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ABSTRACT

This study tested the effectiveness of Teams-Games-Tournament (TGT) for teaching basic reading skills. TGT is a classroom management technique which uses cooperative student teams, instructional games, and interteam tournaments in a particular combination. Fifty-three third-grade students were randomly assigned to either a TGT or a control condition. Both treatment groups were exposed to a five-week, sight-reading curriculum unit which focused on two objectives: development of vocabulary and verbal analogy skills. The results indicated a positive TGT effect on growth for vocabulary and verbal analogy skills. (Author)

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TEAMS-GAMES-TOURNAMENT (TGT) EFFECTS ON READING SKILLS IN
THE ELEMENTARY GRADES

Contract No. NE-C-00-3-0114

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Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through three programs to achieve its objectives. The Schools and Maturity program is studying the effects of school, family, and peer group experiences on the development of attitudes consistent with psychosocial maturity. The objectives are to formulate, assess, and re-search important educational goals other than traditional academic achievement. The program has developed the Psychosocial Maturity (PSM) Inventory for the assessment of adolescent social, individual, and interpersonal adequacy. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed the Teams-Games-Tournament (TGT) instructional process for teaching various subjects in elementary and secondary schools, and has produced a computerized system for school-wide attendance monitoring. The Careers program (formerly Careers and Curricula) bases its work upon a theory of career development. It has developed a self-administered vocational guidance device and a self-directed career program to promote vocational development and to foster satisfying curricular decisions for high school, college, and adult populations.

This report, prepared by the School Organization Program, presents a study of the use of the Teams-Games-Tournament instructional process to teach reading skills at the third-grade level.

Abstract

This study tests the effectiveness of Teams-Games-Tournament (TGT) for teaching basic reading skills. TGT is a classroom management technique which uses cooperative student teams, instructional games, and interteam tournaments in a particular combination. Fifty-three third grade students were randomly assigned to either a TGT or control condition. Both treatment groups were exposed to a five-week sight-reading curriculum unit which focused on two objectives: development of vocabulary and verbal analogy skills. The results indicate a positive TGT effect on growth for vocabulary and verbal analogy skills.

INTRODUCTION

Teaching beginning reading skills to pupils is of central concern to educators. Such concern reflects a national goal of continually improving the literacy rate of our population. A variety of curriculum innovations have been and continue to be directed at teaching beginning reading skills (cf. Chall, 1967), but innovations to restructure classroom management in order to foster greater student enthusiasm for learning reading skills are scarce. Teams-Games-Tournament (TGT) is a classroom management system shown to be effective in teaching mathematics and language arts skills. The present study describes the effects of TGT (compared to a more traditional management of a reading classroom) on the reading skills (both vocabulary and comprehension) of a group of third-grade students.

TGT: A Review

TGT represents a comprehensive change in the reward and task structures which surround a student in the classroom. The change in reward structure involves reinforcing students at the level of small groups, rather than at the individual student level. Task structure changes are created by having each student perform in a small group setting, rather than in an isolated, individual setting. The particular combination of structural changes used by TGT follow directly from research in both social psychology (e.g. Deutsch, 1949; Bronfenbrenner, 1970), and instructional gaming (Allen, et al., 1970).

TGT has three components: teams, games, and tournaments. The team component involves assigning students in a classroom to a series of four- or five-member teams. The students are assigned to create maximal heterogeneity within each team (on such dimensions as student academic achievement, race, and sex) and equality across teams. Team membership remains intact over time; within-team interaction and cohesion is fostered by frequently held team work sessions and by assigning teammates to adjacent seats. The

games component consists of a series of instructional (or learning) games which require knowledge of concepts or skills addressed by the curriculum unit in order to win. The games typically consist of a series of multiple-choice, true-false or objective-type items with a clear correct answer to every item. The games are typically designed by teachers to correspond to their specific curriculum objectives. The tournament component consists of weekly (or even twice-weekly) game-playing sessions, typically lasting 30 to 50 minutes, in which each student competes with two other students of comparable achievement level representing other student teams. At the end of each tournament a "top scorer," "middle scorer," and "low scorer" is declared for each three-person tournament table, the individual student scores are converted to team scores, the team scores are ranked, and winning teams are declared. Public feedback concerning both individual and team performance is provided periodically by classroom newsletters.

Because TGT is a classroom management technique, it is used in the classroom as a supplement to the instructional approach already used by the teachers. In most cases the instructional approach has involved teacher-centered activities based on a standard test or tests. TGT has not been used in classrooms in which other instructional approaches, such as individualized instruction, have been present, although there is no a priori reason why such a match would be incompatible.

TGT effects on students: TGT has been tested in a variety of classroom situations. The research has examined effects of TGT on academic achievement, student attitudes, and classroom social processes (see DeVries & Mescon, 1975, for review). TGT facilitates academic achievement (when contrasted with traditional classroom management) in both mathematics and language arts, using both elementary and junior high school students. Effects of TGT on social studies

achievement are marginal. When student attitudes were measured, TGT appears to quite consistently result in more positive attitudes toward the work in the classroom. Because TGT involves students in a variety of social situations, a variety of measures of classroom social process (defined as frequency and quality of interaction among students) have been used. The data indicate that students in TGT evidence greater peer-tutoring, more varied friendship circles, and greater mutual concern. In short, TGT research suggests that the technique creates fairly consistent and widespread effects on student achievement, attitudes, and social process.

TGT: What accounts for its effects? Particularly with regard to TGT effects on achievement, the treatment appears to affect two cognitive mediating variables in the individual student (Hulten, 1974). That is, students in TGT classes believe (1) they have a reasonable chance of succeeding in the class, and (2) that success in the class is important to them. Both of these cognitive mediating variables (perceived probability of success and importance of success) have been posited as integral parts of the learning process (Kagan, 1974; McKeatchie, 1974). The specific mechanisms by which TGT affects these cognitive variables have been detailed by DeVries and Edwards (1974). In short, TGT appears to positively affect student achievement because (1) students believe they have a better chance of success in a TGT class, and (2) students assign greater importance to success in such a class.

Reading Skills

As noted frequently (e.g. Farr, 1969; Anderson, 1972; Chall, 1967), a major problem in evaluating instructional programs aimed at teaching beginning reading skills is the selection of the target skills. In a field heavily influenced by the existing standardized tests of reading, instructional goals often have been determined by such tests. As noted by Farr (1969), the most commonly tested subskill areas are reading vocabulary and reading comprehension.

Whether these subskill areas represent distinct sub-areas of the reading process is problematical.

For the present study two subskill reading areas were selected. The first involves reading vocabulary. Reading vocabulary represents a basic skill which is intricately related to reading comprehension processes. A second area selected for the present study represents one reading comprehension task, namely, the understanding of analogous relationships between two pairs of stimulus words. Five types of logical relationships were selected: antonyms, synonyms, size or degree, part of the whole, and functional relations. The development of verbal analogy skills in students was of particular interest for the present study because of the emphasis of earlier TGT studies on teaching basic knowledge skills (using Bloom's taxonomy). An example is the DeVries & Mescon (1974) study in which students were asked to memorize and apply basic rules of punctuation. The present study presents a unique test of TGT, focusing on the complex skill of detecting analogous relationships between two pairs of word stimuli.

Research Questions

The main question is whether TGT, when compared to a more traditional classroom management structure, results in any differential acquisition of two diverse reading skills (reading vocabulary and verbal analogies) for third grade students. Another question, of secondary interest, is whether TGT facilitates acquisition of reading skills for some students more than others. For example, Edwards, et al. (1972) report greater TGT effects in mathematics classes for low-ability classes than for average-ability classes. The present study will test for a possible trait-by-treatment interaction effect. Additionally, because two very different reading skills are addressed, one involving more complex cognitive processes than the other, it is important to assess whether TGT is equally effective for both types of skills.

Subjects

The students were 53 third grade students in an elementary school in the Syracuse, New York area. Fifty (50) percent of the students were females. As a measure of the students' verbal ability the students were administered the Gates-MacGinitie Reading Test, Primary C, Form 2 (given during month two of the third grade academic year). The average grade equivalent score for the Vocabulary section of the Gates-McGinitie was 4.2 (range from 1.5 to 7.1) and for the Comprehension section was 4.2 (range from 1.4 to 7.0).

Procedure

The study was conducted for a five-week period and used a simple two-group comparison, contrasting TGT with a control treatment. The first three weeks focused on vocabulary skills, while the latter two weeks addressed verbal analogies. Each treatment group comprised a separate reading class, with both groups meeting during the same time period of the day. The students had all been involved in a six-week TGT study in language arts (cf. DeVries, et al., 1975). A two-week vacation separated the two experiments. For the language arts experiment the students had been randomly assigned (stratifying on verbal ability) to the two treatment conditions. The students remained in the same groups for the present study. As is reported subsequently, the two treatment groups entered the reading experiment with, on the average, roughly comparable skill levels.

Each treatment group met daily for a 50-minute period. Two teachers were involved in the experiment, with teacher effect partially controlled by rotation of teachers across treatment groups every 5 to 7 school days, resulting in equal exposure of both groups to both teachers. Pre and post measures of all but one dependent variable were obtained.

Independent Variables

The independent variable of interest is the classroom managerial structure (comprised of both task and reward dimensions). An attempt was made to hold constant as much as possible other dimensions on which the treatment conditions might vary. Both treatment groups received equal exposure (in terms of time) to both sets of reading objectives (vocabulary and verbal analogies). Both treatments were taught vocabulary skills using the Ginn 360 series (levels 7,8 and 9), and the My Word Book 3 (Glossary) published by Lyons-Carnahan. The source for the verbal analogies unit was Reading-Thinking Skills published by Continental.

In order to partially control for a "Hawthorne effect" the control students were exposed to a variety of unusual classroom activities. These included frequently conducted informal games, use of multicolored worksheets, and individualized attention given to low-reading students. Six low-reading control students and seven low-reading TGT students were regularly given additional instruction designed to preteach vocabulary (focusing both on decoding and definitions).

Teams-Games-Tournament Treatment: The TGT treatment was operationalized in a fashion similar to that used in earlier TGT studies (cf. DeVries & Mescon, 1975; DeVries, et al., 1975). The team component was defined by the assignment of each student to one of six student teams (three teams consisted of 5 students, and three consisted of 4 students). The six teams were divided into two three-team leagues, entitled the "American League" and the "National League." The tournaments were organized around 13 vocabulary games and 9 verbal analogy games. Each game consisted of between 32 and 39 items.

The thirteen vocabulary games varied primarily in terms of word difficulty, following the three levels (7, 8, and 9) of the Ginn 360 series.

The students were exposed to a total of 465 vocabulary items. A typical item from the vocabulary games is listed below:

A person who cuts hair.

- a) barber
- b) singer
- c) banker

A student at each game table would read aloud the definition and the three alternative answers. The student would then say which alternative word correctly matched the definition. The student's opponents were asked to either agree with or challenge the answer, followed by the checking of the answer on an answer key.

The nine verbal analogy games were designed to teach five types of analogies: part-whole, antonyms, synonyms, size or degree, and functional relationships. The students were exposed to a total of 309 different examples of the five types of verbal analogies. An example of an item treating synonyms relationship is:

Sleepy goes with tired as Confused goes with

- a) mad
- b) afraid
- c) bewildered

The correct answer is c) bewildered. The playing of the verbal analogy games followed the same procedure described above for the vocabulary games. A practice worksheet was designed for each game, and the students were asked to work on these worksheets (during regularly scheduled team practice sessions) prior to actual playing of the game.

TGT tournaments were conducted twice weekly, for approximately 30-40 minutes each. Classroom newsletters were prepared weekly, describing the performance of both the student teams as well as individual students.

Control: The control condition involved focusing on the same curriculum objectives as that for the TGT group, but with the use of a different reward and task structure. In the Control class, students were always asked to work by themselves, with rewards (in the form of grades and teacher praise) administered to individual students only. Students received rewards on a partially competitive basis, that is, a student's grades were at least partially a function of the student's classmates' performance. All 465 vocabulary items and 309 verbal analogy items taught to the TGT students were also taught to the control students using the practice worksheets and other exercises. As mentioned earlier, informal learning games were a regular part of the control condition (in order to partially deal with a possible "Hawthorne effect"); however, no formal contingencies were assigned by the teacher to such performance in the Control condition.

Dependent Variables

The dependent variables measured were (1) reading vocabulary skills, and (2) verbal analogy skills. Multiple measures of both skill areas were employed.

Vocabulary Skills: Two tests of vocabulary skills were administered, both on a pre-and post-test basis. The first measure was a Treatment-Specific Vocabulary Test, comprised of 60 items selected on a stratified-random basis from the 465 vocabulary items taught. Each item was listed in the same format as that used in the practice worksheet, namely, the listing of a loose definition, followed by three alternative words. The test score is the total number of items answered correctly. The coefficient alpha measure of internal consistency is .94.

The second measure of vocabulary skills used was the Gates-MacGinitie Reading Test-Vocabulary, Primary C. Form 2 was administered as the pre-test and Form 1 as the post-test. The pre-test was administered approximately three months before the beginning of the experimental period, as a part of the school's annual achievement testing. The 52 items for Form 1 (used as the post-test) were randomly distributed throughout the thirteen vocabulary units and practice worksheets. Consequently, the Gates-MacGinitie is also a treatment-specific measure. The test score is defined by the raw number of items answered correctly. Reliability and validity estimates of the Gates-MacGinitie are listed in Burns (1965).

Verbal Analogy Skills Two measures of skills in detecting verbal analogies were administered. A thirty-item Treatment-Specific Verbal Analogy Test was administered on both a pre- and post-test basis to all students. The test consisted of a stratified-random stratifying on type of analogy and difficulty level. A sample of the 309 verbal analogy items to which students were exposed. Each item was composed of a partial analogy, e.g., "A is to B as C is to D," and the student was to select from three choices the word that would complete the analogy. The test score was defined by the total number of items answered correctly. The reliability alpha was .72.

The test was designed as a measure of a possible transfer effect from the treatment to verbal analogy items. Although it is possible that the test might have the content attribute of verbal analogy items, and the students might be able to detect the various logical relationships among the analogies. In addition, the analogies designed for the Treatment-Specific Verbal Analogy Test comprised only items which sampled the five types of analogies used in the experimental period. The students

item format was similar to that used in the above-mentioned verbal analogies tests. The test was administered as a post-test only. The test score was defined by the raw number of items answered correctly. The coefficient alpha was .88.

Data Analysis

The general linear model approach to the analysis of covariance (Cohen, 1968) was the analytical procedure used to test for experimental effects. The particular linear model used involved the step-down analysis, defined as Method 3 by Overall & Spiegel (1969). The general linear model is particularly useful because (1) it directly measures the strength of a treatment effect, and (2) it allows for examination of trait-by-treatment interaction effects.

RESULTS

Treatment Group Comparability

Because both treatment groups had received prior exposure to an experimental treatment in language arts, it is necessary to ask whether the two groups were comparable (measured at day 1) in reading skills. An examination of the treatment group means and standard deviations (listed in Table 1) reveals no significant difference at pretest time between TGT and Control for any of the three measures for which pretests were administered.

Insert Tables 1 and 2 about here

Vocabulary Skills

The results of the general linear analysis for the Treatment-Specific Vocabulary Test are listed in Table 2, with treatment group means and standard deviations detailed in Table 1. Table 2 summarizes the results for each dependent variable. For every variable three terms were entered into the model, in the

following order: The A term was defined by the pretest score for the dependent variable, the B term was defined as the Treatment effect (TGT coded as 1; Control coded as 0), and the A x B term consisted of the product of A times B (Cohen, 1968). The Incremental R^2 term indicates the amount of additional variance in the dependent variable explained by the addition of the term to the model. Further explanation of the model is available in Cohen (1968), and Overall and Spiegel (1969).

Insert Figures 1 and 2 about here

As Table 2 indicates, significant Treatment [$F(1,50) = 15.39, p < .01, R_I^2 = .15$] and Ability-by-Treatment interaction [$F(1,49) = 5.37, p < .05, R_I^2 = .05$] effects were obtained for the Treatment Specific Vocabulary Test. The treatment effect is explored in greater detail in Table 1 and Figure 1. As indicated, the TGT students evidenced greater growth in vocabulary skills than did the Control students. Figure 2 contains the within-cell regression slopes for the two treatment conditions, which provide a more detailed look at the significant A x B interaction. As the Figure indicates, the positive TGT effect was primarily accounted for by the low and average-achieving students.

The analyses of the Gates-MacGinitie Vocabulary Test are also summarized in Table 2. Significant Treatment [$F(1,48) = 7.69, p < .01, R_I^2 = .08$] and A x B Interaction [$F(1,47) = 6.39, p < .05, R_I^2 = .06$] effects were detected. Table 1 and Figure 3 indicate the treatment effect was due to greater growth in vocabulary skills by the TGT students. Figure 4 provides a closer look at the significant interaction effect, indicating that the low-and average-achieving TGT students were the most positively affected by the treatment.

Insert Figures 3 and 4 about here

Verbal Analogy Skills

The results of the general linear analysis for the two measures of verbal analogy skills are summarized in Table 2. A significant treatment effect [$F(1,50) = 12.26, p < .01, R^2 = .14$] was obtained for the Treatment Specific Verbal Analogies Test. Table 1 and Figure 5 indicate that the effect was due to greater growth in verbal analogy skills by the TGT students than by those in the Control condition.

Insert Figure 5 about here

The test of any possible transfer effects (Verbal Analogies Test) required the use of the pretest Treatment Specific Verbal Analogies Test score for the A term. The results indicate no significant treatment or interaction effects. An examination of the treatment group means, however, (cf. Table 1) indicates that the TGT students scored slightly higher than did the Control students ($\bar{X}_{TGT} = 20.30, \bar{X}_{CONTROL} = 19.65$).

Summary

The results indicate a positive and very strong (in terms of variance explained) TGT effect on vocabulary skills, for both measures. The TGT effect for both vocabulary skill measures appears to be due primarily to gains by initially low-achieving students. For the verbal analogy skill area, a positive and strong TGT effect was noted for the Treatment Specific measure. In contrast only a slightly positive trend was detected for the test measuring a possible transfer effect.

DISCUSSION

In general the positive TGT effects on reading skills correspond to earlier findings which support the use of TGT in the classroom (cf. Edwards, et al., 1972; DeVries & Mescon, 1975; DeVries et al., 1975; Hulten, 1974. This study extends the TGT research to a new skill area--reading--and suggests the technique may have relevance for teaching both basic vocabulary skills as well as more complex comprehension skills such as understanding of verbal

analogies. Following is a more detailed interpretation of the findings and exploration of implications for the practice of education.

TGT Effects on Vocabulary Skills

It is important in interpreting the TGT effects on vocabulary skills to understand the power of the treatment effect. As Table 2 indicates, TGT accounted for 15% of the dependent variable variance for the Treatment Specific measure and 8% of the variance for the Gates-MacGinitie measure. A "mastery learning" approach to the data also gives an enlightening perspective on the strength of the TGT effect. Such an approach sets an arbitrary, absolute criteria (for example, 90% of items correctly answered) for defining whether students acquired the targeted skill areas. If one uses the 90% criterion, the results for the Treatment Specific Vocabulary Test can be summarized as follows:

Of the 27 TGT students, 7% evidenced mastery at pretest, whereas 70% had mastered the skill area at posttest time (a gain of 63%). In contrast, 15% of the Control students had mastered the test at pretest time, and 54% at posttest (a gain of 39%). The results indicate that TGT had a dramatic impact on the vocabulary level of these third grade students in the brief period of three weeks.

The ability-by-treatment interaction effects noted for both measures of vocabulary skills support earlier TGT research (Edwards, et al., 1972) in which low-ability TGT classes evidenced more academic growth than did average-ability TGT classes. The current results should be interpreted cautiously, however, because of a possible "ceiling effect." Table 1 indicates a posttest TGT mean of 55.04 (on a 60-item test) for the treatment specific measure and a posttest mean of 46.93 on the Gates-MacGinitie measure. Because of this concentration of posttest scores at the upper end of the test scale it is likely that both tests were insensitive measures of academic growth for the

high achieving TGT student.

TGT Effects on Verbal Analogy Skills

The power of the TGT effect for the Treatment Specific Verbal Analogies Test is also of interest. For this measure, TGT accounted for 14% of the variance. An examination using the 90% correct criterion of mastery indicates that 0% of the TGT students evidenced mastery at pretest time, whereas 78% reached mastery at posttest. For the Control the contrast is from 0% (pretest) to 58% (posttest). As these percentages indicate, verbal analogy skills represented a totally new set of skills for all students involved. Additionally, the figures indicate both treatment groups were very effective (particularly given the two weeks' instructional period) in teaching a complex and totally new skill area.

The lack of a significant TGT effect for the verbal analogies test measuring a possible transfer effect may be due in part to the test being too easy. The test consisted of 24 items and the TGT posttest mean was 20.30, while the Control mean was 19.65. Using the 90% mastery criterion, 52% of the TGT students reached mastery on the test, while 38% of the Control students evidenced mastery. The results indicate considerable transfer of learning to this test, with scores from both treatment groups bunching up at the top end of the distribution. These results indicate that more than just memorization of specific examples of verbal analogies occurred in students from both treatment conditions.

TGT for Teaching Reading - The Next Step

The results presented suggest that TGT may be a useful managerial approach for the teaching of beginning reading skills. The study presents only a first step in the extension and validation of TGT to the reading area. Further research is required before definitive statements can be made regarding the

efficacy of TGT as an aid to the teaching of reading. The authors encourage educators and educational researchers to cross-validate the current results and to extend the test of TGT into other settings. The authors will provide assistance (including sample copies of games, practice worksheets, and measures of reading skills) to those interested in cross-validating the present study. Only through the accumulation of evidence from a variety of independent empirical tests can new instructional techniques, such as TGT, be effectively tested.

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Table 1

Treatment Group Means and Standard Deviations
for Reading Skills Tests

		TGT		CONTROL	
		Pre	Post	Pre	Post
Treatment Specific Vocabulary Test (60 Items)	\bar{x} S.D.	35.04 13.72 (27)	55.04 5.20 (27)	40.77 11.76 (26)	52.15 6.44 (26)
Gates MacGinitie Vocabulary Test (52 Items)	\bar{x} S.D.	35.78 9.28 (27)	46.93 4.37 (27)	37.44 9.43 (24)	44.63 6.61 (24)
Treatment Specific Verbal Analogies Test (30 Items)	\bar{x} S.D.	15.41 4.81 (27)	27.82 2.47 (27)	16.96 5.01 (26)	25.96 3.85 (26)
Verbal Analogies Test (24 Items)	\bar{x} S.D.		20.30 3.09 (27)		19.65 4.10 (25)

Note: () = n

Table 2

Results of General Linear Analyses for
Treatment-Specific Tests and Gates MacGinitie Tests

DEPENDENT VARIABLE	SOURCE OF VARIANCE	DF	Incremental R ²	F Ratio ¹
Treatment Specific Vocabulary Test (n = 53)	Ability (A)	1,51	.36	28.86**
	Treatment (B)	1,50	.15	15.39**
	A X B	1,49	.05	5.37*
	Total		.56	
Gates MacGinitie Vocabulary Test (n = 51)	Ability (A)	1,49	.43	37.12**
	Treatment (B)	1,48	.08	7.69**
	A X B	1,47	.06	6.39*
	Total		.57	
Treatment-Specific Verbal Analogies Test (n = 53)	Ability (A)	1,51	.29	21.32**
	Treatment (B)	1,50	.14	12.26**
	A X B	1,49	.02	1.74
	Total		.45	
Verbal Analogies Test (n = 53)	Ability (A)	1,51	.29	21.11**
	Treatment (B)	1,50	.03	2.36
	A X B	1,49	.00	< 1
	Total		.32	

* p < .05

** p < .01

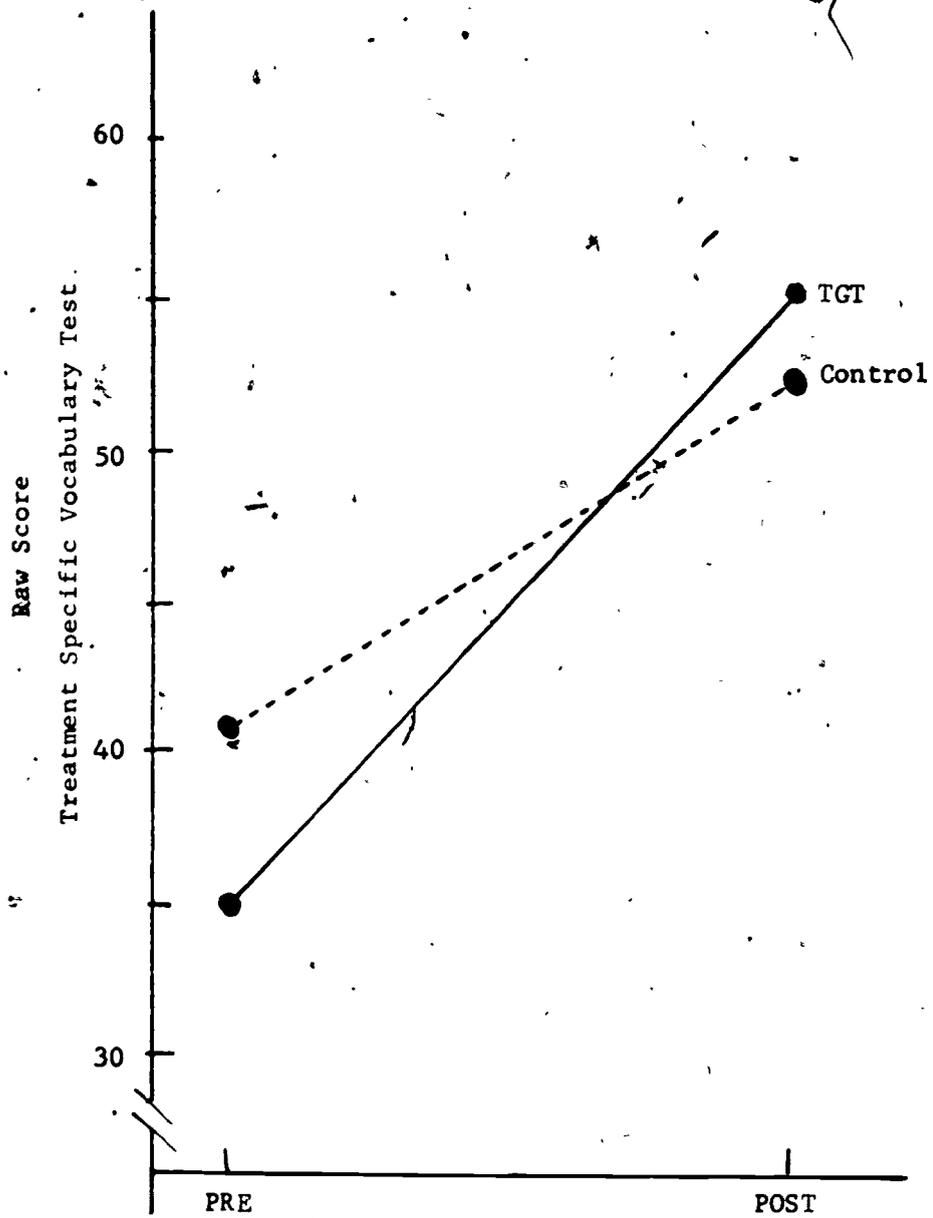


Figure 1: Treatment Group Means for Treatment-Specific Vocabulary Test.

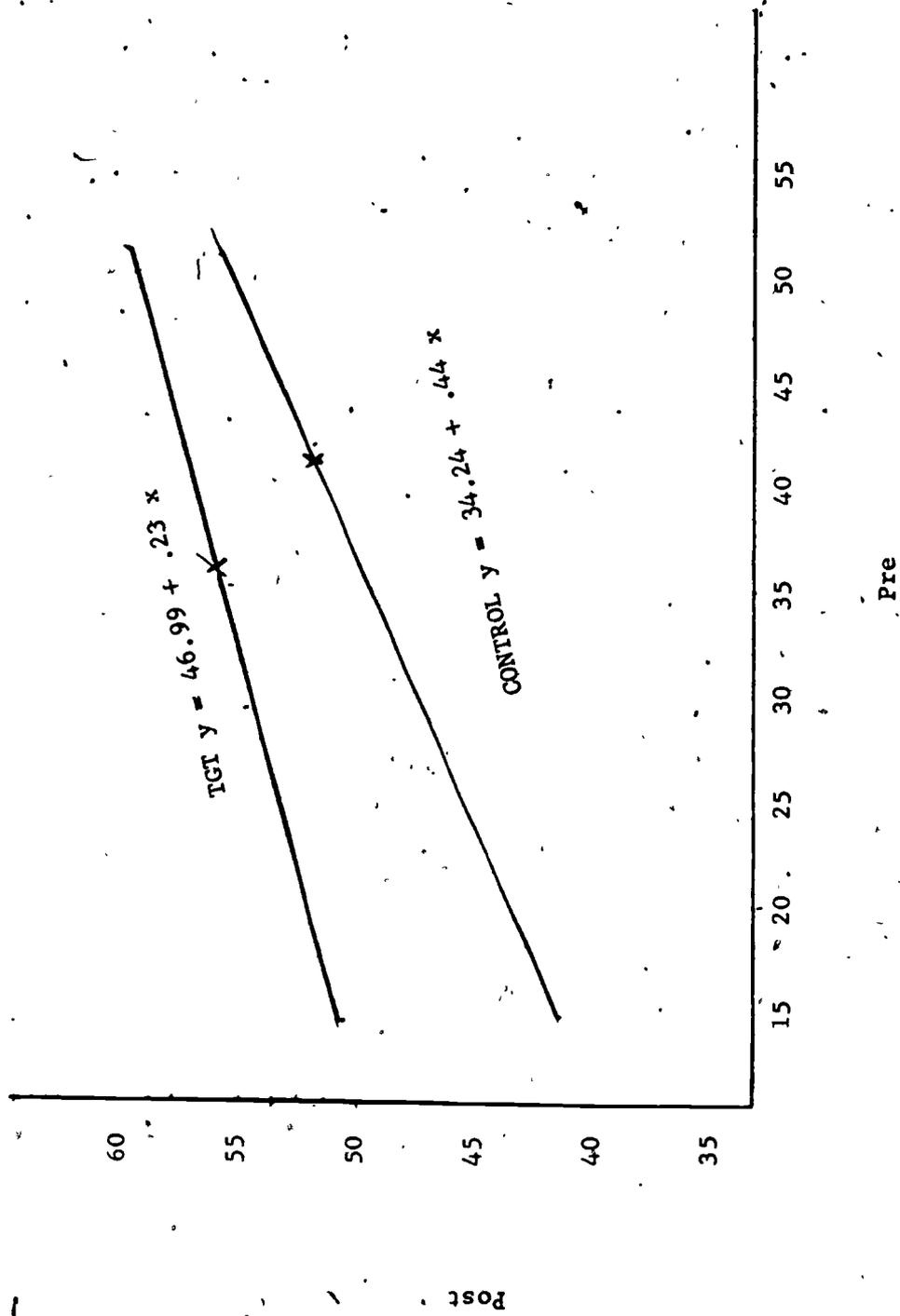


Figure 2: Within Cell Regressions--Treatment-Specific Vocabulary Test

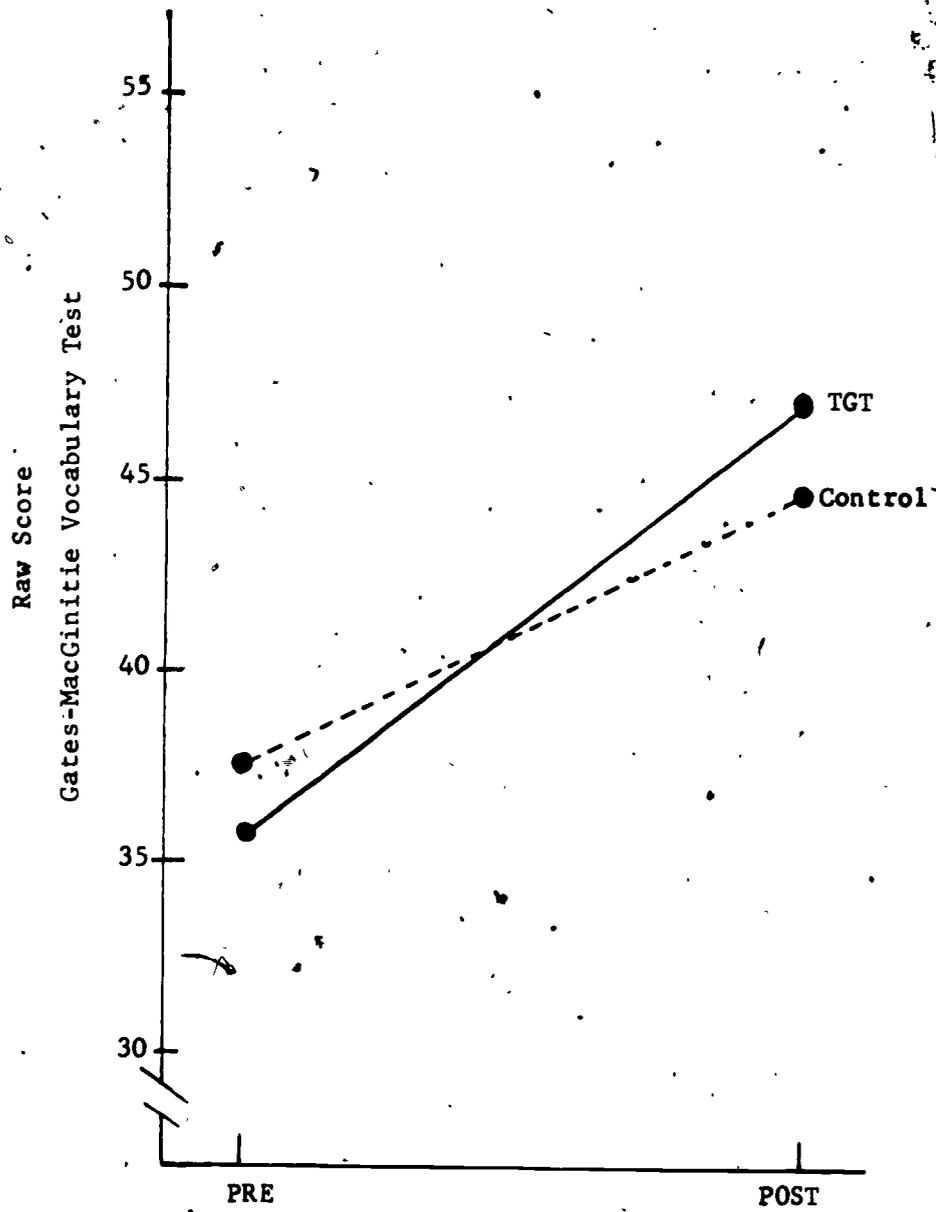


Figure 3: Treatment Group Mean for Gates-MacGinitie Vocabulary Test

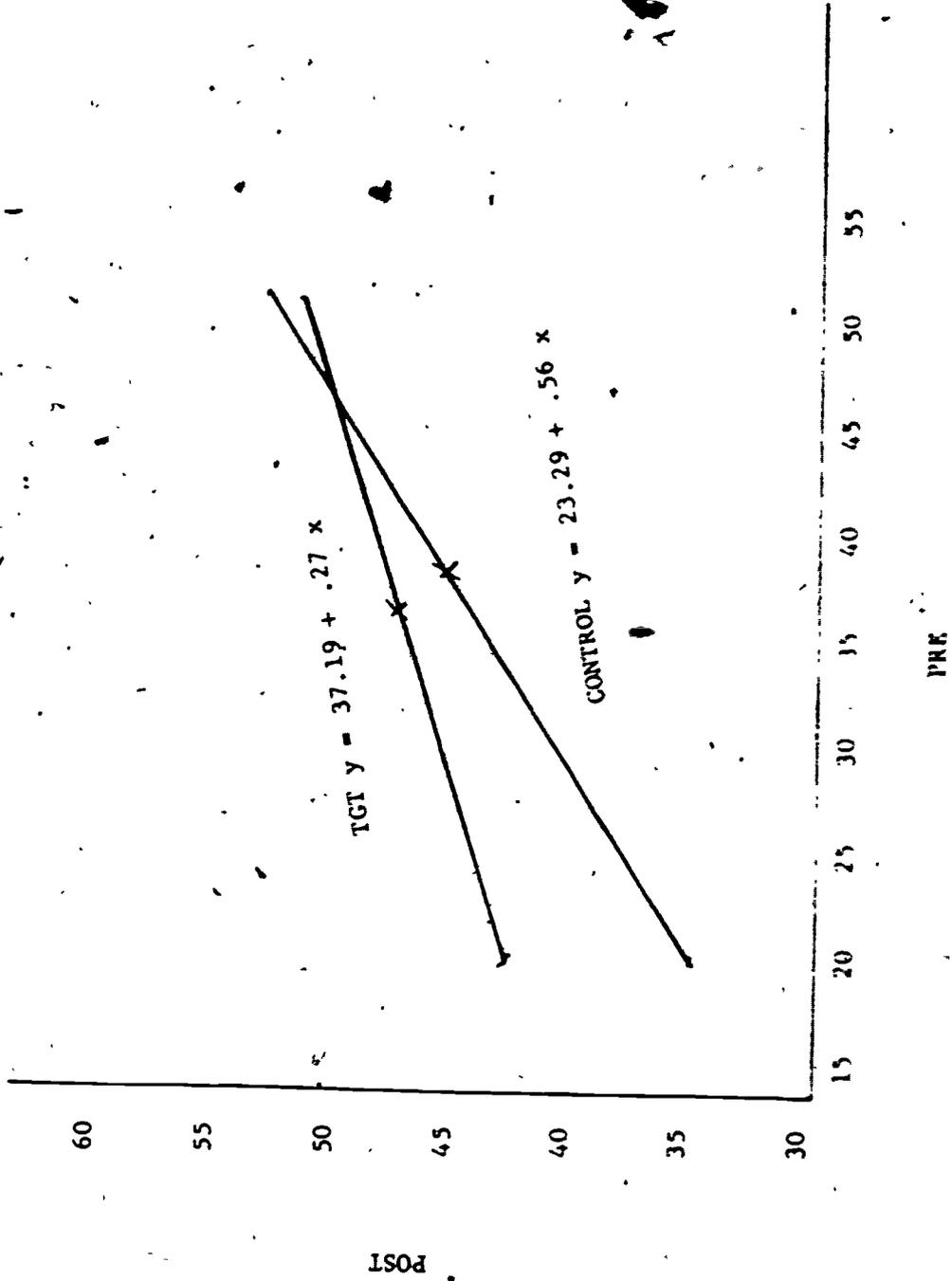


FIGURE 4: Within Cell Correlations - Gates-MacGinitie Vocabulary Test