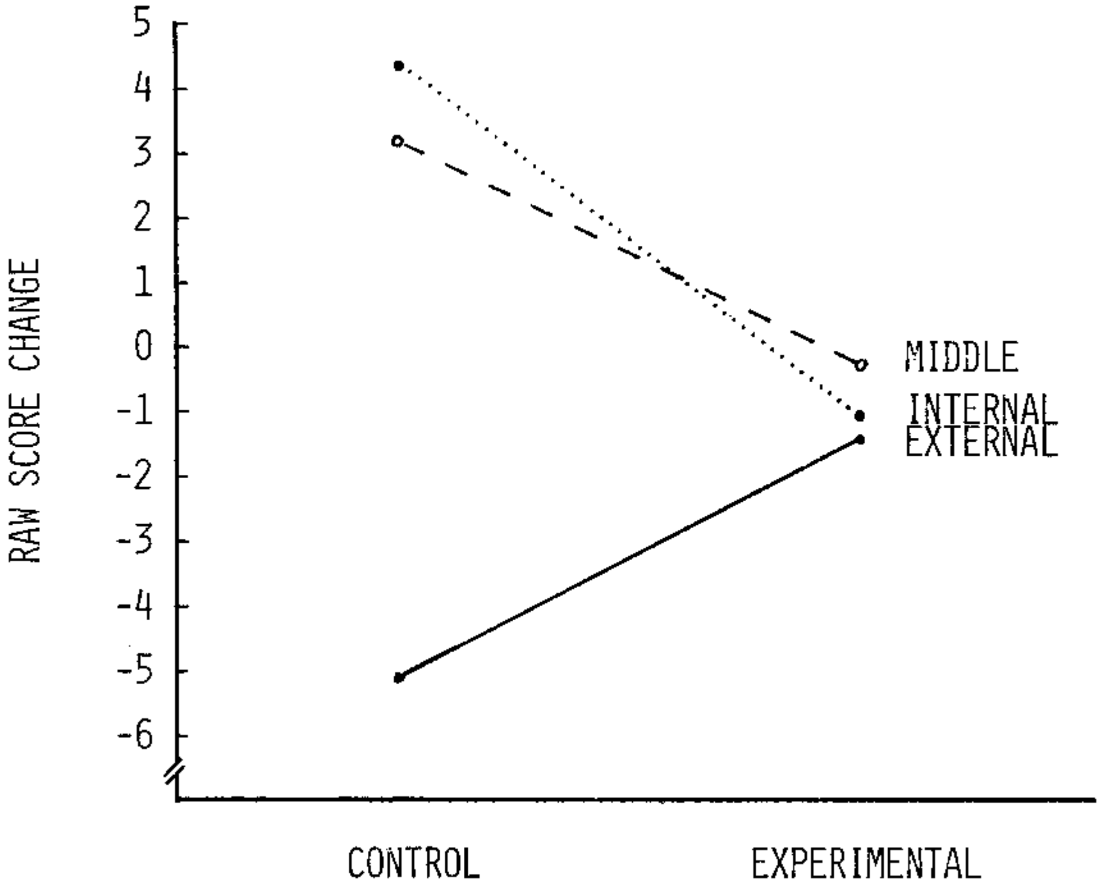

Figure 4. Profiles of simple effects for raw score change and treatment.

across treatment verified the suggestion of the graph that the Internal Control (IC) Group demonstrated significantly greater gain than did the Internal Experimental (IE) Group, $p < .05$. Similar to the IQ data, the raw score loss for Group IE was 1.31 points. The Newman-Keuls across locus of control also verified the suggestion of the graph that both Internal and Middle control groups were significantly higher in gain than the External Control (XE) Group, $p < .01$ and $p < .05$, respectively. The control externalizers demonstrated a loss of 5.07 raw score points. No other

Table 15

Raw Score Means and Mean Gains

	Locus of Control		
	External	Middle	Internal
Control Group			
Pre-test	45.60	54.62	56.86
Post-test	40.53	57.69	61.21
Gain	-5.07	3.08	4.36
Experimental Group			
Pre-test	48.53	53.87	53.85
Post-test	47.13	53.60	52.54
Gain	-1.40	-.27	-1.31

Table 16

Analysis of Variance of Difference Scores
Between Pre- and Post-test Raw Scores

Source of Variation	Sum of Squares	*df*	Mean Square	*F*
Treatment	67.0963	1	67.0963	1.24
Locus of Control	415.4373	2	207.7187	3.83*
Interaction	332.9819	2	166.4910	3.07
Error	4,284.3733	79	54.2326	
Total	5,099.8889	84		

$p < .05$

Table 17

Newman-Keuls across Locus of Control for
Differences in Mean Raw Score Change

	External	Middle	Internal	r	Critical Value
Means	-3.23	1.29	1.63	r	$p < .05$
External	--	4.52	4.86	3	6.64
Middle	--	--	.34	2	5.53

Table 18

Newman-Keuls across Treatment for Differences in Mean Raw Score Change

Internal	IE	IC		
Ordered Means	-1.31	4.36	r	Critical Value, $p < .05$
IE	--	5.67*	2	5.53
Middle	ME	MC		
Ordered Means	-.27	3.08	r	Critical Value, $p < .05$
ME	--	3.35	2	5.53
External	XE	XC		
Ordered Means	-5.07	-1.40	r	Critical Value, $p < .05$
XE	--	3.67	2	5.53

*$p < .05$

Table 19

Newman-Keuls across Locus of Control for Differences in Mean Raw Score Change

Control Group	XC	MC	IC		Critical Value	
Ordered Means	-5.07	3.08	4.36	r	$p < .05$	$p < .01$
XC	--	8.15*	9.43**	3	6.64	8.33
MC	--	--	1.28	2	5.53	7.33

Experimental Group	XE	IE	ME		
Ordered Means	-1.40	-1.31	-.27	r	Critical Value, $p < .05$
XE	--	.09	1.13	3	6.64
IE	--	--	1.04	2	5.53

*$p < .05$

**$p < .01$

Table 20

Newman-Keuls across All Groups for Differences in Mean Raw Score Change

	Group							
	XC	XE	IE	ME	MC	IC		
Ordered Means	-5.07	-1.40	-1.31	-.27	3.08	4.36	r	Critical Value
XC	--	3.67	3.76	4.80	8.15*	9.43*	6	8.11
XE	--	--	.09	1.13	4.48	5.76	5	7.76
IE	--	--	--	1.04	4.39	5.67	4	7.29
ME	--	--	--	--	2.81	4.09	3	6.64
MC	--	--	--	--	--	1.28	2	5.53

*$p < .05$

significant differences were found either across treatment or across locus of control. When the Newman-Keuls was applied to the ordered means of all six groups, both Groups IC and MC continued to demonstrate significantly greater gain than Group XC, $\underline{p} < .05$; however, under this analysis, IC failed to demonstrate significantly greater gain than IE.

Discussion

Two general conclusions can be drawn from these data. First, the programmed texts failed to enhance intelligence test performance for any of the three experimental groups, and the performance of internalizers was actually hampered. Second, intelligence test performance improved with only practice for internalizers, but deteriorated for externalizers. A third observation should be noted at this point, not because it is germane to the central purposes of the study, but rather because it contributes to a body of equivocal literature. Specifically, in this study, locus of control, as measured by the IAR, was significantly related to intelligence, $\underline{r} = .31$, $\underline{p} < .01$. The remaining pages provide an appraisal of the two basic conclusions pertinent to the focus of the study.

With regard to the first basic conclusion, the failure of the experimental programmed texts to enhance intelligence test performance was an unexpected result. This outcome represented a failure to replicate a pilot study regarding instructions similar to those of the present study (Petty,

1971) as well as failure to replicate previously obtained data from the same programmed texts as were used in the present study (Petty & Harrell, 1977). Moreover, none of the three experimental groups demonstrated even a practice effect. More specifically, Milholland (1972) reported, for a two-week interval, the mean practice effect on the OLMAT was 2.5 with a range of 1.0 to 3.6. In contrast, the greatest gain for the experimental groups in the current study was .93. All three experimental groups demonstrated less gain than the bottom of Milholland's range for practice effects.

In sum, the data on the experimental groups were quite inconsistent with those data from previous studies. Moreover, these data did not even show practice effects. It is therefore quite possible that the results were occasioned by artifact rather than by simple failure of the programmed instruction to prove efficacious. The following paragraphs provide an appraisal of five possible confounding variables.

First, as shown in Table 10, mean pretest IQ's for middle and internal locus of control groups seemed unusually high; that is, these four groups ranged from 5.62 to 8.64 points above the OLMAT mean. Because the socio-economic level of these students was not more than average, this observation suggested two possibilities: (a) students may have been uncommonly well-motivated for the pretest and (b) lower posttest scores could possibly be explained by a regression to the mean effect. Upon further speculation, however, neither of these possibilities appeared to adequately explain the results. For one reason, the gain of the control internalizers was left unexplained, particularly in view of the decrement of the experimental internalizers. For a second reason, these above average mean IQ's may have been somewhat spurious as a function of using 1966 OLMAT norms (Otis & Lennon, 1967). That is, as tests have been renormed, it has been found that raw scores have been increasing. Therefore, a given raw score today merits a lower deviation IQ than it would have merited ten years ago. However, this trend should account for the observed inflation by only several IQ points (Termin & Merrill, 1960; Termin & Merrill, 1972).

Second, the same experimenter conducted all three studies concerning instructions related to test motivation, anxiety, and test-wiseness; that is to say, the same experimenter conducted Petty (1971), Petty and Harrell (1977), and the present study. However, in the earlier two studies, the investigator was also the children's regular classroom teacher; but in the third study, she was a stranger. Thus, there was considerable possibility of confounding by means of a relationship variable. Nonetheless, even if it could be established that relationship provided an artifact, the results would still remain confounded. A relationship factor is not likely to explain the significant differences found between experimental and control internalizers.

Third, the study was conducted at the end of the school year, and post-testing occurred in the final week of school. This was not an optimal time because typically at that time of year, children are not easily motivated to work on educational tasks. However, this factor too cannot alone explain the observed interaction. Moreover, Petty and Harrell (1977) was also conducted at the end of the school year, and post-testing occurred in the next-to-the-last week of the term.

Fourth, with each successive study, more elaborate consent procedures were introduced. Petty (1971) was an informally run pilot in which children were not aware that they were participating in a study. Petty and Harrell (1977) were required only to get permission from the school principal to run the study. All sixth graders participated. Subjects were aware of the existence of the study; however, they also were quite accustomed to novel activities with regard to the class in which the study was run. In contrast, subjects in the current study had read a rather detailed consent form (Appendix A) and had been required to secure parental permission in order to participate in the study. As many as 34% of the children in a class were not involved in the study. Furthermore, some concern was expressed regarding the suggestion of the standard waiver that the experiment might be dangerous to subjects' physical well-being. For all of these reasons, it is possible that participants were unusually excited and motivated at the time of the pretest, but that excitement and motivation had attenuated by the time of the posttest.

Again, the problem of explaining the difference between experimental and control internalizers is residual. In this case, however, one might suspect that curiosity generated by the study may have remained for Group IC, but may have been satisfied for Group IE by the information in the programmed texts. Group IE may have determined the purpose of the study and lost motivation from curiosity to maintain their efforts. Conversely, Group IC may have remained activated by a riddle yet unsolved; i.e. what do these heterogeneous tasks have to do with one another? It would be consonant with the literature that internalizers would persevere until such a riddle was solved.

Inspection of the data generated by individual subjects revealed one final, but particularly critical, observation. As shown in Table 21, random responding was observed in two control subjects (both from Group XC) and two experimental subjects (one each from Group XE and Group IE). Although the reason why three of these subjects responded randomly is not clear, it appears that the child from Group XE was affected for the worse by the rationale for ignoring do-not-guess instructions. The rationale was that "smart, careful people are hurt the most by do-not-guess instructions." Furthermore, since one "can get about ¼ of the answers correct without even reading the questions," one should guess when

Table 21

Numbers of Individuals
Showing IQ Change

		Post-test minus pre-test IQ scores						
Group	n	-20 to -16[a]	-15 to -11	-10 to -6	0 to ±5	6 to 10	11 to 15	16 to 20
Control								
XC	15	2	3	2	5	1	2	0
MC	13	0	0	1	10	2	0	0
IC	14	0	0	0	8	5	0	1
Total	42	2	3	3	23	8	2	1
Experimental								
XE	15	1	0	1	13	0	0	0
ME	15	0	1	2	8	4	0	0
IE	13	1	0	0	12	0	0	0
Total	43	2	1	3	33	4	0	0

[a]The four children showing the greatest performance decrements responded at chance level on the post-test.

not certain of the answer. (See Appendix C.)

This child's data were examined in detail because they so strongly implied (a) a risk of experimental treatment and (b) a need for revision of the programmed instructions. Of all 85 subjects, this XE child was the slowest working. On the pretest, he had answered only the first 43 questions of 80, and of these 43 questions, 38 were correctly answered. Of the five subjects (6% of N) who omitted more than 15 questions, four omitted 17-25 questions, and he omitted the last 37. On the posttest, however, he omitted no questions, but answered only 16 correctly, a number of correct answers which would be expected from random responding. He demonstrated a performance decrement of 22 raw score points and 19 IQ points.

Other than this one child, none of Group XE showed decrements of more than ten IQ points, and only one showed a loss between five and ten points. (See Table 21.) Eighty-seven percent of Group XE remained within one standard error of their pretest score.

In contrast to the experimental externalizers, five control externalizers (33% of Group XC) lost more than ten IQ points, and two of these lost 19 points each. Two in Group XC (13%) lost between five and ten points.

Viewed yet another way, one (7%) of the experimental externalizers demonstrated a performance decrement greater than the standard error of the test, and he did so by random responding. In contrast, seven (47%) of the control externalizers demonstrated IQ loss greater than the OLMAT standard error. Two of these seven appeared to respond randomly. The percentage data seem to suggest that the instructions at least appeared to attenuate performance decrements in externalizing children.

Before concluding the discussion of the results regarding efficacy of the experimental programmed texts in enhancing intelligence test performance, one additional unexpected result must be noted, that is, the failure to replicate the difference in gain between upper and lower IQ levels found in the Petty and Harrell (1977) study. Specifically, the earlier study demonstrated that lower IQ level children profited more from the experimental texts than did upper IQ level students. In the current study, however, there was no relationship between pretest IQ and IQ gain for either control ($\underline{r}$ = .15) or experimental subjects ($\underline{r}$ = .09). Reasons for these findings are not clear.

This completes the discussion of the failure of the programmed texts to enhance intelligence test performance for any of the three experimental groups. These data created, rather than answered questions. Perhaps the most appropriate conclusions from the preceding paragraphs are (1) that the data are confounded, (2) that internalizers were hampered by the programs, while externalizers may have been helped, and (3) that it would probably be worthwhile to conduct further research on this topic. It is not felt that the present study provided evidence which adequately demonstrated that programmed instruction dealing with motivation, anxiety, and test-wiseness was ineffective in increasing measured intelligence.

The remaining paragraphs discuss the second general conclusion made from the data analysis, i.e. that intelligence test performance improved with only practice for internalizers, but deteriorated for externalizers. None of the literature reviewed had investigated practice effects across locus of control. Although the data generated by the control group provided a unique contribution to the literature, they are quite consonant with predictions which would be made from research investigating performance as a correlate of locus of control. Cardinal features of internality, as contrasted with externality, included perseverance (Ducette & Wolk, 1972; Dweck, 1975; Dweck & Repucci, 1973) and achievement (Nowicki & Strickland, 1973; Weiner, Heckhausen, Meyer, & Cook, 1972; Weiner & Kukla, 1970). Perhaps while internalizers used practice to optimize their test performance, externalizers increasingly attenuated their efforts as a function of exposure to questions to which they did not know the answer.

In conclusion, the results of this study indicated that locus of control significantly influenced how practice affected intelligence test performance. Demonstration of efficacy of programmed instruction in enhancing test performance was confounded to the extent that interpretation of the data was difficult. Nonetheless, it did appear that instructions may have helped to prevent performance decrements in externalizing children. At the same time, however, the instructions had a debilitating effect on the performance of internalizers. Future research should continue investigation of methods by which individuals with test-taking handicaps may be helped. Programmed instruction may yet prove to be efficacious in meeting that aim. Investigations may include other standardized tests, other age groups, and other means of presentation. Also should be determined the degree to which the effect of verbal programming is maintained over longer periods of time.

Appendix A

Consent Form

Appendix B

Intellectual Achievement Responsibility Questionnaire

Description of Study

As you know, our culture places a great deal of emphasis on the education and intellectual performance of our children. It is generally considered desirable that children do well in academic tasks. Scientific information is always being collected which will further our knowledge of how we can help children achieve academic success. A topic needing further examination is the relationship of children's beliefs about their school achievements to their intellectual performance.

In the next month, Nancy E. Petty, Psychology Resident, and Ronald S. Drabman, Ph.D. will be conducting a study with fifth grade students at Northside Elementary School. This study (1) will help determine to what extent children's intellectual performance relates to their beliefs in the efficacy of academic effort and (2) will assess instructions as a means of improving intellectual performance.

The research will require 30-60 minutes for each of four sessions spread over a month. On the first day of the study, a 40-minute test of intellectual performance will be administered. About a week later, the children will be given a 30-minute questionnaire to assess their beliefs about the efficacy of their academic efforts. In the last week of the study, the children will read a set of programmed texts on various academic topics (about 60 minutes) and the next day will again be given the 40-minute test of intellectual performance.

All sessions will be conducted during class time. Sessions will be conducted with groups of children; no children will be seen individually.

Appendix C

Experimental Programmed Texts

The information gathered will be for groups of children rather than individual children and will be used only for professional purposes. Information will be treated as confidential and will be coded in order to assure privacy. All materials will remain the property of the investigators.

If you have any questions, please feel free to call Ms. Petty or Dr. Drabman at 968-6560. They will be happy to answer any question which you may have. We hope that you will agree to allow your child to participate in this study and want to thank you in advance for your consideration.

Appendix D

Control Programmed Texts

THE UNIVERSITY OF MISSISSIPPI MEDICAL CENTER
2500 North State Street
JACKSON, MISSISSIPPI 39216

School of Medicine
Department of Psychiatry
and Human Behavior

Area Code 601
968-3753

INFORMED CONSENT FORM

The University of Mississippi Medical Center has no mechanism to provide compensation for subjects who may incur injuries as a result of participating in biomedical and behavioral research. This means while all investigators will do everything possible in providing careful medical care and safeguards in conducting this experiment, there is no way in which the institution can pay for the unlikely occurrence of injury resulting solely from the experiment itself. We will, of course, provide our best medical treatment to which you are entitled for the illness, if any, for which you consulted us whether or not you participate in this study and whether or not you decide to withdraw from the study.

I have read the letter which describes the study to be conducted at Northside Elementary School. I understand the information presented in the letter. I also understand that I may withdraw my permission at any time, and that my child may refuse to participate in the study or may withdraw from the study at any time. I hereby grant my informed consent for my child,

____, to participate in this study.
child's name

____
Signature of parent

____
Date

Principle Investigators:

Nancy E. Petty, M.Ed., M.A. and
Ronald S. Drabman, Ph.D.,
faculty sponsor
University Medical Center
Dept. of Psychiatry & Human Behavior
2500 North State Street
Jackson, Mississippi 39216

Institutional Review Board:

Chairman
Institutional Review Board
University Medical Center
2500 North State Street
Jackson, Mississippi 39216

The Intellectual Achievement

Responsibility Scale (IAR)

1. If a teacher passes you to the next grade, would it probably be

    ____a. because she liked you, or

  I+____b. because of the work you did?

2. When you do well on a test at school, is it more likely to be

  I+____a. because you studied for it, or

    ____b. because the test was especially easy?

3. When you have trouble understanding something at school, is it usually

    ____a. because the teacher didn't explain it clearly, or

  I-____b. because you didn't listen carefully?

4. When you read a story and can't remember much of it, is it usually

    ____a. because the story wasn't well written, or

  I-____b. because you weren't interested in the story?

5. Suppose your parents say you are doing well in school. Is this likely to happen

  I+____a. because your school work is good, or

    ____b. because they are in a good mood?

6. Suppose you did better than usual in a subject at school. Would it probably happen

  I+____a. because you tried harder, or

____b. because someone helped you?

7. When you lose at a game of cards or checkers, does it usually happen

____a. because the other player is good at the game, or

I-____b. because you don't play well?

8. Suppose a person doesn't think you are very bright or clever

I-____a. can you make him change his mind if you try to, or

____b. are there some people who will think you're not very bright no matter what you do?

9. If you solve a puzzle quickly, is it

____a. because it wasn't a very hard puzzle, or

I+____b. because you worked on it carefully?

10. If a boy or girl tells you that you are dumb, is it more likely that they say that

____a. because they are mad at you, or

I-____b. because what you did really wasn't very bright?

11. Suppose you study to become a teacher, scientist, or doctor and you fail. Do you think this would happen

I-____a. because you didn't work hard enough, or

____b. because you needed some help, and other people didn't give it to you?

12. When you learn something quickly in school, is it usually

I+____a. because you paid close attention, or

____b. because the teacher explained it clearly?

13. If a teacher says to you, "Your work is fine," is it

    ____a. something teachers usually say to encourage pupils, or

    I+____b. because you did a good job?

14. When you find it hard to work arithmetic or math problems at school, is it

    I-____a. because you didn't study well enough before you tried them, or

    ____b. because the teacher gave problems that were too hard?

15. When you forgot something you heard in class, is it

    ____a. because the teacher didn't explain it very well, or

    I-____b. because you didn't try very hard to remember?

16. Suppose you weren't sure about the answer to a question your teacher asked you, but your answers turned out to be right. Is it likely to happen

    ____a. because she wasn't as particular as usual, or

    I+____b. because you gave the best answer you could think of?

17. When you read a story and remember most of it, is it usually

    I+____a. because you were interested in the story, or

    ____b. because the story was well written?

18. If your parents tell you you're acting silly and not thinking clearly, is it more likely to be

I-____a. because of something you did, or

____b. because they happen to be feeling cranky?

19. When you don't do well on a test at school, is it

____a. because the test was expecially hard, or

I-____b. because you didn't study for it?

20. When you win at a game of cards or checkers, does it happen

I+____a. because you play real well, or

____b. because the other person doesn't play well?

21. If people think you're bright or clever, is it

____a. because they happen to like you, or

I+____b. because you usually act that way?

22. If a teacher didn't pass you to the next grade, would it probably be

____a. because she "had it in for you," or

I-____b. because your school work wasn't good enough?

23. Suppose you don't do as well as usual in a subject at school. Would this probably happen

I-____a. because you weren't as careful as usual, or

____b. because somebody bothered you and kept you from working?

24. If a boy or girl tells you that you are bright, is it usually

I+____a. because you thought up a good idea, or

____b. because they like you?

25. Suppose you became a famous teacher, scientist, or doctor. Do you think this would happen

    ____a. because other people helped you when you needed it, or

    I+____b. because you worked hard?

26. Suppose your parents say you aren't doing well in your school work. Is this likely to happen more

    I-____a. because your work isn't very good, or

    ____b. because they are feeling cranky?

27. Suppose you are showing a friend how to play a game and he has trouble with it. Would that happen

    ____a. Because he wasn't able to understand how to play, or

    I-____b. because you couldn't explain it well?

28. When you find it easy to work arithmetic or math problems at school, is it usually

    ____a. because the teacher gave you especially easy problems, or

    I+____b. because you studied you book well before you tried them?

29. When you remember something you heard in class, is it usually

    I+____a. because you tried hard to remember, or

    ____b. because the teacher explained it well?

30. If you can't work a puzzle, is it more likely to happen

    I-____a. because you are not especially good at working puzzles, or

____b. because the instructions weren't written clearly enough?

31. If your parents tell you that you are bright or clever, is it more likely

____a. because they are feeling good, or

I+____b. because of something you did?

32. Suppose you are explaining how to play a game to a friend and he learns quickly. Would that happen more often

I+____a. because you explained it well, or

____b. because he was able to understand it?

33. Suppose you're not sure about the answer to a question your teacher asks you and the answer you give turns out to be wrong. Is it likely to happen

____a. because she was more particular than usual, or

I-____b. because you answered too quickly?

34. If a teacher says to you, "Try to do better," would it be

____a. because this is something she might say to get pupils to try harder, or

I-____b. because your work wasn't as good as usual?

This is a special kind of book called a programmed text. It lets you read a little bit. Then it asks questions about what you read. It asks a question on one page. Then it gives you the answer on the next page. That way you can have a chance to think about your answer and know right away if it is right.

HOW TO USE A PROGRAMMED TEXT

Do NOT skip through the booklet. Just take one page at a time.

Write your answer to the question BEFORE looking at the correct answer on the next page. (Spelling doesn't count.) That way you can honestly see for yourself how you are doing. It would be silly to try to fool yourself. After all, you're not being graded on the answers you give. You're just checking yourself on how well you can answer the questions over what you have read.

The following are examples of how questions and answers are set up in a programmed text.

Here is the first question.

5 + 5 = __________

Here is the answer to the first question. 10	Here is the second question. Jimmy ___________ is the President of the United States of America.
Answer to the second question. Carter	Third question. Do you know how to drive an Aggie crazy?
Third answer. Put him in a round room, and tell him to find the corner.	

You know those achievement tests you took this year? And the test you took several weeks ago? The ones that were printed in booklets and you filled in answer spaces on a separate answer sheet? Those are called standardized tests. Standardized tests are big business. They are not like the tests your teachers make. Millions of dollars are spent each year on standardized tests.

Research shows that if you are test-wise, you will do better on standardized tests. You can get better scores just by being test-wise! In other words, if you are test-wise, you can make what you

know count for more. Or, you can sometimes get by with knowing less, if you are test-wise.

The purpose of these booklets is to make you test-wise.

Question 1.

Research shows that if you are (1) t___-wise, you will probably do better on standardized tests.

Answer to question 1. (1) test-wise Remember, spelling doesn't count.	Here is question 2. Sometimes computers grade (2) st__dardized tests.
Answer to question 2. (2) standardized	The purpose of this booklet is to make you (3) t___-w___.
(3) test-wise (Spelling doesn't count.)	(4) Stan________ tests are big business.

(4) stand<u>ardized</u>	If you answered all four of these questions right, that is perfect! You may go on to the next section. If you missed any, read this booklet again. Try again to see if you can get them all right.

How well you do on a standardized test can affect your getting into the college of your choice. Your score on a standardized test can affect your getting a job. You can win money with high standardized test scores. You can get out of taking some subjects in school. Even if you plan to drop out of high school, there is a standardized test that can give you a kind of high school diploma.

High school seniors can win money toward going to college by scoring high enough on a standardized test. You could win a college scholarship with a high score.

Even getting into college usually means making a good score on some standardized test.

Many businesses give standardized tests when you apply for a job. Getting a high test score can help you get the job you want. Businesses usually prefer to pick the person with the highest score for the job.

The Army, Navy, Air Force, and Marines all give standardized tests to their new people. The people with the best scores are offered the most opportunities. People with high scores are more likely to be promoted. The government may even pay them to go to school. If there is a war, people with high scores are less likely to be where there is shooting and bombing.

Many high schools and colleges let you test out of some classes. If you do well enough on a standardized test, they will give you credit without making you take the class.

Of course, you would have to know something about a subject to test out of it. For example, a friend of mine tested out of taking a Texas government class after reading a simple little booklet about Texas government before the test.

Even if you have decided that you want to drop out of high school the day you're 16, there is a standardized test for you. If you score well enough, you earn a diploma. This diploma is as good as a high school diploma. You can get a job that requires a high school diploma even though you dropped out.

Research says that just practicing taking standardized tests sometimes helps people make better scores. Every time you take a standardized test, you tend to get better and faster at marking your answers in answer spaces. You get with the "style" of this kind of testing. Times that you take standardized tests are opportunities to practice a skill that can be helpful to you. Besides, it's kind of a neat change from regular classroom work.

	You may have to take a standardized test to get into (1) c__lege.
(1) college	Some businesses make you take standardized tests in order to get a (2) j__.

(2) job	High school seniors can win (3) m____ in the form of scholarships to college with high standardized test scores.
(3) money	Many (4) col___s make you take entrance tests.
(4) colleges	Sometimes you can (5) t___ out of classes. This means you can get credit for the class without taking it.

(5) test out	People who drop out of high school can earn a (6) dip__ma with a standardized test.
(6) diploma	This diploma means that someone who dropped out of high school can have a (7) j__ that requires a high school diploma.
(7) job	The (8) A___, Navy, Air Force, and Marines give standardized tests to new people.

(8) Army	It could be really important to you to be (9) t___-w___. Every chance you have to take a standardized test you can use as a chance to become more (10) t___-____.
(9) test-wise (10) test-wise	If you answered each question perfectly or missed only one, you really did great and may go on to your next activity. If you missed more than one question, read this booklet again. Then try to see if you can get them all right--or miss no more than one.

The companies that make the standardized tests give them to thousands of people. Some of the people get lots of right answers. Some people get very few right. Most of the people get about half of the answers right.

When you take a standardized test, your score is compared with thousands of scores made by kids your own age. Your score means that you did as well as most of those kids--or you did better or worse than most of them.

It feels different to take a standardized test than to take a teacher-made test. Usually there are questions that even the best students in the class don't know. Sometimes there are time limits, and you just can't finish. Even very high scoring people often feel that they didn't do very well on a standardized test.

This feeling comes from a very big difference between standardized tests and teacher-made tests. The test companies rig the tests so that if you are average, you miss about half of the questions. So here you are. You're used to taking the teacher's tests. You kind of know how you're doing on the teacher's tests. Like you think, "I'm doing great because there's only one question I'm not sure about." Or you feel, "Gee, I'm failing this because I only know about half of the answers. I'm really messing up."

If you're missing half of the questions on the teacher's tests, you really are messing up. BUT IF YOU'RE MISSING HALF ON A STANDARDIZED TEST, YOU'RE OK--AVERAGE. Do you get it? On a standardized test, you're probably doing much better than you think.

When you feel you're doing badly, you sometimes get nervous. Just feeling nervous can sometimes cause you to make mistakes.

Some people just quit trying when they feel that they're messing up. They quit trying maybe because they feel sad or uptight or hopeless. Maybe they feel, "What's the use?" So on a standardized test, even if you feel that you're messing up, HANG IN THERE. YOU'RE

DOING BETTER THAN YOU THINK. KEEP TRYING YOUR BEST. DON'T QUIT.

Research shows that just practicing taking standardized tests sometimes helps people make better scores. Every time you take a standardized test, you tend to get better and faster at marking your answers in answer spaces. You get with the "style" of this kind of testing. Times that you take a standardized test are opportunities to practice a skill that can be helpful to you. Besides, it's kind of a neat change from regular classroom work.

If you're missing half of the questions on a standardized test, you're probably __________

a. doing well
b. about average
c. really messing up

(1) b. about average

The test companies rig the tests so that average means getting about (2) h___ of the questions right.

(2) half	(3) Even the b___ students in the class usually miss a number of questions.
(3) best	Some people, when they feel they're messing up, (4) q___ trying.
(4) quit	On a standardized test, you're probably doing (5) b_____ than you think.

(5) better	Feeling that you're doing badly can make you (6) ner____.
(6) nervous	Feeling too nervous can cause you to make mis-takes. It would be helpful to tell yourself that you're doing (7) b_____ than you think.
(7) better	(8) The best advice here is, no matter how you feel, __________________. a. Keep trying. b. Hang in there. c. Don't quit. d. All of the above.

(8) d. All of the above.	It could really be important to you to be (9) t___-w___. Every chance you have to take a standardized test you can use as a chance to become more (10) t___-____.
(9) test-wise (10) test-wise	If you answered each question perfectly or missed only one, you really did great and may go on to your next activity. If you missed more than one question, read this booklet again. Then try again to see if you can get them all right this time--or miss no more than one.

Some standardized test instructions tell you that guessing could hurt you score--that you shouldn't guess. Actually it is very unlikely that guessing would hurt your score very much. But more important, most of the research shows that guessing is more likely to improve your score. This is especially true for people who are smart. It's also especially true for people who like to be very careful about following the instructions. Do-not-guess instructions actually hurt the chances of smart and careful people. This is because smart, careful people tend not to put down answers unless they are sure they are right. When you think you're right, but are not really positive, go ahead and guess.

If there's only $\frac{1}{2}$ minute left and you aren't close to being done, fill in the rest of the answer sheet without reading the questions. You will get about $\frac{1}{4}$ of such answers correct.

One thing that sometimes hurts people is the directions' saying to be careful marking your answer sheet. It is true that you can confuse the computer that grades answer sheets by being careless. But I've also seen people take lots of time very carefully coloring in the answer space. All that care is NOT necessary. You can get a lower score because you didn't use as much time as you could have to think about the questions. Make quick, dark, wide marks. Here there's a real advantage in having a not-too-sharp pencil. Sharp pencils make skinny lines.

Most standardized tests that you will take are timed. Therefore, using your time well is important. One thing to avoid is spending too much time marking answer sheets. Another thing to avoid is getting hung up on one question. If there is a question that is taking a long time to figure out, skip it. If you have time later, go back to it. It would be helpful to put a mark beside that question to make it easier to find later.

Use all extra time to check answers or answer questions you skipped.

In extra time really take time to figure out the hardest questions. Use every minute.

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(1) If you kind of think you're right, but you're not sure,

a. don't guess; skip the question.
b. answer the question anyway.

(Pick answer choice a or b.)

(1) b. answer the question

Research shows that smart (2) c__ful people are hurt the most by do-not-guess instructions.

(2) careful	At worst, guessing when you don't know the answer will probably NOT (3) h___ your score very much anyway.
(3) hurt	If you just mark answers without even reading the question, you will probably get about (4) ______ of the answers right. (The answer to this question is a fraction.)
(4) $\frac{1}{4}$	One way of losing time in taking a standardized test is marking answer sheets too (5) c___fully.

(5) carefully	Another way of losing time is spending too much time on one (6) q_______.
(6) question	If you (7) m__k the questions you skip, you can find them quickly later if you have some extra time.
(7) mark	A (8) sh___ pencil makes a skinny line. It's better to use a slightly dull pencil.

(8) sharp	It could really be important to you to be (9) t___-w___. Every chance you have to take a standardized test you can use as a chance to become more (10) t___-____
(9) test-wise (10) test-wise	If you answered each question perfectly or missed only one, you really did great and may go on to your next activity. If you missed more than one question, read this booklet again. Then try again to see if you can get them all right this time--or miss no more than one.

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Here is the answer to the first question. 10	Here is the second question. Jimmy ____________ is the president of the United States of America.
Answer to the second question. Carter	Third question. Do you know how to drive an Aggie crazy?
Third answer. Put him in a round room, and tell him to find the corner.	

There are two kinds of colors. One kind is pigment color. Paints, crayons, and dyes are all pigment colors. Pigment colors are sometimes made from plants, animals, and minerals. For example, purple can be made from dandelion roots, crushed snails, or coal tar. Red can be made from the bark of birch trees, certain insects, and also coal tar. We use pigment colors when we paint pictures.

The other kind of color is light color. Shining a light through a colored piece of glass is an example of light color. Some people use a machine to shine different colors of lights on their Christmas trees. Sometimes different colors of lights are used for entertainment. For example, circuses, ice skating shows, and even some school shows shine different colored spotlights on performers.

Almost any color can be made by the proper mixture of only three colors. Those three colors are called primary colors. The primary pigment colors are red, yellow, and blue. Mixing red and yellow paint makes orange. Mixing yellow and blue pigment colors makes green. Mixing red and blue pigment colors makes purple. Mixing all three of the primary pigment colors makes black (or almost black).

The primary light colors are different from the primary pigment colors. Remember, the primary pigment colors are red, yellow, and blue. The primary light colors are red, green, and blue. The primary light colors can also be mixed to make almost any color. You cannot mix light colors with a paint brush. You would have to use two or three different colored spotlights. You could also use two or three flashlights with different colored lenses. Red light and blue light make violet. Red light and green light make yellow. (Red pigment and green pigment certainly do not make yellow, do they?) And if you mix red light, blue light, and green light, you get white light. If you mix the three primary pigment colors, you get black. And if you mix the three primary light colors, you get white.

You can break plain <u>white light</u> into the different colors that make it up. <u>White light</u> is like sunlight or the light that comes from regular light bulbs. A glass <u>prism</u> breaks white light up into different colors. A <u>prism</u> is shaped like a slanted roof on a house. Both ends of the <u>prism</u> are triangles. If you shine <u>white light</u> through a prism, the colors of the <u>rainbow</u> come out the other side. Sometimes just an odd-shaped piece of glass will break white light into the colors of the <u>rainbow</u>.

	Paints, crayons, and dyes are (1) p__ment colors.
(1) pigment	Pigment colors can be made from (2) a__mal, plant, or mineral products.

(2) animal	We paint with (3) p______ colors.
(3) pigment	The other kind of color is (4) l____ color.
(4) light	Three colors which can be used to make any other colors are called (5) p__mary colors.

(5) primary	You get black (or almost black) by mixing primary (6) p______ colors.
(6) pigment	You get white by mixing (7) p______y l____ colors.
(7) primary light	White light can be broken into the colors of the (8) r___b__ by using a prism.

(8) rainbow	Two kinds of colors are (9) p_____t colors and (10) l____ colors.
(9) pigment (10) light	If you answered each question perfectly or missed only one, you really did great and may go on to your next activity. If you missed more than one question, read this booklet again. Then try again to see if you can get them all right this time--or miss no more than one.

Imagine an island with mountains. On one side of the island there are lots of trees and plants. On this side of the mountain, it rains every day. But on the other side of the island, it's a desert, and it practically never rains. The mountains divide the island into a wet side and a dry side. It rains on only one side of the mountains. No, this is not science fiction. It actually happens in Hawaii and in other places too.

Wind blows mostly from northeast to southwest near Hawaii. This wind blows from the northeast across the Pacific Ocean. A lot of water evaporates from the ocean into the warm wind. This moist, tropical wind blows into the northeast or windward side of the mountains.

Then there is only one place for the wind to go. It goes up.

When you go up a mountain, the higher you go, the colder it gets. Some mountains are so high that it snows at the top. It does NOT snow in Hawaii, but the mountains still get colder the higher you go.

It is also a fact that hot air can hold more moisture in it than cold air. That's why clothes dryers use hot air. That's also why moisture from the air condenses on the outside of ice cold glasses of Coke. Anyway, water vapor in the air condenses into drops of water when you cool the air. Cold air can't hold as much water vapor as hot air.

Now, back to that wind in Hawaii. The hot wind evaporates a lot of water into it as it moves across the ocean. This hot, moisture-laden wind gets to the mountain and begins to rise in order to go across the mountains. As it rises, it gets colder. When the wind is cooled down, it can't hold as much moisture. In the cooler air, the moisture condenses into droplets of rain. This is why it rains a lot on the windward side of the mountain.

What about the desert on the leeward side of the mountain? This is really fairly simple. The wind drops all of its moisture as it moves up the windward side of the mountain. By the time the wind gets to the top, it is cool and dry. As the wind moves down the leeward side of the mountain, it warms up, but all the moisture it was carrying was dropped on the windward side. Now the wind becomes a hot, dry wind. That is why the leeward side of the mountain is a desert.

The windward side of the mountain may have thick forest, and the leeward side may be a (1) d___rt.

(1) desert

It rains a lot on the (2) w___ward side of the mountain.

(2) windward	Water evaporates from the ocean into the (3) h__, tropical wind.
(3) hot	As the wind goes up the mountain, it gets (4) c___er.
(4) colder	When the hot, moisture-laden wind reaches the mountain, it has to go (5) __.

(5) up	As the air becomes colder, moisture condenses, and it (6) r___s.
(6) rains	All of the moisture in the air is gone by the time the wind gets to the (7) l__ward side of the mountain.
(7) leeward	The leeward side of the mountain is a (8) d_____.

(8) desert	The side of the mountain that the wind reaches first is the (9) w_______ side. The other side, that is in the "rain shadow," is called the (10) _______ side.
(9) windward (10) leeward	If you answered each question perfectly or missed only one, you really did great and may go on to the next activity. If you missed more than one question, read this booklet again. Then try again to see if you can get them all right.

Do you know why it's hot in the summer and cold in the winter? The earth and all of the other planets travel around the sun. But their orbits are NOT perfect circles. Sometimes earth is closer to the sun than it is at other times. However, that is NOT the explanation for the seasons. Actually, we in Texas have summer when the earth is farthest from the sun. Besides, just distance from the sun could NOT explain why the Southern Hemisphere's seasons are the opposite of our. June, July, and August are our hottest months. But June, July, and August are the coldest months in places like Australia and South America, which are in the Southern Hemisphere. In summary, distance from the sun has

NOTHING to do with the seasons.

The cause of the seasons is the tilt of the earth's axis. Imagine that you stick a pencil right through the middle of an orange. You could hold the pencil and by turning the pencil, you could make the orange turn also. The pencil is like the earth's axis. Imagine a giant pencil sticking through the earth. It goes through the North Pole and the South Pole. And you have become a giant who is holding onto this pencil where it comes through the earth at the South Pole. Now the pencil is the earth's axis. If you pointed the pencil directly at the sun, the hottest part of earth would be the North Pole. All other parts of the earth would kind of

just curve away from the direct rays of the sun. If you held the pencil so that neither pole was pointed or even tilted toward the sun, the hottest part of the earth would be the place on the equator where the sun's rays hit most directly.

Actually, the North Pole is NEVER pointed directly at the sun. The South Pole is never directly pointed at the sun either. However, for several months each year at places along the earth's orbit around the sun, the North Pole does tilt a little toward the sun. At other places the North Pole tilts for several months away from the sun. Of course, anytime the North Pole tilts a little toward the sun, the South Pole tilts a little away from the sun.

Those months when the North Pole tilts a little toward the sun, the Northern Hemisphere has summer, and the Southern Hemisphere has winter. Those months when the North Pole is tilted a little away from the sun, the Northern Hemisphere has winter, and the Southern Hemisphere has summer.

	How close the earth is to the sun does (1) n__ cause the seasons.
(1) not	June, July, and August in the Southern Hemisphere are the (2) ____est months.

(2) coldest	The North Pole is tilted a little away from the sun when we have (3) w_____.
(3) winter	The North Pole is tilted a little toward the sun when we have (4) s_____.
(4) summer	The tilt of the earth's (5) ax__ causes the sun's rays to hit different parts of the earth at different angles.

(5) axis	Rays of the sun hitting very directly cause the (6) h__test weather.
(6) hottest	Winter at the North Pole is both cold and dark because the earth's (7) ____ tilts away from the sun.
(7) axis	Winter at the North Pole is also (8) n_ght.

(8) night	Sometimes the earth's axis doesn't tilt either toward or away from the sun. During these months we have (9) f___ or (10) s_____.
(9) fall (10) spring	If you answered each question perfectly or missed only one, you really did great and may go on to the next activity. If you missed more than one question, read this booklet again. Then try again to see if you can get them all right.

REFERENCES

Battle, E. S., & Rotter, J. B. Children's feelings of personal control as related to social class ethnic group. Journal of Personality, 1963, 3, 482-490.

Benson, J. S., & Kennelly, K. J. Learned helplessness: The result of uncontrollable reinforcements or uncontrollable aversive stimuli? Journal of Personality and Social Psychology, 1976, 34, 138-145.

Bialer, S. Conceptualization of success and failure in mentally retarded and normal children. Journal of Personality, 1961, 29, 303-320.

Braud, W., Wepman, B., & Russo, D. Task and species generality of the "helplessness" phenomenon. Psychonomic Science, 1969, 16, 154-155.

Burhenne, D. P., Kaschak, E., & Schwebel, A. I. The effect of altering administration procedure on four WAIS subtests. Educational and Psychological Measurement, 1973, 33, 663-668.

Butterfield, E. C. Locus of control, test anxiety, reactions to frustration, and achievement attitudes. Journal of Personality, 1964, 32, 355-370.

Clifford, M. M., Cleary, T. A., & Walster, G. W. Effects of emphasizing competition in classroom-testing procedures. Journal of Educational Research, 1972, 65, 234-238.

Crandall, V. C., Katkovsky, W., & Crandall, V. J. Children's beliefs in their own control of reinforcement in intellectual-academic achievement situations. Child Development, 1965, 36, 91-109.

Dawley, H. H., & Wenrich, W. W. Achieving assertive behavior. Monterey, California: Brooks-Cole, 1976.

Dawley, H. H., & Wenrich, W. W. Massed group desensitization in the reduction of test anxiety. Psychological Reports, 1973, 33, 359-363.

Donner, L., & Gurney, B. G. Automated group desensitization for test anxiety. Behavior Research and Therapy, 1969, 7, 1-13.

Douglas, D., & Anisman, H. Helplessness or expectation incongruency: Effects of aversive stimulation on subsequent performance. Journal of Experimental Psychology: Human Perception and Performance, 1975, 1, 674-685.

Dweck, C. S. The role of expectations and attributions in the alleviation of learned helplessness. Journal of Personality and Social Psychology, 1975, 31, 674-685.

Dweck, C. S. Children's interpretation of evaluative feedback: The effect of social cues on learned helplessness. Merrill-Palmer Quarterly, 1976, 22, 105-109.

Dweck, C. S., & Bush, E. S. Sex differences in learned helplessness: I. Differential debilitation with peer and adult evaluators. Developmental Psychology, 1976, 12, 147-156.

Dweck, C. S., & Reppucci, N. D. Learned helplessness and reinforcement responsibility in children. Journal of Personality and Social Psychology, 1973, 25, 109-116.

Ducette, J., & Wolk, S. Locus of control and extreme behavior. Journal of Consulting and Clinical Psychology, 1972, 39, 253-358.

Emery, J. R., & Krumboltz, J. D. Standard versus individualized hierarchies in desensitization to reduce test anxiety. Journal of Counseling Psychology, 1967, 14, 204-209.

Feather, N. T. Effects of prior success and failure on expectations of success and subsequent performance. Journal of Personality and Social Psychology, 1966, 3, 287-298.

Gatchel, R. J., Paulus, P. B., & Maples, C. W. Learned helplessness and self-reported affect. Journal of Abnormal Psychology, 1975, 84, 732-734.

Gatchel, R. J., & Proctor, J. D. Physiological correlates of learned helplessness in man. Journal of Abnormal Psychology, 1976, 85, 27-34.

Geer, J., Davison, G. C., & Gatchel, R. J. Reduction of stress in humans through nonveridical perceived control of aversive stimulation. Journal of Personality and Social Psychology, 1970, 16, 731-738.

Hammer, E. F. Post-hypnotic suggestion and test performance. Journal of Clinical Experimental Hypnosis, 1954, 2, 178-

185.

Heisler, G., & Schill, T. R. An investigation of ways to induce optimal aptitude test performance. Proceedings of the Annual Convention of the American Psychological Association, 1972, 7, 483-484.

Hersch, P. D., & Scheibe, K. E. Reliability and validity of internal-external control as a personality dimension. Journal of Consulting Psychology, 1967, 31, 609-613.

Hiroto, D. S. Locus of control and learned helplessness. Journal of Experimental Psychology, 1974, 102, 187-193.

Hiroto, D. S., & Seligman, M. E. P. Generality of learned helplessness in man. Journal of Personality and Social Psychology, 1975, 31, 311-327.

Hritz, R. J., & Jacobs, S. S. Risk taking and the assessment of partial knowledge. Proceedings of the annual Convention of the American Psychological Association, 1970, 5, 171-172.

Kennelly, K. Personal communication, 1975.

Klein, D. C., & Seligman, M. E. P. Reversal of performance deficits and perceptual deficits in learned helplessness and depression. Journal of Abnormal Psychology, 1976, 85, 11-26.

Krantz, D. S., Glass, D. C., & Snyder, M. L. Helplessness, stress level, and the coronary-prone behavior pattern. Journal of Experimental Social Psychology, 1974, 10, 284-300.

Lefcourt, H. M. Internal vs. external control of reinforcement: A review. Psychological Bulletin, 1966, 65, 216-220.

Maier, S. F., & Testa, T. Failure to learn to escape by rats previously exposed to inescapable shock is partly produced by associative interference. Journal of Comparative and Physiological Psychology, 1975, 88, 554-564.

Meichenbaum, D. H. Cognitive modification of test anxious college students. Journal of Consulting and Clinical Psychology, 1972, 39, 370-380.

Milholland, J. E. Otis-Lennon Mental Ability Test. In O. K. Buros (Ed.), The Seventh Mental Measurements Yearbook. Highland Park, New Jersey: Gryphon Press, 1972.

Miller, W. R., & Seligman, M. E. P. Depression and learned helplessness in man. Journal of Abnormal Psychology, 1975, 84, 228-238.

Mischel, W., Zeiss, R., & Zeiss, A. Internal-external control and persistence: Validation and implications of the Stanford Preschool Internal-External Scale. Journal of Personality and Social Psychology, 1974, 29, 265-278.

Mowrer, O. H., & Viek, P. An experimental analogue of fear from a sense of helplessness. Journal of Abnormal and Social Psychology, 1948, 43, 148-154.

Nowicki, S., & Strickland, B. R. A locus of control scale for children. Journal of Consulting and Clinical Psychology, 1973, 40, 148-154.

Otis, A. S., & Lennon, R. T. Otis-Lennon Mental Ability Test: Manual for administration. New York: Harcourt, Brace, & World, 1967.

Overmier, J. B., & Seligman, M. E. P. Effects of inescapable shock upon subsequent escape and avoidance responding. Journal of Comparative and Physiological Psychology, 1967, 63, 28-33.

Padilla, A. M., Padilla, C., Ketterer, T., & Giacalone, D. Inescapable shocks and subsequent avoidance conditioning in goldfish (Carrasius auratus). Psychonomic Science, 1970, 20, 295-296.

Petty, N. E. Unpublished study, 1971.

Petty, N. E., & Harrell, E. H. Effect of programmed instruction related to motivation, anxiety, and test-wiseness on group IQ test performance. Journal of Educational Psychology, 1977, 69, 630-635.

Phillips, B. N. School stress as a factor in children's responses to tests and testing. Journal of Educational Measurement, 1971, 8, 21-26.

Ray, W. J., & Katahn, M. Relation of anxiety to locus of control. Psychological Reports, 1968, 23, 1196.

Roth, S., & Kubal, L. Effects of noncontingent reinforcements on tasks of differing importance: Facilitation and learned helplessness. Journal of Personality and Social Psychology, 1975, 32, 680-691.

Rotter, J. B. Social learning and clinical psychology. New

York: Prentice-Hall, 1954.

Rotter, J. B. Generalized expectancies for internal versus external control of reinforcement. Psychological Monographs, 1966, 80, (1, Whole No. 609).

Rotter, J. B., & Mulry, R. C. Internal versus external control of reinforcement and decision time. Journal of Personality and Social Psychology, 1965, 2, 598-604.

Ryckman, R. M., & Sherman, M. F. Relationship between self-esteem and internal-external control for men and women. Psychological Reports, 1973, 32, 1106.

Seligman, M. E. P. Can we immunize the weak? Psychology Today, June, 1969, 42-44.

Seligman, M. E. P. Helplessness: On depression, development, and death. San Francisco: W. H. Freeman, 1975.

Seligman, M. E. P., & Beagley, G. Learned helplessness in the rat. Journal of Comparative and Physiological Psychology, 1975, 88, 534-541.

Seligman, M. E. P., & Maier, S. F. Failure to escape traumatic shock. Journal of Experimental Psychology, 1967, 74, 1-9.

Seligman, M. E. P., Rosellini, R. A., & Kozak, M. J. Learned helplessness in the rat: Time course, immunization, and reversibility. Journal of Comparative and Physiological Psychology, 1975, 88, 542-547.

Seward, J., & Humphrey, G. L. Avoidance learning as a function of pretraining in the cat. Journal of Comparative and Physiological Psychology, 1967, 63, 338-341.

Sherriffs, A. D., & Boomer, D. S. Who is penalized by the penalty for guessing? Journal of Educational Psychology, 1954, 45, 81-90.

Slakter, M. J. Generality of risk taking on objective examinations. Educational and Psychological Measurement, 1969, 29, 115-128.

Smith, R. E., Ascough, J. C., Ettinger, R. F., & Nelson, D. A. Humor, anxiety, and test performance. Journal of Personality and Social Psychology, 1971, 19, 243-246.

Suinn, R. M. The desensitization of test anxiety by group and individual treatment. Behavior Research and Therapy, 1968, 6, 385-387.

Sweet, R. C., & Ringness, T. A. Variations in the intelligence test performance of referred boys of differing racial and socioeconomic backgrounds as a function of monetary reinforcement. Journal of School Psychology, 1971, 9, 339-409.

Terman, L. M., & Merrill, M. A. Stanford-Binet Intelligence Scale: Manual for the third revision. Boston: Houghton Mifflin, 1960.

Terman, L. M., & Merrill, M. A. Stanford-Binet Intelligence Scale: Manual for the third revision. Boston: Houghton Mifflin, 1972.

Terrace, H. S. Errorless transfer of a discrimination across two continua. Journal of the Experimental Analysis of

Thornton, J. W., & Jacobs, P. D. The facilitating effects of prior unescapable stress on intellectual performance. Psychonomic Science, 1972, 26, 185-187.

Tiber, N., & Kennedy, W. A. The effects of incentives on the intelligence test performance of different social groups. Journal of Consulting Psychology, 1964, 28, 187.

Tuinman, J. J., Farr, R., & Blanton, E. E. Increases in test scores as a function of material rewards. Journal of Educational Measurement, 1972, 9, 215-223.

Votaw, D. F. The effect of do-not-guess directions upon the validity of true-false or multiple choice tests. Journal of Educational Psychology, 1936, 27, 698-703.

Watson, D. Relationship between locus of control and anxiety. Journal of Personality and Social Psychology, 1967, 6, 91-122.

Weiner, B., Heckhausen, H., Meyer,W., & Cook, R. Causal ascriptions and achievement behavior: A conceptual analysis of effort and reanalysis of locus of control. Journal of Personality and Social Psychology, 1972, 21, 239-248.

Weiner, B., & Kukla, A. An attributional analysis of achievement motivation. Journal of Personality and Social Psychology, 1970, 15, 1-20.

Yates, R., Kennelly, K., & Cox, S. H. Perceived contingency of parental reinforcements, parent-child relations, and locus of control. Psychological Reports, 1975, 36, 139-146.