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ABSTRACT

Compared were the characteristics of 60 learning disabled (LD) and 60 normal children (all between 8- and 11-years-old) participating in the Georgia Reading Research Program. The target group consisted of LD children who showed deficits in the psychological process of ordering/sequencing; while the LD reference group were average or above average in ordering/sequencing abilities. Instruments used to assess these deficits were the Wechsler Intelligence Scale for Children Sequencing Triad and the Wide Range Achievement Spelling Test. Other differences between the two groups were that the target group had instructional reading levels one or more years below their expected grade placement levels and were enrolled in special classes; while the LD reference children were enrolled in regular classes and were reading within six months of expected grade level. The program was to focus on an evaluation of specific curriculum treatments designed to facilitate reading achievement. (Author/DB)

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The Target Groups: Description of Learning Disabled and Normal Subjects Participating in Prototype Evaluation Studies[1]

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The decade of the sixties firmly established the identification of a population of children within schools who fail to learn at expected rates consistent with predicted learning as a function of intelligence. Such school children have been labeled under a number of names but are generally classified as learning disabled. A chance to define the learning disabled as a single entity had early emphasized that there is no single identifying characteristic. The delineation of specific syndromes within this larger population is just beginning to emerge (Bannatyne, 1971; Boder, 1971; Doehring, 1968). The U. S. Office of Education in 1968 recognized learning disability children as a category of exceptionality. The USOE definition generally defined such children as those who "are not accummulating academic gains at the rate expected on the basis of their chronological age, mental age, and educational exposure."

The overall goal of the University of Georgia Research Program on Special Reading Instructional Procedures for Mentally Retarded and Learning Disabled Children initially set out in the academic year 1971-72 to identify subsets of mentally retarded and learning disabled children who were compared with normal children for examination of interaction effects between instructional methodology and learning and language characteristics. During the initial year a number of test instruments were chosen to define a subset of learning disabled children. The subset of interest was a sample of LD children who exhibit ordering/sequencing difficulties. Several anticipated areas of deficits were examined, utilizing auditory discrimination measures, a test of perceptual speed, word associative instruments, and more typical

general informal and formal reading assessment scores. Preliminary pilot studies suggested that several of the test instruments, particularly auditory discrimination, word association, and others, appeared to be potentially useful in terms of separating normal and learning disabled children. The full scale study, however, using a larger number of Ss, failed to support these premises. The normal and learning disabled children overlapped significantly on a number of these early measures. The general concept of sequencing deficit, however, remained viable as a significant identification characteristic deficit in learning disabled children. The assumption that sequencing difficulties and/or inefficient ordering processes may be a basis for learning disabilities has support in a number of papers published by researchers working with such children (Oehring, 1968; Campbell, 1974; Kinsbourne & Warrington, 1963; Monroe, 1932; Silver & Hagin, 1967).

All children participating in the study were, as a matter to identify intelligence level, administered the Wechsler Intelligence Scale for Children. Three subtests seemed particularly susceptible to sequencing deficits. These subtests are Digit Span, Picture Arrangement and the Coding subtests. Scaled scores of 10 or composite scores of 30 would be average. Learning disabled children with total summed scaled scores on these three subtests of less than 29 were contrasted with normal children whose summed scaled scores on these three sequencing subtests were greater than 29.

All learning disabled subjects participating in evaluation studies were enrolled in special classes. They were reading one or more years below their expected grade placement as measured by the informal reading inventory and in addition, were below average in the basic psychological processes of sequencing as measured by the WISC sequencing Triad: Digit Span, Picture Arrangement, and coding subtests.

Subjects were drawn from five school systems in Northeast Georgia (Barrow County, DeKalb County, Madison County, Oconee County, and Oglethorpe County) and from one school system in Northeast Florida, Duvall County. These counties would represent both rural and urban populations. Subjects were enrolled in regular or special classes in twenty-six different schools.

The Learning disabled reference subjects were enrolled in regular classes and were reading within six months of their actual grade placement as measured by the informal reading inventory and were considered average or above average in psychological processing or sequencing measured by the WISC sequencing triad.

Sixty LD and 60 LD-reference children were selected for comparison. The hundred and twenty subjects were randomly divided within their categories to two equal sets. Each set was further divided into equal treatment groups. The means and standard deviations of the sets and treatment groups for IQ, CA, IRI, and WISC triad are shown in Tables 1 and 2.

Insert Tables 1 and 2 about here

The design of the project study required that certain relationships between subject variables had to exist. The requirements were:

1. Equivalent on CA and IA.
2. Different on IRI (normal greater than LD)
3. Different on WISC sequencing triad (normal greater than LD)

Analysis of variance were used to obtain the evidence of all cells meeting these requirements. These analyses as shown in Table 3. The design requirements were met for all subject variables.

Insert Table 3 about here

For several reasons (absence, illnesses, etc.) the number of subjects

participating in the various evaluation studies will be found to vary. In all studies, however, at least twelve of the fifteen subjects identified for each cell participated in the evaluation studies.

The general overview of research generated during the second year of the Georgia Reading Project focuses on the evaluation of specific curriculum treatments designed to facilitate reading achievement in matched samples of normal and learning disabled children. Criteria for subject selection are listed in Table 4. The first step in selecting all subjects who participated in this study was to inspect school records for intelligence test scores, reading achievement test scores, teacher comments, health records, sensory and emotional problems, etc. Teacher recommendations were obtained to get an overview and descriptive parameters for all children.

Insert Table 4 about here

The next step was the assessment of intelligence levels and reading achievement. The Wechsler Intelligence Scale for Children was administered to the learning disabled and LD-reference subjects. Level of general reading achievement on all subjects was assessed with the informal reading inventory. Learning disabled and LD-reference subjects were also administered the Wide Range Achievement Spelling subtest.

Every effort was made to insure that LD and LD-reference children were homogeneous in terms of intelligence (range 90 to 110), in chronological age, (8 years to 11 years), were significantly different in terms of reading level with learning disabled subjects one or more years below expected grade placement and normal subjects within six months of expected grade placement. On the WISC sequencing triad, learning disabled subjects had cumulative scores less than 29. Normal subjects all had cumulative scores greater than 29.

This subset of learning disabled children is not presumed to reflect all the characteristics of children who may be diagnosed as disabled. On the contrary, the present study was a very careful attempt to identify a type of learning disability, namely, processing difficulties with deficits in the ordering process, so as to more effectively examine the learning characteristics and/or effectiveness of specific instructional procedures in teaching various targeted reading skills.

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TABLE 1

SET[a] AND TREATMENT[b] GROUP MEANS AND STANDARD DEVIATIONS

OF IQ, CA, RIL, AND WISC TRIAD:

LD AND LD-REFERENCE GROUPS

	IQ		CA (in Months)		RIL[c]		WISC Triad	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Set 1	99.73	4.77	112.73	9.21	3.72(2^2)	1.42	29.22	3.20
Treatment 1	100.10	4.98	112.35	10.50	3.77(2^2)	1.49	29.10	2.64
Treatment 2	99.37	4.57	113.10	7.92	3.67(2^2)	1.35	29.33	3.77
Set 2	98.93	6.48	113.15	9.39	4.22(2^2)	1.74	29.94	3.19
Treatment 1	98.80	6.15	113.73	10.57	4.30(2^2)	1.66	29.90	3.73
Treatment 2	99.07	6.81	112.56	8.20	4.14(2^2)	1.81	29.73	2.65

[a] N per Set = 60; [b] N per Treatment = 30; [c] Means Expressed as Converted Scores and Reading Instructional Levels (in parentheses)

TABLE 2

MEANS AND STANDARD DEVIATIONS OF SUBJECT VARIABLES BY CELLS[a] AND GROUPS[b]: LEARNING DISABLED AND LD-REFERENCE SUBJECTS

Group	Cell	IQ $\bar{X}$	IQ SD	CA $\bar{X}$	CA SD	RIL[c] $\bar{X}$	RIL[c] SD	WISC Triad $\bar{X}$	WISC Triad SD
Learning Disabled	S1T1	98.13	5.34	112.73	11.39	2.27(2^1)	1.75	25.27	2.31
	S1T2	98.53	3.93	114.07	8.33	2.00(2^1)	1.20	25.13	3.58
	S2T1	98.67	5.68	114.67	11.05	2.87(2^1)	1.73	26.40	3.74
	S2T2	98.20	7.40	113.40	8.53	2.80(2^1)	2.15	26.33	2.02
Normal	S1T1	102.07	4.62	112.00	9.61	5.27(3^1)	1.22	32.93	2.96
	S1T2	100.20	5.21	112.13	7.51	5.33(3^1)	1.50	33.53	3.96
	S2T1	98.93	6.22	112.80	10.10	5.73(3^2)	1.58	33.40	3.72
	S2T2	99.93	6.22	111.73	7.88	5.47(3^2)	1.46	33.13	3.27

[a] $\underline{N}$ per Cell = 15; [b] $\underline{N}$ per Group = 60; [c] Means Expressed in Converted Scores and Reading Instructional Levels (in parentheses).

TABLE 3

LEARNING DISABLED AND LD-REFERENCE GROUPS:

ANALYSES OF VARIANCE FOR CA, IQ, RIL, AND WISC TRIAD

Source of Variation	df	Mean Square			
		CA	IQ	RIL	WISC Triad
Groups	1	72.08	108.30	264.03***	1672.53***
Treatments	1	1.41	1.63	.53	.03
Sets	1	5.21	19.20	7.50	10.80
G x Tr	1	1.88	1.20	.03	.53
G x S	1	1.41	24.30	1.20	9.63
S x Tr	1	27.07	7.50	.03	1.20
G x S x Tr	1	3.68	26.13	.53	1.63
Error	112	88.18	32.74	2.55	10.66

***p of $F < .001$.

TABLE 4

CRITERIA FOR SUBJECT SELECTION: LD AND LD-REFERENCE GROUPS

	Criteria			
	IQ Range	CA Range	Reading Instructional Level Range (RIL)	WISC Seq. Triad
Learning Disabled	90-110	8-0 to 11-0	$0\text{-}3^{1}$ (one year or more below expected grade placement	≤ 29
Normal	90-110	8-0 to 11-0	$2^{1}\text{-}5^{1}$ (within 6 months of expected grade placement	≥ 29