DOCUMENT RESUME

ED 032 205 RE 001 875

By-Senter, Donald R.

An Experimental Study Designed to Test the Relative Effectiveness of a Multi-Media Instructional System.

Pub Date Feb 69

Note-10p.; Paper presented at the American Educational Research Association conference, Los Angeles, Calif., Feb. 5-8, 1969.

EDRS Price MF-$0.25 HC-$0.60

Descriptors-Basic Reading, *Curriculum Evaluation, Grade 1, Instructional Materials, *Multimedia Instruction, Reading Research, Reading Tests

Summative evaluation of Cycles R-40 of the Listen Look Learn (LLL) Multi-Media Communication Skills System was conducted in 1967-68, using 28 experimental (LLL system) and 28 control (variety of basal reading programs) classes of first-grade children. Testing included the use of the Metropolitan Readiness Tests; the Pintner-Cunningham Primary Test; the Cooperative Primary Tests, Listening; and the Stanford Achievement Test. Additional evaluation, provided through teacher questionnaires, indicated enthusiasm for the LLL system. Analysis of variance and analysis of covariance, using the BMD05V Computer Program, indicated significantly higher reading achievement test scores for LLL children, similar scores for average-ability LLL children and high-ability control children, and higher scores for suburban children than for urban children. It was concluded that the LLL system is preferred by teachers and is extremely effective with children at all ability levels, from all community sizes, and from every socioeconomic status. Tables of results are included. (MD)

An Experimental Study Designed to Test the Relative Effectiveness of a Multi-Media Instructional System

Presented By
Donald R. Senter, Ed.D
Educational Developmental Laboratories

At The
1969 AERA Conference

Prepared By
Research Department
Educational Developmental Laboratories

Introduction

During the period 1965-67, extensive formative research was done with the Listen Look Learn (LLL) Multi-Media Communication Skills System. Continuous revision and improvement was conducted as a result of the feedback obtained.

Summative evaluation of Cycles R-40 in first-grade classrooms was conducted during the 1967-68 school year. Two major questions were asked in this evaluation. The question of the effectiveness of the LLL system when compared with traditional basal reading programs was primary. Effectiveness of the program was defined, for the purpose of this study, to be the achievement levels attained by students in LLL and control classes. Secondly, it is recognized that the success of any instructional program is largely dependent upon the opinion of teachers regarding its effectiveness and the confidence the teachers have in the ability of the program to satisfactorily aid them in achieving their objectives.

Twenty-eight experimental (LLL system) and twenty-eight control (other basal reading programs) classes of first-grade children constituted the sample.

The experimental classes in all cases used the Listen Look Learn system, Cycles R-40, produced by Educational Developmental Laboratories, Inc. and the L. W. Singer Company. The Ginn Basic Reading Program was used by twelve of the twenty-eight control groups. Five control groups used Scott Foresman; two groups used Houghton Mifflin; two groups used Harper & Row; two groups used S.R.A.; and Webster Programmed Reading, Open Court Reading Program, Bill Martin Sounds of Language, Banks Street Readers, and Economy Series were used by one control group each as the basis of the language arts program. For the purpose of this study, all basal reading programs were classified as the control groups.

The tests used for the objective evaluation of the 1967-68 study were:

1. Metropolitan Readiness Tests - administered in October 1967
2. Pintner-Cunningham Primary Test - administered in October 1967
3. Cooperative Primary Tests, Listening - administered in October 1967 and May 1968
4. Stanford Achievement Test - administered in May 1968

Subjective Evaluation

Examination of subjective responses to questionnaires submitted by the twenty-eight teachers who used the LLL system was extremely favorable. Twenty-two teachers responded that they would like to use the LLL system the following year, and twenty-one teachers judged the total system as superior to any basal programs with which they had had experience. In the opinion of the majority of the teachers the growth patterns of the children in their classes was improved in such areas as listening accuracy, independent activity in small groups, and interest in reading and learning. Most cooperating teachers were able to handle the system successfully with minimal assistance or no assistance. The strength of the program most frequently mentioned by teachers related to the high interest level achieved and maintained throughout the year by the students. Seven of the twenty-eight responding teachers were particularly pleased with the interest exhibited by boys in the system.

Analysis of Variance and Analysis of Covariance was done utilizing the BMD05V Computer Program. The primary analysis involved a 2 x 3 x 2 (treatment group x ability level x sex) factorial design. Two auxiliary Analyses of Covariance were performed. The first was a 2 x 4 x 2 (treatment group x size of community x sex) factorial design and the second was a 2 x 3 x 2 (treatment group x socioeconomic status x sex) factorial design. IQ was used as a covariate for each of these designs. Main effects and interactions of main effects were considered.

Because of the nature of the experiment, intact classroom units had to be used. Analysis of Covariance was used to remove initial differences between groups.

Table I gives the results of the analysis of the data using the Stanford Achievement Test subtests and the Cooperative Primary Test, Listening as the dependent variables. Children who had participated in the LLL system scored significantly higher on these tests than did children from the control group who used other basal reading programs. Ability level was a significant factor in achievement as would be expected. Sex differences were significant and favored girls. The only significant interactions found were treatment by ability level.

TABLE I
about here

Two specific points are of interest in Figure 1 which shows the adjusted mean values for the Word Meaning subtest. First, average ability children who were in classes using the LLL system scored at almost the same level ($\bar{X}_{adj.}$ 21.56) as children of high ability who were in control classes ($\bar{X}_{adj.}$ 21.64). Secondly, the slope of the line that shows the difference between LLL and control groups is much more pronounced for the average group.

Figure 1
about here

Figure 2 is a graphical representation of the results obtained on the Vocabulary subtest.

Figure 2
about here

A significant difference was found to exist at the .05 level that favored boys and girls from the LLL group over boys and girls from the control group for each part score from the Stanford Achievement Test and for the Cooperative Primary Test, Listening. Boys categorized as average (IQ range of 88 to 112) for the purpose of this study, scored significantly higher on each of the five posttests and this difference was at a highly significant ($p < .01$) level for three of the five tests.

In summary, results favoring the students from LLL groups are consistent. No comparison of adjusted cell means showed results in favor of the control group. The results for boys were of particular interest since boys often present greater problems with respect to achievement of reading skills in the early grades.

Auxiliary Analyses

In order to evaluate the effectiveness of the LLL program in communities of varying sizes, an auxiliary analysis of the data was performed following non-stratified blocking on size of community from which the student came. Sizes of communities were grouped into four categories.

Table II gives a summary of the F-ratios obtained from computation of the Analysis of Covariance where IQ scores were used as the covariate. For all subtests and the listening test, differences favoring the LLL group were highly significant. Significant differences were also found on scores according to size of community.

The two categories of size which were favored were the communities of less than 10,000. Communities of this size range were rural in a few cases but generally they would be classified as suburban.

No differences due to sex were found to exist from this analysis.

The only significant interaction that resulted from the analysis was treatment group (LLL or control) by size of community for the Paragraph Meaning subtest. It can be assumed that this significant interaction could have occurred by chance. With a total of thirty-five comparisons it would be expected that more than one interaction might occur by chance at the .05 level.

TABLE II
about here

The second auxiliary analysis was performed following non-stratified blocking on socioeconomic level. It was considered to be of major concern to determine what effect this classification might have on student achievement. Table III gives a summary of the F-ratios obtained from computation of the Analysis of Covariance where IQ scores were used as the covariate. Treatment group (LLL or control) was a significant main effect for all subtests and the listening test favoring the LLL students. Socioeconomic status of the student was a significant main effect for all subtests of the Stanford Achievement Test but not for the listening test.

TABLE III
about here

Conclusions

Subjective evaluation, collected from cooperating teachers and summarized by the EDL Research Department, indicated that the majority of the teachers who used the LLL system were extremely pleased with the effectiveness and operation of the instruments, interest level and greater vocabulary of the LLL materials, and the overall results achieved by their students.

The objective evaluation was consistent and results strongly favored the LLL system. The primary analysis which was done, following blocking on ability level, indicated that children of each ability level using the LLL system were able to achieve at a higher level than the control children using a basal program. In thirteen of fifteen achievement test comparisons, this difference was a significant one in favor of the LLL group; two comparisons were non-significant. The interaction of treatment group (LLL or control) and ability level with achievement was significant for this analysis. In general, this significant interaction was attributable to the excellent results of the average ability children who had been in LLL groups.

Auxiliary analyses were performed to test the effectiveness of the LLL system in varying sizes of communities and with the three general classifications of socioeconomic status. In both of the auxiliary analyses achievement exhibited by students from LLL groups was consistently superior to that exhibited by control students. Children from small communities, essentially suburban areas, were favored as might be suggested a priori. A second finding, also presupposed by experience, indicated that the high and average socioeconomic groups were able to achieve at a higher level. The interesting, and not predetermined, results of the two auxiliary analyses were that children from any of the size categories involved and children from every socioeconomic classification performed consistently better following use of the LLL system.

The results of the year-long evaluative study indicate that the LLL system is a system that can be managed by teachers, that teachers enjoy using and want to use again, and that it is an extremely effective teaching system for children of all ability levels, particularly the average ability range, from all sizes of communities, and from every socioeconomic status.

To the extent to which teachers and children in this investigation are representative of first-grade teachers and pupils, and to the extent to which the evaluation instruments are valid and reliable, the following major conclusions are drawn from the data in this study.

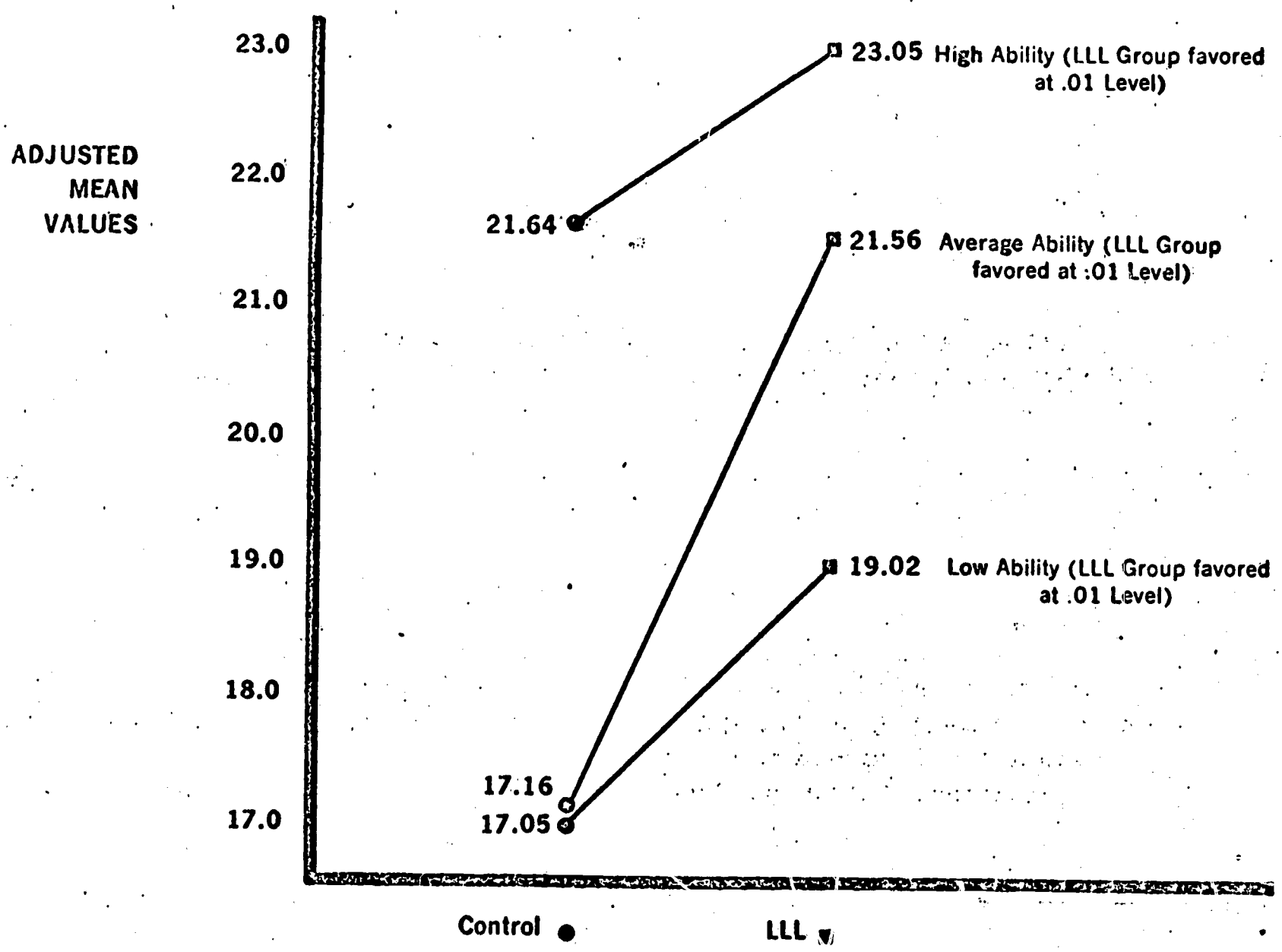
TABLE I

Summary of F-Ratios and Error Mean Squares for the Analysis of Covariance[a]. for the Primary Design Prepared to Test Differences Resulting from the Ability Level of Students for Total Sample.

		Stanford Achievement Test				Cooperative
Source of Variation	df	Word Meaning	Paragraph Meaning	Vocab-ulary	Word Study Skills	Listening Test
Treatment	1	24.33**	24.43**	7.28**	5.51**	21.41**
Ability Level[b].	2	21.16**	20.63**	21.07**	12.08**	27.00**
Sex	1	13.18**	28.32**	.37	14.04**	6.41*
Treatment by Ability	2	9.72**	8.08**	3.38	4.59**	1.56
Treatment by Sex	1	2.88	.19	.10	1.49	.90
Ability by Sex	2	1.66	1.13	1.51	1.05	.71
Treatment by Ability by Sex	2	.33	1.20	.46	1.57	.10
Error Mean Square	933	38.96				
	929		63.14			
	880			30.68		
	882				67.53	
	909					24.35

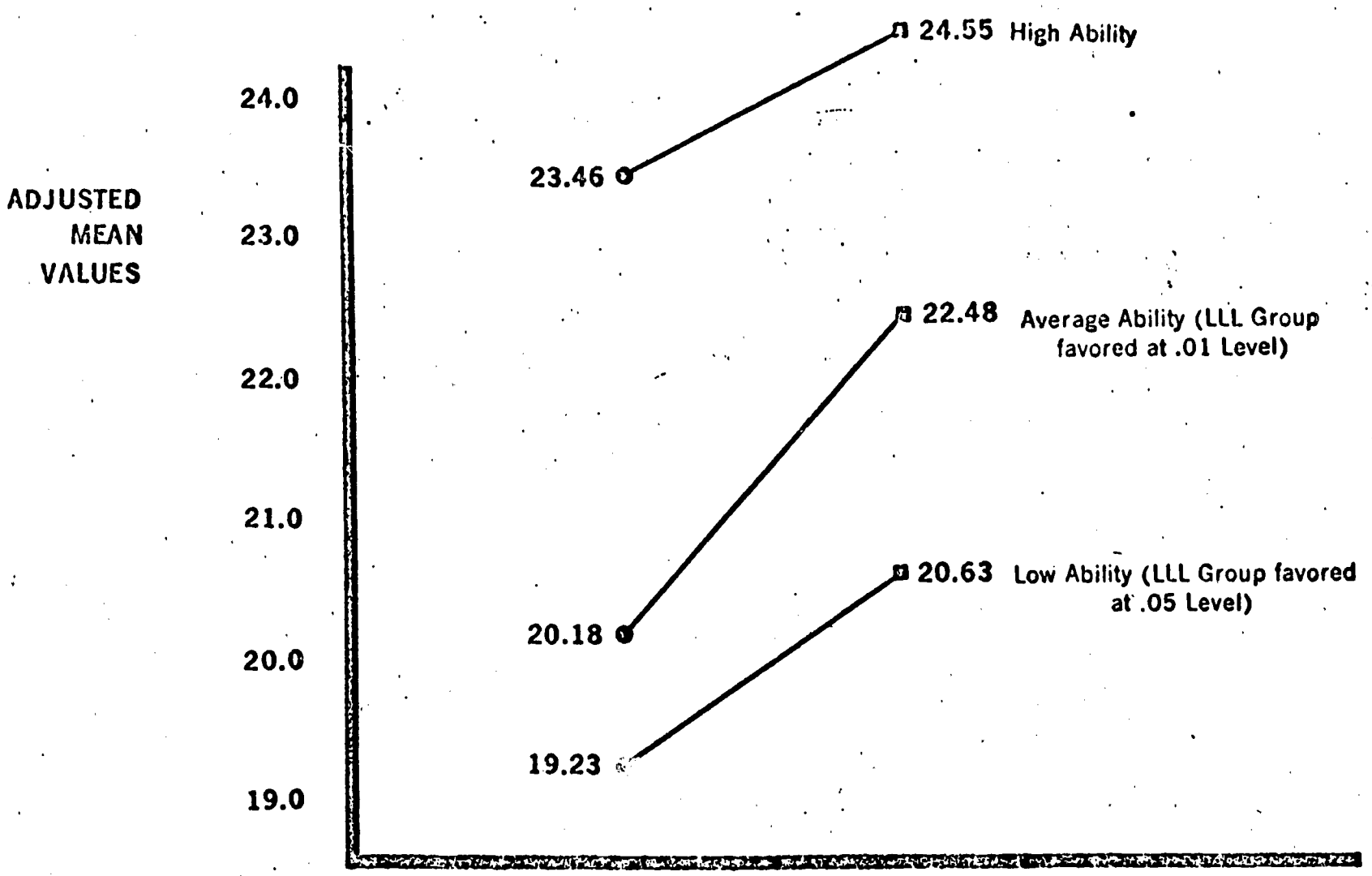
a. Metropolitan Reading Readiness Test was used as the covariate for this analysis.
b. Pintner-Cunningham Primary Test scores were used to determine the ability levels

* $p < .05$ (probability of this result occurring by chance is less than five times over one hundred replications)
** $p < .01$ (probability of this result occurring by chance is less than one time over one hundred replications)



Graphical Representation of Two-Way Interaction of Ability Level by Treatment Group for Word Meaning Subtest

Figure 1



Graphical Representation of Two-Way Interaction of Ability Level by Treatment Group for Vocabulary Subtest

Figure 2

TABLE 11

Summary of F-Ratios and Error Mean Squares for the Analysis of Covariance[a] for the Auxiliary Design Prepared to Test Differences Resulting from Community Size

Source of Variation	df	Stanford Achievement Test				Cooperative
		Word Meaning	Paragraph Meaning	Vocab-ulary	Word Study Skills	Listening Test
Treatment	1	25.35**	20.69**	37.29**	12.10**	14.32**
Size of Community	3	11.66**	14.02**	21.03**	11.00**	9.63**
Sex	1	.09	1.09	1.82	1.01	1.17
Treatment by Size	3	2.32	5.17*	2.79	1.00	1.93
Treatment by Sex	1	1.07	1.13	3.46	3.43	2.68
Size by Sex	3	3.26	2.85	2.32	3.33	2.06
Treatment by Size by Sex	3	1.49	1.89	1.02	1.08	.97
Error Mean Square[b]	984	40.38	42.74	36.94	49.17	43.91

a. Pintner-Cunningham IQ score was used as the covariate for this analysis.
b. Degrees of Freedom for Word Meaning Subtest.

* $p < .05$ (probability of this result occurring by chance is less than five times over one hundred replications)
** $p < .01$ (probability of this result occurring by chance is less than one time over one hundred replications)

TABLE III

Summary of F-Ratios and Error Mean Squares for the Analysis of Covariance[a] for the Auxiliary Design Prepared to Test Differences Resulting from Socioeconomic Background of Community

Source of Variation	df	Stanford Achievement Test				Cooperative
		Word Meaning	Paragraph Meaning	Vocab-ulary	Word Study Skills	Listening Test
Treatment	1	19.37**	12.46**	16.31**	18.19**	6.31*
Socioeconomic Status	2	11.01**	9.27**	12.69*	14.92**	2.83
Sex	1	2.91	1.83	2.13	2.70	1.06
Treatment by Socioeconomic Status	2	1.83	.43	1.47	1.61	2.32
Treatment by Sex	1	2.15	1.17	.86	1.50	1.27
Socioeconomic Status by Sex	2	.96	.80	1.33	2.11	1.64
Treatment by Socioeconomic Status by Sex	2	1.34	2.06	1.84	.99	2.06
Error Mean Square	916	26.87	38.37	35.41	29.87	43.28

a. Pintner-Cunningham IQ score was used as the covariate for this analysis.

* $p < .05$ (probability of this result occurring by chance is less than five times over one hundred replications).

** $p < .01$ (probability of this result occurring by chance is less than one time over one hundred replications)