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AUTHOR	Hill, Russell A.
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ABSTRACT

The author hypothesized that (a) an analysis of the research literature would lead to identifying the behaviors and dispositions associated with successful goal-setting and goal achievement. He further hypothesized that (b) based on these data, an instructional package could be constructed to teach children a skill-strategy based on selected behaviors and dispositions identified as being central to achievement. Following an analysis of the relevant literature, the author selected major achievement behavious and developed Achievement Competence Training (ACT) based on those behaviors to instruct learners in a strategy for setting and achieving goals. The effects of ACT and an alternate set of instructional materials upon goal-setting behavior, perceived locus of control, and self-evaluation were tested in three fifth-grade classrooms in each of 33 schools. ACT significantly increased belief in internal control as compared with the alternative Treatment and an Uninstructed Control group. Students using ACT also demonstrated (a) greater tendency to prescribe self-directed solutions to problems; (b) lower (more realistic) personal performance standards for favorable self-evaluation; and (c) less discrepancy between self-predicted performance and personal standards for good performance. In addition to these measurement data, interviews, observations, and anecdotes reflected positive results of ACT. Results are discussed in relation to a theoretical model of achievement in which achievement behavior is sustained through covert self-reinforcements. (Author)

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TEACHING CHILDREN TO USE ACHIEVEMENT BEHAVIORS AND DISPOSITIONS FOR SETTING AND ACHIEVING PERSONAL GOALS[1]

Russell A. Hill[2]

HUMANIZING LEARNING PROGRAM

RESEARCH FOR BETTER SCHOOLS, INC.

Maximizing student achievement remains the major charge of our public schools. Most efforts to enhance achievement consist of new or improved techniques or materials for instructing students in specific subject matter. Few systematic attempts have been made to instruct school-age children in general behaviors associated with successful achievement across subject areas. The present study describes the results of an instructional program based on the hypotheses that general achievement behaviors can be identified and taught.

Theoretical Background

What characteristics distinguish successful achievers from their less-achieving agemates of comparable general ability? Some of these characterisitcs appear to be specific behaviors, while others are broad attitudes or dispositions. One dispositional characteristic associated with achievement is the concept of perceived locus of causality for behavior, first introduced by Heider (1958). According to this concept, individuals can be scaled on a continuum ranging from belief in internal locus of control (that is, belief that one can control and direct one's life) to belief in external locus of control (that is, belief that external forces control one's life).
Since then numerous theoreticians have developed related theories for achievement in which belief in internal locus of control figures as an essential disposition upon which achievement hinges. A few attempts have been made

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to enhance achievement by increasing students' perceptions of events as "internally" controlled (de Charms, 1972; Lifshitz, 1973; Nowicki & Barnes 1973; Pierce, Schauble, & Farkas, 1970; Reimanis, 1970). This sense of agency, of being able to act and to interact effectively with one's environment, correlates positively with school achievement (Coleman, Campbell, Hobson, McPartland, Alexander, Weinfeld, & York, 1966). Building these skills into a student's repertoire may be a powerful new approach for student success. In addition, a review of over 90 studies support the contention that a belief in internal control is significantly correlated with personal well-being and socially desirable behavior (Chapman & Hill, 1971; Hill, Chapman, & Wuertzer, 1974).

Goal-setting behavior has been found to have a positive effect upon achievement. Gaa (1973) obtained increases in reading achievement as a result of training children in setting goals. Steers and Porter (1974), in a review of the literature, stated that there is strong and consistent evidence that the act of setting definite goals results in increased performance. Kolb, Winter, and Berlew (1968) reported that in two studies personal-behavior change was significantly influenced by goal-setting behavior.

Individuals' evaluation of their accomplishments is another important achievement characteristic. Katz (1968) proposed a model of achievement in which the quality of self-reinforcements determines whether achievement striving is sustained. He postulated that in the absence of external reinforcements individuals make their own evaluations of good or poor performance. Low achievers tend to be those who judge their own performance unfavorably and hence terminate or reduce their striving for achievement. Katz described instances in which habitual low achievers evaluated themselves negatively on a school-like task even though their actual attainment levels on the task were no different from those of habitually good students who evaluated themselves favorably on the task. Thus Katz perceives the individual's personal standard for good performance as contributing in important ways to achievement behavior,

Eiszler and Morrison (1972) provided further evidence in support of the Katz position. They demonstrated that students who more frequently reported favorable self-evaluations on a school-like task were also more likely to have higher grades in school, to have higher levels of expected performance on the task, to have greater expectations for attaining their personal standards of good performance, and to exhibit greater congruence between their personal standards for good performance and their actual attainment levels.

Substantial research and clinical experience have demonstrated that several other behaviors and dispositions correlate with successful achievement. To begin with, certain perceptions of self characterize achievers. We have already mentioned belief in internal locus of control. In addition, high achievers have a clarity of self definition (Hirsch & Costello, 1967) and generally high self-esteem (Coopersmith, 1969; Gill, 1969). They identify with positive-role models (Kolb, 1965). Their self-ideal relationship is closer than that of low achievers (Quimby, 1967). They have self-insight related to achievement (Stevens, 1956) and view themselves as competent (Mukherjee & Sinha, 1970).

High achievers also tend to have certain attitudes. They are interested in achievement and talk about it (McClelland, Clark, & Lowell, 1953). They value achievement (Murkherjee, 1968). In one sense, they are achievement oriented (Reitman, 1960). They express pride in accomplishment (Atkinson & Reitman, 1958) and pride and pleasure in success (Winterbottom, 1958). They value work and imagination more than do low achievers (Pierce, 1959). They place value on skills (Birney, Burdick, & Teevan, 1969). They believe that hard work will pay off (Coleman et al., 1966). They have a desire for autonomy (Veroff, 1969). They display independence and both a reality orientation (Greenberg, Gerves, Chall, & Davidson, 1965) and a future orientation (Cottle, 1969).

Typically high achievers select tasks which have certain characteristics. First, they seek latitude, that is, they seek tasks which give them greater autonomy.

(Litwin & Stringer, 1968; Rosen & D'Andrade, 1959). They respond to situations where they believe personal efforts will make a difference (McClelland, 1961). They seek situations where they can set their own standards (McKeachie, 1968). They are intrigued by tasks which are tests of skill rather than luck (Lefcourt, 1966; Locke, 1965).

Once having selected a task, achievers display certain task attitudes and behaviors. They have high expectations of success (Crandall, Katkovsky, & Preston, 1962). They express an aspiration level (Kausler, 1959). They focus on the positive reinforcements of a task (Crandall, 1968). As already stated, they are realistic and choose moderate-risk levels of behavior. They exhibit low goal discrepancy (Vitz, 1957). They specify goals and view tasks as a test of skill (Lefcourt, 1966; Locke, 1965).

Achievers take the initiative in searching their environment (McClelland & Winter, 1969). They are concerned with formulating concrete action for goal attainment (de Charms, Collins, Jackson, & Shea, 1969). They often refuse help, even when offered (Feather, 1966). Their time orientation is straightforward, concerned with economy, and focused on goal-directed activities (Heckhausen, 1967). Green and Knapp (1959) indicated that achievers are economical in their use of time. They are willing to postpone gratification (Heckhausen, 1967). They are task-persistent (Feather, 1966). They learn to improve their behavior in task situations where learning can affect performance (Lowell, 1952). They work harder following failure than following success (Smith, 1964). Finally, they return to complete unfinished tasks (Heckhausen, 1967).

Quality of self-evaluation also significantly characterizes high achievers. They feel responsible for both success and failure (Crandall, 1965; McGhee & Crandall, 1968). They have greater critical ability (Greenberg et al., 1964). They seek and use feedback (Kolb et al., 1968; Meacham, 1965). They keep records of progress toward goals (McClelland, 1965) and plan formal periodic opportunities to evaluate (Duel, 1958; Kipnis & Resnick,

1969). They make constructive use of information about their failures and successes (Birney et al., 1969).

Hypotheses

The author hypothesized that (a) a synthesis of these research data and clinical reports could provide a profile of the behaviors and attitudes that characterize successful achievers. He further hypothesized that (b) an effective instructional program teaching children to use these achievement behaviors and to model achievement dispositions could be constructed on the basis of such data. The Achievement Competence Training (ACT) (Hill, 1975) instructional materials represent an attempt to design and test such a program. The field evaluation report presents evidence concerning the effectiveness of ACT and supports the validity of the hypotheses that achievement behaviors and dispositions can be identified and taught.

Description of ACT

Content

ACT is a multimedia learning package for late elementary school children which provides instruction in a six-step strategy for goal-setting and goal attainment. ACT is also intended to instill the dispositional qualities characteristic of achievers. A belief in internal locus of control and higher self-esteem are important desired outcomes of practicing the achievement strategy.

The essense of the instructional materials is reflected in the title words. Achievement means the attainment of goals drawn from the full range of a child's hopes, plans, and desires. Competence assumes that a child can become more skillful in setting and achieving his goals by learning to utilize the curriculum strategy. Training indicates that the child learns these skills by applying them in a wide variety of experiences, culminating in an ability to apply them to his own immediate life interests.

The six steps of the strategy are (Hill, 1975): Study Self: ability to state and cite supporting data for personal past achievements and strengths; Get Goal Ideas: ability to generate goal ideas which are related to personal data; Set a Goal: ability to formulate and to commit oneself to goals which are desirable, medium risk, and specific in kind, time, and number; Plan: ability to name and order tasks, seek information, and replan; Strive: ability to envision success; persist in action; and employ affective techniques such as recalling past achievement, remembering heroes, and considering competition (e.g., with another, with past performance, with some standard of excellence); Evaluate: ability to determine whether goals have been attained, identify what was done well and what needs improvement, and identify growth in use of achievement skills.

Format

ACT consists of 24 lessons, each divided into three parts which last 15 to 25 minutes each. The teacher may use each segment separately at different times or on different days or combine the three segments in one time period. The full package is designed to be used for 2-1/2 hours per week for one-half of a school year. Each lesson is administered by an audio cassette tape which gives instructions in conjunction with printed student journals. Additional materials and activities (e.g., games) are also included. Teacher orientation is desirable but not necessary. A 2-1/2 hour workshop package is available.

Field-Test Description

Preliminary pilot field-testing of ACT took place during 1971-72, the findings from which were used to modify and refine the program.

Objectives

The project entered the final stage of formative evaluation in 1973, with the following objectives:

1. To assess the functioning and usability of ACT over a delimited range of types of students and teachers;
2. To determine the effectiveness of ACT in teaching competence in the use of the achievement strategy and its component skills over a delimited range of types of students;
3. To obtain comparative data on the usability and effectiveness of ACT and a published set of instructional materials (Curriculum X) dealing with similar concepts;
4. To obtain subjective evaluations by teachers and students of ACT;
5. To use the information obtained in the field test to revise ACT prior to publication.

The comparison program, Curriculum X, was selected from published curriculum materials dealing with parallel affective constructs and appropriate for use with fifth- and sixth-grade children. Other criteria for selection were that the comparison program be reasonably priced and that it be educationally worthwhile in its own right.

Sample

Students from three fifth-grade classes in each of 33 schools in the Philadelphia metropolitan area participated in the field test (N=99). In each school one fifth-grade class received ACT; a second class received Curriculum X (comparison package); and a third class received no special program and is referred to as (uninstructed) Control. Classes within each school were randomly assigned to the three groups.

Schools were classified into three average family-income levels (Table 1). These descriptive income classifications were not part of the analysis of variance design and were used only as a basis for correlating estimated family-income level with mastery of ACT content.

Insert Table 1 about here

A further characteristic was that Ss were drawn only from those schools where the fifth-grade class average reading level was at or above the 3.5 grade level.

Method

Special Conditions of the Field Test

The field test was planned largely as a "hands-off" test, although under optimal conditions. Therefore, certain guidelines for use of the package were specified, and the use of the package in each classroom was monitored

periodically by field managers. Both the ACT and Curriculum X programs are accompanied by teacher's manuals to enable the teacher to conduct them without formal training. However, to achieve optimal testing conditions, orientation and training sessions were conducted with teachers in both programs. All teachers were also asked to fill out a reaction form after each lesson, and ACT teachers were further asked to tabulate student responses to selected items on lesson tests.

Time guidelines for the use of ACT and Curriculum X were suggested. Teachers were asked to devote approximately 2 to 2-1/2 class hours per week to program activities. ACT took an average total time of 32 class hours to administer. Total duration of the field test varied between 5 and 7 months, with Curriculum X generally being completed in 4 to 5 months.

Measures

During the field test, data were collected to assess both the usability and the effectiveness or impact of ACT (Table 2). This report focuses primarily on the data pertaining to effectiveness of ACT, with some discussion of procedures and outcomes in the assessment of usability. The data on usability were collected from field managers' reports, reaction forms, interviews, anecdotal reports, and teacher observation. Assessment of the effectiveness of ACT was concerned both with testing for student mastery of vocabulary, concepts, and skills as taught in ACT and with testing for enhanced competence and attitudes related to achievement. Mastery of program content was measured by tests included within ACT and by a criterion-referenced end-of-program Mastery Test in which students were asked to recall and apply material from the course. However, most of the testing efforts were devoted to looking for effects of the program upon students' actions or feelings, which could only be evaluated by comparing students who had and had not been in the ACT program. Other measures,

Insert Table 2 about here

not aimed at particular achievement steps, were intended to get at generalized dispositions or attitudes: self-evaluation of Personal Action Inventory and Children's Locus of Control Scale.

Two measures were used as sources of information which might explain differences among children in the effectiveness of the program: The California Test of Mental Maturity (CTMM) and the Test Anxiety Scale for Children.

Several kinds of clinical data were also collected, including random structured interviews with children and teachers; anecdotal reports by teachers, children, parents, and school administrators; and teacher lesson reports and observations of classroom activities. These data provided a qualitative description of the use and effects of the materials (Beckingham, Davis, Kekalos, & Schmuckler, 1974).

Testing Procedures

Table 3 shows the schedule for administering the measures of ACT effectiveness. The items in the ACT journals, the lesson tests, and the ACT Mastery Test were administered only to the ACT classes. The remaining tests were administered to the students in ACT, Curriculum X, and the Control classes. Data on the California Test of Mental Maturity were available from 25 schools. All other tests were administered in all 33 schools.

Insert Table 3 about here

Statistical Analysis of Data

The analysis design for the assessment of program effectiveness was a two-factor design with Treatment as a three-level factor (ACT, Curriculum X, and Control) and Schools as a blocking factor, with 33 levels in most

instances. Hypotheses pertaining to Treatment effects were tested by means of two planned comparisons. In the first comparison ACT and Curriculum X were averaged and contrasted with the Control group in order to detect an effect attributable to being in one of the Experimental programs. In the second comparison ACT was contrasted with the Curriculum X classes in order to detect advantages to being in one Experimental program as opposed to the other Experimental program. Thus the two planned comparisons taken together provided tests of the two sources of effects of greatest interest in the Treatment factor: effects attributable to the Experimental program in general and effects attributable specifically to ACT. An alpha level of .05 was used in performing the planned comparisons. In addition to the planned comparisons, Dunnett's Test was performed contrasting the Control group separately with each of the Experimental groups. Because Dunnett's Test was performed as a post hoc analysis over and above the planned comparisons, a .01 alpha level was used in order to minimize the overall error rate per hypothesis. The class mean was used throughout as the unit of analysis. This mean was estimated using a sample of 14 students from each classroom.

Results

Preprogram Comparison Among Groups

Means for the four pretests and the IQ test are shown in Table 4. Univariate analysis of variance performed on these five measures revealed no significant or near-significant differences between the three groups prior to the field test.

Insert Table 4 about here

Student Mastery of Content in the ACT Instructional Materials

Results pertinent to student mastery of the vocabulary, concepts, and skills taught in ACT consist of performance on items in the ACT journals and

lesson tests and performance on the ACT Mastery Test. Data on student performance on items in the journals and lesson tests were originally collected for 10 students from each of the 33 ACT classes. However, since it was discovered that some teachers were not adhering to the prescribed scoring criteria, a decision was made to sacrifice questionable data and use only accurate data from fewer schools. Toward the end of the school year the field managers collected journals and lesson tests from 10 ACT classes and retabulated student performance; however, due to lost or misplaced papers many of the tabulations were based on fewer than the specified 10 students per class.

Figures 1 and 2 portray student performance on selected items from the ACT journals and lesson tests.

Insert Figures 1 and 2 about here

Performance on the ACT Mastery Test (Table 5) is related to the six ACT achievement steps.

Insert Table 5 about here

Summer Camp Test, Locus of Control Scale, and Self-Evaluation

Univariate analyses of variance on the posttest versions of the Summer Camp Test (which assesses ability to apply concepts of self-direction as taught in ACT) and the Locus of Control and Self-evaluation measures revealed that ACT scores were significantly higher than Curriculum X scores for all three measures. On the other hand, the combination of ACT and Curriculum X differed significantly from the Control group only on the Locus of Control measure. However, Dunnett's Test contrasting the Control group separately

with the two Experimental groups revealed that ACT was significantly higher than the Control mean on both the Locus of Control and Summer Camp measures (Table 6).

Insert Table 6 about here

Connect the Numbers Game

The Connect the Numbers Game is a situational test in which the student is provided with feedback on his performance on a task over several trials and given an opportunity to establish his own level of predicted performance and his own standard for doing a good job. The following variables were analyzed for the Connect the Numbers Game: Number Correct; Attainment Discrepancy (student's actual attainment minus his predicted attainment); Standard Discrepancy (student's personal standard for good performance minus his prediction); Risk (student's attainment prediction minus actual attainment on a previous trial).

Insert Table 7 about here

Means for variables in the Connect the Numbers Game are shown in Table 7. No Treatment differences were found for Number Correct or for Attainment Discrepancy. In the statistical analyses large and significant differences between Treatments were found on Standard Discrepancy. Both planned comparisons were statistically significant, with the mean for ACT lower than the mean for Curriculum X, and the combined mean for ACT and Curriculum X lower than the Control mean. The ACT mean was also significantly lower than the Control mean. These results show that ACT students had a smaller

discrepancy than other groups between their personal standards for good performance and their predicted performance.

The term "Risk" refers to the degree to which students established an expected level of performance for their next attempt that exceeded their prior performance. Theory and research in achievement behavior portray the high achiever as one who on each successive repetition of a task attempts to perform at a slightly higher level of proficiency, so-called medium-risk-taking. Conversely, the lower achiever, in whom the fear of failure is stronger than the motive to succeed, tends to set either extremely high or extremely low goals in relation to prior performance. Both high-risk-taking and low-risk-taking are regarded as defensive strategies for avoiding responsibility for failure.

In comparing the risk-taking strategies of different groups it is common to compare the variances of risk scores instead of, or in addition to, the average risk scores (e.g., Stake, 1973). The risk levels expected of high achievers are in the moderate range between the high- and low-risk levels expected of low achievers. The average of the high- and low-risk scores of low achievers may equal the average of the medium-risk scores earned by high achievers. Thus while there may be no difference in the average values of risk scores for high- and low-achieving groups, one would expect to find a narrower range of risk scores in the high-achieving groups.

In the analysis of the Risk variable (Table 8) the expected differences among Treatments in the distribution of Risk scores were not observed. On the other hand, differences were found between Treatments in the mean values of Risk scores. The combined mean for ACT and Curriculum X students was found to be significantly higher than the Control mean. The contrast between ACT and Control approached but did not reach significance.

Insert Table 8 about here

Contrary to expectations, the effect of the achievement-training programs on risk behavior was to raise the level of risks taken by students, in particular to produce a shift toward the higher end of the medium-risk range. Since all three groups seemed to be composed of predominately medium-risk-takers, the effect of training seems to have been to slightly elevate Risk scores without promoting the strategy of setting unrealistic goals.

Scrambled Words Game

The Scrambled Words Game is identical in format to Connect the Numbers Game, although the task was to solve anagrams. The four variables for the Connect the Numbers Game were analyzed, plus the following three variables:

1. Prediction--the number which the student says he expects to get correct
2. Standard--the number which the student says he would have to attain to feel that he had done a good job
3. Standard-attainment Discrepancy--the discrepancy between the student's personal standard and his actual attainment

Statistical analysis of the means for the seven variables (Table 9) and variances for the Risk variable (Table 10) detected no Treatment effects for Number Correct. The ACT group had a significantly lower (i.e., more negative) score than did the Curriculum X group for Attainment Discrepancy. However, the ACT group did not differ significantly from the Control group on Attainment Discrepancy. On the Risk variable ACT classes had a higher mean than did Curriculum X classes, but there were no differences between ACT and Control.

Insert Tables 9 and 10 about here

All the relevant contrasts were significant for Standard Discrepancy. ACT students had a smaller discrepancy than did either Curriculum X or Control

students between their personal standards for good performance and their predicted performance.

For the Prediction variable ACT students had a significantly higher mean than did Curriculum X students, although their mean did not differ from that of Control students. On the Standard variable the combined mean for ACT and Curriculum X students was significantly lower than the mean for Control students, indicating a trend for students in the Experimental programs to establish their personal standards for doing a good job at a somewhat lower level. The contrast between ACT and the Control group came extremely close to but did not quite reach statistical significance. A similar pattern of effects was found for Standard-attainment Discrepancy. That is, the combined mean for ACT and Curriculum X was significantly lower than the Control mean. The difference between ACT and Control approached but did not reach significance. These effects describe a trend for students in the Experimental programs to establish a personal standard for good performance closer to what they were actually able to attain as compared with their Control peers.

Teacher Interviews

A limited number of teachers and children were randomly chosen to participate in structured interviews following the field test. Eleven teachers were asked to respond to selected questions (Table 11) and to rate responses on a positive-negative continuum.

Insert Table 11 about here

Student Interviews

Individual student interviews were conducted in nine ACT classes with four students per class (Table 12). The interviewer assessed the attitude expressed in the student's response and rated responses on a positive-negative continuum.

Insert Table 12 about here

Observations

Evaluation staff members made periodic visits to ACT and Curriculum X classrooms. Observers made records of whether the materials were being used, how they were being used, and student reactions and activities (Beckingham et al., 1974). All but two of the ACT teachers completed the full couse of materials. Thirty two of the 33 classes carried out a class project using ACT strategy and materials. These activities were extremely varied and reflected the children's energetic use of the brainstorming technique taught in the second strategy step. The following two examples suggest the range of activities.

1. The goal of this class was to have a kids-as-teachers day for grades 1-4. The children gained insight into some of the problems teachers face and were amazed at the amount of planning and stamina necessary to teach an interesting lesson. The teacher said, "Some were amazed that lessons they had planned for hours took only minutes to teach. Some children were able to verbalize about their increased understanding of and appreciation for all the work teachers must do. Several made comments about wanting to be teachers."

2. The class goal was to "have a charity bazaar with games, chances, white elephants, refreshments, exhibits, and handicrafts." The bazaar was successful, and the children raised $97.95, which they gave to a nearby school for cerebral-palsied children. As a result of this initial contact, some class members began to work with the cerebral-palsied chidren on a semiregular basis.

Anecdotes

ACT teachers and one principal member of the ACT evaluation staff collected over 150 anecdotes concerning use of and reaction to the ACT materials. These anecdotes include reports from children, teachers, parents, and administrators (Beckingham et al., 1974). Two typical anecdotes are reported below:

1. The teacher reported that Debbie told her that she had been pleasantly surprised with the results of the Strength Survey, not having realized how many strengths she had. Debbie also said that learning about risk had made her realize that some of her work for a social studies project was really too easy. In one instance, she had redone a report to meet her higher standard.

2. The teacher reported that one of his reading groups was to put on a play for the class. Some members of the group were in the ACT class. At first the children

bickered and argued about how to produce the play; finally a boy who had been an ACT group leader suggested that they choose a group leader to get things written down. The others agreed, and the group began to plan constructively. It was obvious, the teahcer said, that the initiative was taken by the ACT children.

Teacher Lesson Reports

Teacher lesson reports turned in to the evaluation staff by Curriculum X and ACT teachers focused almost entirely on the operational aspects of the lesson and the reactions of the children to specific aspects of lessons (Hill & Campiglia, 1974). The information was valuable during revision of the materials.

Discussion

Student Mastery of Content

In their ACT lessons and lesson tests, students showed marked improvement in their ability to list personal past achievements, strengths, goal ideas, and tasks related to a goal. It may be argued that these demonstrated changes reflected practice effects more than real increases in self-knowledge and goal-setting skills, that students may have had different levels of motivation, and that they may have understood the task differently

on posttests as compared with pretests. Nevertheless, the lesson-tests results showed that students made the desired responses after relevant instruction.

Performance on the ACT Mastery Test was somewhat less impressive, although the pattern of results seemed to reflect the instructional emphases of the package. During the field test 78.4% of the students earned at least 80% of the points on the ACT Mastery Test relating to the achievement step Set a Goal. All but one of the possible eight points in this area pertained to specific goal statements--a crucial aspect of goal-setting in the program. Performance was very good for items relating to the Study Self step, satisfactory for the Plan step, and poor for the Evaluate and Strive steps.

One explanation for these uneven results may be that the Mastery Test was administered in many classes before students had completed the review unit. Thus, students may have performed most poorly on the Strive and Evaluate achievement steps because in most cases these were not reviewed until after the Mastery Test was given. A second explanation may be that instruction was less effective for the Strive and Evaluate steps. Post hoc examination suggests that conceptual confusion may also have been a contributing factor to poor results. These lessons have been rewritten for the first commercial edition.

Summary of Affective and Performance Indicators

Statistically significant differences favoring ACT students over Curriculum X and Control students cannot be attributed to change variations between the groups; they are clearly attributable to students' participation in ACT. ACT students demonstrated the following attitudes or behaviors to a greater degree than did their agemates:

1. greater belief in internal locus of control
2. greater tendency to prescribe self-directed solutions to problems

3. less discrepancy between self-predicted performance and self-set standard of good performance
4. lower personal standards for good performance, i.e., more realistic standard for success
5. a standard toward slightly higher levels of risk in goal-setting

These assertions must be further elaborated to be made consistent with the total findings. In considering all statistically significant effects (Table 13), it is puzzling that on some measures the ACT group differed significantly from the Curriculum X group but not from the Control group. Since the Curriculum X group was included in the evaluation design as a safeguard against incorrectly attributing posttest differences to the specific instruction and experiences provided through ACT, it was anticipated that fewer differences would be detected between ACT and Curriculum X than between ACT and the Control group, with the former contrasts being critical for recommending ACT over the alternative program. One possible explanation is that certain features intrinsic to Curriculum X produced effects contrary to the desired effects. A second possibility is that an awareness in the Curriculum X teachers--and perhaps students--

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Insert Table 13 about here

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of being assigned to the less-preferred program may have interfered with potential benefits of that program as compared with Control classrooms. Whatever the explanation, Curriculum X failed in large measure to produce the anticipated effects. Therefore it seems that the greatest confidence about outcomes should be reserved to those measures on which ACT differed significantly from both Curriculum X and the Control group.

Self-Direction and Locus of Control

On both the Summer Camp Test (cognition) and the Children's Locus of Control Scale (belief system) the ACT group exceeded the other two groups to a greater degree than could occur by chance. The trend was for ACT students to be more internally controlled and self-directed in prescribing solutions to problems (Figures 3 and 4).

Insert Figures 3 and 4 about here

Self-Evaluation

On the Self-evaluation measure ACT students significantly exceeded Curriculum X but did not significantly exceed the Control group. Thus the most conservative conclusion would be that ACT did not significantly alter students' self-evaluations. However, a choice between the two Experimental programs in terms of promoting positive self-evaluations would clearly favor ACT over Curriculum X based on these data (Figure 5).

Insert Figure 5 about here

Expectations for Success and Attainment of Personal Standards for Success

The results from the Connect the Numbers and Scrambled Words Games were interesting both because of the disguised purposes of the instruments and because of the relationship of the measures to published research in achievement behavior. Standard Discrepancy showed significant effects on all contrasts performed for both games. For ACT students the difference between their personal standards for a good job and what they actually expected to attain was less than for either Curriculum X or Control students. One could say that ACT students had greater expectations for doing well or, stated another way, had more realistic standards for success.

Results of the Scrambled Words Game showed a trend for ACT students also to have smaller discrepancies between their personal standards and their actual attainments. This effect was statistically significant for ACT + Curriculum X versus the Control group and approached significance for ACT versus the Control group. Analysis of Standard showed parallel effects. The pattern emerging from the data showed that ACT students lowered their personal standards for good performance to be more consistent with what they expected and were able to attain.

These findings concern one of the most important effects of the ACT program, particularly with regard to the process of changes in goal-setting behavior. As previously stated, Katz (1968) developed a model of achievement motivation based on the premise that achievement-striving is sustained by the quality of covert self-reinforcements. It follows that training in achievement behavior would hinge on making these covert reinforcements more favorable. By causing the student to lower his subjective standard of success in order to reduce the discrepancy between this standard and his expected or actual performance, one can increase the student's subjective experience of success. As a test of the Katz model, using a task similar to our Scrambled Words Game, Eiszler and Morrison (1972) found that ninth-grade black students who evaluated themselves favorably on the task also had greater expectations for doing well.

Estimating Performance and Risk-Taking

There was some tendency for ACT students to overestimate their performance more than did the other groups, as indexed by higher Attainment Discrepancy scores. This effect may be interpreted as an increase in motivation to perform well on the task.

In comparisons between variances on Risk, ACT students did not show the expected trend toward more medium-risk-taking. From inspection of the data it seems most reasonable to conclude that the children in all three Treatments shared the cultural norm of medium-risk-taking. The

only effect of ACT seems to have been to shift Risk scores toward the high end of the range of medium-risk scores.

Intercorrelations Among Measures

None of the intercorrelations among the evaluation tests for ACT students shown in Table 14 exceeded a moderate level, indicating that the various tests were measuring different constructs. Most surprising was the absence of any substantial correlation between IQ and any of the response measures. It is interesting that there was a moderate correlation of .51 between the Summer Camp posttest and the ACT Mastery Test, suggesting that those students who were more successful in mastering program content were also more successful in applying program concepts in a disguised context.

Although not shown in Table 14, the correlation for ACT students between family-income classification and performance on the Summer Camp Test was .58. This is not to suggest that the concepts and skills taught in ACT could not be effectively taught to students of lower-middle and lower economic classes. Researchers have found that in middle-class homes there are many supporting variables, such as parent attitudes, that would reinforce ACT instructions; such supporting variables are not present in lower-class homes. Therefore the impact of ACT might actually be greater among children who receive less training and modeling of achievement behaviors and attitudes at home.

Insert Table 14 about here

Interviews, Reports, and Anecdotes

Teacher and student interviews, anecdotes, and teacher reports provided a qualitative picture of the effectiveness of ACT. Admittedly, all such data tend to be positively biased. This is particularly true of anecdotes.

Nonetheless, the interviews have a convincing quality because of their concrete detailed descriptions, and all anecdotal reports are specific in their descriptions of behavior.

While many of the teacher and student interviews focused on specific content and format issues important primarily for revamping the materials, several questions called for evaluation of the overall effects of the program. Teachers were strongly positive in their belief that the children learned some beneficial behavior and attitudes from ACT, citing specific examples. They also reported that they would use ACT skills and strategy in the future.

Interviews with the children were also highly positive. Children reported that that they had learned something worthwhile, that they learned something new about themselves, that they used the ACT strategy outside of school, that ACT helped them achieve goals they would not otherwise have achieved, and that they would recommend that their friends use the materials.

The approximately 150 acecdotes supported the direction of the interviews. The notes of the staff and teachers provided a wide range of instances in which children, both singly and in groups, used ACT skills and content in transfer situations. These anecdotes were both self-reports of students and observations of students by other students, parents, and teachers. Students were portrayed as using the whole strategy or parts of it as they set goals and working to achieve them both in school and in other areas of their life.

The teacher reports provided specific descriptions of the operation of ACT, testifying to the effectiveness of the program while at the same time identifying program areas needing revision and new tryouts.

Taken together, the interviews, anecdotes, and teacher reports provided evidence that the children generally enjoyed using the materials, that the materials were effective in teaching the skills and content, and that children were disposed to use these skills and the content in their own lives.

Summary of Findings

In summarizing the evaluation findings, a number of signigicant effects of ACT emerge:

1. ACT children learned and used specific skills and content prescribed by the lessons, as indicated by student responses in their journals, lesson tests, observers' reports, teacher reports, and student group projects.
2. ACT children retained much of this learning after completing the instructional materials, as indicated by their Mastery Test scores.
3. ACT children were disposed to use the ACT skills and content, as evidenced by the Summer Camp Test, the Scrambled Words Game, and the Connect the Numbers Game.
4. Attitudes of the ACT children changed in a positive direction, as indicated by the Locus of Control Scale scores, student interviews, and teacher interviews.
5. ACT children used the skills and content outside of ACT classes and in some cases outside of school, as indicated by teacher interviews, student interviews, and anecdotes.

Considered singly, each effect and its supporting data might be considered only partically persuasive. However, when the findings are assessed cumulatively, they present convincing evidence that ACT had a significant effect upon achievement dispositions and behaviors.

Conclusions

Educational Significance of Results

Unlike the objective significance of statistical results, the educational importance of demonstrated effects is ultimately a matter for personal judgment. Statistical significance or nonchance differences between treatments is necessary but not sufficient for proving the educational value of a program. The prospective user of ACT should consider the relevance of the measure on which statistical effects were found, as well as the gains made by the ACT group in comparison with the other two groups.

The difference in the Locus of Control Scale is difficult to interpret. Is a difference between the ACT group and the Control group of slightly less than 1 point educationally and practically significant? Given the large number of the sample, it could be maintained that it is neither. However, one must consider the insensitivity of attitude self-report measures in general, this particular measure's reliability, the fact that scores are already skewed toward the higher levels, and the fact that this is a measure of group means.

Any conclusion seems open to challenge. Independent scholars who reviewed the findings maintained that at worst the results were inconclusive and at best the measure should be considered in the context of the other data. Given these criteria, the results can reasonably be considered educationally and practically significant.

Richard Teevan, Ph. D., Chairman of the Psychology Department of SUNY, Albany, an independent ACT reviewer, made the following statement concerning the evaluation data: "There is no statistical way to determine whether or not a given difference is practically significant. In order to get an answer to this crucial question, I went over all of the comments of the

teachers, the comments of the students, and the comments of the observers. I especially looked for comments which suggested that the children were more self-initiating, felt better about themselves, were able to work better, etc. In view of these comments and the statistical findings, it is my opinion that the results are practically as well as statistically significant."

Considerable educational significance, particularly in terms of behavioral effects, may be attached to the magnitude of effects for Standard Discrepancy in the Connect the Numbers and the Scrambled Words Games. To the extent that these tasks reflect the goal-setting behavior of students, the results were impressive. It is probable that ACT students were more frequently able to experience subjective feelings of success because their self-set standards of success were closer to their predicted performance. This realism in turn provided a basis for more successful goal attainment in the future.

Given the findings that ACT had demonstrated effectiveness in teaching children to use selected achievement behaviors and to model certain achievement dispositions, it can be concluded that hypotheses (a) and (b) were supported, i.e., these behaviors can be identified and taught. It should also be restated that these behaviors and dispositions correlate with a wide variety of positive outcomes in the academic, personal, and social domains.

The ACT materials represent one example of what might be accomplished in training for achievement skills. For these reasons it seems to behoove educational authorities to consider the possibility of including specific instruction for achievement behaviors and dispositions in the school curriculum.

Addendum

Although the field test was conducted in the manner of a summative evaluation, the field-test version of the ACT package was not the final one. In response to the data presented in this report and in the statements of teachers and students, over 50% of the script lines have been revised. Those areas, such as the Strive and Evaluate steps, that gave poor results on the Mastery Test have been altered to assure instructional thoroughness and conceptual clarity. Although these changes have improved the overall quality of instruction, none of the basic concepts of ACT has been changed.

TABLE 1

DISTRIBUTION BY AVERAGE FAMILY INCOME
OF SCHOOLS USED AS TEST SITES

	Average Family Income for School Area		
	$10,200-$12,900	$13,000-$14,900	$15,000-$29,500
Number of Schools	14	7	12

TABLE 2

MEASURES USED IN THE ASSESSMENT OF ACT EFFECTIVENESS

Measure	Description	Origin
ACT Journals and Lesson Tests	Criterion-referenced items appearing throughout the ACT package which are designed to assess student learning of ACT concepts	Project-developed
ACT Mastery Test	A criterion-referenced test administered to ACT students at the end of the program to assess their retention of ACT vocabulary and concepts	Project-developed
Self-evaluation of Personal Action	An inventory which yields an index for favorable evaluations of one's own actions. The test has an internal consistency reliability of .77	Project-developed
Children's Locus of Control Scale	An inventory on which the child reports his perceptions regarding the locus of control over his life experiences. The test has a test-retest reliability of .73	Bialer, 1961
Test Anxiety Scale for Children	An inventory on which the child reports anxiety pertaining to school and tests	Sarason, Davison, Lighthall, Waite, & Ruebush, 1961
Summer Camp Test	A multiple-choice test which assesses the child's ability to apply ACT concepts of self-direction. The test has an internal consistency reliability of .76	Project-developed
California Test of Mental Maturity (CTMM) (short form)	An IQ test	CTB/McGraw-Hill

TABLE 2 (Continued)

MEASURES USED IN THE ASSESSMENT OF ACT EFFECTIVENESS

Measure	Description	Origin
Connect the Numbers	A situational test designed to measure the student's ability to accurately estimate his performance on a task and to set a level of predicted performance commensurate with his prior performance on the task and his personal standard for good performance	Project-developed
Scrambled Words Game	A situational test similar in format and purpose to, but differing in content from, the Connect the Numbers Game	Project-developed

TABLE 3

SCHEDULE FOR ADMINISTERING MEASURES OF ACT EFFECTIVENESS

Measure	When administered			Administered by	
	Pretest	Internal test	Posttest	RBS tester	Teacher
ACT Journals and Lesson Tests			X		X
ACT Mastery Tests			X		X
Self-evaluation	X		X	X	
Locus of Control	X		X	X	
Test Anxiety	X			X	
Summer Camp Test	X		X	X	
Calif. Test of Mental Maturity (CTMM)	X			X	
Connect the Numbers Game			X	X	
Scrambled Words Game			X	X	

TABLE 4

MEANS FOR IQ AND PRETEST MEASURES

Measure	Treatment					
	ACT	N	Curriculum X	N	Control	N
IQ (CTMM)	109.33	25	108.77	25	109.05	25
Self-evaluation	15.44	33	15.45	33	15.42	33
Locus of Control	14.41	33	14.47	33	14.37	33
Summer Camp Test	10.50	33	10.56	33	10.37	33
Test Anxiety Scale	10.74	33	10.05	33	10.28	33

TABLE 5

AVERAGE NUMBER OF POINTS ON ACT MASTERY TEST AND PERCENTAGE OF STUDENTS WHO RECEIVED 80% OR MORE POINTS SUMMARIZED BY ACT STEP

ACT step	Average number of points	Percentage of students who received 80% or more points (criterion)
Naming of Steps (Max. = 4)	2.39	45.7%
Study Self (Max. = 4)	3.29	80.7%
Get Goal Ideas (Max. = 6)	4.50	55.4%
Set a Goal (Max. = 8)	6.83	78.4%
Plan (Max. = 4)	2.66	65.2%
Strive (Max. = 5)	2.38	40.5%
Evaluate (Max. = 5)	2.11	13.2%
Total (Max. = 36)	24.16	34.4%

TABLE 6

MEANS FOR POSTTEST OF SELF-EVALUATION, LOCUS OF CONTROL SCALE, AND SUMMER CAMP TEST

Measure	Treatment		
	ACT	Curriculum X	Control
Self-evaluation	16.34	15.84	15.96
Locus of Control	15.42	14.91	14.78
Summer Camp Test	11.73	10.88	11.04

TABLE 7

MEANS FOR VARIABLES IN THE CONNECT THE NUMBERS GAME

Variable	Treatment		
	ACT	Curriculum X	Control
Number Correct	36.07	35.86	36.32
Attainment Discrepancy	-4.41	-3.00	-2.36
Standard Discrepancy	13.43	20.48	23.47
Risk	6.35	5.14	4.24

TABLE 8

VARIANCES FOR THE RISK VARIABLE IN THE CONNECT THE NUMBERS GAME

ACT	Curriculum X	Control
10.08	8.16	12.48

TABLE 9

MEANS FOR VARIABLES IN THE SCRAMBLED WORDS GAME

Variable	Treatment		
	ACT	Curriculum X	Control
Number Correct	13.22	13.00	13.52
Attainment Discrepancy	-4.08	-3.27	-3.57
Risk	3.67	2.90	3.06
Standard Discrepancy	3.19	4.71	4.98
Prediction	17.31	16.27	17.11
Standard	20.48	20.98	22.06
Standard-attainment Discrepancy	7.19	8.04	8.49

TABLE 10

VARIANCES FOR THE RISK VARIABLE
IN THE SCRAMBLED WORDS GAME

ACT	Curriculum X	Control
2.04	1.12	2.37

TABLE 11

NUMERICAL RESULTS OF TEACHER REACTION TO ACT EVALUATION INTERVIEWS

Teacher	Q1	Q2a	Q5a	Q6	Q7	Q8	Total
1.	5	5	3	5	3	4	25
2.	4	4	2	5	5	5	25
3.	4	3	2	5	5	4	23
4.	5	5	2	5	4	5	26
5.	2	4	2	4	4	3	19
6.	4	3	2	4	4	3	20
7.	3	4	1	4	2	5	19
8.	4	4	3	—	2	5	—
9.	5	5	3	4	2	5	24
10.	5	4	3	5	4	5	26
11.	5	5	1	5	5	4	25
Average	4.2	4.2	2.2	4.6	3.6	4.4	23.2

Note. For the average per question, 1 represents the most negative possible reaction; 5 is the most positive possible reaction, and 3 the neutral point. For the average total, 6 represents the most negative possible reaction; 30 is the most positive possible reaction, and 18 the neutral point.

Q1: How do you feel about your decision to involve yourself and your class in the ACT tryout?

Q2 If ACT became commercially available, would you want to use it in your class?

Q5a: How did you feel about the time demands of the program?

Q6: Was the teacher's manual adequate?

Q7: Were the training sessions adequate and useful?

Q8: Did you ever feel the class getting out of your control because of the materials?

TABLE 12

AVERAGE STUDENT RESPONSES
TO ACT EVALUATION INTERVIEWS

School	Q1	Q2	Q3	Q4	Q5	Total
1.	2.5	2.8	2.5	2.5	2.5	12.8
2.	3.0	3.0	2.5	2.3	2.8	13.6
3.	2.0	3.0	1.8	2.0	2.3	11.1
4.	3.0	3.0	3.0	3.0	3.0	15.0
5.	2.3	2.5	1.5	2.5	1.8	10.6
6.	2.8	3.0	2.3	2.0	3.0	13.1
7.	2.8	3.0	2.5	2.0	2.5	12.8
8.	2.3	3.0	2.0	2.5	2.5	12.3
9.	2.3	2.5	2.3	2.3	2.5	11.0
Average	2.24	2.87	2.04	2.34	2.54	12.58

Note. For the average per question, 1 represents a negative reaction, 3 a positive reaction, and 2 the neutral point. For the average total, 5 represents the most negative possible reaction; 15 is the most positive possible reaction, and 10 is the neutral point.

Q1: How do you feel about having the ACT material in your class?

Q2: If your friend had a choice between taking ACT and not taking ACT, what would you advise him to do?

Q3: Did you learn anything new about yourself in ACT?

Q4: Have you used the ACT achievement steps outside of school?

Q5: Do you think that ACT helped you to achieve any goals which you wouldn't have achieved without it?

TABLE 13

SIGNIFICANT CONTRASTS IN THE ASSESSMENT OF ACT EFFECTIVENESS

Affect/Performance Measure	Groups		
	ACT + Curriculum X vs. Control	ACT vs. Curriculum X	ACT vs. Control
Self-evaluation		X	
Locus of Control	X	X	X
Summer Camp		X	X
Connect the Numbers Game			
Number Correct			
Attainment Discrepancy			
Risk	X		
Standard Discrepancy	X	X	X
Scrambled Words Game			
Number Correct			
Attainment Discrepancy		X	
Risk		X	
Standard Discrepancy	X	X	X
Prediction		X	
Standard	X		
Standard-attainment Discrepancy	X		

Note--(X) Indicates where significance was found.

TABLE 14

INTERCORRELATIONS AMONG RESPONSE MEASURES FOR ACT STUDENTS

	IQ	Pretest: Self-evaluation	Pretest: Locus of Control	Pretest: Summer Camp	Pretest: Anxiety	ACT Mastery	Posttest: Self-evaluation	Posttest: Locus of Control	Posttest: Summer Camp
IQ	---	.09	.06	.13	-.16	.19	.08	.14	.16
Pretest: Self-evaluation		---	.35	.20	-.49	.10	.60	.22	.16
Pretest: Locus of Control			---	.24	-.29	.20	.23	.33	.23
Pretest: Summer Camp				---	-.07	.38	.11	.20	.46
Pretest: Anxiety					---	-.16	-.41	-.17	-.11
ACT Mastery						---	.21	.28	.51
Posttest: Self-evaluation							---	.36	.21
Posttest: Locus of Control								---	.27
Posttest: Summer Camp									---

Figure Captions

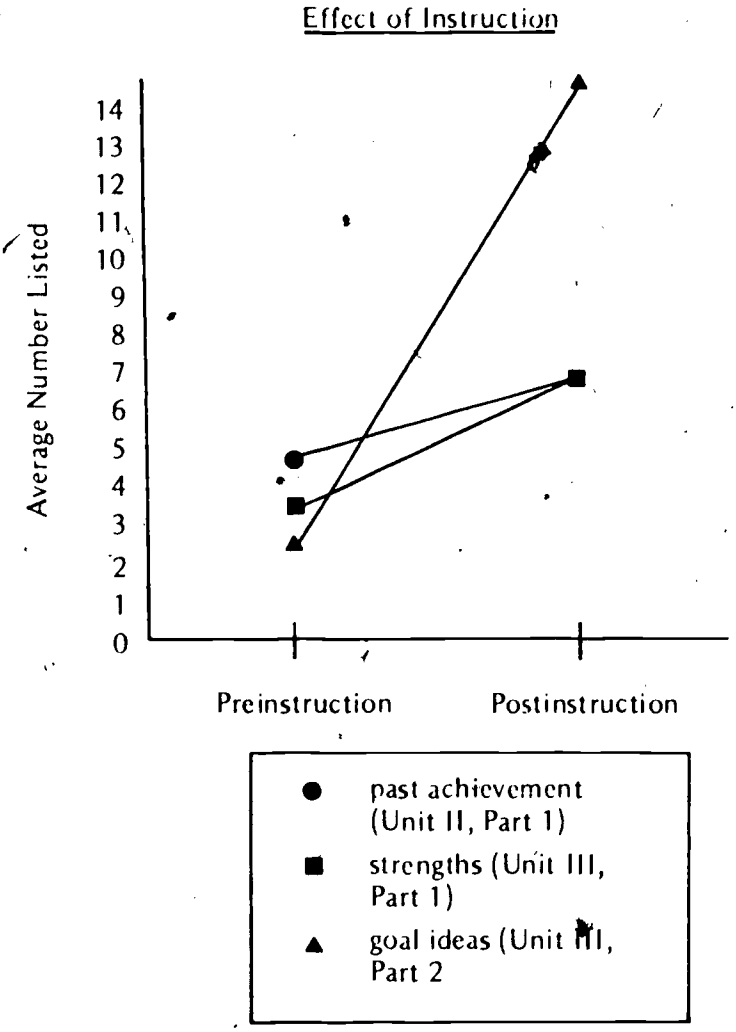
Figure 1. Student Performance on Selected Items from ACT Journals and Lesson Tests.

Figure 2. Percentage of Students Who List a Striving Method and Four or More Tasks.

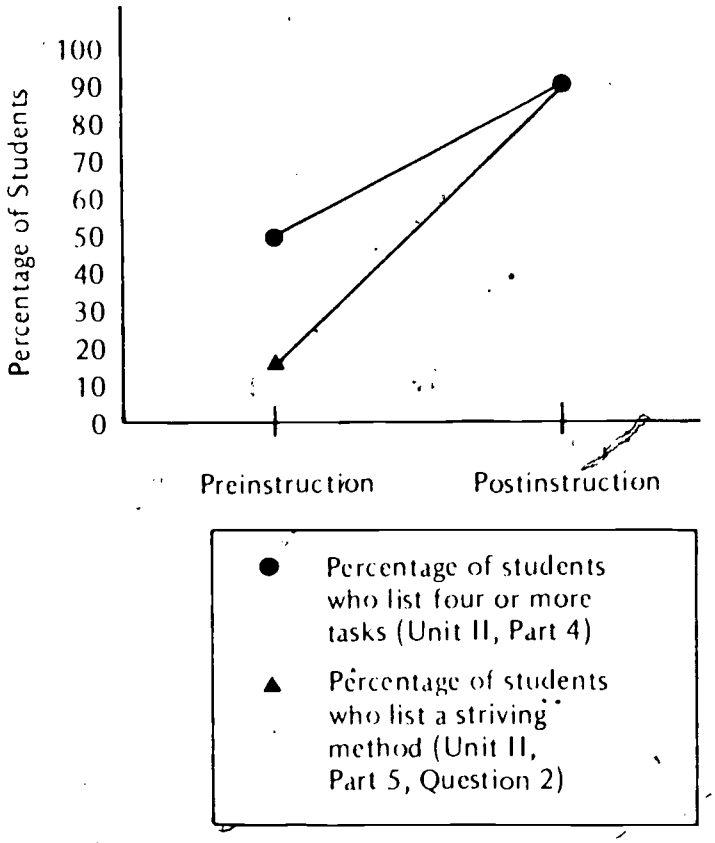
Figure 3. Mean Scores on Summer Camp Test As a Function of Instruction.

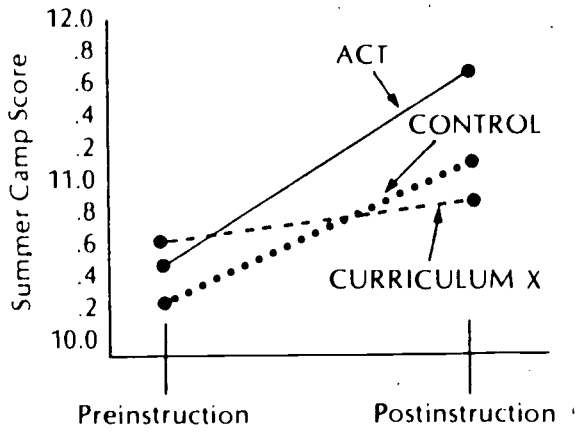
Figure 4. Mean Scores on Locus of Control Shown As a Function of Instruction.

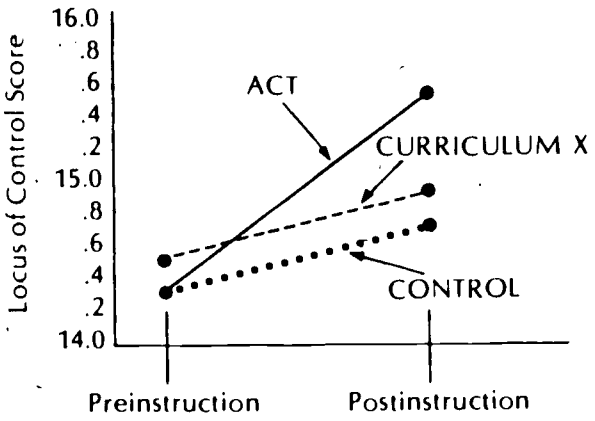
Figure 5. Mean Scores on Self-evaluation Shown As a Function of Instruction.

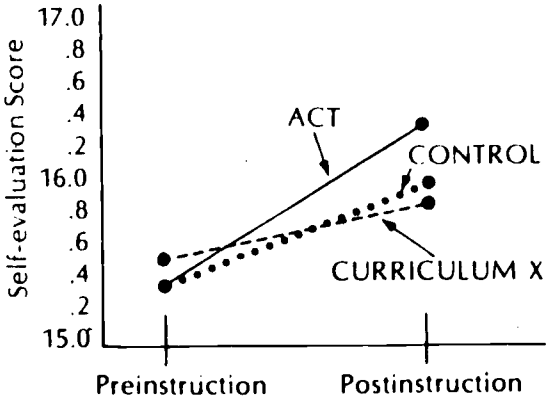

Effect of Instruction
Average Number Listed
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
Preinstruction
Postinstruction
past achievement (Unit II, Part 1)
strengths (Unit III, Part 1)
goal ideas (Unit III, Part 2

Effect of Instruction




12.0
.8
.6
.4
.2
11.0
.8
.6
.4
.2
10.0
Summer Camp Score
ACT
CONTROL
CURRICULUM X
Preinstruction
Postinstruction


Locus of Control Score
16.0
.8
.6
.4
.2
15.0
.8
.6
.4
.2
14.0
ACT
CURRICULUM X
CONTROL
Preinstruction
Postinstruction


Self-evaluation Score
17.0
.8
.6
.4
.2
16.0
.8
.6
.4
.2
15.0
ACT
CONTROL
CURRICULUM X
Preinstruction
Postinstruction

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