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A Study of the Effectiveness of the Beginning Reading Tutorial Program Administered by Elementary Aides

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A STUDY OF THE EFFECTIVENESS OF THE BEGINNING READING TUTORIAL PROGRAM ADMINISTERED BY ELEMENTARY AIDES

By

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A STUDY OF THE EFFECTIVENESS OF THE BEGINNING READING TUTORIAL PROGRAM ADMINISTERED BY ELEMENTARY AIDES

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This study illustrates that early elementary students who were lagging in basic reading skills learned at a faster-than-mainstream rate when taught by paraprofessional aides trained in administering the Beginning Reading tutorial program. After intensive training aides were shown to implement the tutorial program at a level considered to be above adequate. Mean gains made by tutored students in socially important (norm-referenced) reading skills were both statistically and educationally significant. A multiple-baseline analysis of program skill acquisition demonstrated that each program section implemented was effective in reaching its stated objectives. Control group pre- post-test comparisons of program skill acquisition further substantiate the effectiveness of the program over mainstream classroom instruction alone in teaching sound-symbol association and blending skills. Generalizability of results and areas for future research are discussed.

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INTRODUCTION

This project assessed the effectiveness of a commercially available Direct Instruction tutorial reading program on children's word decoding skills. Eight elementary paraprofessionals were trained to a 90% level of accuracy prior to program implementation and monitored to maintain a 90% level of accuracy.

The Select Committee on Equal Educational Opportunity of the United States Senate (1972) found wide disparities within the overall academic achievement of school age children three to seventeen years old. About 18% of these students are one or more school years behind in academic achievement and about 3% are two or more years behind. Most of the children in these extreme groups are non-whites of low socioeconomic status. To close the gap between the achievement of these disadvantaged children and their non-disadvantaged peers, the Committee suggests that the schools must produce a learning rate of four months for every three months of school. Considering the present learning rate of disadvantaged students, this means actually doubling their learning rate. The Committee also points out the later this acceleration begins the higher the rate must be if the disadvantaged child is to achieve at the national norm when (s)he graduates from high school. Since reading has a pervasive effect on overall academic achievement, a reasonable focus for accelerating disadvantaged students' performance would be upon reading. Because early intervention has the greatest impact per unit of time of instruction, beginning

reading skills for early elementary students seems to be a good place to start. However, limitations imposed by the subject matter itself and by the special motivational needs of students with a history of failure make this a difficult task. Some of the most important skills in reading, such as sound-symbol association, are linear-additive: for the student to gain mastery (s)he must be taught each subskill explicitly, along with frequent cumulative review to maintain previously-learned association (Becker, Engelmann, and Thomas, 1975). Since vocal responding does not generate permanent records it is necessary for the teacher to be present to observe, prompt, verify, or correct the student's responses. The teacher may neither have the time for one-to-one instruction nor the pupils who can be grouped for remedial instruction. Even when pupils can be grouped, the teacher may not have been trained for effective small group instruction with remedial learners. Finally, students with a history of failure in reading may tend to avoid further instruction by inattention, misbehavior, copying others, and other interfering behaviors. This further compounds the teacher's problem of providing effective instruction to students who need it the most.

To teach students more in less time, two areas should be considered: which skills will have the biggest payoff for the learner and how these skills can be taught most effectively. Both of these areas correspondingly affect the efficiency of the student and the teacher--the faster the student learns, the more the teacher can teach.

In beginning reading, sound-symbol association knowledge and blending skills together provide a maximum application competence with a minimum repetoire of skills. Once learned these skills become generative as building blocks for reading any phonically regular word. There is substantial agreement that basic phonics, or sound-symbol association, is essential to beginning reading (Gurren and Hughes, 1965; Chall, 1967; Heilman, 1976). However, there is also strong evidence that simple knowledge of the sounds associated with vowels and consonants alone does not guarantee the student will be able to decode a phonically regular word (Jeffery & Samuals, 1967; Jenkens, Bausell, & Jenkins, 1972; Muller, 1973). The relative effectiveness of various word-attack strategies has been compared in several studies (Jeffery & Samuals, 1967; Carnine, in press; Jenkins, Note 1). There is agreement that some kind of word attack operation must be taught in addition to sound-symbol association for students to successfully decode unknown words. By teaching a student to reliably sound-out and say a carefully programmed subset of regular words (s)he should be able to generalize this decoding operation to all simple regular words, thus giving the student a skill with great generality.

How to most effectively teach these basic skills must also be considered. This relates not only to how to teach, but also to who can teach. Rosenshine and Berliner (1978) reviewed studies since 1973 for critical features of effective instruction of basic academic skills and found a strong relationship between amount of academic engaged time and academic achievement. Academic engaged

time refers to the amount of time in which a student spends engaged in academically relevant material of a moderately difficult level. Rosenshine suggests that academic engaged time can be increased when the teacher (a) controls instructional goals, (b) chooses material appropriate to the student's ability level, (c) paces the instructional episode, (d) provides immediate academically oriented feedback, and (e) allots sufficient and continuous time for instruction. It is clear from Rosenshine's review, and the nature of the reading skills suggested for instruction above, that a high amount of teacher contact is necessary to effectively instruct students lagging in beginning reading skills.

The instructor of these skills can be limited to a well-defined instructional universe (i.e., sound-symbol associations for 28 letters and 23 letter combinations, and blending skills). Because the goals of such instruction are so specific the instructor would not need to have the broad training of a classroom teacher, as long as professional supervision were provided. In the Direct Instruction model of the Follow Through project, Becker and Engelmann (Note 2) successfully trained paraprofessional aides to function as specialized teachers of reading and math. Paraprofessionals have been used effectively in a variety of settings including schools, tutorial programs, and institutions. Though paraprofessionals can be effective as instructors, how effective they are appears to be a function of the thoroughness of training and supervision (Martin, 1972; Bricker, et al., 1972; Barnard, et al, 1974; Nelson, 1975; Becker, et al, Gang, Note 2).

One possible solution to teaching reading skills faster is to have paraprofessionals individually tutor students with the Beginning Reading tutorial program (Hofmeister, Rosen & Patten, 1975). The focus of this program is upon teaching 28 letter sounds, 23 letter-combination sounds, and a blending operation to sound out and identify regularly spelled words composed of these sounds. The Beginning Reading program appears to meet the critical features of effective instruction outlined by Rosenshine. First, instructional goals and materials are controlled by the tutor through pretesting, which places the student into the program at a level commensurate with his/her skill level. Second, the tutor paces the tutoring period through a series of timed drills involving sound-symbol correspondence and sounding out and saying words. Third, the tutor provides immediate academically oriented feedback by using standard correction procedures and descriptive praise. Fourth, sufficient time is allocated for instruction by daily 25 minute sessions. Furthermore, the students' motivation to engage in instruction is enhanced by an emphasis on reviewing known items to proficiency, a mastery criterion which must be met before new learning is introduced, and a series of "thermometer charts" for tracking student progress throughout the program (see appendix A).

The instructor's manual provides complete structure for the paraprofessional's behavior by a script detailing instructions to the student, procedures for presenting instructional materials, correction/verification procedures, criteria for advancement through the program, and expected student responses. The script not only

provides powerful antecedents for the paraprofessional's behavior but also provides a basis for assessment of tutor accuracy and eventual remediation of any tutor performance deficits.

Gang (Note 3) trained three mothers to use the Beginning Reading program with their three sons. Tutoring was conducted during the summer following the boys' third year of school. All boys were described by their teacher as being behind in reading one year or more and as having difficulty in decoding words. A single-subject multiple-baseline design across skills (Baer, Wolf & Risley, 1968) was used to assess the effectiveness of the program. The students' growth in reading skills also was compared against that of a national reference group and against their own individual projected gain based on past growth in reading. Generalization of learned word-attack skills to reading tasks outside of the program was assessed by comparing the number of errors committed in an oral reading of two criterion stories pre- and post-tutoring. Gang also included process measures of tutor accuracy in implementing the program. It was shown parents could accurately and effectively administer the program. The mothers' accuracy stayed above a 90% level and all three boys showed gains well above those expected from a comparable amount of time in mainstream instruction. Two of three boys showed a reduction in the number of errors committed in reading the criterion stories.

The present study builds on Gang's effort by extending the evaluation of the Beginning Reading program to an elementary school setting, permitting replication with students of differing grade-

levels, sex, race, and socioeconomic status, and with paraprofessional tutors. In addition to the multiple-baseline design used by Gang to assess program effectiveness, a pre- and post-test control group design was used to determine whether gains made by students in tutorial instruction significantly differ from those made by students in the same classroom but without tutoring. Since this study took place in a school setting, an attempt was made to determine both the generalization and the utility of skills learned in tutoring: tutored and control students were administered an experimenter-developed curriculum-embedded high-frequency word inventory before and after tutoring.

The question that this study attempts to answer is three-fold: (a) can paraprofessionals accurately implement the Beginning Reading program; (b) is the Beginning Reading program effective in reaching its instructional objectives; and, (c) do students tutored in the Beginning Reading program make significantly greater gains than their classroom peers in program-embedded skills, in socially-important reading skills, and in skills important to their prevailing reading curriculum?

METHOD

Setting

The elementary school which participated in this study serves about 400 students, preschool through grade five, with a staff of 21 teachers, 15 paraprofessional aides, and a reading specialist. The community is in southwestern Michigan and is predominantly black, rural, and of low socioeconomic status (SES).

Subjects

Eight paraprofessional aides were selected by the elementary principal on the basis of availability for tutoring and assumed cooperativeness. Two of the aides had about ten years of experience each, one had eight years' experience, and the remaining five were in their first year of service. All had high school degrees, and three had or were currently taking college-level courses in education.

A pool of 16 students was formed by polling teachers of low- and middle-performing first grade classes and low-performing second and third grade classes. Teachers were asked to list students with good attendence records whom they perceived as having the greatest deficit in word attack skills. Eight first grade (six low, two middle), four second grade, and four third grade students were suggested. Eight of the students were black, and eight were white;

three were female and thirteen were male. All were from low SES families. Four of the students had been previously retained one year. Stratifying by classroom students were assigned by lottery to tutorial and control conditions. Stratification by classroom was used to ensure that each teacher's pupils were evenly represented in both experimental and control groups.

Apparatus and Material

Each tutor was given an Instructor's Manual and Student Workbook of the Beginning Reading program, and access to a pool of cassette tapes, digital stopwatches for timing student responses, and kitchen timers for timing session length.

Recording and Reliability

As Becker (1972) has pointed out, it is necessary to obtain process measures of instruction in order to evaluate the achievement of students in relation to an instructional program. Audio tape recordings were made of all tutorial sessions. Because of the time involved in reviewing audio recordings of each tutorial session, it was not possible for the experimenter to review all taped sessions for every tutor. For three tutors all sessions were listened to and recorded (coded) on a tally sheet to determine accuracy of implementation, and for the other five tutors an average of one out of four sessions was unpredictably selected for coding. Tutors scheduled by the principal for morning sessions were selected by the experimenter for the continuous monitoring condition to allow

sufficient lead time to code the taped sessions and provide feedback to those tutors in the same day. The remaining five tutors were assigned by default to the intermittent monitoring condition. Regardless of monitoring condition, as each tutor entered a new section of the program her sessions were coded continuously until she met a 90% accuracy criteria.

Although a 100% implementation criteria would provide the most accurate assessment of program effectiveness, it was not chosen for two reasons. First, Carnine (1978) found a 70% level of implementation adequate for validated instructional techniques. Although measuring different teaching behaviors than those in the present study, Carnine's study does suggest a 100% level of implementation may not be necessary to demonstrate a program's effectiveness. Second, Gang's study of the Beginning Reading program administered by parent-tutors showed the program had a definite effect when implemented at a 90% level of accuracy, though the tutors infrequently reached 100% accuracy during tutoring sessions. It was anticipated by the experimenter that expecting 100% accuracy from the tutors in the present study would require nearly continuous monitoring. Thus, on the basis of related and direct empirical evidence on what comprises an adequate level of implementation, and upon time restrictions on the number of sessions that could be monitored, a 90% criteria for accuracy of implementation was chosen.

The following categories of instructional behavior were coded (see Appendix B).

1. Presents stimuli correctly: presenting flashcards in the correct number and order; modelling sounds and the blending operation correctly; and, presenting the correct workbook page and task.

2. Presents instructions correctly: reading the appropriate instruction from the Instructor's Manual, or using a paraphrased instruction agreed upon, by the experimenter and the tutor.[1]

3. Uses appropriate correction: using the proper and complete correction procedure for any error of commission as specified in the Instructor's Manual pp. 15, 16, 19, 24, 26, 28, 29 and 32. For example, if a student misidentified a sound during a flashcard drill requiring him/her to say six known sounds the tutor was instructed to say:

   ."What's this sound?" Student says sound.
   ."Now say all six sounds again, and be careful on this sound." (Tutor points to the sound that was missed.)
   ."Ready, start!" (p. 15)

4. Times correctly: correctly timing (within one second variance) the student's performance on various flashcard and workbook exercises. For example, the student is given 15 seconds to sound out and say a list of five words in a workbook exercise. To time correctly, the tutor must start her stopwatch when the student makes the first sound and stop her watch after the student sounds out and says the last word on the list; then she must take appropriate action if the elapsed time is above or below criteria for the task.

A second trained observer randomly selected one out of every four tapes coded by the primary observer (the experimenter) and coded those tapes independently. Point by point reliability was obtained by summing instances of agreement within all categories and

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[1]After students demonstrated comprehension of task directions by making the correct task response over several sessions, the scripted task directions were shortened. This permitted time for more task responses during a session. Tutors were instructed to return to the scripted directions any time the student did not respond appropriately to the paraphrased instruction.

dividing by the sum of agreements and disagreements. Point by point reliability overcomes the problem of random or sequence errors cancelling out, thus providing a more conservative estimate (Kelly, 1977).

The second observer was trained in the Beginning Reading sounds and procedures with the same training package presented to the aides. Preservice tapes of the experimenter acting as a student and the trainee aides acting as tutors were coded with both the primary and secondary observers present and disagreements in coding were discussed as they occurred. Additional preservice tapes were coded independently and disagreements were reviewed and resolved. Retraining was carried out at the beginning of each program section.

Student response to tutoring was studied by a multiple-baseline design across skills replicated across subjects. Following Gang (Note 3), alternate form program-referenced tests were administered to each student prior to program implementation and immediately following the completion of each program section, except Section One, which taught no new skills (see Appendix C). Since it is not desirable or likely that the behaviors of interest be reversed, the multiple-baseline design is an especially suitable way of demonstrating experimental control (Baer, Wolf, & Risley, 1968).

Both the tutored students and their controls were administered a series of assessment instruments pre- and post-tutoring. Program-referenced tests were administered to determine whether students learned significantly more word attack skills from tutoring than from regular classroom instruction. The reliability

of the program-referenced tests has not been established. However, items for all forms were selected from the instructional universe without bias so it might be expected that each form is roughly equivalent in reliability. The Woodcock Reading Mastery Test (WRMT) was chosen because it is an individually administered test sampling a wide range of reading skills. The five subtests include identification of printed and cursive letters, word recognition, pronunciation of phonically regular nonsense words, reading incomplete analogies and giving the missing final element, and supplying a missing word in passages of increasing length and difficulty through the use of context clues. The word attack subtest is of particular interest since it directly measures skills taught by the Beginning Reading program. The WRMT is recommended by its author for use in research because of its respectably high reliability (Woodcock, 1973). Correlations on test-retest, split-half, and alternate forms are in the .90's. The Wide Range Achievement Test (WRAT) reading subtest was chosen because it is widely administered in the schools and in research, thus allowing comparisons with previous research. The only reliability coefficients reported in the WRAT manual are split-half reliabilities for each of the subtests by grade-level. All reliability coefficients exceed .90. The authors do not report test-retest reliability for the WRAT (Salvia and Ysseldyke, 1978). The basal reading inventory was developed by the experimenter to assess generalization of word attack skills to decoding regular high-frequency words found in the students' reading curriculum (see Appendix D). The test-retest reliability

Beginning Reading program:

Section One: Sounds #1-#28 determined by the placement test as known are practiced in sound drills requiring the student to "read" sounds at the rate of 1/second.

Section Two: Unknown sounds #1-#14 (m,a,s,e,f,d,r,i,c,o, n,t,h,u) are taught and known sounds #1-#28 are drilled under a time criteria as in Section One.

Section Three: Unknown sounds #15-#28 (g,l,w,k,$\bar{o}$,v,p.$\bar{e}$,$\bar{y}$,j, x,y,z) are taught, known sounds #1-#28 are drilled under a time criteria, and words composed of sounds #1-#14 are blended synthetically in workbook exercises.

Section Four: Unknown letter combinations #29-#40 (ir,er, ur,th,qu,ea,ee,ol,wh,oo,aw,or) are taught, known letter combinations are drilled under a time criteria, and words composed of sounds #1-#28 are blended synthetically in workbook exercises.

Section Five: Unknown letter combinations #41-#51 (ai,ay, ou,igh,oa,al,ar) are taught, known letter combinations are drilled under a time criteria, and words composed of sounds #1-#28 and letter combinations #29-#41 are blended synthetically in workbook exercises.

Section Six: Words composed of sounds and letter combinations of #1-#51 are blended synthetically in workbook exercises.

Seven students were placed in Section One and one student was placed in Section Two.

Tutoring sessions were scheduled for five days a week at a time that did not coincide with academic instruction in the classroom. Six students were tutored in the morning and two in the afternoon. Before each tutoring session the aides collected a tape recorder and blank tape, a stopwatch, and a kitchen timer to ensure the session ran a full 25 minutes.

Aides were instructed to mark student progress on a "thermometer chart" every time a student was taught a new sound or completed a workbook page. Students were awarded inexpensive prizes for

RESULTS

Process measures indicate that the Beginning Reading program was adequately implemented by the paraprofessional tutors. A multiple baseline analysis of program skills acquisition reveals that tutored students learned most skills taught in all implemented sections. On both measures of reading achievement group comparisons between mean gain scores of tutored and untutored students were statistically and educationally significant. The difference in mean gain scores on the program-referenced tests was also statistically significant in favor of the tutored students. The difference in basal reading inventory mean gain scores between tutored and control groups was not statistically significant.

Reliability

Interobserver agreement was assessed for 25% (37 of 151) of the sessions coded. Point by point reliability was computed across all coding categories. Total agreement averaged 92% (range - 83 to 100%).

Program Implementation

The aides' accuracy in presenting instructions and stimuli correctly, in using the appropriate and complete correction procedure, and in timing responses correctly, was measured as an index of program implementation. As shown in Table 1, the percent

Table 1

Aides' Percent Accuracy and Percent Sessions Monitored

Aide	Average Percent Accuracy	Accuracy Range in Percent	Percent Sessions Monitored
One	88%	61 to 99%	84%
Two	96%	82 to 100%	95%
Three	94%	77 to 100%	94%
Four	84%	67 to 98%	40%
Five	88%	73 to 98%	30%
Six	88%	50 to 100%	33%
Seven	86%	74 to 99%	23%
Eight	92%	64 to 100%	26%

accuracy for aides in the continuous monitoring condition (aides one, two, and three) ranged from 88 to 96%. The percent accuracy for aides in the intermittent monitoring condition (aides four through eight) ranged from 84 to 92%. This is above Carnine's 70% criteria for adequate implementation and comparable to levels obtained by Gang (Carnine, 1978; Gang, 1977). As shown in Table 2, the number of sessions run by all aides ranged from 23 to 42. Out of six program sections six aides completed three and two aides completed four sections.

Table 2

Number of Program Sessions and Sections Completed

Aide	Sections Completed	Sections Completed (out of six)
One	35	3
Two	42	4
Three	33	3
Four	40	4
Five	33	3
Six	33	3
Seven	23	3
Eight	26	3

Students' Reading Behavior

Within-subject comparisons

Figures 1-8 present the multiple-probe results for students' accuracy on program-referenced tests (PRT's). Skills for Section One are not included since that section exclusively involves the review of known skills. In all these figures the top panel presents results for program Two, including sounds #1 - 14 (m, a, s, e, f, d, r, i, c, o, n, t, h, u). Panels 2 and 3 present the results for program Section Three, including Sounds #15 - 28) (g, l, w, k, $\bar{o}$, v, p, $\bar{e}$, y, j, x, $\bar{y}$, z) and blending words

Fig. 1: Lamont's percent correct on program-referenced tests administered prior to tutoring (test 1) and following the completion of each program section.

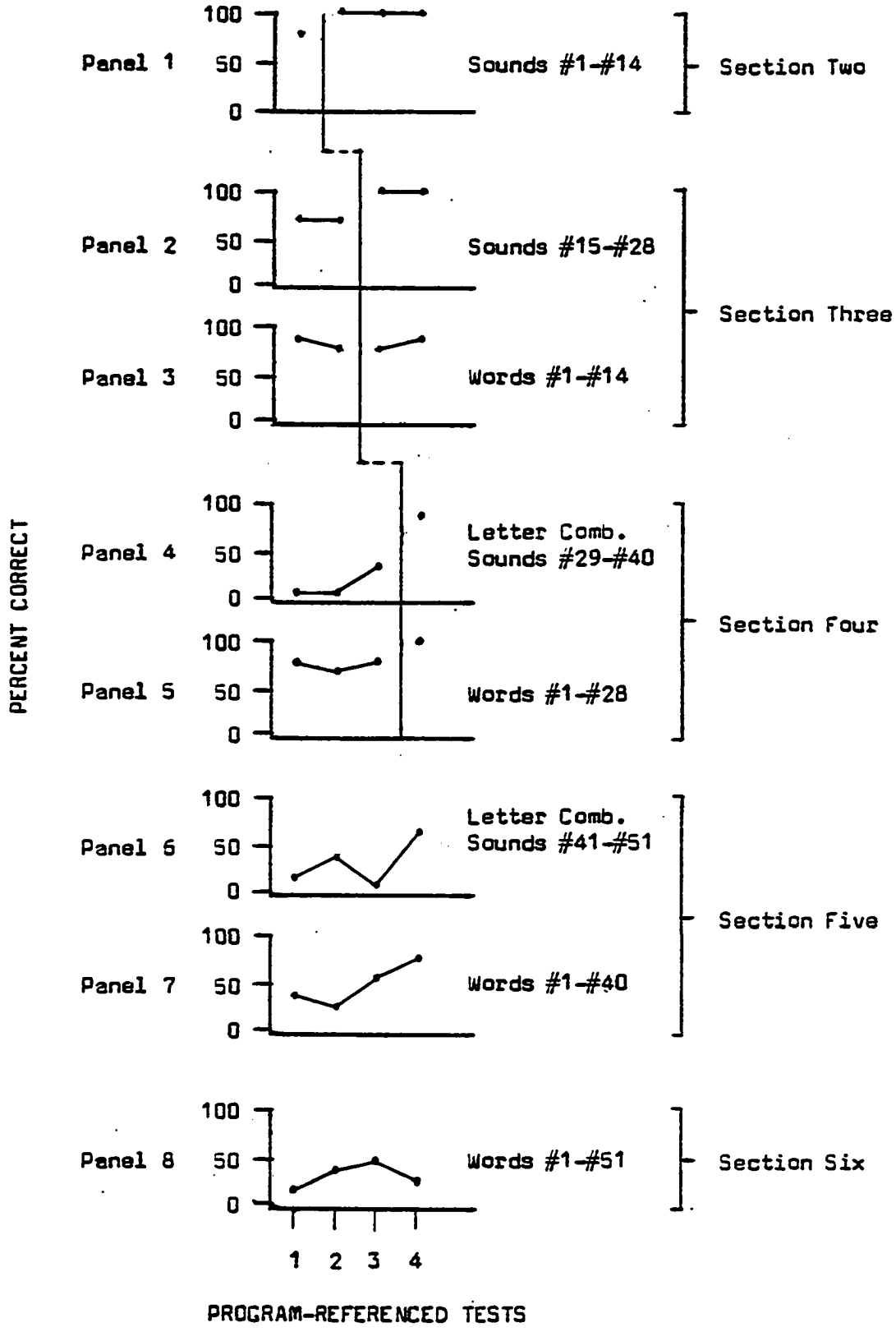


Fig. 2: Larry's percent correct on program-referenced tests administered prior to tutoring (test 1) and following the completion of each program section.

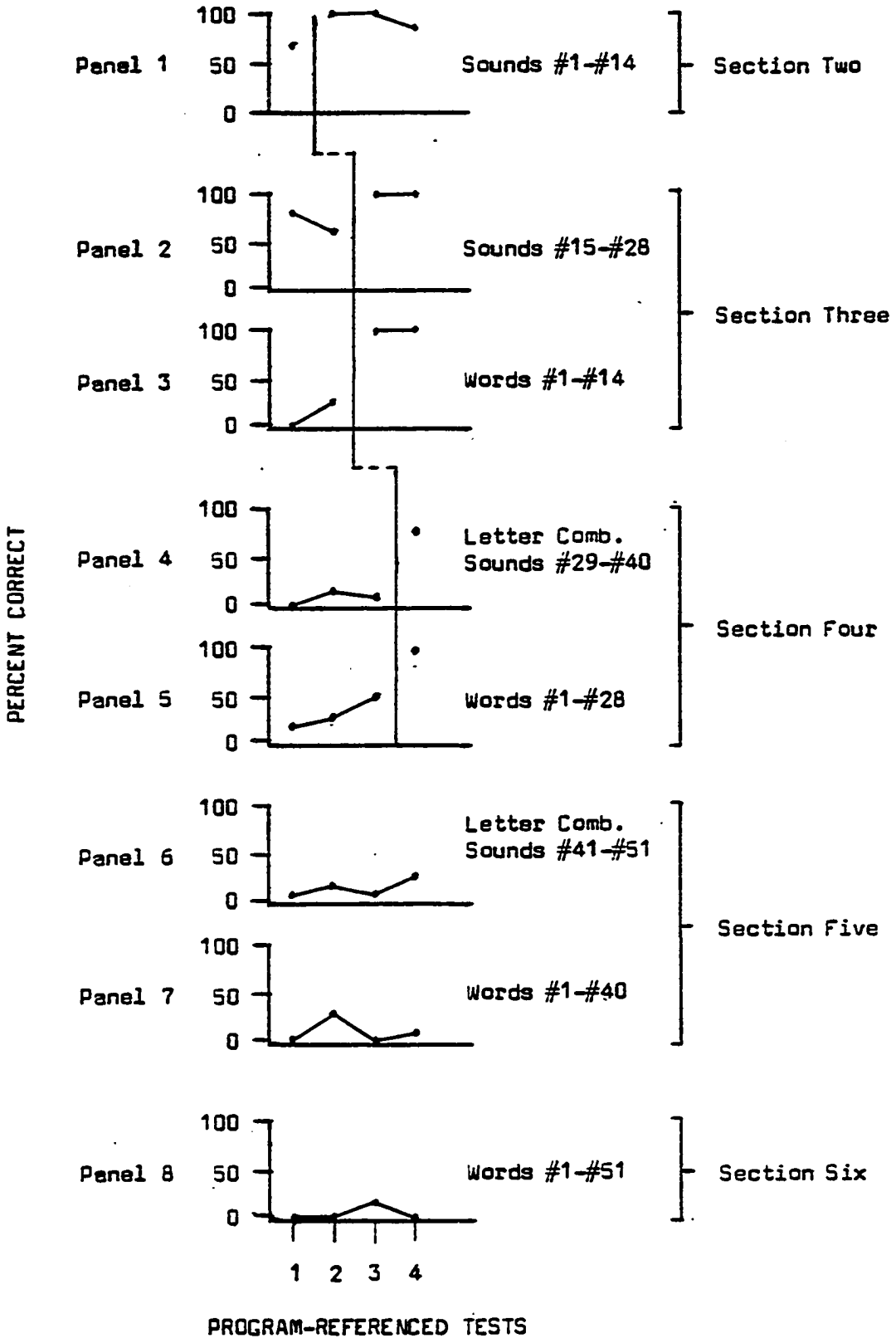


Fig. 3: Cynthia's percent correct on program-referenced tests administered prior to tutoring (test 1) and following the completion of each program section.

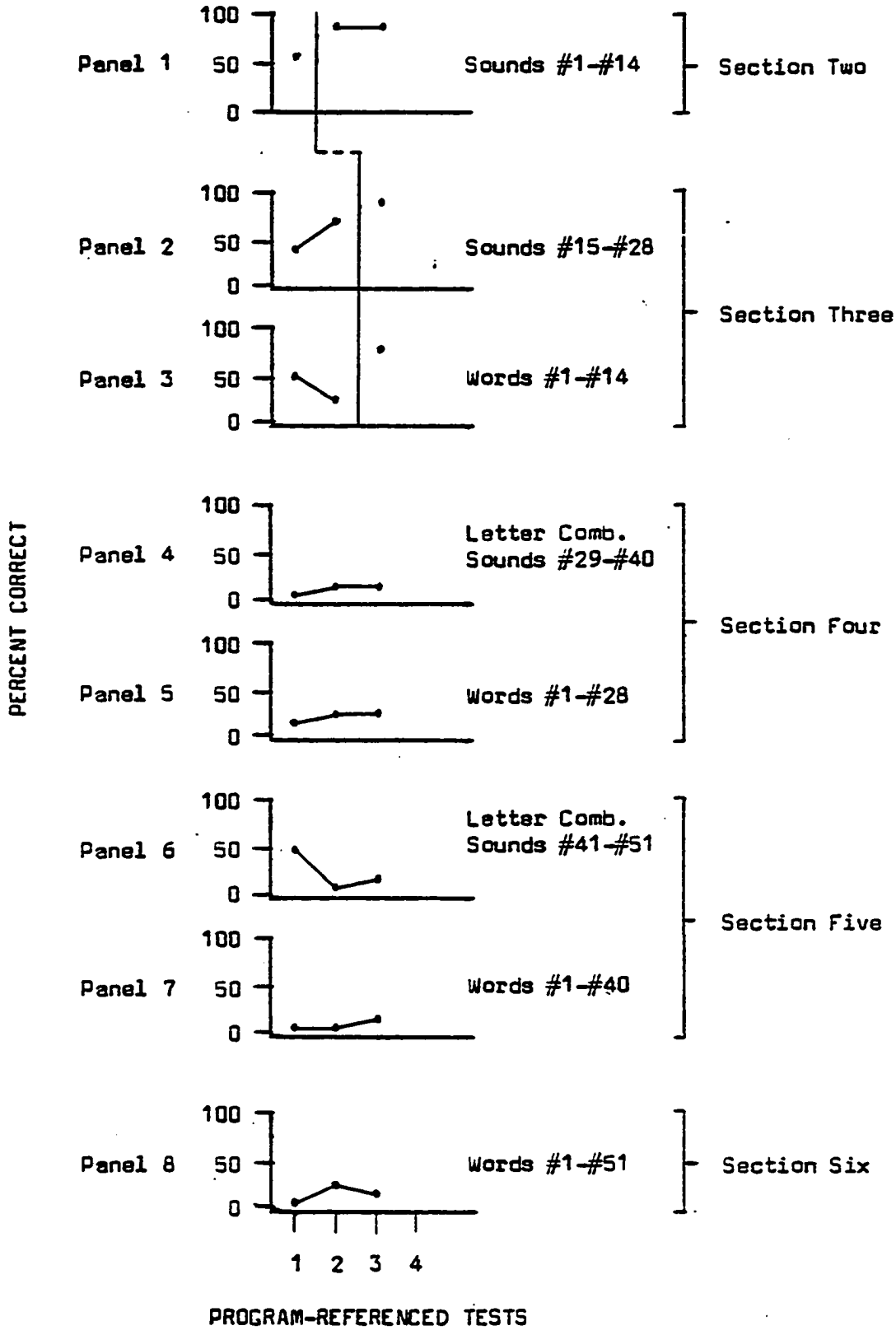


Fig. 4: John's percent correct on program-referenced tests administered prior to tutoring (test 1) and following the completion of each program section.

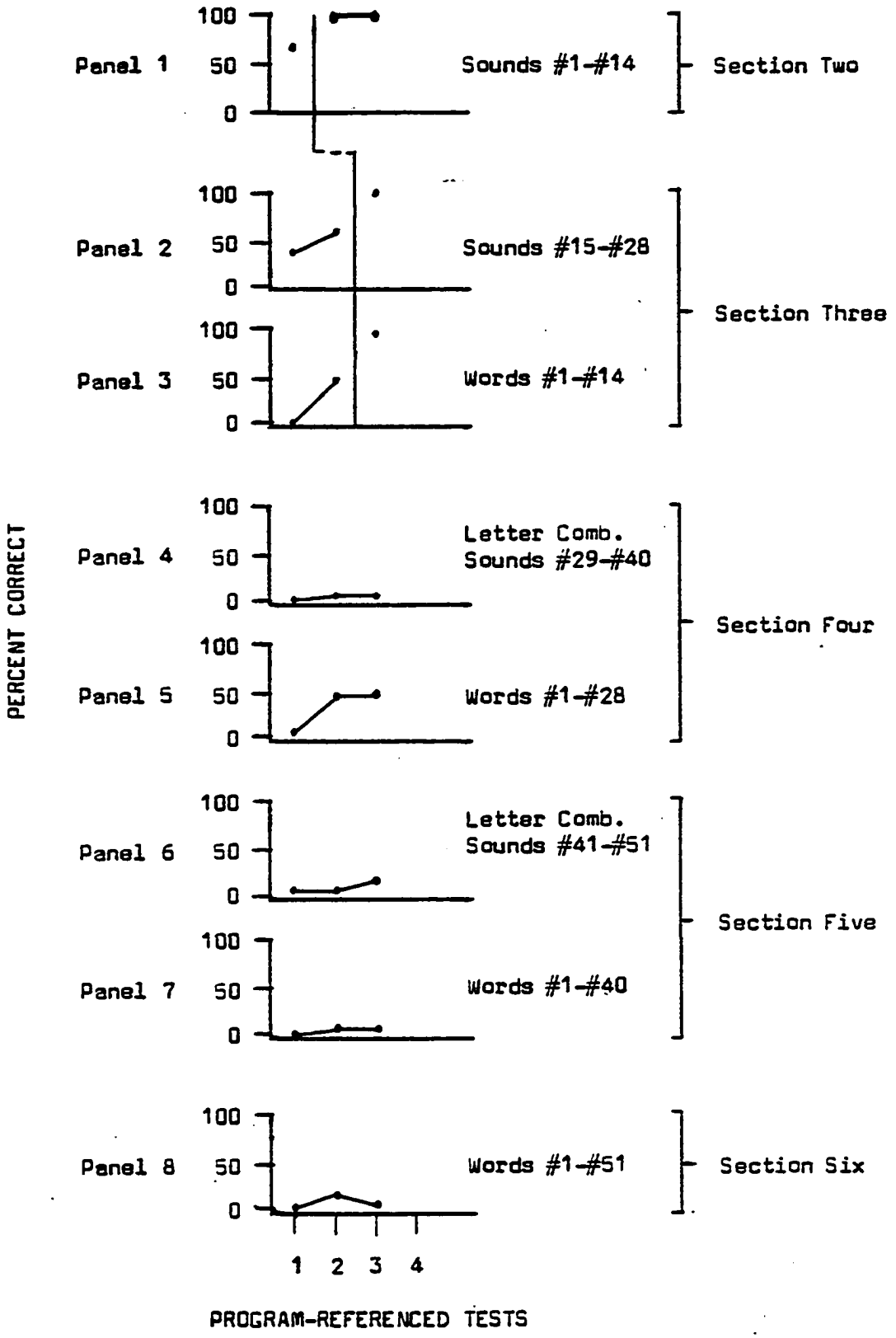


Fig. 5: Lela's percent correct on program-referenced tests administered prior to tutoring (test 1) and following the completion of each program section.

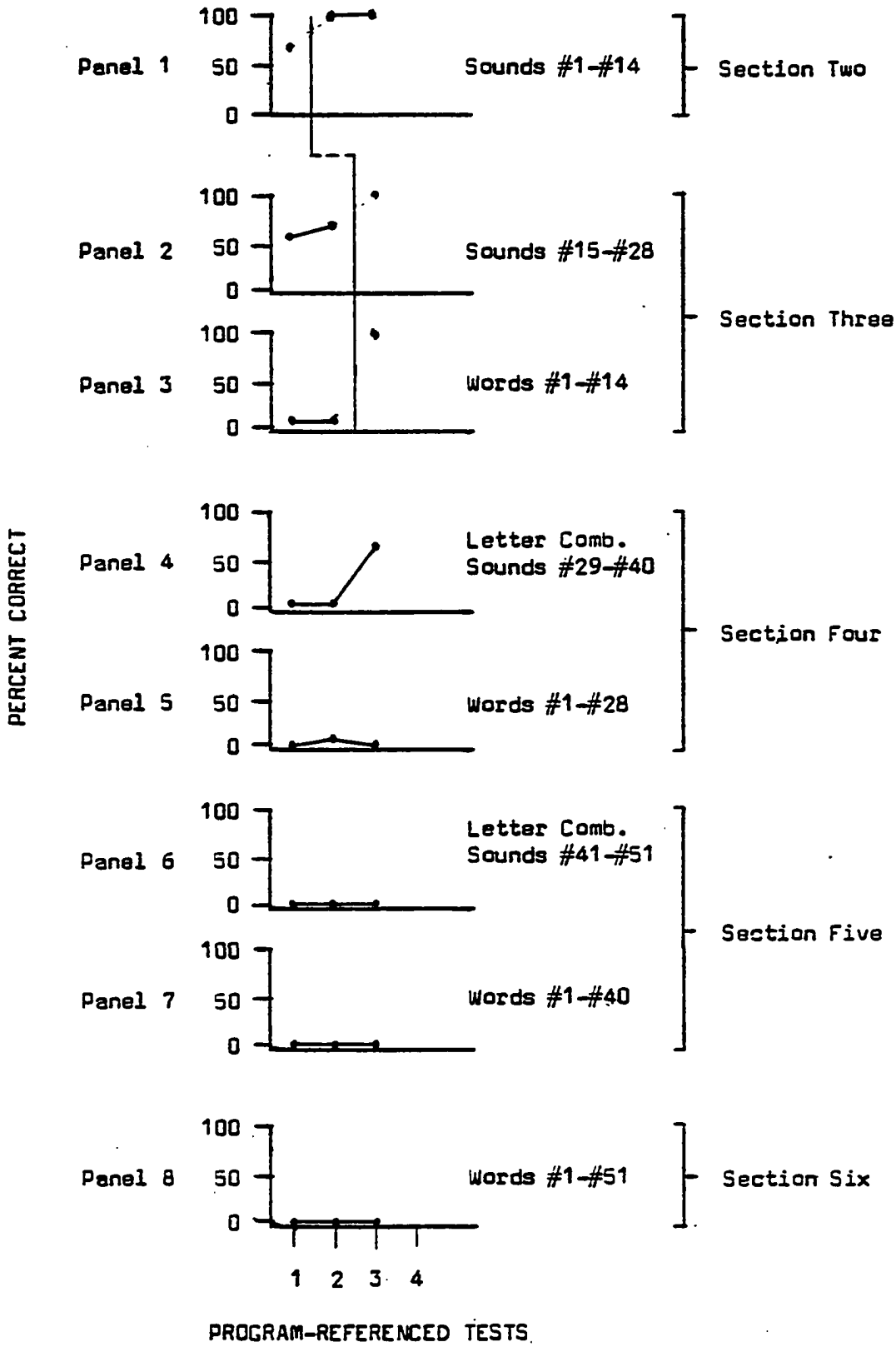


Fig. 6: Leslie's percent correct on program-referenced tests administered prior to tutoring (test 1) and following the completion of each program section.

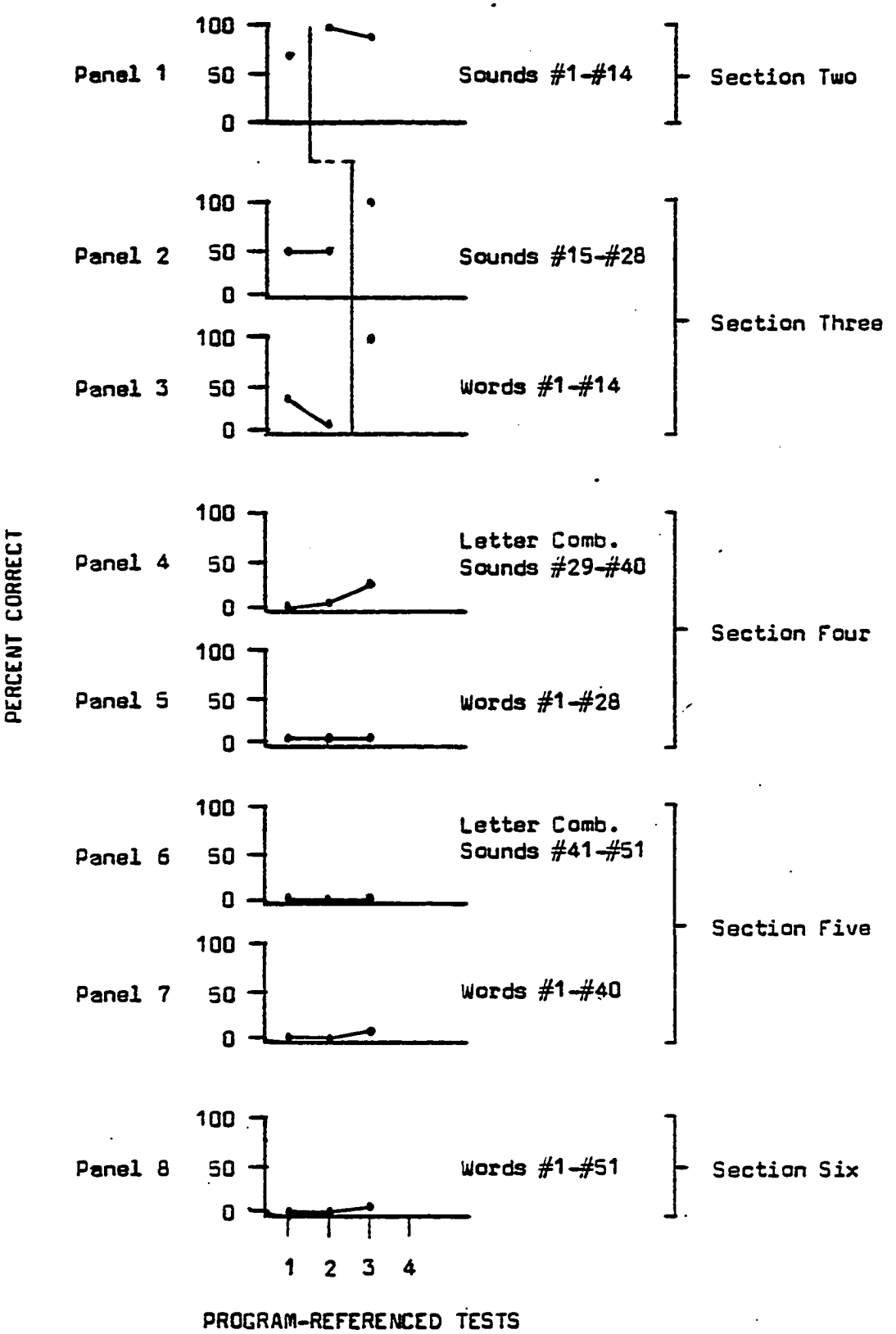


Fig. 7: Jack's percent correct on program-referenced tests administered prior to tutoring (test 1) and following the completion of each program section.

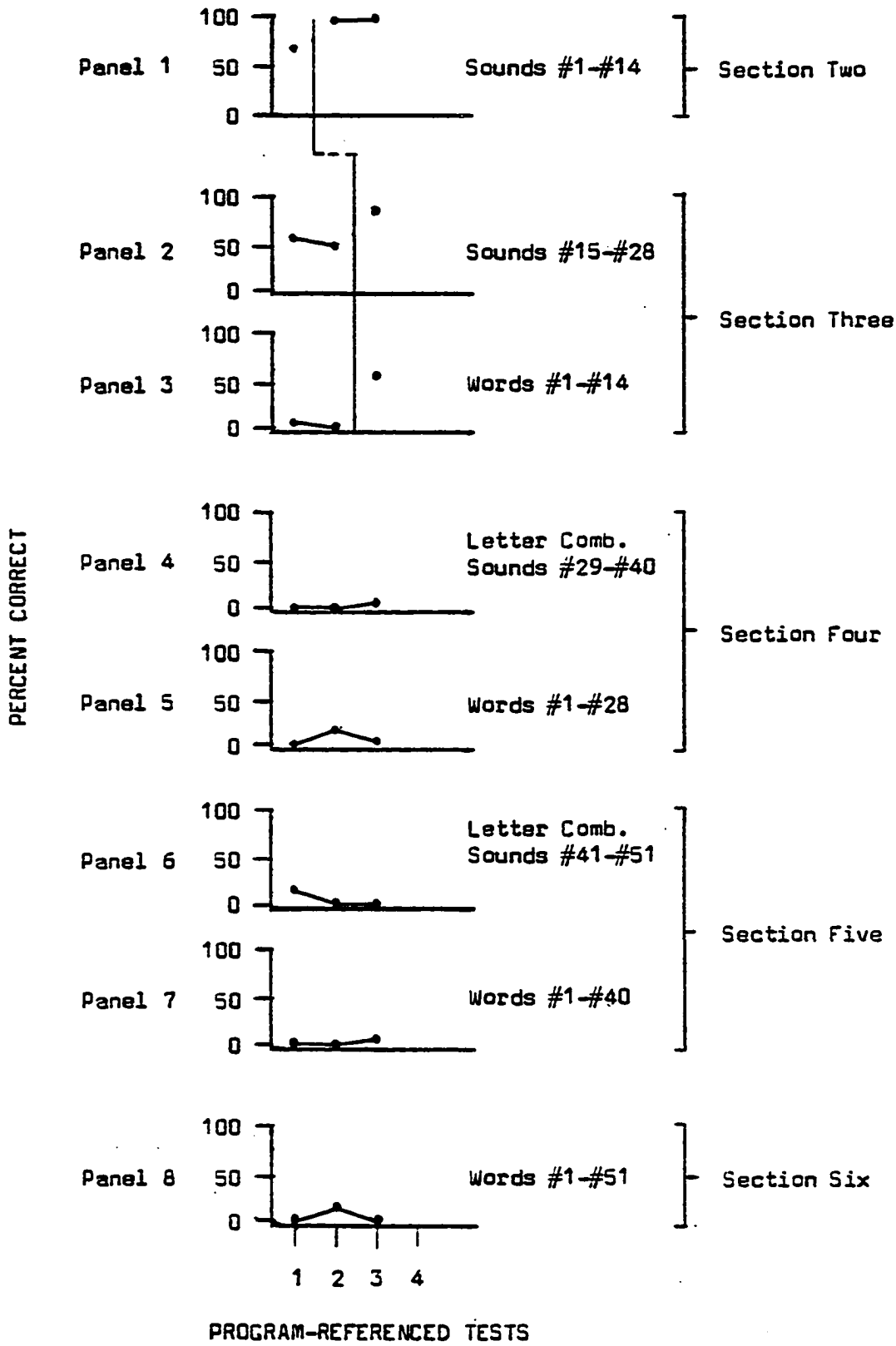
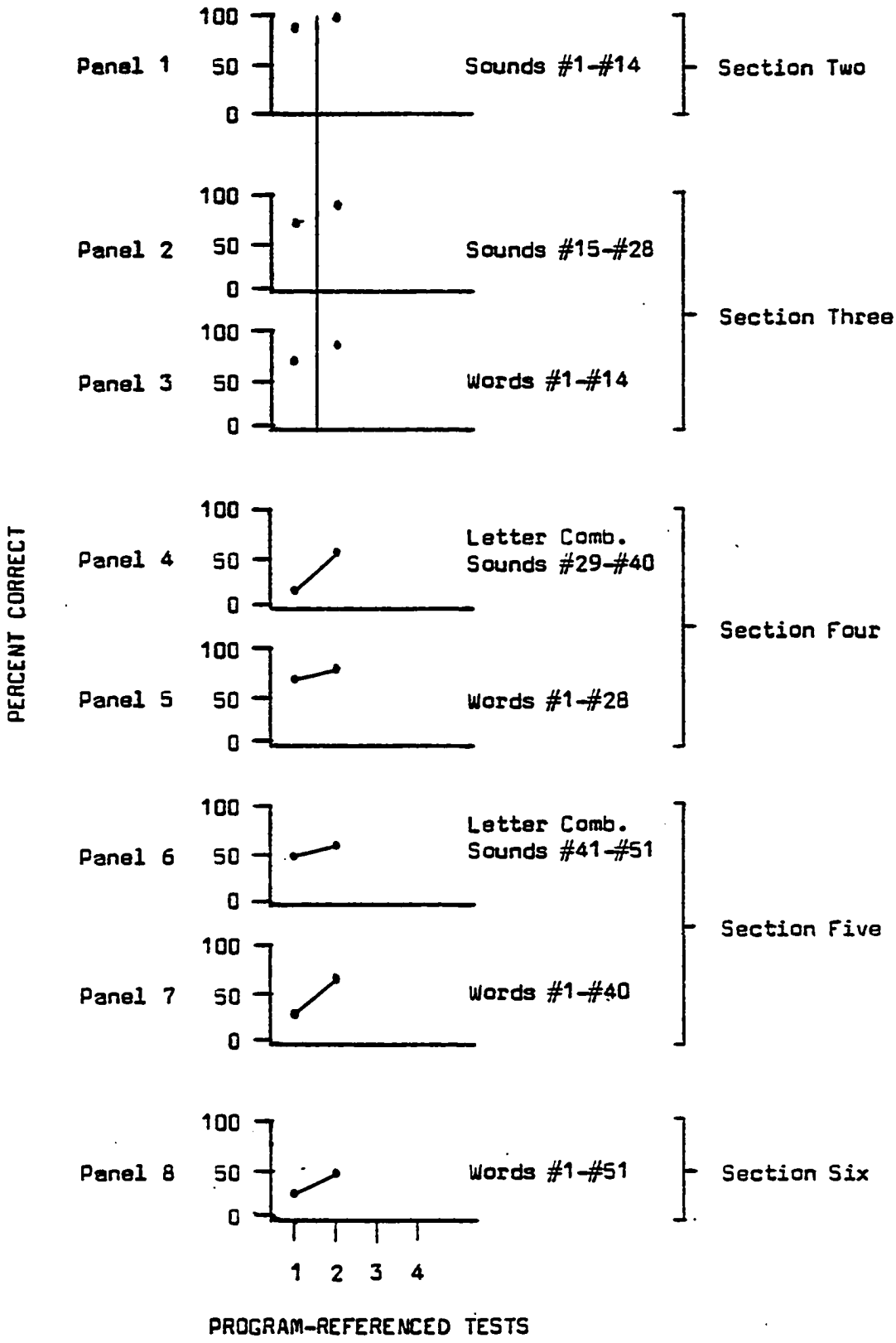


Fig. 8: Dushon's percent correct on program-referenced tests administered prior to tutoring (test 1) and following the completion of each program section.



composed of sounds #1 - 14. Panels 5 and 6 present results for program Section Four, including letter-combination sounds #29 - 40 (ir, er, ur, th, qu, ea, ee, ol, wh, oo, aw, or) and blending words composed of sounds #1 - 28. Panels 6 and 7 present results for program Section Five, including letter-combination sounds #41 - 51 (ai, ay, ou, igh, oa, al, ar) and blending words composed of sounds #1 - 40. Finally, the bottom panel presents the results for program Section Six, including blending words composed of sounds #1 - 51.

None of the eight students tutored completed all six program sections. Figures 1 and 2 present the performances of two students on program Sections Two, Three, and Four. Neither of these students completed program Sections Five and Six (Panels 6, 7, and 8). Figure 1 portrays Lamont's performance in the program. Lamont averaged 62% correct on PRT items prior to tutoring and 85% correct after tutoring. The upward trend on panels 6 and 7 may be attributable to concurrent classroom instruction in vowel blends and digraphs. Figure 2 portrays Larry's performance in the program. He averaged 32% correct on PRT items prior to tutoring and 97% correct after tutoring. Although Larry made frequent b-d confusion errors during tutoring, PRT items containing b's and d's were responded to correctly.

Figures 3-7 present the performances of five students on program Sections Two and Three. For these five students, tutoring did not occur in program Sections Four, Five, and Six (panels 4-8). Figure 3 portrays Cynthia's performance in the program. She

averaged 50% correct on PRT items prior to tutoring and 88% correct after tutoring. Cynthia made frequent b-d confusion errors throughout tutoring. B-d confusions on PRT items account for the less than 100% mastery of skills in Sections Two and Three (panels 1, 2, and 3). Figure 4 portrays John's performance in the program. He averaged 44% correct on PRT items prior to tutoring and 100% correct after tutoring. Figure 5 portrays Lela's performance in the program. She averaged 44% correct on PRT items prior to tutoring and 100% correct after tutoring. Gains in letter-combination sounds #29 - 40 (panel 4) were due to the aide inadvertantly teaching those sounds in Section Three out of sequence. Figure 6 portrays Leslie's performance in the program. He averaged 44% correct on PRT items prior to tutoring and 98% correct after tutoring. Leslie made frequent b-d confusion errors throughout tutoring. A b-d confusion resulted in the 90% accuracy score on the final administration of a PRT on Section Two (panel 1). Figure 7 portrays Jack's performance in the program. Jack averaged 38% correct on PRT items prior to tutoring and 93% correct after tutoring. Errors in sounding and blending medial and final sounds resulted in the 60% accuracy score on the final administration of a PRT on program Section Three (panel 3).

Finally, Figure 8 portrays Dushon's performance on Section Three of the program. Unlike the other students who began in Section One of the program, Dushon was placed in Section Three on the basis of his performance on the program placement test. He averaged 77% correct on PRT items prior to tutoring and 93% correct

after tutoring. Tutoring did not occur in Sections Four, Five, and Six (panels 4-8). Dushon made frequent b-d confusion errors throughout tutoring. B-d confusions on PRT items for Section Three account for the less than 100% mastery (panels 2 and 3). The upward trend on panel 4 may be attributable to concurrent classroom instruction on vowel blends and digraphs.

Table 3 summarizes students' average accuracy on all PRT items immediately prior to, and immediately following tutoring. Students' average accuracy prior to tutoring ranged from 40 to 77%. Following tutoring, students' average accuracy ranged from 83 to 100%.

Group comparisons

Table 4 summarizes the mean gains made by tutored and control groups. Before performing the t-tests Hartley F-max tests for homogeneity of variance were computed. Homogeneity of variance was accepted in all cases ($p \leq .1$), supporting the assumptions required for use of the t statistic with these data. Raw score data were used in all comparisons of performance on norm-referenced instruments except the WRMT Total Reading gain scores, where grade equivalents were used. Raw scores yielded consistently more conservative t values than their corresponding transformed grade equivalents. Grade equivalents were used with the WRMT Total Reading scale since this scale is a composite transformation of all WRMT subtests. Using an arithmatic sum of the subtest raw scores would be invalid

Table 3

Students' Average Program-Referenced Test Score Across Program Skills Immediately Prior to and Immediately Following Tutoring in Each Program Section

Student	Average Score Before Tutoring	Average Score After Tutoring	Gain Scores
Lamont	70%	94%	24%
Larry	44%	96%	52%
Cynthia	53%	87%	34%
John	60%	100%	40%
Lela	50%	100%	50%
Leslie	43%	100%	57%
Jack	40%	83%	43%
Dushon	77%	93%	16%

since all of the subtests have different means and standard deviations.

The mean gains in raw scores on the WRAT Reading subtest and the WRMT Word Attack subtest were both statistically significant ($p \leq .025$). Mean gains in grade equivalents on the WRMT Total Reading scale were also significant ($p \leq .005$). Becker (1976, 1978) suggests that on most achievement tests a statistically significant mean gain which is also larger than one-fourth to one-half of a standard deviation is likely to be educationally significant. The mean gains of tutored students on all three

Table 4

A Comparison of Tutored and Control Group Performance Using a t-Test Analysis

Assessment Instrument	$\bar{X}_{tutored}$	$\bar{X}_{control}$	SD	$\frac{\bar{X}_{Tutor} - G}{SD}$	t	df	p (one-tailed)
WRMT Word-Attack subtest raw score gain	10.125	.5	5.05	1.05*	3.83	14	$\leq .005$
WRMT Total-Reading grade-equivalent gain	.8625	.05	.386	1.18*	2.397	14	$\leq .025$
WRAT Reading sub-test raw score gain	7.125	4.5	2.25	2.58*	2.33	14	$\leq .025$
PRT raw score gain	20.4	7.125	6.98	1.97	3.80	14	$\leq .005$
Basal Reading Inventory raw score gain	16.5	10.25	---	---	1.42	14	N.S.

*Educationally Significant Gain

achievement measures exceed one-half of a standard deviation from their respective total means. The mean gain of tutored students' raw scores on the program-referenced tests was also statistically significant ($p \leq .005$), in spite of the fact that items in the latter 40 to 60% of the PRT were not taught to the tutored students. The difference in mean gain of raw scores on the basal reading inventory between tutored and control students was not statistically significant.

DISCUSSION

This study illustrates that early elementary students who are lagging in basic reading skills can learn at a faster-than-mainstream rate when taught by paraprofessional tutors trained in the Beginning Reading program. After intensive training aides were shown to implement the program at a level considered to be above adequate, even when monitoring was intermittent. Mean gains in socially important (norm-referenced) reading skills made by tutored students were both statistically and educationally significant. The multiple-baseline analysis of acquisition of program skills demonstrated that each program section implemented was effective in reaching its stated objectives. Control group pre- post-test comparisons of program skill acquisition further substantiate the effectiveness of the program over mainstream classroom instruction alone in teaching sound-symbol association and blending skills. The non-significant difference between tutored and untutored students' mean gain scores on the basal reading inventory may be due to the fact that none of the tutored students completed the program sections teaching letter-combination sounds. These sounds were contained in 52% of the words in the basal inventory; tutored students had no particular advantage over untutored students on about half of the items in the inventory.

Generalizability of the results of the group comparisons are limited to other students from similar geo-socioeconomic and

cultural backgrounds. On the other hand, a look at the single-subject comparisons (multiple-baseline analysis across skills, replicated across subjects) suggests a program which is generally effective in teaching early elementary students of differing age, sex, and race. Gang's single-subject study involving three white, male, middle-class, urban post- third-grade students shows similar results, lending further evidence to the program's general effectiveness.

One possible weakness noted is that, as implemented in this study, the Beginning Reading program was not successful in remediating b-d confusions exhibited by four of the students prior to tutoring. The experimenter deliberately did not suggest other remedial techniques to the tutors so that the effect of the program on these b-d confusions could be assessed. All four students who demonstrated b-d confusions prior to tutoring continued to commit frequent b-d confusions throughout all tutoring sessions. The program-referenced test scores probably underestimate the extent of the b-d confusions since students exhibiting the confusions could respond correctly to these items 50% of the time by merely guessing. However, the portion of the workbook task requiring students to write, sound out and say words was dropped in an effort to accelerate students' progress through the program so they might complete all sections before the school year ended. Perhaps the additional practice inherent in the deleted writing task would have provided the extra learning trials to firm up the b-d discrimination. If this additional practice were not sufficient, a

subroutine based on Stromer's differential reinforcement technique (1975) and/or Engelmann's dynamic presentation technique (1977) may have been helpful in remediating the b-d confusions.

Paraprofessional preservice training required about 28 hours of engaged time. About 23 hours of this time was in individual training while the remaining five hours was in group training. The engaged time is a very conservative estimate of actual time spent carrying out preservice training. It does not account for time lost in missed appointments, absences, and schedule conflicts. Preservice training time could have been considerably shorter if the ongoing duties of the aides were rescheduled to permit more group training time. For example, firming up the aides' knowledge of sound-symbol associations alone consumed seven hours of individual training time. This might have been reduced to one hour if similar techniques were used in a group format. Another consideration is the experimenter's false assumption that group training should focus on familiarizing the aides with the Instructor's Manual rather than on actual practice of the tutoring techniques. Aides had uniformly poor performance on tutoring techniques after group training on the manual. As a result, additional practice sessions had to be scheduled for firm up the aides' performance on procedures for Sections One and Two of the program. In hindsight, a more effective approach would have been to focus practicing procedures for Sections One, Two, and Three. Training for Sections Four, Five, and Six could have been carried out individually with each aide as she completed each section. Since

Sections Four, Five, and Six are variants of Sections One, Two, and Three, individual training prior to implementing Sections Four, Five, and Six could be brief.

Monitoring aides' performance consumed about one-half hour to code each taped tutoring session and about five minutes to give corrective feedback and praise, or approximately three hours per week for each of the three aides in the continuous monitoring condition and a little over one-half hour per week for each of the five aides in the intermittent monitoring condition. It appears that intermittent monitoring and feedback along with brief check-outs prior to the implementation of each new program section was just as effective as continuous monitoring in maintaining a near 90% level of tutor accuracy. The amount of time necessary to intermittently monitor the initial implementation of the Beginning Reading program can be quite reasonable for school psychologists, teacher consultants, or other support personnel depending upon the number of tutor-trainees and the amount of time available from the support person's regular activities. It is not clear from the present study whether less frequent monitoring would maintain a near 90% level of implementation.

A large amount of training time was spent implementing the tutorial system. However, it is possible that the amount of trainer time required to maintain experienced tutors' performance could be reduced through the use of a peer-review system. Although Maddox (Note 4) found, that during training, monitor feedback

was more effective than peer feedback in increasing tutors' appropriate use of correction procedures and descriptive praise, it may be that peer-review would be effective in maintaining adequate performance of previously trained tutors. After all tutors have been firmed up on all program procedures by taking a student through the program with monitoring by the trainer, tutors could intermittently review tapes of each others' sessions once a week. Tutors could be trained to fill out a tutor-behavior check-list specifying criteria for adequate performance and those in need of improvement. Such a review system would make all tutors' sessions public, thus increasing both the motivation, corrective feedback, and support to accurately carry out the program. The trainer's time committment could then be limited to dealing with special learning problems exhibited by tutors or tutees. A peer-review system would distribute the time necessary for monitoring among all of the tutors rather than concentrating it upon the trainer. This shift would lead to savings in more expensive professional time. Such a review system is planned for the coming academic year at the elementary school which sponsored this project. One aide has been allotted two hours per week to (a) coordinate the procedures for a totational review among the tutors and (b) act as a contact person for the consulting school psychologist overseeing the project.

Overall acceptance by school personnel and tutored students was quite good. Only one of eight aides involved in tutoring declined to tutor next year; although quite pleased with the tutoring

program, she felt she would not be able to perform her tutoring sessions regularly because of her unpredictable schedule as a "utility" aide. Three aides asked to tutor more than one student next year. Several teachers volunteered to the experimenter that they observed positive attitudinal changes in their tutored students ranging from "improved self-concept" to "more confidence in learning situations". Two teachers spontaneously commented that they saw no discernible difference in their tutored students' performance in reading. When probed further it was found that these teachers were looking for changes in reading behavior unrelated to the objectives of the tutoring program, e.g., decoding irregular words.

The principal of the school commented that morale among the aides was unusually high during implementation of the tutorial program. He has chosen to continue the program next year and has completely revised his assignment of aides from classrooms to grade levels to ensure tutoring sessions will be run with greater continuity next year.

After tutoring sessions were discontinued for the end of the school year, a questionnaire was given to all tutors. Questions probed their satisfaction with the program (see Appendix G). The tutors were also directed to ask their tutees what they liked and disliked most about the program and to record all student responses on paper. On the questionnaire all aides commented that they were pleased with the knowledge they had gained in sound symbol association, which they felt had better equipped them to help all

readers in the classroom. All aides also expressed pleasure with the gains shown by their students. Only one aide expressed displeasure with the program, specifically with the amount of repetition but felt that it was a necessary part of the program. When asked what changes they would make in the program if they could, all but two of the aides felt that no change was desirable. One aide felt that the amount of repetition should be reduced while the other felt that a change in the flashcards should be made, specifically, that only one letter combination should be present on each flashcard.[1]

Information on student likes and dislikes about the tutorial program were obtained on only three of the students. All three said they enjoyed the small prizes which were given to them by the tutors for completing workbook pages. None of the students stated any dislikes.

The material cost of the present project included: $2.00 per Student Workbook; $4.50 per Instructor's Manual; $10.00 for two kitchen timers; about $20.00 for cassette tapes; and, about $10.00 for rewards. The rewards and Student Workbooks were the only consumable items. Cassette recorders and stopwatches were available as part of regular school equipment.

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[1]Program flashcards had more than one letter-combination per card if the sounds were identical, e.g., oi-oy, ir-er-ur, etc. This led the latter aide's student to recognize only the leftmost letter combination, thus to fail blending tasks requiring knowledge of the other combinations.

The results of this study suggest several areas for future research. Foremost would be a study of the retention of the word attack skills taught by the Beginning Reading program. Retention would very likely be related to the student's opportunity to use the learned skills in his/her prevailing reading curriculum. Another study might look at the effects of the tutoring program with differing reading curricula, e.g., phonics-vs.-meaning emphasis, or at the effects of the tutoring program and one approach at differing grade levels. This would provide estimates of the best fit between the Beginning Reading program and curriculum type or level. Research could investigate minimal levels of process monitoring that would still ensure adequate implementation and student gain. Finally, both the present study and Gang's study did not fully implement the Beginning Reading program as designed. A study which would include the word-writing tasks deleted by these two studies would provide valuable information on the effects of the writing task on student gain.

In summary, the Beginning Reading program administered by paraprofessional aides proved to be an effective means of teaching basic reading skills to low-performing early elementary readers at a faster-than-mainstream rate.

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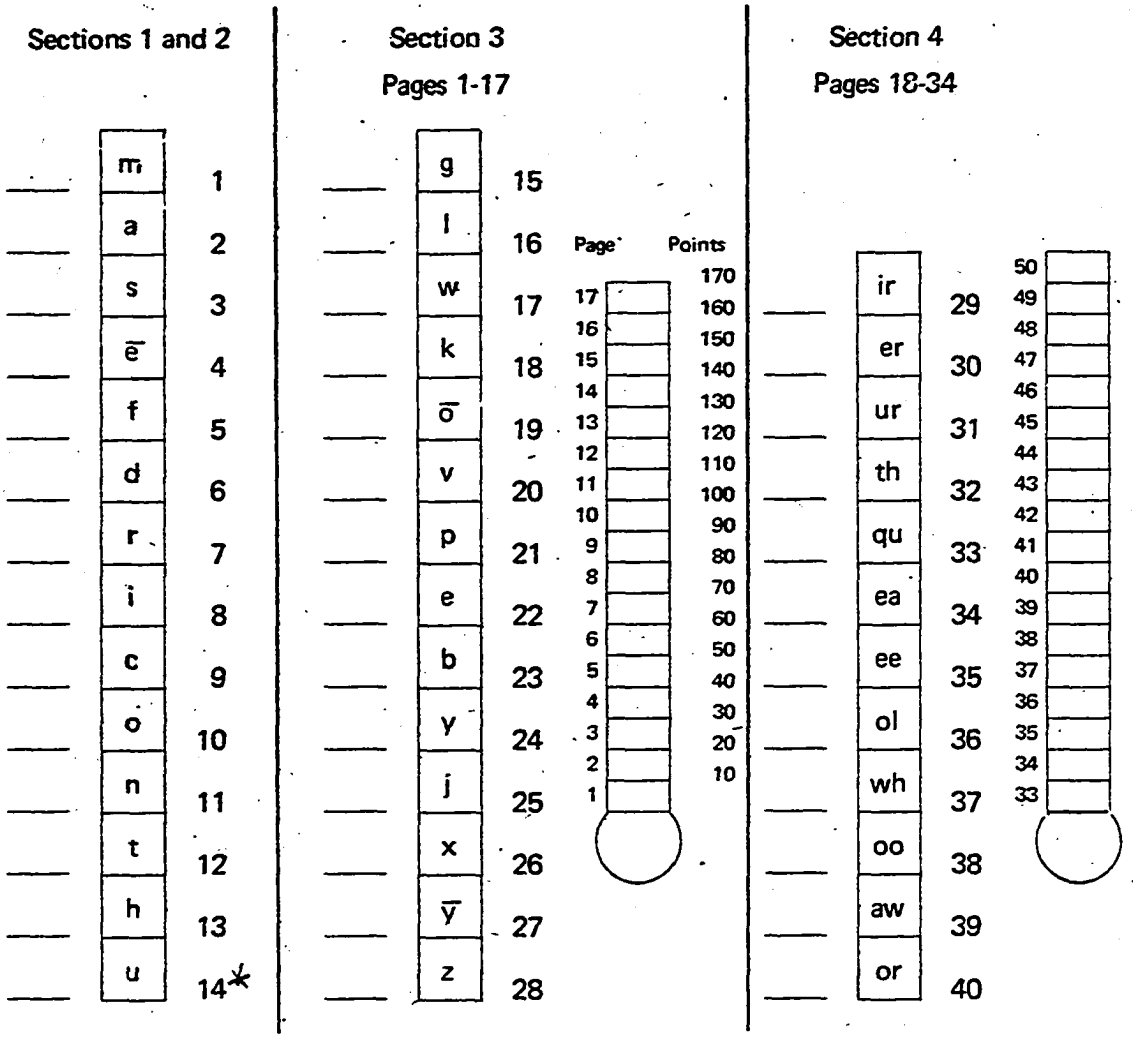
Appendix A



Student Progress Chart

DATE_____

TUTOR_____

SECTION_____

SESSION #_____

( ) OBS. ( ) RELIA.

TASK #	TASK	PRESENTS STIMULI CORRECTLY	PRESENTS INSTRUCTIONS CORRECTLY	USES APPROPRIATE CORRECTION	TIMES AND RECORDS CORRECTLY
1	TEACH SOUND				
2	PICK OUT SOUND				
3	READ ALL SIX				
4	LAY OUT ALL SIX				
5	6 in 6' FIRST				
6	6 in 6' SECOND				
7	6 in 6' THIRD				
8	ALL KNOWN SOUNDS				
9	WB SOUND DRILL				
10	WB WORD READING				
11	WB WORD				

Appendix C

FORM C NAME_____ DATE_____

SAY THESE SOUNDS AS QUICKLY AS YOU CAN. REMEMBER TO TELL ME THE SOUND TEE LETTER MAKES AND NOT ITS NAME.

f a t i u m d h c $\bar{e}$

$\bar{o}$ w p x y l v b z j

I WANT YOU TO POINT TO EACH WORD AND SOUND IT OUT, THEN TELL ME THE WORD. THEN GO ON TO THE NEXT WORD AND SOUND IT OUT AND SAY IT. READ ALL OF THE WORDS ON THE LIST. WORK AS QUICKLY AS YOU CAN.

fan	fox
dam	lift
mod	yes
mid	vest
ant	let
rid	did
in	fix
odd	no
can	kitten
sis	yet

FORM C NAME_____ DATE_____

SAY THE SOUNDS THAT THESE LETTER COMBINATIONS MAKE AS QUICKLY AS YOU CAN.

er th aw ir ee ur wh ol qu or

ay ch ar ou oi ai igh oa oy al

I WANT YOU TO POINT TO EACH WORD AND SOUND IT OUT, THEN TELL ME THE WORD. THEN GO ON TO THE NEXT WORD AND SOUND IT OUT AND SAY IT. READ ALL OF THE WORDS ON THE LIST.

saw	high
told	annoy
loot	much
raw	load
bee	hay
fork	rush
her	ship
for	short
why	sham
born	all

Appendix D

__ PRETEST __ POSTTEST NAME_____ DATE_____

GRTR	TIGERS	LIONS	DINOSAURS
not	the	play	us
and	me	dog	she
on	want	away	got
go	can	find	boys
he	see	work	wait
the	get	big	walk
in	this	how	man
we	stop	box	back
will	cat	for	tree
it	fish	did	much

RAINBOWS	SIGNPOSTS	REWARDS	SECRETS
two	long	ground	keep
our	morning	sight	pick
saw	try	spend	food
children	why	shall	corner
her	start	class	small
another	around	address	night
next	king	rather	fight
them	sat	seven	cool
right	cry	lead	boat
again	under	team	sweet

Appendix E

SUGGESTED PROCEDURE FOR LEARNING SOUND-SYMBOL ASSOCIATIONS

The tutor's knowledge of the sounds made for the 51 letters and letter-combinations is the very heart of the Beginning Reading program. You will have to constantly make judgements as to the correctness of sounds made by your students. Mastering these sound-symbol associations before you begin pre-service training will allow you to concentrate more fully on the details of the program.

Consider the following points as you work on mastering these associations:

- Frequent, short practice sessions will pay off more than one or two long ones (for example, five five-minute sessions rather than one 25-minute session).

- Don't try to learn too many new sounds at one time. Select four sounds that you don't know, or don't know well, and practice these until they are firm, then add four more.

- First practice unknown sounds , then review these along with the sounds you already know.

- Note stop-sounds like d, c, t, g, p, b, d, etc. Be sure to make them sharp and crisp and don't include any vowel sound on the end.

- Note sounds w,y,x,qu, wh. These sounds are made differently to help students more easily blend words having these sounds.

Appendix F

CHECK-OUT #5

1. On workbook page 45, in the first list, what should you do if the student points to the letters lo when instructed to point to the letter combination in the word loud? (Instructor's manual Sec. 5)

2. On page 22 of the workbook, in the second list, what should you do if the student pronounces me with a short e sound?

3. On page 24 of the workbook, on list #3, what should you do if a student makes an error on the word kitten?

4. How many workbook pages should you do each day?

5. Do you use sound cards 1-28 in the sound drill with cards in Section 4?

Appendix G

The purpose of this questionaire is to get information on your feelings about the the BEGINNING READING tutorial program. I am interested in your individual reactions to the program so please do not share your thoughts about the program with other tutors until you have completed this questionaire. You can write as little or as much as you like. If necessary you can write on the back of the sheet.

1. What pleased you about the BEGINNING READING program? Be specific.

2. What displeased you about the BEGINNING READING program? Be specific.

3. What would you want to change in the BEGINNING READING program? (Think about your comments on #2 above.) If you do not feel that any changes would be desirable, say so.

4. Do you feel that you could have carried out the BEGINNING READING program without any training or consultation?

5. If we could do it all over again what type of training would be most beneficial to you?

6. Did you enjoy your tutoring experience with this program? Would you enjoy working with a program that is more structured or less structured? Why?

7. Would you enjoy using this program again next year?

8. This is very important: Ask the student that you tutored questions #1 and #2. Rephrase the question so that the student understands what you are asking. Write their comments on another piece of paper and turn it in with this questionaire. Turn your questionaire and student responses into the primary office..

thanks!!!!!!!!!!!!!!!!!!!!!!!!

P. S. the results of this questionaire will be considered as confidential.

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