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ABSTRACT

Three experiments were conducted in order to investigate teacher- and experimenter-bias effects on children's learning and performance. Teacher-bias effects on children's Stanford Achievement Test (SAT) performance were assessed in a one and a half year longitudinal study in two second- and two fourth-grade classrooms. The teacher-bias manipulation had no significant relationship to SAT performance on any of the testings, but teacher ranking was strongly and consistently related to SAT performance. The results indicate teachers are good predictors of student academic potential but do not bias students' achievement test performance. Two experimental studies were also conducted in order to examine developmental trends and mode of inducing bias on children's susceptibility to experimenter bias. College students were trained to be experimenters in a simple motor performance task, marble dropping, in which experimenter-bias effects had been demonstrated previously. The major finding was a significant Age x Bias Condition X Sex of Subject (S) interaction indicating a general trend for older Ss to be more influenced by biasing effects of Es than younger Ss. The significant effects were unclear with respect to mode of biasing the experimenters. The test was disguised as a test to predict academic potential. (Author)

Final Report

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An Investigation of Adult Expectations as They Affect Children's Learning and Performance

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

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Preface

There were a number of people who significantly contributed to the completion of this project. Dr. Edward J. O'Connell, Dr. Richard Wheeler, Miss Jomel Lawless, and Miss Meryl Weinstein all deserve thanks for their help in various aspects of data collection, summarization, and analysis. The twenty-four students who served as experimenters in experiments II and III also deserve a hearty thank you. Finally, my most sincere thanks are due to Mr. James McGee, principal, and the kindergarten, first-, second-, third-, fourth-, and fifth-grade teachers of Clinton School, Syracuse, for their kind cooperation and sincere interest in the project.

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Introduction

The central problem under investigation was the effect of adult/teacher expectations on children's learning and performance. Three studies were conducted to provide information relevant to the following three questions: a) Are teacher-bias or teacher-expectancy effects observable in measures of academic performance? b) Are these effects observable only when induced in the teacher or experimenter by the principal investigator as opposed to being self-generated by the adult? c) Are there developmental trends in susceptibility to adult expectancy effects?

A constructive context within which to view this research is to conceive of the classroom or experimental setting as a social interaction situation in which the adult and the child are continually interacting with each other. There is considerable evidence that during this interaction teachers treat groups of students differently (e.g., Davidson, 1972; Good & Brophy, 1970; Schwebel & Cherlin, 1972) and that the manner in which a teacher reacts toward a student influences the student's self-concept and classroom performance. Meyer and Thompson (1956) have shown that teacher disapproval is distributed unequally between boys and girls and furthermore that both boys and girls are aware that boys are recipients of more disapproval than are girls. More recently, Davidson (1972) has shown both sex differences and social class differences in students' reactions to teacher reinforcement. Davidson and Lang (1960) have reported that students' self-concept is directly related to teachers' use of approval and disapproval. These investigators have also provided evidence indicating that the more positively the student views the teacher's feelings toward him the better his academic achievement. Finally, Staines (1958) has shown that by specific behaviors toward pupils with low self-concepts the teacher can effectively raise the students' rated self-concept. It is apparent, then, that the student is aware of what the teacher thinks of his abilities and personality and that this awareness plays an important role in the child's developing self-concept. It is not difficult to imagine that the student also has some perception of the teacher's views regarding his academic potential. The crucial question is whether this may affect the student's performance in the academic setting. Similar evidence (e.g., Rosenthal, 1966; Friedman, 1967) indicates analogous processes may operate in the experimental situation.

Research bearing on these issues falls into three categories. First, there is a body of research dealing with experimenter bias effects in psychological research. This research has been thoroughly reviewed by Rosenthal (1966, 1968a, 1969a,b), Friedman (1967) and Barber and Silver (1968a, 1968b). The literature in this area is a clear demonstration that under certain conditions experimenters may intentionally or unintentionally bias the performance of adults (Rosenthal, 1966; Barber & Silver, 1968a, 1968b) or children (Dusek, 1971; 1972) in psychological experiments. Second, there are several studies in which expectancy effects and self-fulfilling prophecies have been investigated in tutoring situations involving student teachers (e.g., Beez, 1968; Rubovits & Maehr, 1972). Third, there are a number of studies in which teacher expectancy effects in elementary school classrooms, or other classroom situations, have been investigated (e.g., Rosenthal & Jacobson, 1968; Claiborn, 1969; Dusek & O'Connell, 1973).

In the following literature review the term "teacher-bias or experimenter-bias effects" will refer to significant effects due to teacher/experimenter differential expectations for children's performance, but only in the case involving induction of expectancies by a principal investigator. That is, bias effects will be due to a manipulation, or attempted manipulation, of expectancies by an investigator. Such effects are analagous to the effects reported by Rosenthal (1966) and Rosenthal and Jacobson (1968) and are bias in the sense that the adult has differential expectations regarding the performance of children who are equivalent on some objective measure. The term "expectancy effects" will refer to significant effects due to the adults' own, self-generated expectations regarding children's performance. In this case, it is the adults' own expectancy, formed however adults form it, which is related to children's performance. This distinction will prove critical in interpreting the findings reported below. Each of these areas of research will be reviewed below.

Literature Review

In-classroom studies of teacher bias effects.

A number of studies have investigated teacher bias effects in elementary school classrooms. That teachers do form expectations regarding specific children who will or will not perform well in certain academic subjects has been clearly shown by Rist (1970). Rist found that a kindergarten teacher placed children into groups on the basis of her subjective impressions regarding their likelihood to succeed in the academic situation. Once placed into one of the three levels of this caste system it was nearly impossible for a child to change his classification from one of the lower groups into the top group. Furthermore, Rist found that a child's group placement by the kindergarten teacher was maintained by the first- and second-grade teachers. At the second-grade level the teacher used reading level to assign the groups. Rist, however, notes that the use of "objective" data may simply have been a rationalization for placing the children into groups on the basis of other reasons, such as neatness, social class, etc. Unfortunately, Rist did not systematically examine the effects of teacher expectations on school and achievement test performance. Hence, the extent to which teacher expectations biased the children's education, if at all, is not known.

The first study of teacher bias effects was conducted by Rosenthal and Jacobson (1968) in an elementary school serving primarily a lower social class neighborhood. At the beginning of the school year all the children in grades 1-6 were given an IQ test, Flanagan's (1960) Test of General Ability (TOGA), disguised as a test to predict "academic blooming". The test was given again at the middle and end of the school year. Within each of the 18 classrooms approximately 20% of the children were randomly chosen to form an experimental group. The names of these students were given to their teachers and it was explained that these children had scored on the test in such a manner as to predict that they would show large gains in intellectual ability during the school year. Across all classrooms the year-end test scores showed an approximately 4 point advantage for the children in the experimental group. However, at the first- and second-grade levels the children in the experimental group showed gains of as much as 15 IQ points more than the children in the control group. In terms of school performance, the children in the experimental group showed a significantly better gain than the children in the control group only for reading, one of the 11 school grades considered. On the basis of these data Rosenthal and Jacobson (1968) concluded that the children in the experimental group gained more than children in the control group during the course of the academic year because the teachers expected a higher level of performance from them.

R. L. Thorndike (1968, 1969) has criticized the Rosenthal and Jacobson research on several grounds, including faulty pre- and post-test data and the suggestion that students may not have attempted a large number of items, thus lowering their IQ scores and, essentially, making the test a poor measure. Jensen (1969) has attacked the Rosenthal and Jacobson research on three grounds: a) the same IQ test was used for the pre- and post-tests; b) the teachers administered the tests; c) the child was the unit of analysis instead of the classroom. In addition, Claiborn (1969) has argued that many of the findings are unconvincing since they did not reach standard levels of significance and were not predicted prior to the investigation. Rosenthal (1968, 1969b, 1973) has convincingly replied to many of these criticisms. However, other criticisms of the Rosenthal and Jacobson research remain (e.g., see Elashoff & Snow, 1970, 1971; Rosenthal & Rubin, 1971). As Snow (1969) has argued, "Rosenthal and Jacobson will have made an important contribution if their work prompts others to do sound research in this area. But their study has not come close to providing adequate demonstration of the phenomenon or understanding of its process." At the present time, no other conclusion regarding this research has stimulated a number of studies exploring various aspects of teacher bias, or self-fulfilling prophecy, effects, however. It is these which shall be reviewed next.

Claiborn (1969) attempted to replicate the Rosenthal and Jacobson research. Not only were some of the teachers led to believe certain students would show much progress intellectually during the remainder of the year, but some of the classrooms were observed in order to obtain data concerning the student-teacher interactions. The results indicated no differential gain in IQ between the experimental and control children. Furthermore, there was no indication that teachers behaved differently toward the control and experimental children. Since the biasing statements were introduced well into the school year (Spring semester) and since the length of the study was only 2 months, the results are difficult to interpret. Perhaps the teachers had their own well-formed opinions of the students' potential and the opinion of an "outsider" was just not seen as valid. Perhaps, too, the two month interval between biasing and post-testing was not long enough for the effect of teacher expectancy to become critical to the students' performance.

Several other studies have attempted to replicate the findings of Rosenthal and Jacobson with varying degrees of success. Evans and Rosenthal (1969) found that for Kindergarten through fifth grades the boys in the experimental group gained more IQ points in the reasoning subtest than the boys in the control group, with the reverse holding for the girls. There were no effects for Verbal IQ or Total IQ scores. Anderson and Rosenthal (1968) report a failure to replicate with familial retarded boys. Meichenbaum, Bowers, and Ross (1969), using female adolescent offenders, reported that the "bloomers" showed more improvement on objective but not on subjective tests than did the control group. This study is of particular interest since it focused on academic performance rather than IQ. Furthermore the classroom observations revealed that the "bloomers" significantly improved in terms of appropriate behavior more than did the control group.

Studies involving the tutoring situation.

One of the earliest attempts to replicate Rosenthal and Jacobson's findings was conducted by Beez (1968). Sixty graduate students in education each taught a symbol learning task to one child in a summer Headstart program. Half the teachers were told the child they would teach was culturally deprived and would probably have trouble adjusting to school and doing well in school. Half the teachers were told the reverse about their children, i.e., that the child should be able to adjust and do well in school despite cultural deprivation. Each teacher was given 10 minutes to teach the child the meanings of 20 different symbols. Compared with teachers of "non-problem" children, teachers of "problem" children tried to teach significantly fewer symbols (5.7 vs. 10.4), spent more time on non-teaching activities, rated the children as lower on achievement, intellectual ability and social competency, and generally thought the task too difficult for the children. The children taught by these teachers learned fewer symbols than the children taught by teachers expecting the children to do well (3.1 vs 5.9). Moreover, 77% of the children alleged to have better intellectual prospects learned five or more symbols but only 13% of the children alleged to have poorer prospects learned five or more symbols. These results suggest that teacher bias, in this case induced by the experimenters, may be translated into subtle teaching style effects related to the child's actual learning. In other words, teachers may both teach differently and try to teach different amounts to children depending upon their experiences regarding the child's performance.

This possibility was specifically investigated by Rubovits and Maehr (1971), who used a micro-teaching situation. Each of 26 female undergraduates taught a lesson on television to four sixth and seventh graders. The teachers were given a folder with false IQ and school program information for each of the children. The information indicated that two of the children were from the school's gifted program and two were from a regular track. The teaching session lasted from 43 to 60 minutes. An observer recorded the student-teacher interactions. The teachers did not differ in the amount of attention given to allegedly "gifted" and "nongifted" children but the pattern of attention and praise given the children in the two groups did differ. The teachers requested more information from "gifted" than "nongifted" children and praised the statements of "gifted" children more often than the statements of "nongifted" children. Rubovits and Maehr have discussed the implications of these findings for academic achievement of "gifted" children. Briefly, they argue that this type of interaction may allow the "gifted" child to better clarify his thoughts regarding the material being taught and thereby allow him to learn more than the "nongifted" child.

Carter (1969) also found differences in the teaching styles of tutors who were given either positive or negative information about students. Carter used a task and procedure similar to Beez (1968) with tutors who were either internal or external locus of control individuals. For external locus of control tutors there were no bias effects. For internal locus of control tutors, however, tutors given positive information attempted to teach more material than tutors given negative information. Although they did not replicate Carter's findings, Panda and Guskin (1970) did report that tutors given positive information rated the students higher in academic achievement and social competency than tutors given negative information, a replication of Beez's (1968) findings.

Two other studies deserve brief mention here although neither involved tutoring. Pitt (1956) investigated the effects of teachers' knowledge or incorrect knowledge of students' IQ scores on the children's school achievement, attitudes toward school, teachers, and school work, teachers' ratings of student conduct, and teachers' attitudes and behaviors in relation to students. Teachers' knowledge or incorrect knowledge did not relate to achievement test performance, students' expressed views about various aspects of the school situation, or teachers' ratings of students' conduct or effort. The information given the teachers did, however, cause them to increase pressure on bright students and lower expectations for students with lower intellectual ability. This latter finding represents a teacher bias effect but it apparently had no effect on the students' learning or achievement test performance. Cahen (1966) had 256 college students in elementary education score subjective tests after being given various amounts of information about the students who purportedly took the tests. Cahen (1966) reported that teachers' scoring of the tests was biased depending on the information given.

These studies, in conjunction with similar work done by Flowers (1966), Jose and Cody (1971), and Fleming and Anttonen (1971), lead to the conclusion that false test or IQ scores, or differential track assignments do not relate to students' actual achievement. That is, there is no measurable teacher-bias effect in the children's learning or test performance. These studies do, however, clearly demonstrate effects of such information on teachers' attitudes toward the children and in the way they treat different groups of children. In one study (Beez, 1968) the students did, indeed, learn different amounts of material. These studies generally suggest the value of examining teacher bias effects in real classroom situations.

Studies of experimenter-bias (E-bias) effects.

Rosenthal (1966, 1969b) has recently summarized the research dealing with E-bias effects. By far, the majority of these studies have been done with the Person-Perception Task, although verbal conditioning, simple motor tasks, as well as other tasks have been used in these investigations. The general procedure is to tell a group os Es to expect to obtain one type of data from certain subjects (Ss) (e.g., high anxious Ss) and to expect another type of data from other Ss (e.g., low anxious Ss). Unknown to the Es, these Ss have been randomly assigned to groups, e.g., high or low anxious. The data obtained by these Es from the differently-designated Ss is then compared to see if Es obtained the expected data. For example, in the Person-Perception Task, S simply rates photographs of individuals on the degree of success or failure, on a scale ranging from extreme success (+10) to extreme failure (-10), which S thinks that the pictured individual has just experienced. Of course, the photographs have previously been rated by large groups of Ss as being expressive or neither success nor failure (mean photo rating is zero for each photo). The Es are biased to expect relatively high (+5) or relatively low (-5) ratings from certain Ss. A total of at least 57 experiments using essentially the same procedures and subject populations have been conducted by various investigators (Rosenthal, 1969a). These studies have shown that Es tend to obtain the data they have been led to expect.

Since extrapolations from the E-bias literature are drawn with reference to general experimental research in psychology and education, it is critical that the ecological validity of the expectancy manipulation be established. Few principal investigators are told to expect certain data. Rather, they intuit their expectancies from large research literatures. To the extent that E-expectancy effects are obtained only when E is told what to expect and are not obtained when E postulates some outcome from his own knowledge and intuition, the extrapolations from this research to general experimental psychology are likely to be incomplete or faulty. Several studies have investigated whether the method of inducing bias into E is related to E-bias effects. Induction has been loosely defined and includes methods such as allowing E to generate his own preductions, telling E what to expect, and asking E to intentionally try to bias S.

Marcia (1961) asked half the Es to estimate the magnitude of the scores they expected to obtain from Ss in the Person Perception Task. The other half of the Es were told to expect certain scores from their Ss. Marcia found no evidence of E-bias effects for either group of Es. In a second study (Marwit & Marcia, 1967) half of the Es were told to expect either many or few responses in the Holtzman Inkblot Test and half were asked to predict whether they would obtain many or few responses. Both groups of Es obtained data consistent with their expectations, with no difference in magnitude between the two types of biased Es.

Johnson and Adair (1970), using the Word Association Task, manipulated the involvement of the Principal Investigator (PI) in the conducting of the experiment by having the PI visit half the Es during the testing and express concern for the findings of the experiment. The other half of the Es were visited equally often but no mention of the results was made. The overall expectancy effect was significant, i.e., there were greater latencies to exam-related words for Ss in the Exam Condition, but this effect did not interact with involvement of the PI. It may be that just by visiting E, E is made more aware of the results and the importance of the results to the PI, thus eliminating any differential effect of the PI's verbalizations.

A study recently completed by Johnson (1970) included a group of Es who were completely informed of the purposes of the experiment and the importance of the E-bias research. These Es were asked to intentionally bias S by any method except telling S to perform in any certain manner. The results indicated that this group of Es did not obtain data which was biased. It may be the case that if E actively or knowingly attempts to bias S there is no bias effect. Perhaps Ss become aware that E is attempting to bias their responses and do not comply for fear of "cheating" the advancement of Science (Orne, 1962).

It is obvious that at this point very little is known about the effects of the method of inducing bias in Es. It may be the case that self-generated expectancies produce no E-bias effects. Furthermore, it may be that it is impossible for E to intentionally bias Ss. It is unfortunate that the Es in these various studies were not questioned regarding the reasons they expected certain data, i.e., the reasons they held certain expectancies. A recent study by Dusek (1971) found that the Es not obtaining any bias effect in the marble dropping task expected the data consistent with the induced bias, as did the Es who did obtain bias effects. However, the reasons given for why the E held the expectancy he stated differed for the two groups of Es. The Es who did obtain data biased toward their expectations stated some reason related to their experience with children. It may be that if E has had some experience which he may bring to bear on the task he will be better able to rationally predict certain outcomes and will be more willing to hold a given belief than might otherwise be the case. If this is true, then the more ecologically valid question of whether behavioral scientists bias their research would be better answered by providing Es with enough data and experience to be able to make some rational prediction regarding Ss' performance. The Es would then have some more concrete basis for making predictions than was the case in the above research and may have a greater stake in the results, much as the professional researcher. It would then be possible to have the Es test Ss and investigate, in an analogue manner, the question of bias in the present research methods used in psychological and educational research.

Summary of literature review.

A perusal of the above literature review reveals a number of interesting findings with respect to teacher- and experimenter-bias effects. It is clear from the literature review that teacher bias effects may exist, particularly in the tutoring situation (e.g., Beez, 1968) or in the instance where teachers teach only a few students (e.g., Meichenbaum, Bowers, & Ross, 1969). The research in which the elementary school classroom has been employed is less clear with respect to this issue. Evidence indicating teachers bias students' learning or intellectual ability is either weak or nonexistent in the studies conducted up to this time. Evidence indicating that teachers do form expectations is abundunt (e.g., Brophy & Good, 1970; Rist, 1970), as is evidence that teachers treat students differently depending upon their expectations for the students' performance (e.g., Brophy & Good, 1970; Good & Brophy, 1972; Rothbart, Dalfen, & Barrett, 1971). Moreover, these expectancies, and presumably their behavioral manifestations, have been shown to relate to students' academic achievement (Brophy & Good, 1970). Part of the research described below was aimed at examining both teacher-bias and teacher-expectancy effects in order to assess their relationship to children's academic achievement.

A perusal of the above literature review also leads to several rather interesting conclusions regarding deficiencies in the research dealing with experimenter-bias effects. First, there is not one study which has used more than one age level of S. In fact, in all but two of the studies cited above the Ss were college students. It is the opinion of the writer that by studying the developmental aspects of adult-expectancy effects three goals will be accomplished: a) valuable information on the generality of the E-bias effect across age of S will be added to the existing literature; b) the importance of E-expectancy effects in experimental child psychology will be explored. In view of the literature dealing with teacher expectancy effects it is necessary that rigorous experimental investigations with children be undertaken to delineate the conditions and factors related to adult-expectancy effects with children; c) developmental studies of expectancy effects will explicate some of the factors related to how an individual develops the skills necessary for interpreting subtle cues from another individual in a face-to-face situation. Second, studies of the effects of mode of inducing bias in Es are lacking, with the presently available research being inconclusive. Part of the research described below was aimed at each of these problems.

Experiment I

A Longitudinal Study of Teacher-bias and Teacher-expectancy Effects on Elementary School Children's Achievement Test Performance

The purpose of this experiment was to investigate teacher-bias and teacher-expectancy effects on elementary school children's achievement test performance. Teacher-bias is defined as above, that is, an expectancy for performance as induced by the principal investigator. Analagously, teacher expectancy is defined as the teacher's own self-generated (stated) expectations regarding children's performance. In this experiment, as well be noted below, teacher-bias was manipulated by statements from the principal investigator and teacher-expectancies were measured by teachers' rankings regarding year-end academic performance levels.

Subjects.

The subjects were 32 second-graders ($\overline{CA}$ = 8.60 years), 13 boys and 19 girls, and 32 fourth-graders ($\overline{CA}$ = 10.73 years), 15 boys and 17 girls, attending a school serving primarily a lower-class population. There were 16 subjects in each of two classrooms in each grade level.

Procedure.

During the first week of the 1971-1972 academic year several subtests from the SAT battery were administered by the principal investigator to each of the classrooms involved in the study. The subtests administered included: Word Reading, Paragraph Meaning, Spelling, Arithmetic Computation, and Arithmetic Concepts (fourth-grade only). The Primary I and Partial Intermediate I batteries were used for the second- and fourth-grades, respectively. The SAT's were disguised as tests to measure potential gains in language and arithmetic skills. The same subtests were administered at the middle and end of the 1971-1972 academic year. The SAT's were again administered at the beginning and middle of the 1972-1973 academic year, the children now being in the third- and fifth-grades. Subtests from the Primary II and Partial Intermediate I were now employed for the third- and fifth-graders respectively. It is important to keep in mind that the subjects were, at this time, in new grade levels with new teachers.

During the initial testing session each teacher was asked to rank the children in her classroom from 1-n based on her expectations regarding their year-end performance levels in language and arithmetic skills. In each classroom the children ranked 1-16 were randomly and equally divided into an experimental and a control group. One week after the initial testing each teacher was given the names of the children in the experimental group and was told that, on the basis of the tests, these children should show large gains in language and arithmetic skills during the academic year. It should be noted that no further mention of these children was made to <u>any</u> teacher throughout the remainder of the study, a year and a half.

Results.

The dependent variables were total SAT raw scores for each testing session. Originally, the design was conceived as a three-way factorial arrangement, including experimental vs. control groups, grade level, and teacher ranking. However, due to subject attrition there were not an equal number of subjects in each cell.[1] Rather than solve the analysis problem by application of the unweighted means solution to the analysis of variance the multiple regression approach of Cohen (1968), Overall and Spiegel (1969), and Overall (1972) was employed.

The results of the multiple regression analyses are summarized in Table 1. The means associated with the main effects of the multiple regression analyses are presented in Table 2. As may be seen in Table 1 the bias manipulation (Experimental Condition) was not significantly related to SAT performance on any of the five testing occasions. Grade Level was significantly related to performance on SAT-2, SAT-3, and SAT-4. As may be seen in Table 2, the younger Ss scored higher than the older Ss on SAT-2 and SAT-3 with the reverse being the case for SAT-4.

Teacher ranking was strongly and consistently related to SAT performance on each testing occasion. In general, the higher the teacher's ranking the higher the child's SAT performance (see Table 2). The correlations between SAT performance and Teacher Ranking, presented in Table 3, reflect the strength of the relationships detected in the multiple regression analyses.

Conclusions.

The findings are quite conclusive with respect to the importance of teacher-bias and teacher-expectancy effects on children's academic performance. Clearly, simply telling teachers certain students would be performing well at the end of the academic year was not sufficient to increase there students' SAT performance. It appears that the teachers biased neither the SAT performance nor the classroom learning of the children in the experimental or control groups. This appears to be the case for both short- and long-term effects due to teacher-bias. This finding does not replicate the findings of Rosenthal and Jacobson (1968). When considered in conjunction with other research (e.g., Claiborn, 1969; Anderson & Rosenthal, 1969; Evans & Rosenthal, 1969; Fleming & Anttonen, 1971; Jose & Cody, 1971) which has also failed to replicate the Rosenthal and Jacobson findings, however, it seems quite clear that teachers do not bias students' performance.

Teacher Ranking was related to SAT performance on each testing occasion. Children ranked higher by the teacher had higher SAT scores than children

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[1]Analyses of SAT-1 scores revealed no differences between the children remaining available at the end of the first year or middle of the second year and those lost throughout the experiment.

Table 1

Multiple Correlations and F-ratios for Each Condition at Each Testing Session

Source		SAT-1[a] (Oct.,'71)	SAT-2[a] (Feb.,'72)	SAT-3[a] (June,'72)	SAT-4[b] (Sept.,'72)	SAT-5[b] (June,'73)
Experimental Condition	R^2 Full	.3536	.5472	.6825	.4229	.4598
	R^2 Reduced	.3536	.5465	.6817	.4213	.4537
	Difference	.0000	.0006	.0007	.0016	.0061
	F =	<1	<1	<1	<1	<1
Grade Level	R^2 Full	.3536	.5472	.6825	.4229	.4598
	R^2 Reduced	.3482	.4467	.3051	.3093	.4594
	Difference	.0055	.1005	.3774	.1136	.0004
	F =	<1	10.431*	55.852*	6.69*	<1
Teacher Ranking	R^2 Full	.3536	.5472	.6825	.4229	.4598
	R^2 Reduced	.0202	.1395	.4244	.0714	.0105
	Difference	.3334	.4076	.2580	.3516	.4493
	F =	24.243**	42.310**	38.188**	20.71**	28.28**

* $p < .01$
** $p < .001$
a df = 1/47
b df = 1/34

Table 2

Mean Stanford Achievement Test Scores for Each Condition at Each Testing Session

Condition	Mean Test Score SAT-1	SAT-2	SAT-3	SAT-4	SAT-5
Condition					
Experimental	58.35	79.15	96.30	75.53	84.21
Control	56.63	76.51	96.71	68.58	81.11
Grade Level[a]					
Second (Third)	57.59	85.63	111.38	65.09	84.91
Fourth (Fifth)	57.38	70.37	79.95	81.63	79.56
Teacher ranking[b]					
Rankings 1-4	75.56	96.55	116.13	101.75	116.50
Rankings 5-8	60.13	81.48	100.82	67.13	86.50
Rankings 9-12	52.50	73.21	89.08	76.36	77.82
Rankings 13-16	41.75	60.06	80.00	49.73	60.09

[a] The grade level listed in the parentheses refers to SAT-4 and SAT-5.

[b] Teacher ranking was entered as a continuous variable in the multiple regression analyses. The data are grouped here simply for convenience.

Table 3

Correlations Between Teacher Ranking and SAT Performance
Across All Grade Levels and Conditions

SAT	r
1	-.59
2	-.67
3	-.55
4	-.55
5	-.67

Note.- n = 51 for SAT-1, SAT-2, and SAT-3 and n = 38 for SAT-4 and SAT-5. All *r*'s are statistically significant ($p < .001$).

ranked lower. This effect has been deemed a teacher expectancy effect since it reflects the teacher's own self-generated expectancy for the child's performance.

There is some evidence in the present study which supports the argument that this teacher-expectancy effect is not a teacher-bias effect in the Rosenthal and Jacobson (1968) sense. The first piece of evidence is the correlation between Teacher Ranking and SAT-1 performance. If this teacher-expectancy effect were due to teachers somehow biasing the test performance of the children it is unlikely that the magnitude of the correlation would have been as large. Second, teacher ranking was related to SAT performance 12 and 18 months after the ranking was made, the students now being advanced one grade level and under the tutelage of a new teacher. It is unliely that this could be the case were the relationship based on a biasing influence by the teacher of the students' performance. Finally, the teachers reported that their rankings were based on criteria directly relevant to academic abilities, e.g., previous grades, readiness tests, and current classroom performance.

These effects due to teacher-expectancy appear to reflect the teacher's ability to accurately estimate the relative academic ability of the children in her classroom. The longitudinal data presented above appear to support this contention. Future research should focus on determining the exact bases used by teachers to form expectancies regarding students' abilities and the relationship of these bases to actual student performance as well as to teacher-student interaction in the classroom. Such research will not only clarify the nature of teacher-expectancies but also the role of the teacher in the child's cognitive and social development.

Experiment II

A Developmental Study of Experimenter Bias Effects with Children as Subjects

As was noted in the above literature review the research on experimenter-bias (E-bias) effects has been deficient in examining a number of areas, especially in experimental child psychology research. Although E-bias effects have been shown in studies using children as Ss (e.g., Dusek, 1971, 1972), no information regarding developmental trends in susceptibility to E-bias effects is available. The major purpose of this experiment was to test for possible developmental trends. A secondary purpose was to include both male and female Es in order to assess the possibility that boys and girls are differentially susceptible to subtle influences from men and women.

Subjects.

The subjects were 48 first ($\overline{CA}$ = 7 yrs. 4 mo., SD = 9 mo.), 48 third- ($\overline{CA}$ = 9 yrs. 5 mo., SD = 7 mo.), and 48 fifth-graders ($\overline{CA}$ = 11 yrs. 6 mo., SD = 8 mo.). Half the children in each grade level were males and half were females. The children attended a school serving primarily a lower-class neighborhood.

Experimenters.

The experimenters were six male and six female college students (CA = 19 yrs. 11 mo., SD = 7 mo.) enrolled in the introductory psychology course at Syracuse University. Each E participated in both a group and an individual training session prior to testing the children (see below). During the experiment each E tested two boys and two girls from each grade level. Half the experimenters of each sex were randomly assigned to each bias condition.

Apparatus.

The apparatus has been described in detail elsewhere (Stevenson & Fahel, 1961). Briefly, it consisted of a table with two bins and a transverse upright panel which served as a shield. The left bin contained approximately 1000 marbles. The table top above the right bin contained five randomly placed holes through which the marbles could be dropped. An Esterline Angus Event Recorder, shielded from S's view, was connected to microswitches below the holes and was used to obtain an automatic and permanent record of S's responses. The experiment was conducted in an area of the school free of distractions.

Procedure.

Experimenter training. Each experimenter was randomly assigned to one of the two bias conditions. All experimenters (n=6) in the same bias condition attended the same group training session. The experimenters were shown the apparatus and the procedure was briefly outlined and demonstrated. The experimenters were then told they would be testing children in the public schools and the following biasing statement was made:

> We have used this task with this age children before and it has been found to be a sensitive measure of children's motivation. In fact, previous research shows that one of the findings we

should expect to get is that boys (girls) will
drop the marbles faster than girls (boys).

The procedures were then demonstrated again and each experimenter practiced the task. Each experimenter subsequently met with a graduate assistant to further practice the procedures.

Experimental task. The experimenter brought the subject to the testing room and read the instructions telling the subject to pick the marbles up one at a time and put them into the holes. As the subject picked up the first marble the experimenter started a stop watch and allowed the child to perform at the task for seven minutes.

During the first or baseline minute of the task the experimenter remained an attentive but nonresponsive observer of the subject's performance by glancing at the marbles and holes while avoiding looking at the subject. During the next six minutes, the experimental period, the experimenter used verbal reinforcers on a Fixed Interval 30-second schedule contingent on a marble drop. Six reinforcing statements were used: Good, Fine, That's good, That's fine, Very good, Very fine. Each subject received each statement twice in a predetermined random order. Each experimenter tested two boys and two girls at each grade level using this procedure.

Design.

The experimental procedures required a 3 (Grade Level) x 2 (Sex of E) x 2 (Bias Conditions) x 2 (Sex of S) x 7 (Minutes) analysis of variance design with six subjects in the smallest cell.

Results.

Dependent measures. There were two dependent variables of interest in the study: the base rate of response (the number of marbles dropped in the first minute of the task) and a series of difference scores computed separately for each subject by subtracting the number of marbles dropped in the first minute from the number of marbles dropped in each subsequent minute (Minutes 2-7). The correlation between the base-rate score and the average difference score was $-.4133$ (n - 144, $p < .01$) indicating that although the two variables are correlated only 17.1% of the variance in the difference scores is accounted for by the initial base rates.

Analysis of base-rate scores. The base-rate scores were subjected to a 3 (Grade Level) x 2 (Sex of Experimenter) x 2 (Bias Conditions) x 2 (Sex of Subject) analysis of variance (see Table 4). The mean base-rate scores for each main effect are presented in Table 5.

Table 3

Analysis of Variance of Base-Rate Scores

Source	df	MS	F	P
Grade Level (A)	2	604.000	23.16	<.001
Sex of E (B)	1	4.000	<1	
Bias Condition (C)	1	103.313	3.96	
Sex of S (D)	1	.438	<1	
A x B	2	14.656	<1	
A x C	2	56.188	2.16	
A x D	2	14.094	<1	
B x C	1	1.813	<1	
B x D	1	8.000	<1	
C x D	1	277.813	10.65	<.001
A x B x C	2	31.375	1.20	
A x B x D	2	3.063	<1	
A x C x D	2	68.375	2.62	
B x C x D	1	84.000	3.22	
A x B x C x D	2	21.750	<1	
error	120	26.078		

Table 5

Mean Base-Rate and Mean Difference Score for Each Main Effect

Effect	Mean Base-Rate	Mean Difference Score
Grade Level		
First	20.69	-.44
Third	23.46	1.59
Fifth	27.73	1.59
Sex of E		
Male	23.79	.95
Female	24.12	.88
Bias Condition		
To Males	23.11	1.06
To Females	24.81	.76
Sex of S		
Male	24.01	.37
Female	23.90	1.46

As may be seen in Table 4, there were two significant effects. The significant Grade Level effect reflected a general increase in base rates with increasing grade levels. Newman-Keuls comparisons (Winer, 1962, p. 80) revealed that the means for each grade level were significantly different from each other (all $p < .01$). The Bias Condition x Sex of Subject interaction was also significant. The means are presented in Table 6. Individual comparisons (Winer, 1962, p. 207ff) revealed a significant Bias Condition effect only for the boys ($F = 13.79$, $df = 1/120$, $p < .001$), but significant Sex of Subject effects for both Bias to Males ($F = 4.88$, $df = 1/120$, $p < .05$) and Bias to Females ($F = 5.76$, $df = 1/120$, $p < .05$).

Analysis of Difference Scores. The difference scores were subjected to a 3 (Grade Level) x 2 (Sex of Experimenter) x 2 (Bias Condition) x 2 (Sex of Subject) x 6 (Minutes) analysis of variance (See Table 7). The means for the main effects are presented in Table 5. The significant Grade Level effect reflected higher difference scores for the third- and fifth-graders than for the first-graders (See Table 5). Female Ss had higher difference scores than male Ss (See Table 5).

The Grade Level x Sex of Subject and Bias Condition x Sex of Subject interactions were also significant. The means for each effect are presented in Tables 8 and 9, respectively. Tests of simple effects (Kirk, 1968, p. 289ff) on the means in Table 8 revealed a significant Sex of Subject effect only for the fifth-graders ($F = 12.20$, $df = 1/120$, $p < .001$). The Grade-Level effect was significant for both the boys ($F = 3.96$, $df = 2/120$, $p < .05$) and the girls ($F = 11.90$, $df = 2/120$, $p < .01$). Individual comparisons (Winer, 1962, p. 344) conducted on the means in Table 9 revealed significant Bias Condition effects for both the boys ($F = 5.52$, $df = 1/120$, $p < .05$) and the girls ($F = 29.20$, $df = 1/120$, $p < .001$) and significant Sex of Subject effects for Bias to Males ($F = 18.54$, $df = 1/120$, $p < .001$) and Bias to Females ($F = 11.88$, $df = 1/120$, $p < .001$).

These interactions are of limited interest in view of the significant Grade Level x Bias Condition x Sex of Subject interaction (See Table 10). Individual comparisons (Winer, 1962, p. 344) were conducted on the bias condition x sex of subject means separately for each grade level and tests of simple effects (Kirk, 1968, p. 289ff) were conducted on the grade level x sex of subject means for each bias condition. The individual comparisons revealed no significant Bias Condition or Sex of Subject effects at the first-grade level. At the third-grade level there was a significant Bias Condition effect ($F = 12.20$, $df = 1/120$, $p < .001$) for the males but not for the females. There were significant sex differences for both the Bias to Male ($F = 7.36$, $df = 1/120$, $p < .01$) and Bias to Female ($F = 4.22$, $df = 1/120$, $p < .05$) conditions. At the fifth-grade level the bias conditions were significantly different for both the male ($F = 7.72$, $df = 1/120$, $p < .01$) and female Ss ($F = 16.11$, $df = 1/120$, $p < .001$). The tests of simple effects revealed that for the Bias toward Males condition there was a significant age effect ($F = 10.43$, $df = 2/120$, $p < .001$) for the male Ss but not for the female Ss. In the Bias toward Females condition the age effect was significant

Table 6

Mean Base-Rate Scores for the Bias Condition
x Sex of Subject Interaction

Sex of Subject	Bias Condition Males	Bias Condition Females
Males	21.78	26.25
Females	21.44	23.36

Table 7

Analysis of Variance of Difference Scores

Source	df	MS	F	P
Grade Level (A)	2	394.066	7.22	<.001
Sex of E (B)	1	1.260	<1	
Bias Condition (C)	1	19.260	<1	
Sex of S (D)	1	254.584	4.67	<.05
A x B	2	19.448	<1	
A x C	2	81.816	1.50	
A x D	2	225.876	4.14	<.05
B x C	1	13.751	<1	
B x D	1	10.446	<1	
C x D	1	1641.760	30.10	<.001
A x B x C	2	6.689	<1	
A x B x D	2	78.300	1.43	
A x C x D	2	166.774	3.06	<.06
B x C x D	1	19.862	<1	
A x B x C x D	2	4.689	<1	
error	120	54.546		
Minutes (E)	5	.874	<1	
A x E	10	12.205	2.48	<.01
B x E	5	8.841	1.80	
C x E	5	3.074	<1	
D x E	5	3.493	<1	
A x B x E	10	6.853	1.40	
A x C x E	10	6.297	1.28	
A x D x E	10	5.651	1.94	
B x C x E	5	4.660	<1	
B x D x E	5	2.659	<1	
C x D x E	5	11.008	2.24	<.06
A x B x C x E	10	3.480	<1	
A x B x D x E	10	4.914	1.00	
A x C x D x E	10	3.996	<1	
B x C x D x E	5	8.826	1.80	
A x B x C x D x E	10	1.891	<1	
error	600	4.911		

Table 8

Mean Difference Score for the Grade Level
x Sex of Subject Effect

Sex of Subject	Grade Level First	Third	Fifth
Males	-.75	1.79	.07
Females	-.12	1.38	3.11

Table 9

Mean Difference Score for the Bias Condition
x Sex of Subject Effect

Sex of subject	Bias Condition Males	Females
Males	1.90	-1.16
Females	.23	2.68

Table 10

Mean Difference Scores for the Grade Level
x Bias Condition x Sex of Subject Interaction

Bias Condition	Sex of Subject	Grade Level First	Third	Fifth
Males	Male	-.03	3.94	1.78
	Female	-.56	.60	.64
Females	Male	-1.47	-.36	-1.64
	Female	.31	2.17	5.58

Table 11

Mean Difference Scores for the Grade
Level x Minutes Interaction

Grade Level	Minutes 2	3	4	5	6	7
First	.12	-.21	-.75	-.46	-.19	-1.15
Third	1.02	1.79	1.33	1.83	1.88	1.67
Fifth	1.62	1.27	1.71	1.56	1.02	2.35

for both the males ($F = 6.45$, $df = 2/120$, p .01) and the females ($F = 18.86$, $df = 2/120$, p .001). In effect, both the individual comparisons and the tests of simple effects reveal grade level differences and sex differences in susceptibility to subtle cues emitted by the experimenters.

There were two within subjects comparisons which were also found to be significant. The means for the Grade Level x Minutes Interaction may be seen in Table 11. In general, the performance rates of the first-graders declined over time but the performance rates of the third- and fifth graders increased over time and then remained relatively stable.

The Bias Condition x Sex of Subject x Minutes interaction approached the traditional $p < .05$ level of significance. The performance curves reflected by this effect are shown in Figure 1. Individual comparisons (Winer, 1962) of each pair of means for each minute revealed no significant differences between the sexes in the Bias to Males condition. Individual comparisons for the Bias to Females condition, however, revealed significant sex differences at each minute.

Discussion.

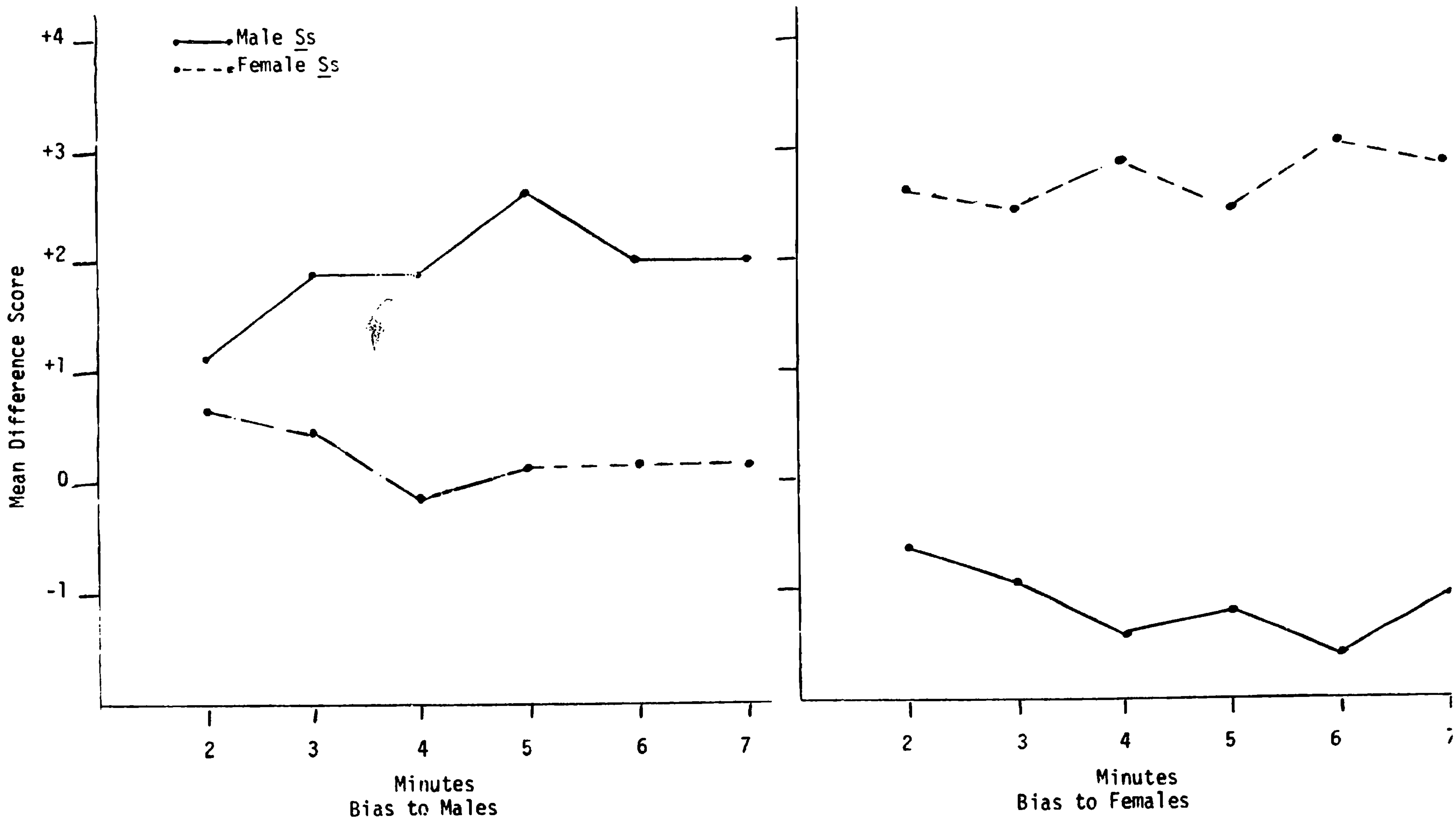
There were two major objectives in the present study: a) to examine the possibility of developmental trends in susceptibility to subtle cues emitted by experimenters, and b) to examine possible differential bias effects due to male and female experimenters. The data provided an affirmative answer to the former objective and a negative answer to the latter objective. Data with respect to each objective will be discussed in turn.

Generally speaking, the experimenters did bias the performance of the children. The significant Bias Condition x Sex of Subject interaction in the analysis of the difference scores reveals differences in the predicted direction, i.e., boys performed at a higher rate than girls for experimenters biased toward males and girls performed at a higher rate than boys for experimenters biased toward girls. Although this same interaction was significant in the analysis of base-rate scores, suggesting the possibility that the difference score analysis is contaminated by regression effects (Parton & Ross, 1965; Stevenson & Hill, 1966), there is some evidence to suggest this is not the case. First, the base-rate scores for the females did not differ between the Bias Conditions but the difference scores did. Second, the base-rate scores for the three age groups were each significantly different from the other but in the difference score analysis the third- and fifth-grades had identical and positive difference scores and the first-grade had a negative difference score. Although part (17%) of the variance in difference scores can be attributed to initial base-rate level because of the Base-Rate x Difference Score correlation ($r = .41$) the above data suggest this is not an over-riding factor.

The Bias Condition x Sex of Subject x Minutes interaction (Figure 1) revealed no significant Sex of Subject differences for experimenters biased toward males, although the means were in the predicted direction, but consistent Sex of Subject differences for experimenters biased toward females. This is a replication of a finding reported by Dusek (1972) in which female experimenters biased toward boys did not significantly bias the performance of boys or

Figure 1

Mean Difference Scores for Each Bias
Condition x Sex of Subject Group over Minutes



girls. In the present study neither male nor female experimenters biased toward boys could effect significant changes over time. The basis of this finding is unclear.

The major finding with respect to the predictions was the Grade Level x Bias Condition x Sex of Subject interaction (Table 10) which revealed clear developmental trends in susceptibility to experimenter bias effects. At the first-grade level there were no significant Bias Condition effects for either the male or female Ss, although the means were in the predicted directions. At the third-grade level the Bias Condition effect was significant for the males, the mean difference score was higher if the experimenter was biased toward males than females; for the females the Bias Condition effect was not significant although the means were in the predicted direction. At the fifth-grade level the Bias Condition effect was significant, for both the male and female subjects with the means in the predicted direction.

The above findings indicate clear developmental and sex of subject trends in susceptibility to experimenter-bias effects. Although the exact bases of these trends is difficult to elaborate at the present time it may be that as children become more developmentally mature they are better able to interpret the subtle cues emitted by the experimenter and tend to comply with the interpretation placed on the cues. The processes involved may be similar to those examined by Flavell (1968) in connection with children's role-taking and communication skills.

Sex of experimenter was neither a significant main effect nor involved in a significant interaction in the analysis of either the base-rate or difference scores. Thus,the bias effects obtained were independent of sex of experimenter and support the earlier findings of Dusek (1971, 1972) with respect to experimenter bias by male and female experimenters testing children.

Future research aimed at testing a) the reliability of the above findings and b) the basis of the observed grade level differences is obviously called for. The results of such a series of experiments should aid the development of a theory of experimenter bias effects. Such research should also lead to a better understanding of childhood socialization vis-a-vis interaction with adults.

Experiment III

Adult Expectancy Effects: Self-generated versus Induced Expectancies

As noted in the literature review, when evaluating adult expectancy effects there is but little evidence relating to the importance of the manner by which the adult acquires the expectancy for the to-be-produced outcome. Some of the available evidence (e.g., Bootzin, 1971) suggests that self-generated expectancies relate more to obtained bias than expectancies induced by the principal investigator. However, there is other evidence (e.g., Marcia, 1961; Marwit & Marcia, 1967) which does not support this position. As a result, the issue remains unresolved. Experiment III was aimed at assessing the importance of mode of development of adult expectancies vis-a-vis the effectiveness of adults to bias the simple motor performance of children.

Subjects.

The subjects were 48 kindergarten children ($\overline{CA}$ = 5 yrs. 11 mo., SD = 8 mo.), half males and half females. The children attended a school serving primarily a lower-class neighborhood.

Experimenters.

The experimenters were 12 male college students ($\overline{CA}$ = 19 yrs. 9 mo., SD = 13 mo.) enrolled in the introductory psychology course at Syracuse University. During the experiment each E tested two boys and two girls. Each E was randomly assigned to one bias condition and one induction condition.

Apparatus.

The apparatus was identical to that used in Experiment II.

Procedure.

Experimenter training. With the exception of the group training session the experimenter training was essentially identical to that of Experiment II. Each experimenter was trained individually. Experimenters assigned to the Induced Bias Condition were given the same statement as was given in Experiment II. Experimenters in the Self-generated Bias Condition were asked to predict whether boys or girls would drop the marbles faster. Each experimenter practiced the task administration procedures with a graduate student.

Experimental task. The procedures for the experimental task were identical to those employed in Experiment II.

Design.

The design of Experiment III was a 2 (Induction Condition) x 2 (Bias Condition) x 2 (Sex of Subject) x 7 (Minutes) factorial design with six subjects in the smallest cell.

Results

Dependent measures. As in Experiment II, the dependent measures were the base-rate of response and six difference scores, one for each minute of the experimental period of the task. The correlation between the base-rate and the average difference score was $-.62$ ($N = 48$, $p < .01$), indicating that approximately 38% of the variance in the difference scores is accounted for by the initial base-rate levels.

Analysis of base-rate scores. The base-rate scores were subjected to a 2 (Induction Condition) x 2 (Bias Condition) x 2 (Sex of Subject) analysis of variance (see Table 12). The mean base-rate scores for each main effect are presented in Table 13. As may be seen in Table 12 the only significant effect was the triple interaction involving Induction Condition, Bias Condition, and Sex of Subject. The means for this effect are presented in Table 14. Individual comparisons revealed the following: a) the only significant sex difference ($F = 7.08$, $df = 1/40$, $p < .05$) was in the Self-Generated Bias to Females Condition; b) the only significant Bias Condition difference was for the male Ss in the Self-Generated Induction Condition.

Analysis of Difference Scores. The difference scores were subjected to a 2 (Induction Condition) x 2 (Bias Condition) x 2 (Sex of Subject) x 6 (Minutes) analysis of variance with repeated measures on the last factor (See Table 15). The means for the between-subjects main effects are presented in Table 13. The only significant between-subjects effect was the Bias Condition x Sex of Subject interaction (see Table 16). Individual comparisons (Winer, 1962, p. 344) revealed significant Sex of Subject effects for Bias to Males ($F = 6.48$, $df = 1/40$, $p < .05$) and Bias to Females ($F = 22.90$, $df = 1/40$, $p < .001$) and significant Bias Condition effects for Male Ss ($F = 10.36$, $df = 1/40$, $p < .01$) and Female Ss ($F = 16.92$, $df = 1/40$, $p < .001$).

There were several significant within-subjects effects. The significant Minutes main effect (See Table 17) reflected a general decrease in rate of response during the experimental period of the task. The Induction Condition x Minutes interaction was significant (see Table 17) and reflected a general decrease in rate of response for Ss in the Induced condition and, generally, an increase and then decrease in rate of response for Ss in the Self-Generated condition. The Induction condition x Bias Condition x Minutes interaction was also significant (see Figure 2). Individual comparisons revealed that for the Induced Condition there were significant Bias Condition effects for minutes 4 ($F = 6.50$, $df = 1/200$, $p < .05$), 5 ($F = 6.03$, $df = 1/200$, $p < .05$), 6 ($F = 6.36$, $df = 1/200$, $p < .05$), and 7 ($F = 6.56$, $df = 1/200$, $p < .05$), but for the Self-Generated Condition the only significant Bias Condition effect was for minute 4 ($F = 4.27$, $df = 1/200$, $p < .05$).

Discussion.

The major focus of Experiment III was to investigate the effects of mode of inducing expectations in the experimenter in the obtaining of experimenter-bias effects with children. Although the analysis of the difference scores revealed a significant Bias Condition x Sex of Subject interaction, indicating a significant experimenter-bias effect, this effect

Table 12

Analysis of Variance of Base-Rate Scores

Source	df	MS	F	p
Induction Condition (A)	1	17.516	<1	
Bias Condition (B)	1	1.688	<1	
Sex of Subject (C)	1	17.520	<1	
A x B	1	46.023	2.44	
A x C	1	6.023	<1	
B x C	1	50.020	2.66	
A x B x C	1	88.023	4.67	<.05
error	40	18.838		

Table 13

Mean Base-Rate and Mean Difference Score for Each Main Effect

Effect	Mean Base-Rate	Mean Difference Score
Induction Condition		
Induced	17.92	-.75
Self-generated	16.71	.56
Bias Condition		
To Males	17.50	.43
To Females	17.12	.88
Sex of Subject		
Males	17.92	.10
Females	16.71	1.20

Table 14

Mean Base-Rates for the Induction Condition x Bias Condition x Sex of Subject Interaction

Induction Condition	Bias Condition	Sex of Subject: Male	Female
Induced	To Males	19.67	18.50
	To Females	16.67	16.83
Self-Generated	To Males	14.50	17.33
	To Females	20.83	14.17

Table 15

Analysis of Variance of Difference Scores

Source	df	MS	F	p
Induction Condition (A)	1	2.722	<1	
Bias Condition (B)	1	14.222	<1	
Sex of Subject (C)	1	86.681	2.44	
A x B	1	102.722	2.90	
A x C	1	8.681	<1	
B x C	1	946.125	26.675	<.001
A x B x C	1	5.014	<1	
error	40	35.469		
Minutes (D)	5	28.431	6.60	<.001
A x D	5	10.631	2.47	<.05
B x D	5	.631	<1	
C x D	5	6.255	1.45	
A x B x D	5	9.797	2.28	<.06
A x C x D	5	.556	<1	
B x C x D	5	3.867	<1	
A x B x C x D	5	4.256	<1	
error	200	4.306		

Table 16

Mean Difference Scores for Each Bias Condition x Sex of Subject Subgroup

Bias Condition	Sex of Subject Male	Female
To Males	1.69	-.83
To Females	-1.49	3.24

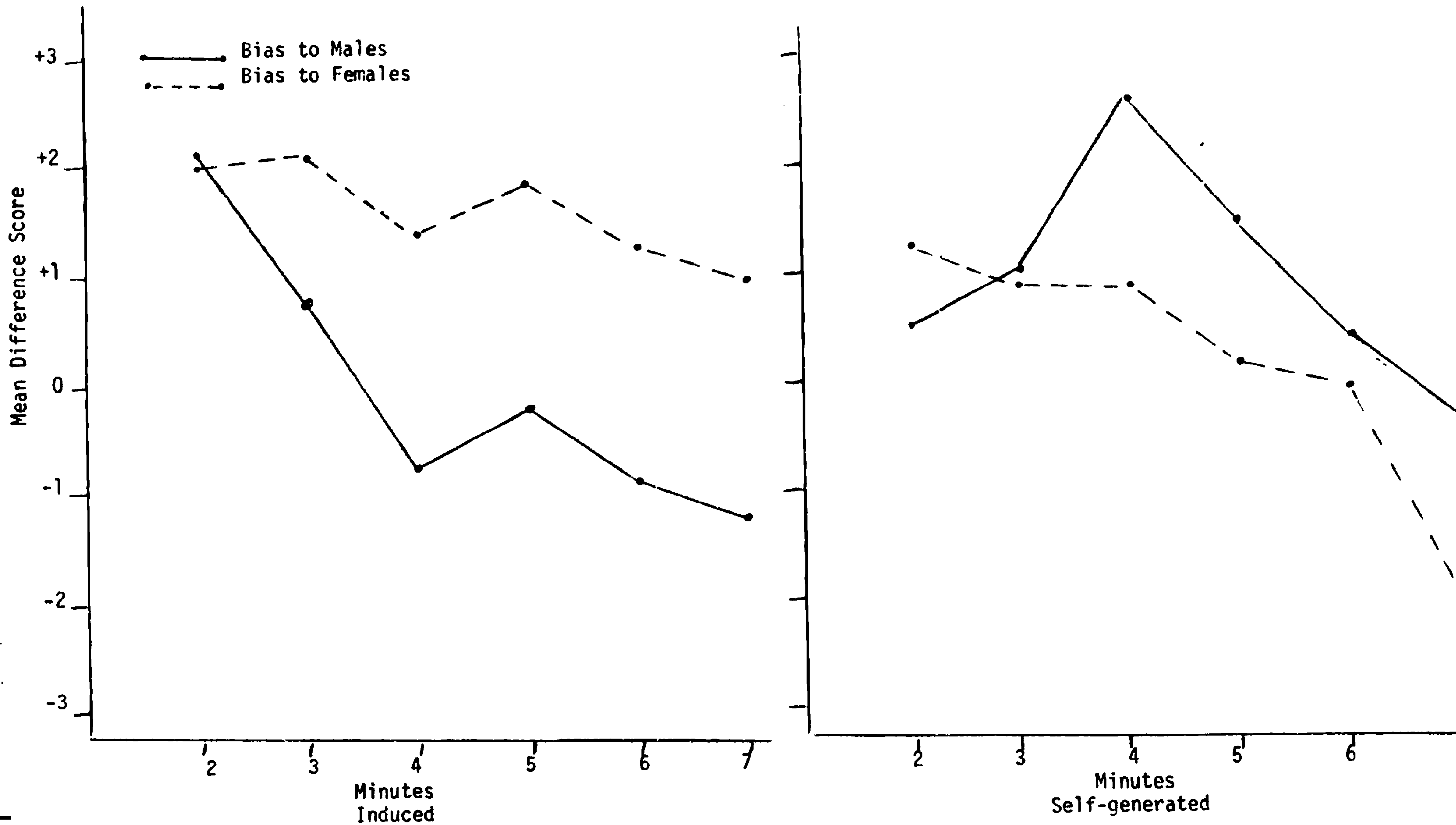
Table 17

Mean Difference Scores for the Minutes x Induction Condition Interaction

Induction Condition	Minutes 2	3	4	5	6	7
Induced	2.04	1.42	.25	.79	.17	-.17
Self-generated	.88	.92	1.71	.79	.17	-1.12
Mean	1.46	1.17	.98	.79	.17	-.64

Figure 2

Mean Difference Score for Each Induction Condition x Bias Condition Group over Minutes



did not interact with Induction Condition. Induction Condition did interact with Minutes, and with Bias Condition and Minutes. However, these effects are not readily interpretable given current theorizing in the area. The data would appear to support the findings and theorizing of Marcia (1961) and Marwit and Marcia (1967), indicating no significant differences due to Induction Condition.

It must be pointed out that both the correlation between the base-rate and the average difference score, as well as the significant Induction Condition x Bias Condition x Sex of Subject interaction in the analysis of the base-rate scores, lead to the possibility of relatively strong regression effects in the analyses of the difference scores. Although it is not readily possible to accurately evaluate the extent of this possible regression effect due to initial base rate, it may be that the experimenter-bias effect occurs primarily in the initial interactions in the experiment. That is, the experimenter-bias effect may be reflected in the base-rate scores as opposed to the difference scores. The current investigation was not designed in such a way as to allow the veridicality of this possibility to be examined. Data reported by Rosenthal (1966) and Friedman (1967), however, lend credence to this view.

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