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ABSTRACT

Objectives of this educational research conducted in 1969-70 to determine if two categories of variables, socioeconomic level and location (rural, suburban, or urban), affect 6th and 7th grade students in their: 1) acquired economic knowledge; and 2) ability to gain knowledge from an economic program. Classes and teachers were randomly selected from communities of differing sizes to participate in the field tests. Teachers were supplied with materials for the "Economic Man", program and were asked to administer to their students the Otis-Lennon Mental Ability Test, to yield a dependable measure of general intelligence, and pre-/post-IRC tests, to measure economic knowledge and application. Methods of investigation created two additional variables, grade level, and order of testing. Based upon differences between observed and predicted scores, findings indicate that location and socio-economic status were not significant variables affecting acquired economic understanding and that grade and order of testing were significant. Results show that, for ability to gain knowledge from a classroom economics program, location was significant, rural students scoring higher than urban or suburban students, and that grade level was also significant. (SJM)

TEACHING ECONOMICS IN ELEMENTARY SCHOOLS:

Comparing Acquisition of Economic Knowledge by Elementary School Students in Different Types of Communities

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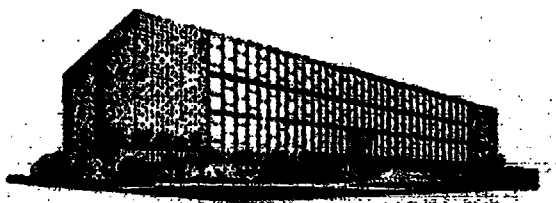

ELEMENTARY ECONOMICS PROJECT

INDUSTRIAL RELATIONS CENTER / THE UNIVERSITY OF CHICAGO

TEACHING ECONOMICS IN ELEMENTARY SCHOOLS: Comparing Acquisition of Economic Knowledge by Elementary School Students in Different Types of Communities

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Of general interest within the broad area of education in the social studies is the differing amounts of knowledge about a specific subject which are acquired by children from different environments. The Industrial Relations Center of The University of Chicago had the opportunity during field testing of a 21-week elementary economics program to investigate some aspects of this question in relation to one such specific area: the learning of economics by elementary school children.

The field testing was conducted during the school year of 1969-70 in a number of communities throughout the United States. These communities differed in the amount of economic activity that school children could observe and in which they could participate. An urban center with many kinds of shops and stores, with newsstands and street vendors, with currency exchanges and branch banks, with modern shopping centers and downtown retail activity, with factories and industrial establishments, and with large numbers of people offers children many opportunities to observe and take part in economic activities and transactions. In contrast, children in a sparsely populated rural community may lack many of these opportunities although they may observe and take part in other kinds of economic transactions, such as those related to agriculture or even to barter. Taylor and Jones list numerous other differences between rural and urban communities. (1)

Environment, then, affects the amount of economic activity that school children can participate in and observe. Brunner (1967) states: "As the young child interacts with his environment, his self-concept begins to form, the content and pattern of his language develop, skills in social processes evolve, attitudes toward learning take shape, and concepts which enable him to interpret and organize his environment begin to form." (2) The environment of the community not only influences the amount of firsthand information about economic transactions that children encounter but also the values and aspirations which they acquire. Tannenbaum (1967) reports that many investigators have found "lower-class youth expressing lower educational aspirations than did those from higher-status families." (3) Dooley (1968), in a review of literature from various sources on the teaching of elementary economics to school children,

concludes: "Evidence is presented that concept development is a function of the socio-economic class in which the child belongs only at the outset. The lower socio-economic class child has a reduced amount of interaction with concrete experience of an economic nature but tends to respond to instruction in this area." (4)

Given the opportunities provided by the field testing and the conditions described above, two specific questions were posed for investigation:

1. Does the economic knowledge acquired by children differ according to their socioeconomic level and according to the location in which they live—rural, suburban, or urban?

2. Will the amount of economic knowledge that children acquire from an elementary economics program differ according to their SES level and to their location?

These questions produced two primary variables for analysis:

1. Location—Rural, Suburban, or Urban
2. Socioeconomic Status—High or Low

THE PROGRAM

The Economic Man (5) program was developed over a period of five years by the Elementary Social Studies Division of the Industrial Relations Center.* The program focuses on the central economic concept of exchange and requires approximately 40 minutes of teaching time per day, five days a week, for 21 weeks. Economic Man contains three units of eight, five and eight weeks duration respectively. Each of the units was designed to include activities that would interest a wide variety of students.

Unit I tells the story of a young man who is shipwrecked on a deserted island. The students learn how economic decisions are made as they see the young man confront and solve such problems as how to spend his time and how to take advantage of the island's resources. Later in the story, other people are also shipwrecked on the island, and the concepts of specialization and division of labor are introduced. Throughout the eight weeks of studying this unit, the students have many opportunities for role playing, team activities, and arts and crafts. Some teachers report that students who are ordinarily complacent about social studies often become actively interested in Unit I.

*The research and development activity of the IRC in the field of economic programs for elementary schools was funded by the Charles Stewart Mott Foundation of Flint, Michigan.

Unit II centers on a simulation game called MARKET and was designed to teach price theory: the determination of a market clearing price (or equilibrium) from supply and demand conditions. The class is divided into retailer and consumer teams. Retailer teams sell to the consumer teams and each retailer team tries to make the largest profit. Consumer teams circulate among the retailers, search for the most competitive prices, and attempt to satisfy dinner meal requirements with a limited amount of money. Students move about and interact a great deal during the playing of the game.

Unit III uses a problem-solving approach to the study of international trade and introduces graph reading. In the first part of this unit, students learn about trade between the United States and Canada. Later, they are asked to imagine what would happen if Canada and the United States stopped trading. In the second part of the unit, the students study the production of natural rubber in Brazil during the early part of the 20th century, the prevailing international trade patterns, and consequent changes in trade patterns when rubber trees begin to be cultivated in Southeast Asia.

THE PROCEDURE

In order to obtain a diverse population of students for field testing, representatives of school systems from communities of differing sizes in various parts of the United States were contacted. With the assistance of these representatives, schools were chosen that were willing to participate in field tests of the program.

The Rural Group

The rural group consisted of schools in communities with a population of less than 15,000 located at least fifty miles from a large urban center. These rural schools were located in Illinois, Michigan, Nebraska, and Texas. The SES designation for each school was made by a representative of the school system in the area.

The concept of socioeconomic status may be less meaningful when used in rural districts than when used in urban areas. The term level-of-living is often used, but more frequently in reference to single families than to communities. The classification of the rural groups into high and low SES levels has to be regarded as less satisfactory than the suburban or urban designations because school administrators in the rural communities were not confident of their ability to designate SES levels accurately, and no objective data was available to aid them in their classification.

The Suburban Group

The suburban group was comprised of schools in communities that were within 25 miles of a large city. These suburbs were either 1) bedroom communities—whose residents commuted to the city to work, or 2) communities whose

residents worked in industrial belts around the large city. Most of these schools were located outside the greater-Chicago metropolitan area. Socioeconomic groups for the Chicago-suburban schools were determined from an economic ranking of 250 communities in the Chicago metropolitan area made by the Chicago Chamber of Commerce. These rankings were based on median family income and median home value. Communities selected for the low SES suburban group ranked in the lower 25% of the list; communities selected for the high SES suburban group were ranked in the top 10% of the list. The remainder of the suburban groups were located near a large west coast city and were rated very high on SES level by local representatives of the school system familiar with the economic ranking of the community.

The Urban Group

An urban group of schools was chosen from three cities which had a population of 350,000 or more according to the 1970 census. One of these cities was located in the Southwest, one in the Midwest, and one in the East. Administrators in the school systems of these cities were asked to identify the SES level of each of the areas in which the schools were located. Each of the cities had previously developed an index of poverty level for the U.S. Department of Health, Education, and Welfare to be used for Title I purposes. Schools were randomly selected from the upper and lower 25% of these indices to make up the high and low socioeconomic groups in the urban communities.

Within each school system selected for the study, a list of available classes and their teachers was drawn up. For the suburban and urban groups, the lists were fairly long. Random selection was used, therefore, in choosing classes and teachers from these two groups to participate in the field tests. A letter was then sent to the randomly selected teachers offering to supply them with the program materials in exchange for their assistance in obtaining test results by administering the IRC test of economic knowledge and application and the Otis-Lennon Mental Ability Test to their students. If the teacher declined to participate another teacher was randomly selected.

Letters were also sent to the teachers in the rural group inviting them to participate in the field testing. Usually, only one teacher was available at the sixth or seventh grade level, but none of the teachers in the rural group declined to participate.

After the classes had been selected and the teachers had agreed to participate in the study, copies of the two tests were sent to each teacher. Mailing of the tests and instructions for administration were coordinated in an effort to make administration as standard as possible among all students in all communities participating in the study. Teachers were requested to give the tests as soon after the Christmas holidays as possible and to administer both tests within a period of three days.

THE TESTS

The Otis-Lennon Mental Ability Test (6) was used to yield a dependable measurement of the general intellectual factor. An interim version* of the IRC test of economic knowledge and application was used to assess the amount of economic understanding students had at the beginning and again at the end of the program.

The IRC test consists of two forms—E and F. In administering the test, the crossover testing technique was used in which half of each class received Form E as a pre-test; the other half received Form F. Approximately 21 weeks later, each student received the alternate form as a post-test.

Each form of the IRC test contains 53, four-choice multiple choice items. Most students could complete the test within the usual 45-minute class period, but some could not. Under these arbitrary limitations of time, the tests were less power tests than intended. Therefore, correction for guessing (i.e., number of items correct minus one-third the number wrong) was applied to the sample used in the subsequent analysis.

Table 1 shows the means, standard deviations, K-R 20 reliability estimates of the IRC test and correlations with the Otis-Lennon Mental Ability Test. The sample used for reliability data includes the students participating in this study plus similar kinds of students taking the test, but not included in the study. The data in Table 1 are based on raw scores without correction for guessing.

TABLE 1
Means, Standard Deviations, and K-R 20 Reliability Estimates of the IRC Test of Economic Knowledge and Application

Form	How Used	n	Mean	s.d.	Reliability (K-R 20)	Correlation with O-L
E	Pre	739	20.56	7.45	.803	.676
F	Post	739	25.73	8.83	.864	.707
F	Pre	756	19.95	6.66	.764	.676
E	Post	756	25.67	9.06	.866	.707

*Several field tests have been made during development of the IRC test over a number of years. After analysis of the 1969 results, the latest revision was administered to about 2,000 students. These results are now being analyzed to develop a final version in two parallel forms.

THE RESULTS

As indicated in the first section of this paper, the study was designed to examine the effects of two categories of variables:

Location—Rural, Suburban, or Urban
Socioeconomic Status—High or Low

The circumstances of field testing the program and the method of investigation produced two additional categories. The third category, grade, was created because the program was tested in both sixth and seventh grades. The fourth category, order, was created by use of the crossover testing technique.

The results of the IRC test of economic knowledge and application from the students in the six kinds of communities (three locations and two SES levels) were examined in two separate analyses: one on the pre-test and one on the post-test. Preliminary to these analyses, however, the results of the mental ability test were examined. We would expect a test of mental abilities, such as the Otis-Lennon, to have a fairly high correlation with other pencil and paper tests such as the IRC tests. We would also expect to find some of our categories to be significant with respect to mental abilities. For these reasons, the Otis-Lennon was used as a covariate in the analyses of the IRC cases; the analysis of the post-test results used both the Otis-Lennon and the pre-test as covariates.

Mental Ability Test

The Otis-Lennon Mental Ability Test, Elementary II level, Form K, was administered to all students in the study. Both sixth and seventh grades were included even though this level of the test is recommended for use in fourth through sixth grades. The intermediate level is recommended for seventh grade. Conversion of the Otis-Lennon raw score to an I.Q. equivalent requires knowing age to the nearest three months of respondent; information on age was not gathered in the study. Only raw scores were used, even though in a given classroom ages of students may differ by more than a year.

TABLE 2
Analysis of Variance—Otis-Lennon Results

Source	Mean Square	df	F	p
Location	5092.07	2	26.96	<.0001
SES	28666.55	1	151.76	<.0001
Grade	13385.15	1	10.86	<.0001
Order	3.45	1	.02	<.8884
Pooled Error	188.89			

Table 2 shows the Analysis of Variance results on the Otis-Lennon Test. The results summarized in the table indicate that the effects of location, SES level, and grade are significant and the effect of order is not significant. The interactions were pooled into the error term because interest in the study was focused on the main class effects and not on specific intercell differences. For the most part the generalizations which can be made from the main class effects are as would be expected. One somewhat unexpected result concerns location. The results show that suburban students scored highest on the Otis-Lennon followed by the rural and then the urban students. The raw score means and standard deviations of the cells are shown in Table 5 at the end of this section.

Students from a high SES level would be expected to score higher on the Otis-Lennon Test than students from a low SES level. Seventh graders with about one more year of development would be expected to have higher raw scores than sixth graders in any type of community—rural, suburban, or urban. The effects of order in testing would not be expected to be significant. Each teacher was asked to distribute the two forms of the test in a "random" fashion within the classroom.

Pre-Test

One of the questions posed in this investigation concerns the amount of economic knowledge students have acquired as a result of living in a certain environment. Acquisition of such knowledge is learning without being exposed to a specific classroom program in economics. Although both forms of the IRC test of economic knowledge and application were developed to be used with Economic Man, an attempt was also made to include items of a more general economic nature, and test items were constructed to represent various levels of Bloom's Taxonomy. (7) For purposes of the analysis, the IRC pre-test was used as a general test of economic knowledge and application.

The Analysis of Covariance shows that the effects of location and SES are not significant on the pre-test. Table 3 indicates that the effect of grade is significant and, surprisingly, so is order of testing. Neither the analysis of the

TABLE 3
Analysis of Covariance
Pre-Test with Otis-Lennon as Covariate

Source	Mean Square	df	F	p
Location	5.66	2	.14	< .3691
SES	72.81	1	1.78	< .1792
Grade	595.81	1	14.53	< .0002
Order	314.17	1	7.66	< .0054
Pooled Error	41.01			

test forms nor examination of the items in each form indicate why the difference occurs in testing order. One possible explanation for the significance in testing order in the analysis of covariance is that it was the result of chance distribution of the forms within the classroom. When the students returned to class after the Christmas vacation, they may have chosen or have been assigned seats by the teacher in such a way as to affect the results of testing order.

Fig. 1 may give a better understanding of the pre-test results. Here, Otis-Lennon and pre-test scores are plotted against one another and the line of prediction of pre-test based on Otis-Lennon scores is drawn in. Fig. 1 indicates the deviations between the observed pre-test score and the score that the Otis-Lennon would predict. It is these deviations that are related to the analysis of covariance results. Although there is a large difference between the scores of high and low SES groups on the pre-test, the category of SES is not significant since the high and low SES observed scores do not deviate much from their predicted scores. The raw score means and standard deviations of the cells are shown in Table 6 at the end of this section.

Fig. 1 shows that sixth grade students did worse than predicted and the seventh grade students did better than predicted based on the Otis-Lennon results. Also, students taking the Form E pre-test did worse than predicted and students taking the Form F pre-test did better.

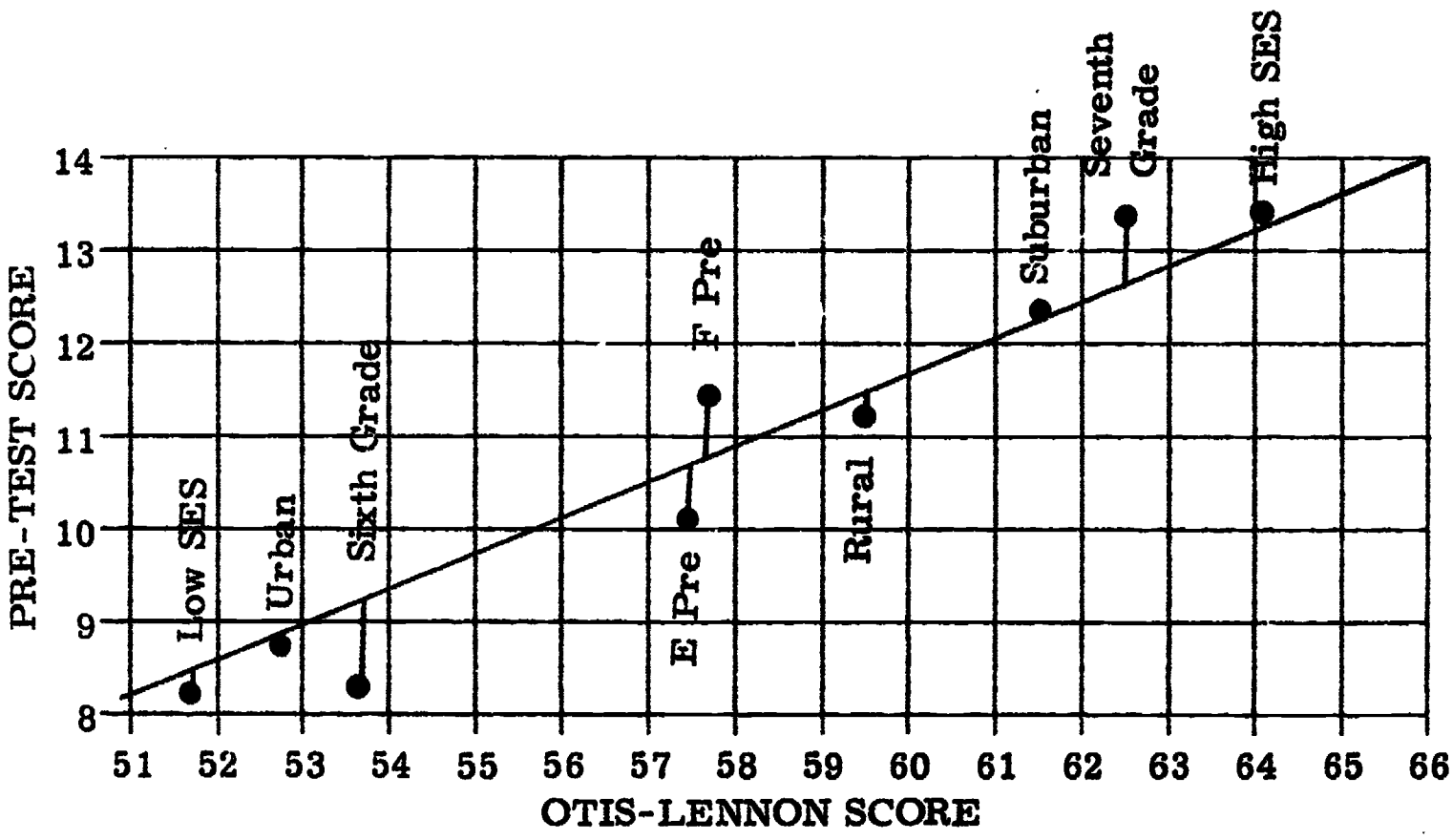

Fig. 1. Observed means of pre-test scores plotted against Otis-Lennon scores with line of prediction drawn in.

Post-Test

A different concern from what students already know is the question of what they are able to learn from a specific classroom program. Are the effects of location and SES level on post-test results significant? Table 4 shows the results of the Analysis of Covariance with the Otis-Lennon and pre-test scores as covariates. In this analysis, location and grade are both significant while SES level and order of testing are not significant.

TABLE 4
Analysis of Covariance
Post-Test with Otis-Lennon and Pre-Test as Covariates

Source	Mean Square	df	F	p
Location	448.24	2	9.13	<.0002
SES	10.21	1	.21	<.6474
Grade	230.43	1	4.74	<.0300
Order	158.33	1	3.25	<.0719
Pooled Error	48.65	764		

Fig. 2 will give a better picture of these results. The center line corresponds to the prediction of post-test scores from the Otis-Lennon and pre-test scores. The bars show the deviations of actual post-test mean scores from the prediction.

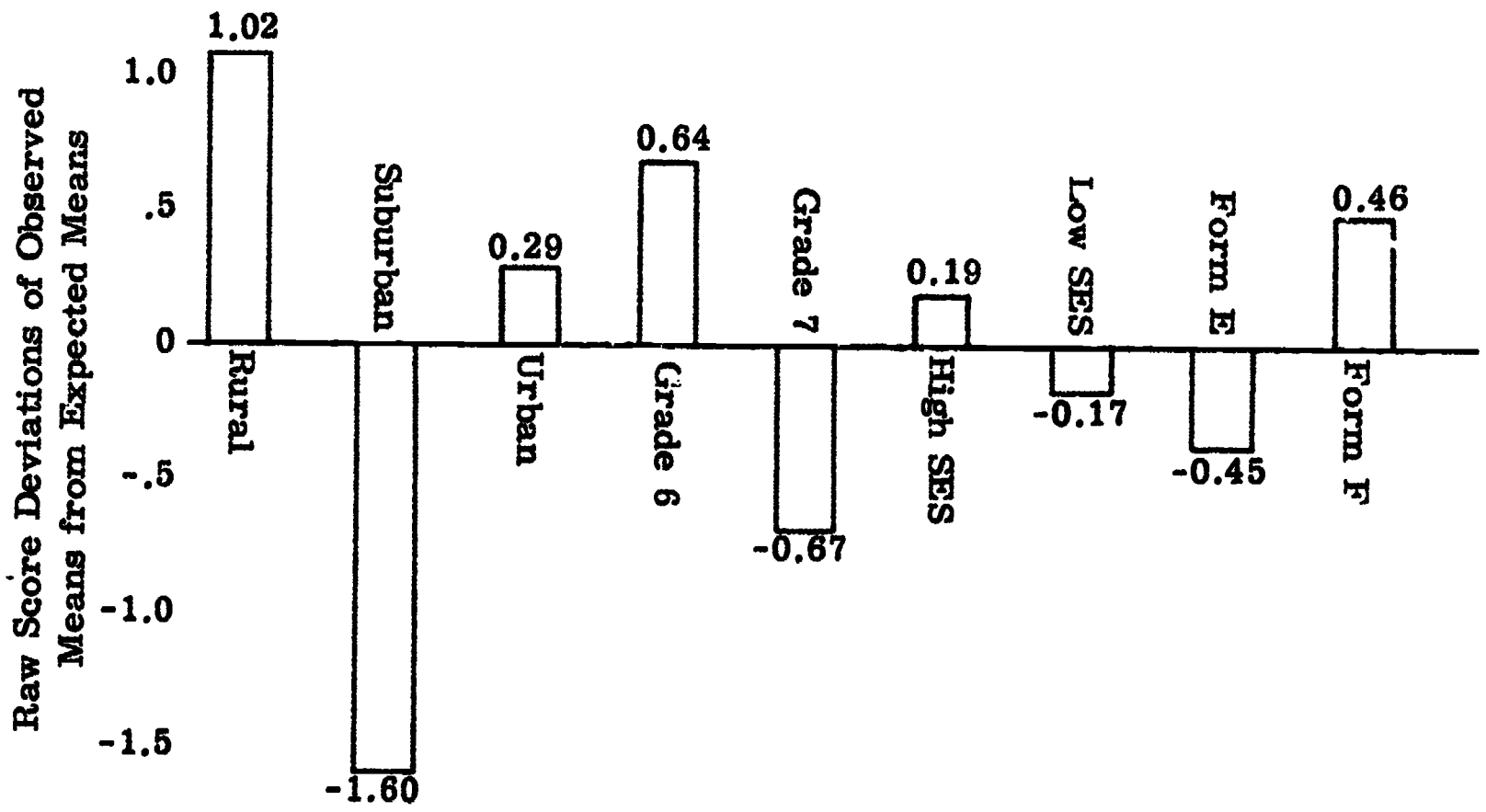

Fig. 2. Deviations of post-test scores from predictions made from Otis-Lennon and pre-test scores.

The actual post-test scores show the rural students score highest, followed by the suburban students, and then the urban students. The raw score means and standard deviations of the cells are shown in Table 7 at the end of this section. Seventh grade students had higher post-test mean scores than the sixth grade students. Both rural and urban students do better than predicted while the suburban students do worse than predicted. The sixth grade students did better than predicted and seventh grade students did worse than predicted. The SES and test-order categories are not significant.

This study was intended to investigate the main class effects of certain categories on pre- and post-test results of the IRC tests of economic knowledge and application. Of additional interest are the raw-score means and standard deviations of all cells for the Otis-Lennon Mental Ability Test, the pre-test and the post-test. These are shown in Tables 5, 6 and 7.

TABLE 5
Means and Standard Deviations
Otis-Lennon Mental Ability Test

Order*	SES		Sixth Grade			Seventh Grade		
			Rural	Suburban	Urban	Rural	Suburban	Urban
Form E Pre-Test	High	n	37	35	29	36	20	29
		Mean	61.30	65.06	55.66	66.67	67.30	71.76
		s. d.	12.36	10.52	12.59	9.45	9.11	4.41
	Low	n	44	16	38	23	41	31
		Mean	54.70	52.25	34.00	56.17	60.61	53.32
		s. d.	15.89	19.90	15.21	14.91	14.07	15.59
Form F Pre-Test	High	n	33	34	33	43	17	31
		Mean	62.85	60.76	58.61	63.79	68.53	70.13
		s. d.	11.25	12.34	13.73	13.17	9.51	6.13
	Low	n	43	21	41	25	43	29
		Mean	51.51	57.43	36.85	58.72	60.09	53.17
		s. d.	14.36	20.39	14.49	15.27	11.29	13.54

*The captions, Form E and Form F, under the heading Order, identify the groups that took the IRC economics test as a pre-test when the crossover testing technique was used.

TABLE 6
Means and Standard Deviations
Pre-Test of Economic Knowledge and Application

Order	SES		Sixth Grade			Seventh Grade		
			Rural	Suburban	Urban	Rural	Suburban	Urban
Form E Pre-Test	High	n	37	35	29	36	20	29
		Mean	13.23	12.25	6.97	16.70	17.57	21.02
		s. d.	8.89	7.61	7.25	8.47	9.61	6.99
	Low	n	44	16	38	23	41	31
		Mean	8.51	7.65	2.00	10.86	14.13	8.22
		s. d.	8.51	8.19	5.08	9.14	9.79	7.40
Form F Pre-Test	High	n	33	34	33	43	17	31
		Mean	11.40	10.26	10.38	12.68	15.92	16.30
		s. d.	8.43	8.20	8.53	8.26	8.33	6.03
	Low	n	43	21	41	25	43	29
		Mean	6.34	9.49	3.11	10.95	11.44	7.40
		s. d.	7.55	10.53	5.49	9.82	9.03	6.83

TABLE 7
Means and Standard Deviations
Post-Test of Economic Knowledge and Application

Order	SES		Sixth Grade			Seventh Grade		
			Rural	Suburban	Urban	Rural	Suburban	Urban
Form E Pre-Test	High	n	37	35	29	36	20	29
		Mean	20.01	18.05	14.02	23.82	22.27	28.74
		s. d.	11.76	10.56	10.15	10.32	11.53	9.44
	Low	n	44	16	38	23	41	31
		Mean	15.82	9.77	4.48	17.78	18.44	13.66
		s. d.	11.25	10.92	8.31	12.34	11.33	8.81
Form F Pre-Test	High	n	33	34	33	43	17	31
		Mean	20.50	18.90	20.16	20.01	23.35	23.82
		s. d.	9.31	11.26	11.60	11.97	13.40	10.55
	Low	n	43	21	41	25	43	29
		Mean	15.68	15.56	7.25	19.00	15.23	12.06
		s. d.	9.63	14.35	7.48	13.93	9.96	10.54

CONCLUSION

Two questions were posed for investigation in this study. One was concerned with the amount of economic knowledge children living in different types of communities had already acquired. The second was concerned with the effectiveness of a classroom economics program on the children living in these communities. The two primary variables used in the analysis were:

- Location—Rural, Suburban, and Urban
- Socioeconomic Status—High and Low

Two additional variables were created by the method of investigation:

- Grade—Sixth and Seventh
- Order (of testing)—The crossover technique was used in which Forms E and F of the IRC test of economic knowledge and application were given as a pre-test. The alternate form was given as the post-test.

Analysis of the field test results produced the following findings in answer to the two questions posed when the study was undertaken.

Existing Amount of Economic Understanding

The pre-test scores were predicted from the Otis-Lennon scores. The analysis of covariance showed that:

- Location was not significant.
- SES level was not significant.
- Grade was significant.
  - Scores of sixth grade students were lower than predicted from Otis-Lennon scores.
  - Scores of seventh grade students were higher than predicted from Otis-Lennon scores.
- Order of testing is significant.
  - Students taking Form E pre-test of economic knowledge and application were lower than predicted.
  - Students taking Form F pre-test of economic knowledge and application were higher than predicted.

Influence of a Classroom Economics Program

The post-test scores were predicted from the Otis-Lennon scores and the pre-test scores. The analysis of covariance showed that:

- ▶ Location was significant.
  - ● Rural students were higher than predicted and significantly higher than both urban and suburban students.
  - ● Urban students were higher than predicted and significantly higher than suburban students.
  - ● Suburban students were lower than predicted.
- ▶ Socioeconomic status was not significant.
- ▶ Grade level was significant.
  - ● Sixth grade students were higher than predicted.
  - ● Seventh grade students were lower than predicted.
- ▶ Order of testing was not significant.

These findings in answer to the two questions posed for this study are based on the differences of observed scores from predicted scores. If we had looked at only the observed scores, we would have found that the gain between pre-test and post-test scores was significant for all locations, both SES levels, and both sixth and seventh grades. Even though seventh graders scored less than predicted, observed scores showed significant gain from pre-test to post-test.

This study was not designed to show that students acquire economic knowledge or that the program used in this study is effective. Everyone sooner or later acquires some information about economics—with or without a formal program. Previous studies on this and similar programs show that such programs are effective in a wide variety of situations. (8) Indeed, inspection of Tables 6 and 7 will show that in all cells there is an increase in mean score from pre-test to post-test. Most of these differences between pre and post are significant beyond the .001 level.

The depth or "correctness" of economic knowledge is quite varied in our society. In an increasingly complex world, it may become more and more costly to have a public whose economic knowledge is picked up "in the gutter." The results of this study suggest some possibilities for further investigation into the acquisition of economic knowledge by children. Such an investigation might benefit by using somewhat different dimensions than the socioeconomic

status used in this study. A different approach with stronger emphasis on social factors and less emphasis on economic factors would perhaps provide more useful findings on how children acquire economic knowledge. Acquisition of economic knowledge is probably affected more by shared value systems, attitudes of peers and parents and teachers, aspiration levels, or motivation for learning.

With a clearer understanding as to why sixth graders seem to get more out of the program than seventh graders and why rural students do better than expected than suburban students, the program writer, the curriculum developer, and the teacher would be in a better position to adjust the learning situation to the benefit of different types of students.

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