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ABSTRACT

The purpose of this study was to investigate the correlation between gain on the Stanford-Binet Intelligence Test (S-B) in compensatory prekindergarten programs, and scores on the New York State Pupil Evaluation Program (PEP), Reading Section, over three years later. Four hundred and five subjects showed a correlation of 0.42 for the pre-post S-B gain correlated with PEP, when corrected for regression, versus 0.13 for uncorrected S-B gain. Additional correlations were computed for restricted IQ ranges. This study lends support to compensatory education programs attempting to raise IQ's. [Not available in hard copy due to marginal legibility of original document.] (Author)

Compensatory Prekindergarteners' I.Q. Gain Correlated With Third Grade Reading Achievement

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Introduction

During the past few years, there has been a good deal of criticism leveled at compensatory prekindergarten programs that attempt to raise IQ (e.g. Ziegler). Much of this criticism suggests that these programs merely accelerate the normal developmental process, and that children not in this type of prekindergarten program quickly catch up. This is being popularly called the "fade-out phenomenon." Karnes (1968) reports that dramatic increases in academic programs had faded by the end of first grade.

Another contention is that there is little evidence to support the transfer of training for such mental processes as measured by IQ. This would then suggest that reported gains in IQ by these subjects is not correlated with later achievement as measured by a standardized achievement test. This does not mean to imply that gains reported by many Head Start programs were accurately reported. This actually is a mute point if there is no correlation between the two in the first place.

The purpose of this study is to investigate the relationship between gain (or change) scores on standardized intelligence tests, during prekindergarten compensatory education programs, and future performance on standardized achievement tests.

This study is important for at least two reasons. First, compensatory programs which use IQ gain as their

criteria for success are prevalent throughout the literature (DiLorenzo, Weikard, Gray and Klaus, Beriter and Engelmann, Miller, etc.).

Secondly, the methodology used for determining the gain scores used is one which the authors find seldom implemented in the literature. It takes into account regression which has often been a major contributor to the gain shown by subjects in compensatory programs (Jensen).

Review of the Literature

As is well known, many studies have been conducted which show a high correlation between IQ and Achievement (Lennon; Woodrow; Manolakes; George and Sheldon; Birch,L.G.). This of course is an important relationship which has been accepted by many coordinators of compensatory education programs (DiLorenzo, Weikart, Gray and Klaus, Bereiter and Engelmann, Alpern, Karnes, Kohlberg, Phillips, and Reidford). One of the objectives of their programs was to raise IQ. It was felt if this could be accomplished then this IQ gain would be positively correlated with a gain in later achievement. Much criticism has been leveled at this contention, for it has not been empirically demonstrated.

Subjects

The sample for this study was drawn from five geographic areas of New York State in which 1476 children participated

in a prekindergarten evaluation during 1965-66 or 1966-67 (Table I). Approximately 84% of these children were disadvantaged. The chief criterion for the identification of disadvantaged and nondisadvantaged children was the father's occupational rating on the Warner Scale. When there was no father in the home, the mother's occupation or the general economic status of the family was the index used. Children were screened by School district personnel, pretested with the individual Stanford-Binet Intelligence Scale and the Peabody Picture Vocabulary Test, and randomly assigned to experimental and control groups in each district (DiLorenzo, 1968). Over three years later, the students who remained in the state were given an achievement test, the New York State Pupil Evaluation Program (PEP). Reading scores on the PEP were the comparison criteria for S-B gains.

Table I

Population		
Subjects	Test	Date Administered
720	S-B (Pre-Test)	1965
	S-B (Post-Test)	1966
	PEP	1969
756	S-B (Pre-Test)	1966
	S-B (Post-Test)	1967
	PEP	1970

The sample consisted of the 405 subjects on which it was possible to find recorded scores on all three tests. 144 of the subjects were controls in the original study.

Methodology

Three of the major criticisms directed at the evaluation of compensatory education programs have been (1) the failure to include a control group, (2) the failure to take into account regression when computing gain scores, and (3) the lack of evidence showing a substantial relationship between gain and later achievement.

The procedures employed attack each of the above criticisms. First, the original sample was randomly selected from a general population of disadvantaged children, rather than the participants being selected on the basis of extreme scores. A control group, which did not attend the prekindergarten program, was randomly selected from the sample. (DiLorenzo, 1969)

The second criticism, involving the failure to account for regression in the computation of gain scores, has been put forward by many, including Jensen (1969) and several of the contributors to the Harris (1963) text. The procedure followed in this study has taken into account regression through the use of the following technique. (1) A coefficient of stability was obtained on the control group for the instrument on which the gain scores were to be computed; in this case the Stanford-Binet Intelligence Test (S-B). The obtained coefficient of stability was used as an estimate for the entire sample. (2) The sample mean for the pretest was then computed and each score subtracted from this mean. (3) This difference score was then multiplied by the coefficient of stability. (4) The product that was calcu-

lated was added to the pre-test score to produce an expected post-test score with regression taken into account. (5) The expected post-test score was then subtracted from the actual post-test score with the result being the corrected gain score. (6) Finally, the corrected gain scores were correlated with an independent measure; for this study, reading scores on the New York State Pupil Evaluation Program.

The third criticism, concerning the lack of empirical evidence showing a relationship between gain scores and later achievement, was attacked by comparing the correlation between absolute S-B gain (post-test minus pre-test) and later PEP scores with the correlation between corrected S-B gain and later PEP scores.

Results

The coefficient of stability for the pre and post S-B was .698 for the 144 controls.

The results of the correlations between absolute S-B gain with PEP and corrected S-B gain with PEP are shown in Table II.

Table II

Correlations between S-B Gain and PEP

Type of S-B Gain	Correlation	Number
Absolute gain	0.13	405
Corrected gain	0.42	405

It was also felt by the authors that it would be worthwhile looking at correlations within a series of smaller score ranges. The subjects were placed in cells based on

their pre Stanford-Binet score. It was decided to make each cell represent one half a standard deviation of the normal population. Each cell would then represent a rather homogeneous sample, the difference which would then be highlighted would be the gain which each individual within a cell would show. (Table III)

Table III

Matrix of Subdivided IQ Range Showing Number of S's within each cell

	IQ RANGE						
SUBJECTS	68-75	76-83	84-91	92-99	100-107	108-115	Total N
SUBJECTS	29	60	77	125	57	10	358**

The above cells were also subdivided into experimental and control. All of the cells showed a positive correlation between amount of gain and IQ except the lowest extreme, which is significantly different at the .01 level from all the other groups. The entire breakdown can be seen in Table IV.

**Any cell containing less than 10 S's was not considered meaningful and, therefore, a correlation was not computed.

Table IV

Matrix of Correlations Between S's Pre-test Stanford-Binet and Pupil Evaluation Program Score Subdivided by IQ Range, Experimental, Control, and Overall.

IQ Range	68-75	76-83	84-91	92-99	100-107	108-115
Experimental	.22 N=15	.49 N=39	.18 N=49	.29 N=87	.30 N=35	.06 N=31
Control	-.34 N=14	.60 N=21	.44 N=28	.24 N=38	.26 N=22	.02 N=21
Overall	-.08 N=29	.55 N=60	.29 N=77	.28 N=125	.39 N=57	.17 N=10

Conclusions

It is evident that the relationship between gains on standardized intelligence tests and later achievement tests is not apparent from an examination of the raw data. The effects of regression on any change score must be taken into account before any meaningful statements can be made concerning these scores. Once regression has been corrected within the gain scores, vastly different correlations appear between these gains and later achievement (0.42 vs. 0.13). If such correlations are consistently found to exist between gain score and later achievement, the argument that prekindergarten programs attempting to raise IQ's are not educationally sound, is not a valid one. The substantial correlations between gain scores and achievement give support for cognitive programs aimed at raising IQ's.

The importance of this study is not as a defense for educational programs designed to raise a child's IQ, but rather the fact that a correlation does exist between gain in IQ and later achievement test scores. For too long

educators have lived with the misrepresented knowledge that no such correlation exists.

Additional studies, using different achievement test measures and different intelligence tests on different populations, need to be undertaken. This study shows that such relationships do exist; the generalizability of these relationships is yet to be shown.

BIBLIOGRAPHY

1. Alpern, Gerald D. "The failure of a nursery school enrichment program for culturally disadvantaged children." Paper read at annual meeting of American Orthopsychiatric Association, San Francisco. 1966.

2. Bereiter, Carl, & Engelmann, Siegfried. Teaching disadvantaged children in the preschool. New Jersey: Engelwood Cliffs. Prentice-Hall. 1966.

3. Birch, L. G. "The Improvement of Reading Ability," British Journal of Educational Psychology, XX Part 2 (June, 1950), 73-76.

4. Diederick, Paul. "Pitfalls in the Measurement of Gains in Achievement." The School Review. February, 1956. 59-64.

5. DiLorenzo, Louis T. "Prekindergarten Programs for Educationally Disadvantaged Children." New York State Education Department. Albany, New York. December, 1969.

6. Gray, Susan W. & Klaus, Rupert A. Early training projects: interim report, November 1963. Murfreesboro City Schools and George Peabody College for Teachers. Nashville, Tenn.

7. _____. The early training project for disadvantaged children: a report after five years. George Peabody College for Teachers. Nashville, Tenn. September 1967.

8. _____. "An experimental preschool program for culturally deprived children." Project Report. George Peabody College. Nashville, Tenn. 1965.

9. Harris, Chester. (ed.) "Problems in Measuring Change." University of Wisconsin Press. 1963.

10. Jensen, Arthur R. "How much can we boost IQ and Academic Achievement." Harvard Education Review. 39: 1-123. Winter, 1969.

11. Karnes, Merle B. "A longitudinal study of disadvantaged children who participated in three different preschool programs." Institute for Research on Exceptional Children. Univ. of Illinois, Urbana, Ill. Unpublished report. 1968.