*COLLEGE STUDENTS AS CONTINGENCY MANAGERS FOR
ADOLESCENTS IN A PROGRAM TO DEVELOP
READING SKILLS¹*

GERALDINE J. SCHWARTZ

JOHN ABBOTT COLLEGE

Behavior-modification procedures and an individualized tutorial program were used to remediate reading skill deficits in seventh-grade adolescent subjects. Forty-two college students were trained as reading tutors and contingency managers to use reading diagnostic and remedial materials, and to develop contracts and reinforce positive verbal responses toward reading. Significantly greater increases in reading scores of experimental groups, compared to control groups, substantial improvement in target behaviors, and significant changes in verbalizations toward reading were observed after 10 weeks of treatment. Six-month followup studies showed that all groups had consolidated their gains and that grade scores continued to improve. The improvement of the experimental subjects remained significantly ahead of the control subjects.

DESCRIPTORS: reading skills, contingency management, tutors, college students, adolescents

Despite the fact that the ability to read efficiently and with understanding is a central and critical skill in all academic areas, many adolescents reach grade seven without the skills necessary to deal with tasks demanded by the high-school curriculum. It is not that they cannot read but that their strategies and skills are below the level required for successful performance of reading tasks in their grade. Because they are unable to perform competently, they are deprived of regular reinforcement for learning and of meaningful feedback about their performance. These students develop avoidance strategies to school and to the learning situation in general, which serve them poorly in the acquisition of new skills. Since they avoid both reading and the practising of reading skills, the gap between their skills and those of their peers continues to widen as they proceed through high school. The social and academic consequences

of this poor performance often affect motivation to participate in further learning, and attitudes toward school, teachers, and themselves.

A careful analysis of the performance of underachievers (Cohen, 1970) indicates that there are substantial deficiencies in their repertoire of skills in areas critical to successful performance of reading tasks at grade level. These deficiencies appear to be different for each student. Since reading performance at higher levels is dependent on the acquisition of the relevant prerequisite skills at the lower levels (Gagné, 1970), prior mastery of these skills is the most important factor in successful performance of reading tasks at grade level. A skill-oriented therapy that provides strategies for solving problems in reading tasks, practice in reading at progressively more difficult levels, and reinforcement for successful performance, should effectively remediate these deficiencies and enable the students to become more competent readers.

Motivation to participate productively in the learning situation is critical to the continued development of these skills. Behavior-modification procedures and a contingency contract system could be used to break down avoidance strategies, and other maladaptive behaviors. The sub-

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ject's expressed negative attitude toward reading, and negative self-statements, can presumably be modified and replaced with more productive statements by systematically ignoring negative self-statements ("I'm dumb at this kind of work"), by providing evidence of competence ("Look—you were 100% correct in this exercise"), and by reinforcing positive self-statements ("I did really well on that exercise"). Evidence suggests that when positive statements are made, attitudes change to reflect more positive feelings (Beck, 1970; Early, 1968; Meichenbaum, 1974; Velten, 1968).

This study was designed to deal with the problems of adolescent disabled readers in three areas.

1. A skills-oriented therapy procedure using a tutorial system was designed to remediate specific deficiencies in the individual subject's repertoire of reading skills.
2. The subject's verbal responses toward the reading process and self statements regarding competence as a learner were systematically modified to reduce negative statements and to increase positive statements.
3. Behavior-change procedures and a contingency contract system were designed to motivate the subjects to learn new skills and strategies in reading and to practise these skills.

METHOD

Subjects

During October, all grade-seven students in four high schools were given the Gates-MacGinitie Reading Test, Survey E, (Grades 7-9), Form 1M.² The tests were administered by school personnel and machine scored. All four high schools had comparable academic standards and were located in bordering communities in the same middle-class suburb outside a large urban center. The four communities were

unusually similar in housing accommodations and religious and ethnic mixture.

Of the 1265 students tested, 260 were in the remedial range (1.5 to 4.5 yr below grade level). These subjects were between 12 and 14 yr old, with boys outnumbering girls 3:1. All subjects were functioning in regular classes despite their reading disability. Remedial programs were minimal in these high schools and all subjects were expected to perform academically without special assistance. However, their grades were low, particularly in subjects dependent on the language arts.

The Design

The subjects in each school were ranked according to their composite scores on the Gates-MacGinitie Reading Test (Table 1 clarifies the explanation of the design). In two schools, the experiment was carried on as if they were separate replications of the same study. In each of these schools, the subjects in the remedial range were listed by teacher and paired with the student in the class who came closest to them in rank. The pairs were then divided at random into an experimental and a control group.

The experimental groups (E1, E2) received the full treatment procedures for 10 weeks. Each subject had a contingency contract and an individualized reading program monitored by a trained tutor.

To control for the special attention given to the experimental group by researchers and teachers, and expectation of improvement from treatment procedures, the control groups (C1, C2) were sent a letter stating they had been selected for special attention because they had the potential to improve, and that their progress in reading would be monitored by a posttest at

²The Gates-MacGinitie Reading Test consists of three subtests in speed and accuracy, vocabulary, and comprehension. These scores can be added to provide a composite score. This test provides standard scores and comparative grade scores. Standard scores were used for statistical analyses, and comparative grade scores were used for meaningful presentation of data.

the end of the semester. (Identical letters were also sent to randomly selected high scorers in each of their classes so the control subjects would not think only poor students were selected.) In addition, these students were identified for their teachers as needing compensative activities. Thus, the teachers were free to provide help within the constraints of the regular school situation. Usually, this meant only superficial help, since no special reading program was available in these schools.

In the third school, all grade-seven students were taught reading development skills as a regular part of the curriculum by three teachers. These teachers were trained by the author to employ program procedures. In five classes, they used behavior-modification procedures with a contingency contract similar to the one used for the experimental groups, and the tutorial program in reading designed for this study, in addition to the school's reading program (C3). There was no individualized attention and the additional activities were monitored by the teachers as part of the classroom procedure during the 10-week treatment period. The other five classes continued to receive the regular reading development program (C4). For the purposes of this study, only the progress of students in the remedial range was of interest. These procedures were used to determine whether the program could be used effectively by classroom teachers without the individualized attention provided by the tutors.

To determine whether individual attention by a college student would be sufficient to improve reading scores without the use of the reading program or behavior-modification procedures, in the fourth school, college students were paired for a 10-week treatment period with subjects whose scores were in the remedial range (C5). These tutors met their clients for 1 hr each week during the school day. They were directed to help the subjects with their homework, to support positive verbal statements toward reading and the learning process, and to spend the treatment time acting as buddies to their

clients. No systematic skill-training or behavior-management procedures were employed.

PROCEDURES

The Tutors

The reading tutors for the experimental groups were 42 college students enrolled in a course in Developmental Psychology. This course stressed the adolescent period and presented development in terms of basic psychological theory. The text used in this course was *Adolescents: behavior and development* (McCandless, 1970). Prerequisite credits for most students included content in experimental methods, learning theory, and child development.

Training of Tutors

During the first third of the 15-week semester (15 hr), in addition to the program in psychology, the tutors were trained to use diagnostic materials, remedial workbooks and a manual for reading tutors written for this program (Schwartz, 1974).³ The manual contains specific instructions and exercises for each of the basic reading strategies. The workbooks contain graded prose passages in each skill area, which are followed by multiple-choice questions. A program, which consisted of four modules in contingency management procedures (Homme and Tosti, 1973), was used to teach the principles of learning, contingency contracting, and behavior management.

Task Definition for Tutors

1. Using the diagnostic materials provided, and the diagnostic strategies outlined, tutors established baselines in each of the basic skill areas designated by the program (see Target Behaviors, Table 2). They determined which strat-

³This manual may be obtained by writing to the author at The Children's Hospital, 250 West 59th Avenue, Vancouver, British Columbia, Canada, V5X, 1X2.

egies and target behaviors were appropriate, and designed and carried out a program to meet their client's individual needs. Tutors modelled effective reading strategies, and productive thinking styles.

2. Tutors used skills as contingency managers to supervise a reading contract in which all reading behaviors had specific consequences. Reading points were used as tokens and a grade on the report was the prize for which they were exchanged.
3. Tutors attempted to break down avoidance strategies by systematically reinforcing all positive verbal responses to the reading process and the self as a reader, and by ignoring all negative responses. Tutors systematically but covertly recorded all positive and negative responses through a system of dots and dashes. These marks were translated into the subject's actual verbal statements as soon as possible after the tutoring session.

The Reading Program

The target behaviors selected for this program were those which, in combination, were judged the most critical for effective performance in reading tasks at the junior high-school level. Good comprehension, and speed appropriate to the grade level, were considered the most essential. A series of workbooks assembled by the writer, written by Goldsweig (1970*a*, *b*, 1973) and the editors of Scholastic Scope (1967, 1969*a*, 1970, 1971) contained articles and diagnostic and training exercises designed to develop these skills. The workbook exercises consisted of prose passages of graded difficulty followed by multiple-choice questions. Exercises were available in each of the major skill areas. The tutor used the exercises to determine the most difficult level that the student could handle successfully. In this way, baselines

in each skill area were established. It also allowed for swift progress to more difficult material within the skill area as soon as the subject was successful, and practice on material of easier or equivalent difficulty when the subject was not. This procedure provided a simple and objective method to assess the student's progress.

In addition to the workbooks, a specialized library, which contained novels, biographies, collections of short stories, *etc.*, was placed at each school. The books were also available to the tutors through their own library. They were chosen because they were of interest to adolescents, but ranged from grades four to eight in reading level. These books formed the basis of reading material for the contract.

The books were placed on the shelves and labelled according to their level of difficulty. The points assigned to each category of book were established by a sliding scale and were different for each subject.

Contingency Management

Before treatment began, a reading contract was designed for each subject by the reading tutor in consultation with the subject's Language Arts teacher. The subject contracted to earn 150 reading points for a B on the report and 200 points for an A. The point values of books to a particular subject were dependent on reading scores, the teacher's judgement of ability, and the number of pages in the book. The contract was divided into 10 weekly sections and the subject was encouraged to earn a minimum number of points each week. Each week, the books to be read were selected jointly by the tutor and subject, and the tutor was required to parallel read. Reading points were earned when the subject had filled out a summary form based on the reading, and had satisfied the tutor through oral questioning and discussion that what he had been reading was understood. Points could also be earned during the skill-building session for arriving on time, for having the necessary equipment and assignments complete, for paying attention and making a good effort, and for a

success rate of 80% on assigned tasks. Target behaviors were listed on the contract after the second session. Baselines and time spent working on each skill were recorded each week for the final report.

The tutor met the subject once per week during school hours and was available for telephone consultation at any time during the treatment period. To build stamina for concentrated reading, the subject began with a minimum of 15 min each night, increased the amount to 30 min by the third night, and to 40 min by the fifth. The time per sitting continued to increase throughout the program and time spent reading for the contract was recorded and graphed. To earn sufficient points to complete a contract, at least 500 pages of average difficulty had to be read, representing approximately 3 hr a week of reading time.

During the tutoring session, skill building was the main activity. The subject proceeded to more difficult exercises in a particular skill as soon as all questions had been answered successfully. The program allowed the subject to retreat when the success criteria were not met, to work at the same level to establish skills when having difficulty, and to progress as soon as the skill had been successfully acquired. The tutor used materials specifically geared to the subject's skill deficits and level of competence in a carefully planned and structured program. Progress was charted, and constant testing and feedback opportunities were built in. Progress was clearly evident to both tutor and subject as improvement from baseline was recorded, and as more difficult tasks were completed successfully.

By the end of the program, each subject had a minimum of 40 hr of reading training and practice, which included 10 hr of tutoring and 30 hr of independent reading to fulfill the contract. The emphasis was on the unstructured time, so that the habit of reading independently could be developed and the responsibility for progress would be largely dependent on the learner.

During the session, the tutor systematically but covertly recorded all verbal responses toward reading and the learning process, and reinforced all positive responses with praise and points. For example, the subject was encouraged for saying that reading a book had been enjoyable or that improvement was noticeable. Statements suggesting disinterest, inability to perform, or failure, were ignored. After each weekly session, a report was prepared, and the tutor was required to reproduce the subject's verbal statements.

A research assistant met once with each team to observe and record independently what the client said, and how the tutor responded, to determine whether the tutor was identifying the subject's responses correctly and reinforcing them appropriately. Immediate feedback on performance was available to all the tutors and retraining occurred if responses were not appropriate.

Summer Contract

At the end of the 10-week treatment period, each experimental subject was given a self-monitored summer contract as an intermediate step to complete independence. The contract was drawn up by the tutor and client jointly. The point system was the same as in the previous contract. The subject was advised to aim for at least the number of points earned in the first contract. The subject was told that the contracts would be collected in September by the project coordinator and that skills would be retested, but that there would be no reward for completion. The tutors told the subjects that they would contact them in September to see how they had done. The student was asked to choose and read as many books as possible and to record what had been read. The contract provided nine shortened reading forms for recording. The tutor stressed the direct relationship between the practice of reading and the improvement of skills. The importance of reading well for future academic success, pleasure of reading, and the subject's current success were also emphasized.

RESULTS

A one-way analysis of variance was carried out on the composite pretest scores for all groups. The overall differences between groups before treatment was statistically reliable at the 0.05 level ($F_{6,139} = 2.90$, $p < 0.05$). This occurred because there were three or four students with very low scores in Groups C1, C4, and C5 relative to groups E1, E2, C2, and C3. The results should be considered with this factor in mind.

The Gates-MacGinitie Reading Test, Survey E, Form 2M, was administered in May in the week after the program was completed. A factorial analysis of variance with one independent-samples factor (schools) and two correlated-samples factors (groups and pre-post trials) was used to analyze the data in schools one and two. The interaction between groups and trials ($F_{1,40} = 76.98$, $p < 0.05$) and the main effects for groups ($F_{1,40} = 39.93$, $p < 0.05$), and for trials ($F_{1,40} = 250.84$, $p < 0.05$) were all statistically reliable. Thus, both experimental and control groups improved between the pre- and posttest, but the experimental groups improved considerably more. Because neither the main effect of schools [$F_{1,40} = 0.60$; $F_{.95}(1,40) = 4.08$] nor any of the interactions with schools (schools $\times$ trials $F_{1,40} = 2.89$; schools $\times$ groups $\times$ trials $F_{1,40} = 0.28$) approached statistical significance, in subsequent analysis the data from E1 and E2 were combined, as were the data from C1 and C2, and each was considered as one group. These scores were then analyzed along with those of the control groups in schools three and four (C3, C4, C5). In this analysis, the groups $\times$ trials interaction was again significant at the 0.05 level ($F_{4,141} = 21.02$, $p < 0.05$), as well as the main effect of groups ($F_{4,141} = 11.47$, $p < 0.05$), and the main effect of trials ($F_{1,141} = 266.79$, $p < 0.05$). This suggests that the treatment made a significant difference for all groups, but that the effect on the experimental group was significantly better.

Post hoc tests (Scheffé) using change scores were then carried out between the experimental group and each of the control groups, and between C4 and C5 because the difference among their means was the greatest of all control groups. The differences between the experimental group and each of the control groups was significant at the 0.05 level, but the difference between C4 and C5 was not. Therefore, we may conclude that the treatment procedures were more effective for the experimental subjects than for the control subjects. The control groups were not significantly different from each other. It appears that in a component analysis the control subjects were not differentially affected by the different components of the program. However, the control subjects did improve. It seems that singling out poor readers for treatment is generally beneficial, whatever that treatment might be.

The mean grade scores are presented in Table 1. As it shows, the average grade increase in composite scores for students in E1 was 2.2 grades compared to 1.0 grades for students in group C1 in that school. In school two, the average increase for students in E2 was 1.9 grades compared to 0.9 grades for students in C2. The expected rate of growth between the pre- and posttest is 0.7 grades for students progressing normally. However, because the subjects in this study had been progressing at approximately 70% of the normal rate, their expected rate of increase over this same period was 0.5 grades. Thus, the treatment procedures accelerated the rate of growth of the experimental subjects (E1 and E2) to 2.1 grades, or three times the expected rate for average students, and four times their previous rate. This may be compared to the gain of 1.0 grades for all the control subjects (C1, C2, C3, C4, C5), which was 1.4 times the average expected rate and twice their previous rate.

Table 2 presents the tutors' assessment of their clients' progress in the target behaviors.

Tutors were asked to rate their clients' progress on a five-point scale. Pre scores represent

Table 1
Mean Grade Scores
Gates-MacGinitie Reading Test—Survey E (Grades 7 to 9)

Group	n	<i>Speed</i>		<i>Vocabulary</i>		<i>Comprehension</i>		<i>Composite^a</i>		<i>Grade Increase</i>
		<i>pre</i>	<i>post</i>	<i>pre</i>	<i>post</i>	<i>pre</i>	<i>post</i>	<i>pre</i>	<i>post</i>	
E1—Exp. School 1	20	5.3	7.3	5.7	7.7	4.6	7.2	5.2	7.4	2.2
E2—Exp. School 2	22	5.2	6.9	5.5	7.8	4.8	6.7	5.2	7.1	1.9
C1—Cont. Letters School 1	20	4.7	5.8	5.2	6.2	4.3	5.1	4.7	5.7	1.0
C2—Cont. Letters School 2	22	5.3	5.9	5.3	6.9	5.2	5.7	5.3	6.1	0.8
C3—Cont. Read. Train. & Program School 3	17	4.5	5.6	5.4	6.9	5.7	6.0	5.2	6.2	1.0
C4—Cont. Read. Train. School 3	17	4.8	6.8	4.4	6.5	5.2	5.1	4.8	6.1	1.3
C5—Cont. Buddies School 4	28	4.7	5.8	5.1	6.0	4.4	4.7	4.7	5.5	0.8

Note. 0.7 of a grade is the expected rate of increase for average students between the pre- and posttests.

^aComposite scores are made up of the subscores in speed, vocabulary, and comprehension, divided by three.

their assessment of presenting behaviors and the difficulty of task exercises the subjects were able to perform successfully. Post scores indicate both their assessment of the learners' achievements and task performance at the end of the program. The final column indicates the extent to which each target behavior was stressed in individual programs. It should be noted that there was important progress in all target behaviors over the treatment period.

Contracts

Contracts were completed by 40 of 42 experimental subjects. Of these, 37 earned an A and 27 earned more than 250 points. To do this, the subjects read an average of 8.9 books. One student read 18 books and earned 499 points, thus improving reading scores by 3.6 grades. The minimum number of books read by subjects who completed their contract was five.

Expressed Verbal Responses to Reading Process

The number of positive and negative verbal responses to the reading process and to the self as a reader were recorded and graphed each week by each tutor. Figure 1 shows the average number of these responses each week for all experimental subjects.

The subjects' verbal responses in the first two weeks of the program were used as pretreatment scores, and verbal responses in weeks nine and ten, after the reinforcement procedures had been in effect for eight sessions, were used as posttreatment scores. Analysis of the data, using a two factor repeated measures design, revealed a significant interaction between positive and negative responses and pre-post measures ($F_{1,40} = 48.94$, $p < 0.05$). Post hoc comparisons (Scheffé) indicated a significant increase for positive responses ($F_{2,80} = 35.04$, $p < 0.05$).

Table 2
Tutor's Assessment of Progress in Target Behaviors

Target Behaviors		Level of Efficiency					% of Teams Working on Target Behaviors
		1 (least)	2	3	4	5 (most)	
Speed	pre	2.4% ^a	52.4%	40.5%	2.4%	2.4%	92.9% ^b
	post	0.0%	0.0%	4.8%	71.4%	16.7%	
Stamina	pre	19.0%	52.4%	11.9%	14.3%	2.4%	88.1%
	post	0.0%	0.0%	7.1%	66.7%	26.1%	
Main Idea	pre	26.1%	52.4%	19.0%	2.4%	0.0%	100.0%
	post	0.0%	0.0%	26.1%	57.1%	16.7%	
Detailing	pre	21.4%	50.0%	16.7%	11.9%	0.0%	81.0%
	post	0.0%	2.4%	47.6%	35.7%	14.3%	
Sequencing	pre	11.9%	38.1%	31.0%	19.0%	0.0%	61.9%
	post	0.0%	0.0%	38.1%	54.8%	7.1%	
Generalizing	pre	23.8%	38.1%	33.3%	4.8%	0.0%	76.2%
	post	0.0%	2.4%	35.7%	35.7%	26.1%	
Novel Analysis	pre	31.0%	33.3%	28.5%	7.1%	0.0%	90.5%
	post	0.0%	2.4%	28.5%	54.8%	14.3%	
Reading Form	pre	23.8%	52.4%	19.0%	2.4%	2.4%	83.3%
	post	0.0%	4.8%	14.3%	45.2%	35.7%	
Organization	pre	21.4%	28.5%	26.1%	16.7%	7.1%	83.3%
	post	0.0%	2.4%	23.8%	40.5%	33.3%	
Independence	pre	23.8%	21.4%	40.5%	7.1%	7.1%	92.9%
	post	2.4%	2.4%	21.4%	38.1%	35.7%	
Attitude	pre	14.3%	26.1%	23.8%	19.0%	16.7%	92.9%
	post	0.0%	2.4%	7.1%	26.1%	64.3%	

^a2.4% means that one of the 42 tutors assessed client's baseline performance in Speed at the lowest level of efficiency.

^b92.9% means that 39 of 42 teams worked on Speed.

and a significant decrease for negative responses ($F_{2,80} = 9.32, p < 0.05$) ($F'_{2,80} = 6.22$).

Followup

Seventy-four per cent of the subjects were retested six months after treatment with the Gates-MacGinitie Reading Test, Survey E, Form 3M. Analysis of the data shows that over time the effects of the treatment made a significant difference for all groups. Planned comparisons between the pre- and posttest, between the experimental group and each of the control groups, show that the difference between the experimental group (E1 and E2) and the control groups (C1 and C2) ($F_{1,103} = 5.00, p < 0.05$), C3 ($F_{1,103} = 6.64, p < 0.05$), and C5 ($F_{1,103} = 4.80, p < 0.05$) were significant at the 0.05

level. The mean difference between (E1 and E2) and C4 was not significant ($F_{1,103} = 2.94, p > 0.05$). It is possible that the procedures used in C4 were particularly effective. However, the lack of significant differences may have resulted from C4's depressed scores in the pretest. It is evident that the experimental subjects maintained their lead over all groups. The results of the followup testing are presented in Table 3.

Six months after tutoring was completed, all subjects had consolidated their gains and continued to progress. The expected rate of increase for average students between the pretest and the followup test is 1.0 grades. The subjects in this study had been progressing at 70% of this rate, or 0.7 of a grade per year. The total grade increase for the experimental subjects (E1 and E2)

Fig. 1. Expressed verbal responses to the reading process.

was 2.6 grades, compared to the average total grade increase of 1.6 grades for the control subjects (C1 and C2, C3, C4, C5). Treatment procedures accelerated the rate of growth of the experimental subjects to 3.7 times their previous rate and 2.6 times the expected rate for average students in one year. The rate of growth for control subjects was 2.3 times their previous rate

Table 3

Composite grade scores—Gates-MacGinitie reading test final results.

Group	n	Pretest	Posttest	Followup	Total Grade Increase
E1 and E2	30	5.2	7.5	7.8	2.6
C1 and C2	27	5.0	5.8	6.7	1.7
C3	12	5.2	6.1	6.4	1.2
C4	14	4.8	6.1	6.4	1.6
C5	25	4.9	5.7	6.6	1.7

Note. Only subjects present for followup testing are included in this sample.

a. The expected rate of increase for average students between the pretest and the followup test is 1.0 grade.

and 1.6 times the expected rate for average students.

Summer Contract

Early in September, the summer contracts were collected from school two. Nineteen of the 22 subjects were still attending that school; 13 of these students returned the summer contract booklet. They read an average of 6.3 books (1026.6 pages) between May and August. This may be considered a considerable amount of reading during the summer months, even for an adult reader.

In school one, the distribution and collection of summer contracts was disorganized and the booklets could not be collected in September. However, three students voluntarily handed their booklets to their section head. They read an average of 6.5 books (1611 pages).

DISCUSSION

This study demonstrated that an individually designed tutorial program in reading, combined with contingency management procedures to motivate sustained reading practice and to modify verbal responses to the reading process, can produce substantial progress in target and reading behaviors and significant gains in reading scores in adolescent subjects. These gains did not dissipate. Followup studies six months after the program showed that all groups had consolidated their gains and that their grade scores continued to improve.

Control conditions, which combined attention, test practice, and some help in developing reading skills, produced growth in reading scores beyond the expected rate, regardless of which variables were included. It should be noted, however, that the composite scores of the control subjects remain in the grade-six range, at least 1.5 grades below the level required for task performance at their grade level. Perusal of the subtest scores in the followup data shows that the lowest scores for all groups are in comprehension, the skill that is most critical for task

performance in other subject areas, and for continued skill development in reading. The scores of the experimental subjects, however, were at the grade-seven level in comprehension.

The subjects in C4 appeared to make important progress. While this may be due to an unusual strength of this particular treatment procedure, it is more probably due to low pretest scores. Data from pilot studies showed that low pretest scores provided a considerable advantage, in that the weakest students improved the most. Low scoring students appear to have had a bad day. Analysis of individual scores showed that these subjects score closer to the mean for the group in the posttest. In this experiment, the weakest students appeared by chance in groups C1, C4, and C5. This advantage masks somewhat the performance of the experimental subjects.

Target Behaviors

While standardized testing is an important aspect of evaluating programs of this kind, it is not always clear that for the individual subject, improvement on standardized reading tests is equivalent to improved reading performance.

The development of skills in target behaviors reflects an important change in learners' abilities and corroborates the results achieved in standardized tests. The measurement of improvement in a series of critical subskills, such as efficiency in finding the main idea, sequencing, detailing, and generalizing, provides clear evidence in individual cases, both to the tutor and the learner, of progress in tasks closely related to those required for daily academic success. Evidence of increased speed in reading, provided by timed and graded exercises, show students that they are reading more difficult material faster. Many subjects indicated they could not concentrate for more than one half to three quarters of an hour at a time. By the end of the program, stamina had increased to an average of an hour and a half, and some reported they were able to read for 2 to 3 hr at a stretch. Behaviors that reflect the subjects'

ability to organize and carry on their work independently are particularly important for continued skill development. By week seven, tutors reported students choosing books on their own, browsing in book stores and libraries, and taking the initiative for choosing extra books when they completed their work early. They reported that the subjects chose books from the more difficult categories as they progressed.

In addition to increased ability in basic reading skills, many positive spin-off effects were noted. Guidance counsellors reported fewer visits, and more positive encounters with subjects. Teachers noted that the subjects demonstrated greater self-confidence in other academic areas. Parents reported discussions about books they were sharing with the subjects and a lessening of tension regarding homework and school achievement. Some noted that the students were carrying books around the house, and that they were reading under the covers after "lights out". Librarians reported seeing the subjects in the library, a place they avoided before the program. These activities suggest that a new series of behaviors common to good readers was beginning to appear.

The contingency management procedures used by the tutors, of reinforcing positive responses toward the reading process and ignoring negative responses, effectively increased the subjects' positive statements about reading and about themselves as readers, and reduced negative statements. As the student starts to talk more positively about self performance, about competence, and about the tasks themselves, natural and positive support is likely to come from significant others, such as tutor, teachers, and parents, which will strengthen and maintain the positive responses.

The importance of including procedures that promote a positive attitude to reading and the practice of reading tasks should not be underestimated. When the amount of treatment time is short and when the long-term success of the treatment is dependent on the extent to which it acts as a catalyst to encourage the subjects to

continue their own skill development, a positive attitude toward continued practice is essential.

The procedures used in the present program allowed for: inclusion of a large number of subjects; a limited number of contact hours, combined with a large practice component for the subjects, and an individualized program based on specific skill deficits. It also provided tutors with substantial training in reading tutoring, so that they could apply the reading program flexibly to their individual clients, as well as with training in contingency management procedures so that they could systematically reinforce positive verbalizations toward the reading process, enhance their clients' self-image as competent readers, and motivate them to read for their contract. The design included the use of a series of control groups, whose performance could be realistically compared to that of the experimental subjects, and followup testing six months after treatment, to determine whether progress had been maintained. These procedures resulted in significant gains on a standardized reading test.

This study demonstrated that research and the use of experimental methods need not be confined to the laboratory. If the development of learning theory is to have a useful effect in the schools and clinics of North America, psychologists should begin to study representative functional repertoires of human behavior in the applied settings where they occur.

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