DOCUMENT RESUME

ED 051 253 24 TE 499 830

AUTHOR Rosner, Jerome; Simon, Dorothea P.
TITLE The Auditory Analysis Test: An Initial Report.
INSTITUTION Pittsburgh Univ., Pa. Learning Research and Development Center.
BUREAU NO BR-5-0253
PUB DATE 70
NOTE 25p.

EDRS PRICE EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS Auditory Perception, *Auditory Tests, Correlation, *Elementary School Students, *Item Analysis, *Kindergarten Children, *Test Results, Test Validity
IDENTIFIERS *Auditory Analysis Test

ABSTRACT

A new test for auditory perception (Auditory Analysis Test) was given to 284 kindergarten through grade 6 children. The instrument, consisting of 40 items, asks the testee to repeat a spoken word, then to repeat it again without certain specified phonemic elements--such as a beginning, ending or medially-positioned sound. Seven categories of item difficulty were proposed. Test results varied, both within and between class groups. Performance tended to improve with age and grade placement. Pearson Product Moment Correlations of individual AAT scores with Stanford Achievement Test reading scores yielded significant relationships ($p < .01$) ranging from .53 (grade 1) to .84 (grade 3). Analysis of errors supported the validity of test item difficulty and provided direction for the design of a treatment approach to auditory perceptual dysfunction. (Author)

UNIVERSITY OF PITTSBURGH - LEARNING R & D CENTER

1971/3

THE AUDITORY ANALYSIS TEST: AN INITIAL REPORT

JEROME RO' NER AND DOROTHEA P. SIMON

THE AUDITORY ANALYSIS TEST: AN INITIAL REPORT

Jerome Rosner

and

Dorothea P. Simon

Learning Research and Development Center
University of Pittsburgh

1970

The research reported herein was supported by the Learning Research and Development Center supported in part as a research and development center by funds from the United States Office of Education, Department of Health, Education, and Welfare. The opinions expressed in this publication do not necessarily reflect the position or policy of the Office of Education and no official endorsement should be inferred.

ABSTRACT

A new test for auditory perception (Auditory Analysis Test) was given to 284 kindergarten through grade 6 children. The instrument, consisting of 40 items, asks the testee to repeat a spoken word, then to repeat it again without certain specified phonemic elements--such as a beginning, ending or medially-positioned consonant sound. Seven categories of item difficulty were proposed.

Test results varied, both within and between class groups. Performance tended to improve with age and grade placement. Pearson Product Moment Correlations of individual AAT scores with Stanford Achievement Test reading scores yielded significant relationships ($p < .01$) ranging from .53 (grade 1) to .84 (grade 3). Analysis of errors supported the validity of test item difficulty and provided direction for the design of a treatment approach to auditory perceptual dysfunction.

The Auditory Analysis Test: An Initial Report

Jerome Rosner
University of Pittsburgh

Dorothea P. Simon
University of Pittsburgh

The ability to differentiate the sounds of the language, both in listening and speaking, has long been recognized as an important factor in learning to read. The literature concerned with the teaching of reading has repeatedly acknowledged the importance of auditory perception (Evans, 1969; Dykstra, 1968; Smith, 1968), but offered little in the way of operational definitions except in such general terms as "listening skills." Published instruments for testing auditory perception are primarily concerned with hearing acuity or, at best, discrimination skills (Wepman, 1958; Murphy and Durrell, 1949; STAP, 1969). Some provide data supporting test validity for predicting reading performance. These tests, however, usually require responses that are limited to "yes-no," "same-different," or the like. Such responses provide a minimum of information concerning the processes used to produce the assessed behaviors. Many pre-reading auditory training programs have been developed that provide the child with discrimination tasks that are similar, though not identical, to the test items -apparently with the anticipation that whatever basic behaviors are required for competent auditory discrimination will be realized through repeated practice and generalized to other situations such as reading class.

Few tests have been constructed that attempt to analyze the processes that contribute to auditory perception as related to reading.

One exception, a phoneme blending test by Chall (Chall, 1963), does require behaviors more complex than "same-different" discrimination responses. She relates her instrument to certain reading skills and has provided validation of some significance in a longitudinal study with a small group of children.

The auditory-motor component of the LRDC Perceptual Skills Curriculum (Rosner, 1969) is based on the rationale that the child's ability to differentiate the phonemic elements of the spoken language develops as the result of feedback loops between his production and hearing of vocal sounds. As the child accumulates experiences, both his hearing and his vocal control gain in the direction of increased capacities for discrete functioning. The ability to sort out the perceptual elements of verbal acoustic information seems vital to the subsequent skill of reliably ordering these elements into the symbolic constructs--words--of the culture. As the capacity to sort, order and synthesize sounds is acquired, refined and performed more efficiently, the task of reliably relating phoneme and grapheme, as required in learning to read and spell, becomes manageable. The goals, then, of the auditory-motor curricular component are to insure that each child acquires the skills needed for competent analysis and synthesis of the phonemes presented in a beginning reading program, and that his repertoire continues to expand as he progresses through that program.

The development of valid and reliable criterion-referenced curriculum tests for these behaviors has been one of our major objectives. During the past two years, we examined a number of standardized instruments,

including the Rosner Perceptual Survey (Rosner, Richman, and Scott, 1969) which contains two subtests designed to sample auditory perceptual skills. One is an abbreviated version of the Slingerland Echolalia test (Slingerland, 1962). In the other, the child is asked to reproduce rhythmic clapping patterns (Rosner, 1966). Data were gathered on these two tests and additional data on two types of discrimination tests that required that the child recognize the presence or absence of an embedded sound in the context of a word. Both nonsense and common English words were used.

The outcomes of these investigations made apparent the requirements for the kind of instrument we were seeking, i.e., one that tests for phonic analysis and synthesis behaviors, and requires encoding responses more complex than "yes-no" discriminations. This paper reports a test that seems to meet both criteria--the child is asked to remember and analyze spoken sounds and to demonstrate these abilities in his oral response. Descriptions of the test and method of administration are presented below.

The questions asked by this study were: (1) Do the test results indicate a range of individual competencies in the behaviors we have defined as auditory perception; that is, do the children display variations in their ability to replicate spoken sounds, eliminating certain specified phonemic components in their responses? (2) To what extent do individual test results correlate with measures of reading performance at different grade levels? (3) If measures correlate with reading, then what data are provided by item analyses with respect to the design of training programs to teach competent auditory perceptual skills? (4) What are the implications of these test results to developers of reading curricula?

Subjects

The subjects were all of the available children (N = 284) in grades K through 6 enrolled in a suburban elementary school situated in Western Pennsylvania. The school population is entirely white and middle class. This school has participated in many research projects: the subjects are accustomed to testing in many areas. They were uniformly cooperative and, above the kindergarten level, had no difficulty in understanding the test. Table 1 describes the school population.

Table 1

Characteristics of Experimental School Population by Grade

Grade	N	Chronological Age Mean (months)	S.D. (months)	I.Q.* Mean	S.D.
K	50	70	3.5	112	14.4
1	53	83	3.2	114	14.2
2	41	93	3.2	108	18.1
3	37	106	4.5	109	16.9
4	29	119	3.7	110	12.2
5	35	130	3.7	106	13.6
6	39	143	5.0	105	15.5

* Otis-Lennon Mental Abilities Test

Procedures

The Auditory Analysis Test (AAT), reproduced as Table 2, consists of 40 English words varying in length from one to four syllables.

Table 2

Auditory Analysis Test

Name _____ Date _____

School _____ Grade _____ Teacher _____

Birthdate _____

A. cow(boy)			
B. (tooth)brush			
1. birth(day)		21. (sh)rug	
2. (car)pet		22. g(l)ow	
3. bel(t)		23. cr(e)ate	
4. (m)an		24. (st)rain	
5. (b)lock		25. s(m)ell	
6. to(ne)		26. Es(ki)mo	
7. (s)our		27. de(s)k	
8. (p)ray		28. Ger(ma)ny	
9. stea(k)		29. st(r)eam	
10. (l)end		30. auto(mo)bile	
11. (s)mile		31. re(pro)duce	
12. plea(se)		32. s(m)ack	
13. (g)ate		33. phi(lo)sophy	
14. (c)lip		34. s(k)in	
15. ti(me)		35. lo(ca)tion	
16. (sc)old		36. cont(in)ent	
17. (b)reak		37. s(w)ing	
18. ro(de)		38. car(pen)ter	
19. (w)ill		39. c(l)utter	
20. (t)rail		40. off(er)ing	

These are pronounced singly by the examiner who instructs the child to repeat the word, then to repeat it again but to omit a specified sound. With three exceptions the words were selected on the basis that the elimination of a phoneme, phoneme cluster, or syllable would result in another English word when pronounced. (Since this is an oral test, we were not concerned with consistency of spoken sound to spelling.) The sounds to be eliminated, as indicated by parentheses on the test record sheet, include 13 different consonants, one consonant digraph, two consonant blends, and 12 syllables.

Seven task categories were designated:

I. Omission of the final syllable of a two-syllable word.

II. Omission of the initial syllable of a two-syllable word.

III. Omission of the final consonant of a one-syllable word.

IV. Omission of the initial consonant of a one-syllable word.

V. Omission of the first consonant of a consonant blend.

VI. Omission of a medial consonant.

VII. Omission of a medial syllable.

Their arrangement, as shown above, reflects our predictions of rank order of difficulty, starting with the task we assumed to be least demanding. Based on that order, the test was constructed with the five easier types in the first half and the two harder types in the second half. Table 3 lists the words by type.

Table 3

AAT Words Arranged as to Type
in Predicted Order of Difficulty

Type	Item #	Word	Type	Item #	Word
I	1.	birth(day)	II	2.	(car)pet
III	3.	bel(t)	IV	4.	(m)an
	6.	to(ne)		7.	(s)our
	9.	stea(k)		10.	(l)end
	12.	plea(se)		13.	(g)ate
	15.	ti(me)		16.	(sc)old
	18.	ro(de)		19.	(w)ill
V	5.	(b)lock	VI	22.	g(l)ow
	8.	(p)ray		25.	s(m)ell
	11.	(s)mile		27.	de(s)k
	14.	(c)lip		29.	st(r)eam
	17.	(b)reak		32.	s(m)ack
	20.	(t)rail		34.	s(k)in
	21.	(sh)rug		37.	s(w)ing
	24.	(st)rain		39.	c(l)utter
VII	23.	cr(e)ate		33.	phi(lo)sophy
	26.	Es(ki)mo		35.	lo(ca)tion
	28.	Gar(ma)ny		36.	cont(in)ent
	30.	auto(mo)bile		38.	car(pen)ter
	31.	re(pro)duce		40.	off(er)ing

The test items were arranged so that four consecutive errors in the first half of the test meant a failure to respond correctly to at least three different types of words. Four consecutive errors in the second half of the test meant failure with at least two different types of words. By ordering the items in this fashion we sought to avoid collecting distorted data in the event that we had incorrectly judged the relative difficulty of the seven types of words. In addition, this ordering scheme asked for a different behavior for each item; we thus hoped to avoid unreliable data due to a response set or to learning accrued on previous items.

The tests were administered individually. To explain the test, E first showed S the top half of a sheet of 8 1/2 x 11 paper on which pictures of a cow and a boy's head had been drawn side by side and asked him to "Say cow-boy." After S's response, E covered the picture of the boy and said, "Now say it again, but without boy." If the response was correct, ("cow"), the bottom half of the sheet was exposed, showing drawings of a tooth and a brush. S was asked to "say toothbrush," and after response, "Say it again, but without tooth." If S failed either demonstration item, an attempt was made to teach the task by repeating the demonstration procedures with the pictures. If S again failed to make correct responses to both items, testing was discontinued and a score of zero (0) was recorded. If both responses were correct, the picture sheet was withdrawn and E proceeded with the test. E said, "Say birthday," waited for response, then, "Now say it again, but without the day," and so on down the list. E always pronounced the specific sound(s)

(not the letter name) to be omitted. If S had a speech articulation problem, it was noted by E when S first repeated the full test word and was taken into consideration when assessing the accuracy of the response in which a portion of the word was omitted. If S failed to respond to an item, it was repeated exactly as it had first been stated. If S again did not respond, an item score of zero (0) was recorded and the next item was presented. Testing was discontinued after four consecutive errors.

The test score indicates the total number of correct responses. Hence, the range of possible scores extends from 0 to 40. Three examiners conducted the testing on different children in grades K through 2. All children in grades 3 through 6 were tested by the same person.

Test Results

Nine of the 50 kindergarten children did not understand the task, i.e., they did not pass the demonstration items, and they were given scores of zero. All of the other children passed the demonstration items (indicating that they were offered at least four items). Only 18.8 percent of the first grade children responded accurately enough to be offered all 40 test items, whereas 79.5 percent of the 6th grade remained in the test through all of the items. Table 4 lists the percentage of each class that had not yet been eliminated from the test (four consecutive errors) at the 10th, 20th, 30th and 40th item point. A gap between kindergarten and grade 1 is clearly indicated. The other interclass differences anticipate the changes in the mean scores of the groups as age and grade placement moves upward.

Table 4

Percent of Class Remaining in Test at the 10th, 20th, 30th, and 40th Item Level

Item #	K	1	2	3	4	5	6
10	34.0	94.3	95.1	100.0	100.0	100.0	100.0
20	12.0	90.5	90.2	97.3	100.0	100.0	100.0
30	2.0	41.5	36.6	[illegible].6	72.4	77.1	84.6
40	0.0	18.8	34.1	56.8	55.2	71.4	79.5

Table 5 summarizes the test scores for the seven grade levels. From K upward, the mean scores increased progressively, with the major change occurring between K and grade 1. The distribution of scores within and between classes is graphed with relative cumulative frequency ogives in Figure 1. Again, the marked difference between K and

Table 5

Auditory Analysis Test Mean Scores by Grade

Grade	N	Mean	S.D.	Median	Range
K	50	3.5	3.5	3.1	0-14
1	53	17.6	8.4	17.6	2-35
2	41	19.9	9.3	17.6	1-36
3	37	25.1	8.5	25.5	6-37
4	29	25.7	7.9	28.7	9-35
5	35	28.1	7.6	30.8	11-38
6	39	29.9	6.9	32.3	15-38

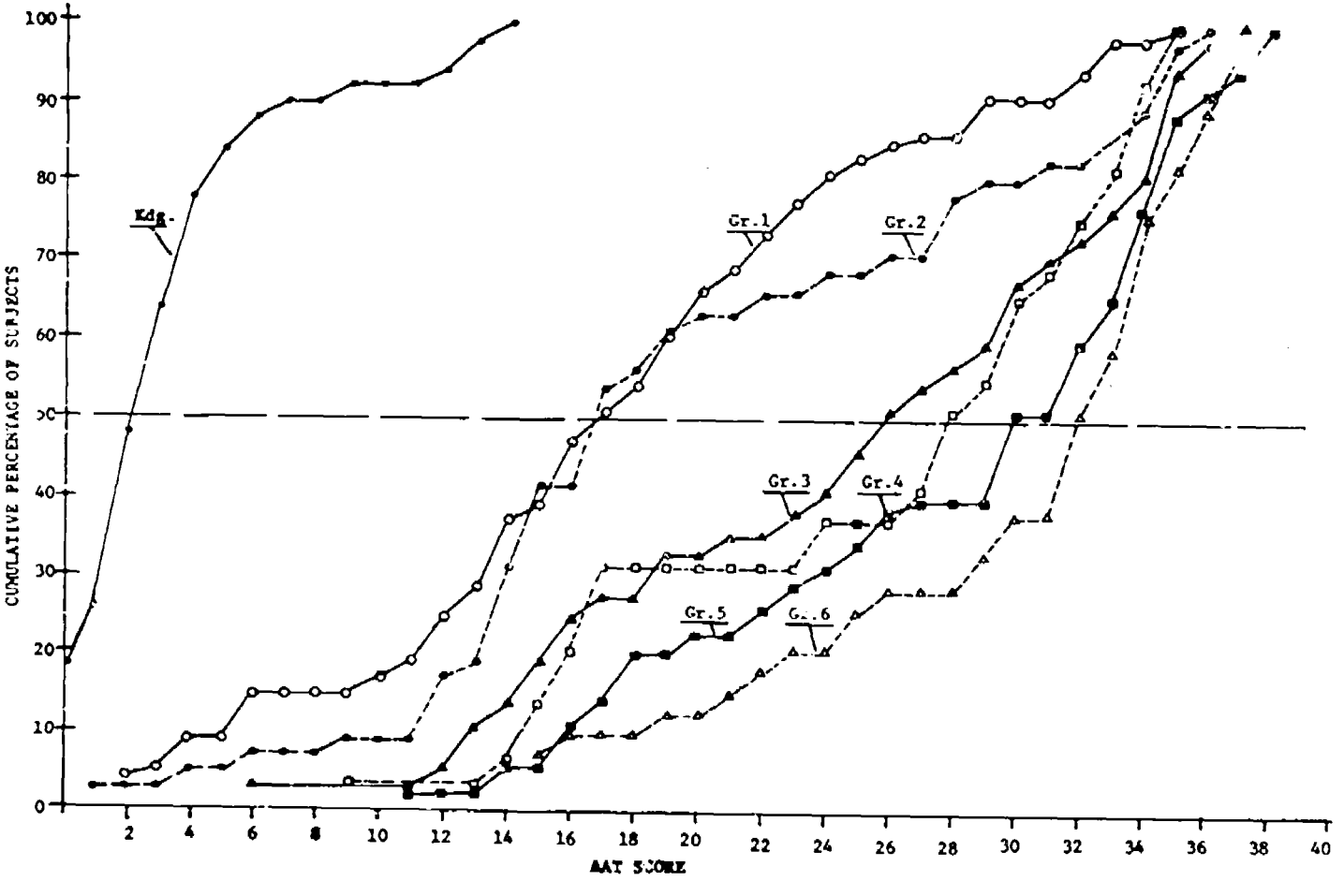

Figure 1: Relative Distribution of AAT Scores - Grades K through 6

grade 1 is obvious. In addition, a merging of the curves for grades 1 and 2 at P_{50} causes another unusual gap between the ogives of grades 2 and 3 in the range of scores between P_{30} and P_{70}. The graph indicates that over 60 percent of both the first and second grade children earned scores of 19 or less. In contrast, this score was exceeded by over 67 percent of the 3rd grade, 69 percent of the 4th grade, 80 percent of the 5th grade and 87 percent of the 6th. The first and second grade curves diverge again in the upper ranges. We note that approximately 15 percent of the first grade and in excess of 28 percent of the second achieved scores better than 25, the median of grade 3. The test items seem to impose an effective ceiling on the scores of grades 5 and 6. In general, Figure 1 suggests that the demands of the AAT are met more readily by children as they mature and progress through an academic program.

Validation Procedure

During the month in which this testing was conducted (April 1970), the children were also given the Stanford Achievement Test. For purposes of validation, AAT scores were correlated with the sum of the stanines on the language arts subtests of the Stanford Achievement Test.

Validation Results

The answer to the second question raised in undertaking this study--the nature of the correlations between the AAT and academic achievement--is contained, at least in part, in Table 6. The correlation between AAT and language arts achievement is relatively high, particularly in

Table 6

Relations Among Language Arts Skills, I.Q. and Auditory Analysis Test

Grade	N	Pearson Product Moment Correlations[a]			Partial Correlations[b] between language arts and AAT--IQ held constant
		Language arts[c] and AAT	Language arts[c] and IQ[d]	IQ[d] and AAT	
1	53	.53	.58	.40	.40
2	41	.62	.57	.22	.62
3	37	.84	.76	.67	.69
4	29	.72	.75	.50	.60
5	35	.75	.83	.65	.50
6	39	.59	.36	.64	.10

[a] All correlations significant ($p < .01$, two-tailed) except Grade 2--IQ and AAT (n.s.)

[b] All partial correlations significant ($p < .01$, two-tailed) except Grade 6 (n.s.)

[c] Language arts skills--Stanford Achievement Tests, April 1970--Σ stanines of language arts subtests

[d] IQ--Otis-Lennon Mental Abilities Test

grades 2 and 3 where the AAT accounts for 39 percent and 70 percent of the variance, respectively, in contrast to the 32 and 57 percent that is accounted for by I.Q. An analysis of partial correlation between AAT and language arts, with I.Q. held constant, shows a positive value of .5 or better for grades 2 through 5 ($p < .01$). At grade 6, I.Q. seems to be the more decisive factor. Table 7 is a summation of grades 1 through 6

Table 7

Summation of the z-Score Scatter (calculated separately for each class) from the L.A. and AAT Results

		Language Arts z-scores		
		-1.00 or lower	-0.99 thru +0.99	+1.00 or higher
AAT z-scores	+1.00 or higher	1	16	19
	-0.99 thru +0.99	16	118	19
	-1.00 or lower	24	21	0

scatter diagrams of z-scores for language arts and AAT. We calculated z-scores within each class separately from both the language arts and AAT data. The nine cells contain the total number of S's in grades 1 through 6. Their z-scores have been sorted into one of three categories: from +1.00 upward, between -0.99 to +0.99, and from -1.00 downward. Only one child (grade 2) achieved an AAT z-score of +1.00 or better and a language arts z-score of -1.00 or less. No child displayed the opposite results, i.e., an AAT z-score of -1.00 or less combined with an L.A. z-score of +1.00 or better. Thus, in addition to favorable correlation coefficients, we observe that, in all but one instance, children who performed well above average in one of the measured tasks never performed well below average in the other.

Item Analysis

To assess the relative difficulty children had with individual words in performing the auditory analysis task, item responses were rank ordered according to several different methods. Some of the schemes did and some did not take account of the fact that not all children were tested on the entire list. Analysis by all these methods, however, yielded only small differences in ordering. Furthermore, the first four task "types" (14 words--see Table 3) remained at the top of every list, and the last 10 words appeared in the same order at the end of every list. Table 8 presents the test words ordered by the simplest, most straightforward method--a count of correct responses in each class--with some confidence that this ranking represents the average difficulty of individual words for children in grades 1 through 6.

Table 9, which presents the mean percentage of correct responses by word type at each grade level, shows that the children beyond the first grade found it easier to omit an initial sound than to omit a final sound. As predicted, in general it proved harder to omit the first sound of an initial consonant blend than of an initial consonant-vowel combination, and still more difficult to omit a medial consonant. The longer Type VII words put an additional strain on short-term memory, and, except for "create" and "reproduce," all of these words appear at the end of the list.

Table 8

Mean Rank Order of AAT Words

Rank Order	Test Item Number	Word Type
1	1	I
2	3	III
3	4	IV
4	18	III
5 1/2	2	II
5 1/2	19	IV
7	10	IV
8	7	IV
9	13	IV
10	6	III
11	15	III
12	12	III
13	9	III
14	16	IV
15	14	V
16	11	V
17	8	V
18	5	V
19	17	V
20	25	VI

Rank Order	Test Item Number	Word Type
21	20	V
22	27	VI
23	21	V
24	23	VII
25 1/2	32	VI
25 1/2	31	VII
27	34	VI
28	37	VI
29	24	V
30	22	VI
31	29	VI
32	39	VI
33	40	VII
34	26	VII
35	30	VII
36	38	VII
37	28	VII
38	35	VII
39	36	VII
40	33	VII

Table 9

Mean Percent Correct Responses to Word Types
by Grade Level

Word Type	Grade Level						
	K	1	2	3	4	5	6
I	80.0	100.0	97.6	100.0	100.0	100.0	100.0
II	52.0	77.4	82.9	97.3	96.6	100.0	100.0
III	20.0	81.8	80.9	91.5	94.9	94.5	94.0
IV	7.0	70.2	86.9	93.7	94.8	97.6	97.0
V	6.3	44.3	42.9	60.8	63.8	71.1	74.7
VI	0.5	22.6	33.5	53.1	56.9	62.1	74.1
VII	0.2	13.7	24.6	29.5	33.4	38.3	44.9

The interclass data indicate that the ability to respond appropriately to the AAT improved for all word types in step with maturation and/or improved reading skills among children in K through 3rd grade. Word Types I through IV were apparently not of sufficient difficulty to provide discriminating powers within grades 4, 5, and 6. The more difficult types (V, VI, VII), however, reflect changes that, again, may be related to age and grade placement.

Discussion

The AAT seems to provide a systematic method of assessing the degree to which a child has learned to sort, order and synthesize the perceptual elements of auditory information. In respect to the initial question

asked by this study, a relatively wide performance range was demonstrated within and between the various age groups; thus, individual variation was tapped. Are these skills genetically determined? Are they the result of experience, both incidental and intentional--the latter, perhaps, by way of reading instruction? The answers, not fully available in these data, certainly should be sought. The major differences evidenced between K and grade 1 (acknowledging that this investigation was conducted near the end of the school year) may imply that reading instruction is an important factor in teaching a child to perform the analytical tasks we measured. This is a reasonable stance, considering the general powerful effect that results from teaching a child to use visual information as a mediator for auditory. It cannot be concluded, however, that the AAT is completely dependent upon a child's reading skills or, for that matter, vice versa. The logical position is that the two are completely interwoven--that, as a child commences to grasp the concepts of phoneme-grapheme interrelationships, he is learning the initial decoding skills of reading which, in turn, teach him to sort verbally produced perceptual information which, again in turn, assists him in the auditory sorting and ordering skills needed for reading, and so on. More study will be needed to answer this interwoven puzzle. More importantly, inquiry must be initiated as to which of the two behaviors--symbol decoding or auditory analysis--may most readily be taught at an early age. If it is the latter, it makes sense to urge that this capacity be exploited, albeit benignly, at least with certain populations.

In regard to question 2, concerning the relationship of the AAT to reading, here too the evidence offers reason for further investigation. The substantial correlation between the AAT and language arts scores suggests that there may be a cause-and-effect connection; certainly much more work is needed, across different populations and in different settings, but correlational data will not be sufficient. If, indeed, a true relationship does exist between the AAT and reading, what effect will an intervention program that improves AAT performance have upon reading achievement? The answer to this question is essential before any firm conclusion regarding cause and effect is to be drawn.

Yet another factor must be mentioned. In our judgment, reading is primarily an auditorily based skill. The analysis of the visual symbols presented in reading is less demanding, and perhaps less important to the typical first grade child, than the analysis of verbal sounds. Visual analysis is, nonetheless, a factor in learning to read. With this in mind, we examined the effect upon the correlation between L.A. and AAT at the first grade level after a visual-motor score* was added to the AAT. The correlation coefficient did rise--from .53 to .62, accounting for an additional ten percent of the variance. The correlation between the first grade visual-motor scores and language arts, omitting the AAT scores, on the other hand, was only .32.

Question 3 asked what could be learned from the item analysis regarding the structuring of a training program. Enough data are available

* The visual-motor score is derived from a quantitative assessment of S's responses to the Gesell Copy Forms and Rutgers Drawing Test.

to support the basic sequence of the word types. A thorough analysis of error responses directs us not only to a more reliable and valid AAT, but more importantly, to a refined recognition of the criteria for structuring the learning objectives into a hierarchy.

The fourth question, the implication of this type of study to reading curriculum designers, is an important and interesting one. The school in which our testing was conducted introduced a new early reading program to this year's first grade. The prior program was based on teaching the process of decoding a linguistically regular sound-symbol system. The new program is much more analytical in nature. It initially stresses a precise, structured decoding approach to reading in which individual letters and their sounds are taught. After the child has mastered a predetermined number of phoneme-grapheme combinations, he is taught to blend the individual phonemes into units that form the basis of his beginning reading vocabulary. Does the very narrow gap between the grades 1 and 2 AAT scores, reported here, suggest a better than average first grade, or a difference in the teaching method? We do not yet have any other samples for comparison. If the new teaching system does assist the child in developing more analytical auditory skills which, in turn, support him in learning to read more efficiently, the AAT may be useful in assessing the effectiveness and uniqueness of that instructional program. If this is the case, there are implications for pre-reading instruction in the skills needed for successful AAT performance.

One final consideration: Are there individual differences in modality preference? Are there certain children who would profit more from

a program that strongly stressed the visual differences of graphemes before introducing the phonetic relationships? Are there children of the opposite type--those who initially should be taught to analyze verbal sounds and, once having achieved some skills in sorting and ordering the acoustic elements of the language, be taught the graphic code by relating it to sound? Is it logical to expect children to progress equally well with either of the two approaches or some combination of them? Not necessarily; yet in many schools the same reading program is provided for all. Is it coincidental that in many schools, also, a significant percentage of the students display reading problems not explainable by I.Q. or other predictors? Clearly, the answers are not yet available but, indeed, they merit investigation. Individual differences--aptitudes--do exist. Consideration should be given to the design of instructional programs that acknowledge individual differences in perceptual aptitudes, identify them, and teach to the student's weaknesses through his strengths.

The AAT, in our judgment, provides an additional tool for recognizing those individual differences.

References

Chall, J. Auditory blending ability: a factor in success in beginning reading. The Reading Teacher, 1963, 17, 113-118. (See also Roswell-Chall Auditory Blending Test. New York: Essay Press, 1963.)

Dykstra, R. Continuation of the coordinating center for first grade reading instruction programs. Report of Project N. 6-1651. Minneapolis: University of Minnesota, 1967. (Summary of report in Reading Research Quarterly, 1968, 4, 49-70.)

Evans, J.R. Auditory and auditory-visual integration skills as they relate to reading. The Reading Teacher, 1969, 22, 625-629.

Murphy-Durrell Diagnostic Reading Readiness Test. New York: Harcourt, Brace & World, 1949.

Rosner, J. Visual Perceptual Survey, An evaluation designed for the Oakmont Public School District, Oakmont, Pa., ESEA Title I, 1966. Mimeographed report.

Rosner, J. The design of an individualized perceptual skills curriculum. Pittsburgh: University of Pittsburgh, 1969. (LRDC Working Paper #53)

Rosner, J., Richman, V., and Scott, R.H. The identification of children with perceptual-motor dysfunction. Pittsburgh: University of Pittsburgh, 1969. Pp. 40-51. (LRDC Working Paper #47)

Slingerland, B. Screening test for identifying children with specific language disabilities. Cambridge, Mass.: Educators Publishing Service, 1962.

Smith, H.K. (Ed.) Perception and reading. Proceedings of the Twelfth Annual Convention of the International Reading Association, Vol. 12, Part 4. Newark, Del.: International Reading Association, Inc., 1968.

The STAP: Screening Test for Auditory Perception. San Rafael, Calif.: Academic Therapy Publications, 1969.

Wepman Auditory Discrimination Test. Chicago: Author, 1958.