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TITLE Outcome Predictions Following Placement in a Learning Handicapped Resource Specialist Program.
PUB DATE 89
NOTE 17p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement; *Diagnostic Tests; Educational Diagnosis; Elementary Education; Instructional Effectiveness; *Learning Disabilities; *Norm Referenced Tests; *Outcomes of Education; *Predictive Validity; *Resource Room Programs
IDENTIFIERS Peabody Picture Vocabulary Test; Wechsler Intelligence Scale for Children (Revised); Wide Range Achievement Test

ABSTRACT

The study sought to determine if significant predictive relationships could be found between diagnostic psychological test data and the changes in academic achievement of learning handicapped children participating in a resource specialist program for one period per day. The 102 students, with a mean age of 9 years, were administered the Wide Range Achievement Test (WRAT) at the time of resource program placement and during April 1981, to obtain pre-scores and post-scores which were used to calculate a change score. Significant yearly increases in reading, spelling, and arithmetic grade levels were found. However, analyses of age-normed standard change scores showed significant increases in only the reading standard score, with actual decreases in spelling and arithmetic abilities. The search for significant predictors of academic improvement revealed the Peabody Picture Vocabulary Test was the best and often the only significant predictor of grade level and standardized WRAT change scores. Scores on the Wechsler Intelligence Scale for Children-Revised were not found to be consistently related to change data. (JDD)

Outcome Predictions Following Placement in a Learning Handicapped Resource Specialist Program

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1989

Running head: Outcome Predictions of a Learning Handicap Treatment

Abstract

The academic achievement change scores of 102 learning handicapped children receiving special education intervention for a single period per day in a resource specialist program were evaluated. It was predicted that significant increases in achievement would be present and modest but statistically significant yearly increases in reading, spelling, and arithmetic grade levels were found. However, the analyses of age normed standard change scores showed actual decreases in spelling and arithmetic abilities. The search for significant predictors of academic improvement revealed the Peabody Picture Vocabulary Test I.Q. score to be the best and often the only predictor of achievement change scores while WISC-R measures were not found to be consistently related to change data. Treatment and placement implications of these results are discussed.

Outcome Predictions Following Placement in a Learning Handicapped Resource Specialist Program

School districts are now required to remediate the educational deficits of children with learning handicaps in an environment that is "least restrictive." While considerable research regarding the diagnosis of children with learning problems has been undertaken (e.g. Adelman, 1978; Fuller & Goh, 1981), studies of the academic changes brought about by various special education intervention programs are few in spite of the fact that outcome data are more important than labeling issues per se. Thus, the present study was undertaken to determine if significant predictive relationships could be found between diagnostic psychological test data and the changes in academic achievement of learning handicapped children participating in the most commonly used and the least restrictive special education intervention program, i.e. the resource specialist program (RSP) which consists of individualized instruction with a certified special education teacher for one period per day (usually 45 minutes); otherwise, the children receiving this service participate fully in the regular school program at the building level. Specifically, two hypotheses were tested: (a) significant increases in educational achievement scores for children involved in the RSP would be found and (b) a significant predictive relationship between diagnostic psychological variables and academic achievement change scores would be present.

Method

Subjects

The sample consisted of 102 children (69 males and 33 females) from a Northern California suburban community who had been placed in a building level resource specialist program based on the guidelines given in the California State Department of Education Eligibility Criteria for Special Education Services (1978). This placement was made by a multi-disciplinary School Appraisal Team which included a school psychologist, special education teacher, counselor, classroom teacher and principal, district director of pupil personnel services and usually the child's parents; on occasion, other related professional were also included in the Evaluation and Planning meeting when appropriate. The present sample was 87% caucasian, the mean age at the time of initial learning handicap diagnosis was 9.41 years and 5.46 months. All subjects received individualized instruction from a certified special education teacher from 45 to 60 minutes per day, otherwise these children participated in the regular classroom program at the building level. None had learning problems due to serious emotional illness, blindness, deafness, mental retardation, or physical handicap. I.Q. data for the sample are given in Table 1.

Insert Table 1 about here

Test Materials and Procedure

Diagnostic psychoeducation tests utilized in the present study were the Wechsler Intelligence Scale for Children - Revised (WISC-R) (Wechsler, 1974), the Wide Range Achievement Test (WRAT) (Jastak & Jastak, 1978) and the Peabody Picture Vocabulary Test (PPVT). These measures were among the data obtained on each child prior to the Evaluation and Planning meeting where diagnosis and special education placement were made. The children in the present investigation were diagnosed as learning handicapped by the multidisciplinary School Appraisal Team and placed in the RSP at the building level, i.e. they received individualized instruction at their regular school for one period per day. Nine district RSP's were studied. All subjects had participated in the RSP for at least one year (M = 2.8 years, SD = 1.5 years). At the end of each year of specialized educational service, the school psychologist routinely assessed each child's progress using a variety of tests including the WRAT. Thus, academic achievement change scores were obtained by subtracting the WRAT standard and grade level scores at the time of placement in the RSP (prescores) from the WRAT scores obtained during the month of April, 1981 (postscores); an average change score per year in the special education program was then obtained by dividing the difference between the postscore minus the prescore by the time, in years, the child had been receiving RSP educational services. The following variables were utilized in data analyses: pretreatment WRAT grade level

and standard scores for the Reading Recognition, Spelling and Arithmetic subtests, WRAT posttest and change scores (per year) on the forementioned subtests; age; sex; time in special education program; WISC-R Full Scale I.Q., Verbal I.Q., Performance I.Q., and the scaled scores of Information, Comprehension, Arithmetic, Similarities, Vocabulary, Picture Completion, Picture Arrangement, Block Design, Object Assembly, and Coding subtests; and finally, the Peabody Picture Vocabulary I.Q. score.

Results

Academic Achievement Change Data

Inspection of Table 1 shows that the learning handicapped children participating in the present RSP's obtained significant increases in grade levels for all basic academic skills. However, this overall improvement does not hold when aged normed standard scores are used as the measure of academic change. Here, only the Reading standard score showed a significant increase while the Spelling and Arithmetic standard scores actually decreased per year in the special education program. Thus, when learning handicapped children are compared to their peers, even with special education intervention, their spelling and quantitative skills are slowly falling behind aged normed expected levels of achievement.

Insert Table 2 about here

Predictors of Academic Improvement

Psychodiagnostic test data and demographic variables were entered as independent variables in stepwise multiple regression analyses (Nie, Hull, Jenkins, Steinbrenner & Bent, 1975, chap. 20) with the WRAT change scores as the dependent variables. Results of these multiple regression analyses are given in Tables 3 and 4.

Insert Tables 3 and 4 about here

Surprisingly, the Peabody Picture Vocabulary I.Q. score was the best and often the only significant predictor of grade level and standardized WRAT Reading, Spelling, and Arithmetic change scores.

Discussion

With respect to the hypotheses tested, it was first found that the learning handicapped children participating in the resource specialist special education intervention programs were making significant gains in reading, spelling, and arithmetic grade levels; however, when aged normed standard scores were studied, only reading skills showed a significant increase while spelling and arithmetic abilities were actually decreasing yearly. Second, the efficacy of the Peabody Picture Vocabulary Test as the best and often the only significant predictor of academic change was also demonstrated.

While grade level improvements were statistically significant, the amount of change achieved by the learning handicapped children in the

present study was less than one grade level per year. Abidin & Seltzer (1981) have also reported less than one grade level per year improvement for children participating in similar resource specialist programs and Ritter (1978) as well as Rust, Miller, and Wilson (1978) found equivalent grade level changes for children receiving this method of special education intervention; however, these researchers also found that such changes were not statistically different from those obtained by learning handicapped children who were placed solely in regular school programs. Finally, Abidin & Seltzer (1981) have shown that when learning handicapped children who had been obtaining less than one year's growth in basic academic skills were placed in residential day schools where the teacher to pupil ratio was approximately 1 to 2.5, such children subsequently showed average yearly academic growth rates of 1.19 grade levels. Thus, the modest gains obtained by the learning handicapped children in the present study are consistent with other recent research and naturally bring into question the overall efficacy of a resource specialist approach. Perhaps it will take very intensive intervention away from the regular school environment for learning handicapped children to overcome their learning deficits. It is possible that the current rush to mainstream handicapped children was based more on the "fantasies" of well meaning law-makers rather than objective research data. Yet, how could school districts ever hope to fund residential or self-contained classrooms to assist the large number of children with learning handicaps? Whatever the

answer to this economic consideration, the present emphasis on "mainstreaming" and "least restrictive environments" appears to be premature and needs much more research before it is accepted as an effective approach to the remediation of learning handicaps.

The second finding of the present study showed the Peabody Picture Vocabulary Test to be significantly correlated with academic achievement change scores. The fact that only the PPVT I.Q. scores enabled the significant prediction of reading, spelling, and arithmetic change was surprising and suggests that receptive language ability is one key to the successful remediation of serious learning problems. If cross-validation studies continue to support the significant relationships between PPVT (now revised) and the improvement of basic reading, spelling, and arithmetic skills, then new special education teaching methods and placement procedures for learning handicapped children with differing levels of receptive language facility could be developed. For example, future research centering on the learning differences between children with below average, average, and above average PPVT I.Q. scores should be undertaken. Continued investigations of word-image association methods and neurophysiology may prove very important to the understanding of the specific developmental disabilities.

The lack of any consistent relationship between academic achievement change data and any of the WISC-R measures was also quite notable. The few modest increases in the multiple correlation coefficients contributed

by WISC-R measures could well be due to chance given the large number of WISC-R variables and the six different multiple regression analyses performed. The relationship between the WRAT Spelling standard change scores and Block Design and Object Assembly data does make sense, however, in that spelling ability does require one to assemble small parts into a meaningful whole. Yet, why the WISC-R data was such a poor over-all predictor of academic improvement remains puzzling and further research concerning the predictive ability of the WISC-R should be initiated.

Finally, a word of caution should be made regarding the problem of performing quantitative operations on WRAT grade level data. While these scores do not fulfill the technical requirements for interval or ratio measurement, they do approach what Coombs (1953) has called "ordered--metric" scales and can, therefore, be used in statistical analyses. The fact that grade levels are routinely reported in the psychoeducational literature supports this contention; furthermore, since grade level data in the present investigation gave a different perspective on academic change that did only the age normed standard scores, their inclusion in this report seems warranted. However, some interpretative caution regarding grade level data is appropriate.

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Table 1

I.Q. Data for all Subjects (n = 102)

Variable	M	SD
PPVT I.Q.[a]	100.43	13.09
WISC-R		
Full Scale I.Q.	92.81	9.01
Verbal I.Q.	91.88	9.95
Performance I.Q.	95.32	10.88
Information[b]	7.72	2.47
Similarities	9.17	2.58
Arithmetic	7.78	2.01
Vocabulary	8.98	2.55
Comprehension	9.65	2.50
Picture Completion	9.51	2.43
Picture Arrangement	10.12	2.61
Block Design	8.86	2.44
Object Assembly	9.95	2.42
Coding	8.11	2.58

[a]PPVT I.Q. = Peabody Picture Vocabulary Test I.Q. score.

[b]All WISC-R subtests are in scaled score form.

Table 2

Wide Range Achievement Test Data for all Subjects (n = 102)

WRAT Variables[c]	Prescores M	Prescores SD	Postscores M	Postscores SD	Change per year[a] M	Change per year[a] SD	t[b]
Reading							
GL	2.39	1.28	4.72	1.20	0.89	0.63	18.25***
SS	83.35	8.98	88.23	8.63	1.57	5.93	3.11**
Spelling							
GL	2.32	0.98	3.82	0.92	0.56	0.51	13.81***
SS	85.81	8.85	81.25	9.96	-1.12	5.65	-4.07***
Arithmetic							
GL	2.62	1.13	4.04	0.96	0.55	0.48	12.17***
SS	89.06	9.26	82.92	9.95	-1.83	5.66	-5.88***

[a]Postscore minus prescore divided by number of years in special education program.

[b]t-test for correlated measures; df = 101.

[c]GL = grade level.

SS = standard score.

**$p < .01$

***$p < .001$

Table 3

Significant Predictors of WRAT Grade Level Change Scores for all Subjects (n = 102)

Variable Entered	F to Enter	Multiple R	Overall F
Reading			
PPVT I.Q.	11.63***	.33	11.63***
WISC-R Arithmetic	3.89*	.37	7.92**
Spelling			
PPVT I.Q.	10.05**	.31	10.05**
Arithmetic			
PPVT I.Q.	8.15**	.28	8.15**

* $p < .05$

** $p < .01$

*** $p < .001$

Table 4

Significant Predictors of WRAT Standard Change Scores for all Subjects (n = 102)

Variable Entered	F to Enter	Multiple R	Overall F
	Reading		
PPVT I.Q.	17.54***	.39	17.54***
	Spelling		
PPVT I.Q.	11.59***	.33	11.59***
WISC-R Similarities	5.27*	.38	8.68**
WISC-R Block Design	5.12*	.43	7.73**
WISC-R Object Assembly	5.06*	.4[illegible]	7.40**
	Arithmetic		
PPVT I.Q.	11.81***	.34	11.81***

* $p < .05$

** $p < .01$

*** $p < .001$