

SYNTACTICAL ASPECTS OF DEVELOPMENTAL APRAXIA

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ABSTRACT

The purpose of this study was to investigate the receptive and expressive language skills of children with developmental apraxia. The Northwestern Syntax Screening Test was administered to thirty children: ten with developmental apraxia, ten with functional misarticulation disorders, and ten with normal articulatory skills. Results revealed: (1) significant differences between the expressive scores for the three groups, (2) no significant differences between the receptive scores for the groups, and (3) significant differences between the receptive and expressive scores for the developmental apraxic and functional misarticulation groups but not the normal group. These results suggest that children with developmental apraxia demonstrate significantly better receptive than expressive language skills.

INTRODUCTION

Developmental apraxia has been defined as an articulation disorder due to neurological impairment (Rosenbek, et. al., 1974). Characteristics frequently associated with the disorder include: inconsistent phonemic errors of both vowels and consonants, the presence of "soft" neurological signs, co-existent oral apraxia, reduced diadochokinetic rates, prosodic disturbances and poor maintenance of syllable sequences and shapes (Rosenbek and Wertz, 1972; Rosenbek, et. al., 1974; Yoss and Darley, 1974a;b). One aspect of the disorder that has received limited attention, however, is the observation that children with developmental apraxia demonstrate receptive skills inordinately superior to expressive skills (Rosenbek and Wertz, 1972). The purpose of this study was to compare the receptive and expressive grammatical skills of children with developmental apraxia, children with functional misarticulation disorders and children with normal articulation.

METHOD

Subjects:

Thirty male children between five years and seven years and eleven months of age served as subjects. The children demonstrated hearing acuity within normal limits bilaterally, no orofacial anomalies, and receptive vocabulary age scores on the Peabody Picture Vocabulary Test (Dunn, 1965) within one standard deviation of chronological age (Table I). The subjects were divided into three groups on the basis of articulatory and isolated volitional movement skills. The apractic group included ten children with articulation scores one standard deviation or more below the mean for their age and sex on the Templin-Darley Screening Articulation Test (1960) and a score of less than 80 on the Smartt, et al. (1976) revision of the DeRenzi, et al. (1966) test for apraxia. The functional misarticulation group included ten boys with articulation scores one standard deviation or more below the mean for their age and sex on the Templin-Darley and a score of more than 80 on the revised test for apraxia. Children within the normal articulation group demonstrated articulatory skills within normal limits for their age and sex and a score on the revised test of apraxia of more than 80. The non speech tasks which make up the Smartt, et. al. test, and which were utilized to divide the children into apractic and non-apractic groups, were the isolated volitional oral movements (IVOM) section of the Yoss and Darley (1974a) battery, which in turn, was a modification and elaboration of the DeRenzi, et. al. tests for oral apraxia. Yoss and Darley found that division of a group of defective articulation children on the basis of results from a test of isolated volitional oral movements delineated a group of children who ".....resembled patients with developmental apraxia of speech previously described in the literature...." and who could be described as demonstrating developmental apraxia of speech. Smartt, et. al. reported a similar description for their population. Smartt, et. al., had tested a population of 54 children with a median age of seven years on isolated volitional oral movements, sequenced volitional oral movements, and speech tasks on which types of errors, consistency of error productions and prosodic distortions were considered as partial definitions of apraxia. The IVOM tasks were most consistent in separating the apractic children from those with "severe articulation problems."

Procedures:

Each of the thirty subjects was administered the Northwestern Syntax Screening Test (Lee, 1971). The Northwestern Syntax Screening Test was utilized to assess language skills because it contains both receptive and expressive items and because the receptive and expressive sections are a stable measure of syntactic and morphological encoding (Ratusinik and Koenigsknecht, 1975). The receptive and expressive scores for the subjects in each group were used for analysis.

RESULTS

The means, standard deviations and ranges of receptive and expressive scores on the Northwestern Syntax Screening Test were computed for the three groups of subjects and are presented in Table 2. Mean receptive scores were 33.5, 32.9, and 36.5 for the apractic, functional misarticulation and normal groups, respectively. Mean expressive scores were 20.4 for the apractic group, 28.2 for the functional misarticulation group, and 34.5 for the normal group. Comparison of these means with the norms for the Northwestern Syntax Screening Test revealed that the functional misarticulation and apractic children scored at approximately the 50th percentile and the normal subjects

scored at approximately the 75th percentile on the receptive portion; the apractic children scored below the 10th percentile, the functional misarticulation group scored at approximately the 25th percentile and the normal group scored between the 50th and 75th percentiles on the expressive portion. A one way analysis of variance, used to compare the receptive and expressive scores for the three groups, revealed that the scores were significantly different ($F = 21.76, df = 5/54, p < .0001$). A Duncan Multiple Range Test, utilized to compare the receptive and expressive scores of the groups (Table 3) revealed: (1) no significant differences between the receptive scores of the groups; (2) significant differences between the expressive scores of the groups for all three comparisons (apractic and functional misarticulation, functional misarticulation and normal; apractic and normal) and (3) significant differences between the expressive and receptive scores for the apractic and functional misarticulation groups but not the normal group.

DISCUSSION

Several aspects of these results merit further comment. First, the finding that the receptive skills of the children in the three groups were not significantly different suggests that children with developmental apraxia and children with functional misarticulation disorders do not demonstrate reduced knowledge of syntactical and morphological rules compared with children without articulatory impairments. Interestingly, earlier studies of children with articulation disorders (Whiteacre, Luper and Pollio, 1970; Marquardt and Saxman, 1973) suggested that children with articulation disorders demonstrate reduced language comprehension skills although these studies did not specifically evaluate children with developmental apraxia.

Secondly, the significantly reduced expressive grammatical skills observed for the apractic and functional groups suggest that these children demonstrate reduced expressive syntactical and morphological skills compared with normal children and that children with apraxia appear to be more impaired than children with functional articulation disorders. Apparently, the impaired imitative skills of the apractic subjects resulted in reduced ability to interpret the appropriate grammatical structures to be used compared with the functional misarticulation and normal subjects. Reduced syntactical skills have previously been reported for children with articulation disorders (Menyuk, 1964; Shriner, Holloway and Daniloff, 1969; Vandemark and Mann, 1965) although these investigators did not segment subjects into apractic and nonapractic groups.

It is not likely that the specific articulatory errors of the functional and developmental apractic groups had a significant effect on the results of the expressive portion of the NSST. Since both groups exhibited omission errors and the mean scores on the Templin-Darley Screening Test of Articulation were similar, the expressive language scores of the functional and developmental apractic groups would not have been as significantly different if misarticulations were the only factor involved. However, since developmental apractic children exhibit more multiple feature errors (Yoss and Darley, 1974a), it was possible that the examiner had more difficulty evaluating and interpreting the connected speech of the developmentally apractic children. The reduced intelligibility of the connected speech of developmental apractic children may have been one contributing factor in the difference between expressive scores of the developmental apractic group and the functional group. Another consideration was a difficulty in sequencing both speech and non-speech oral tasks observed in developmental apractic children but not characteristic of children with functional articulation disorders (Yoss

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and Darley, 1974a). Consequently, the inability to sequence and to imitate expressive utterances, characteristic of developmentally apractic children, may have contributed to the depressed expressive language scores on the NSST.

Finally, the finding that the receptive and expressive skills of the apractic and functional misarticulation groups were significantly different suggests that although these children had stored and integrated the basic components of language, they were unable to organize and direct volitional and sequenced productions necessary for accurately completing the utterances. Moreover, these deficits are greater in children with developmental apraxia than children with functional misarticulation disorders.

TABLE 1. Chronological Age (CA) means and ranges, and means, standard deviations and ranges of scores for Peabody Picture Vocabulary Test (PPVT), Templin-Darley Screening Test of Articulation (TD) and Isolated Volitional Movements Test (IVOM) for Developmental Apractic, Functional Misarticulation, and Normal Subjects.

GROUP	CA		PPVT-MA			TD			IVOM		
	Mean	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
Apractic	6-2	6-1 to 7-7	7-0	1-1	5-5 to 8-11	14.8	11.0	2 to 34	73.1	4.2	66 to 79
Functional	6-3	5-1 to 7-7	7-1	1-3	5-7 to 10-0	16.2	9.3	0 to 31	93.5	4.5	88 to 101
Normal	6-8	5-3 to 7-11	8-5	1-9	6-2 to 11-4	48.6	3.4	39 to 50	101.4	3.2	94 to 104

TABLE 2: Northwestern Syntax Screening Test Receptive and Expressive score means, standard deviations and ranges for Developmental Apractic, Functional Misarticulation and Normal Subjects.

Group	Mean	S.D.	Range
Receptive			
Apractic	33.5	1.65	30-35
Functional	32.9	4.12	24-38
Normal	36.5	3.20	31-40
Expressive			
Apractic	20.4	5.17	14-29
Functional	28.2	5.49	15-35
Normal	34.5	2.88	30-37

TABLE 3. Comparison of Northwestern Syntax Screening Test Receptive and Expressive Mean Scores for Developmental Apractic, Functional Misarticulation, and Normal Subjects.

	Apractic Receptive	Functional Receptive	Normal Receptive	Apractic Expressive	Functional Expressive	Normal Expressive
Apractic receptive	—	NS	NS	<.05*	<.05*	NS
Functional receptive	NS	—	NS	<.05*	<.05*	NS
Normal receptive	NS	NS	—	<.05*	<.05*	NS
Apractic expressive	<.05*	<.05*	<.05*	—	<.05*	<.05*
Functional expressive	<.05*	<.05*	<.05*	<.05*	—	<.05*
Normal expressive	NS	NS	NS	<.05*	<.05*	—

* Duncan Multiple Range Test

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