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HEAD START EVALUATION AND RESEARCH CENTER, UNIVERSITY OF KANSAS. REPORT NO. IV. A COMPARISON OF FOUR MODES OF ELICITING BRIEF ORAL RESPONSES FROM CHILDREN

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A 112-item Multi-Modal Articulation Analysis test was administered to 116 Head Start children ranging in age from 4 years, 6 months to 5 years, 5 months. The test involves presenting to the subject an object, or representation thereof, requiring a one-word response. Four modes of stimulus presentation were used. (1) actual objects, (2) black and white prints, (3) color prints, and (4) color transparencies. The children's responses to the 112 test stimuli were studied in terms of item recognition, response latency, articulatory accuracy, and subject preference for one of the four modes of stimulus presentation. The results showed that (1) item recognition improved with increasing age of the subjects and was not significantly affected by the mode of stimulus presentation, (2) response latency did not appear to be affected either by mode of stimulus presentation or age or sex of subject, (3) articulatory ability tends to increase with age, and (4) the subject preference was highest for the actual objects, lowest for the black and white prints. The data showed no significant differences in subject responding on the basis of sex. (WD)

The University of Kansas Head Start Evaluation and Research Center

IV.

"A Comparison of Four Modes of Eliciting Brief Oral Responses from Children."

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A Comparison of Four Modes of Eliciting Brief Oral Responses from Children[1]

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ABSTRACT

A 112 item articulation and vocabulary analysis was presented to 116 boys and girls who ranged in three month intervals from 4 years 6 months to 5 years 5 months inclusive. The stimulus modes of the four equivalent forms of the test were: (1) black and white prints, (2) color prints, (3) color transparencies, or (4) actual objects. The test was evaluated by mode of stimulation, age, and sex in terms of (1) word recognition, (2) latency of response, (3) articulation, and (4) subject preference. Mode of stimulation did not affect the variables studied, but the marked preference of the subjects was for the actual object. The performance of the children improved generally with age on the measures taken. Sex differences were not significant at these ages on these measures. An improved version of the test is being developed.

A Comparison of Four Modes of Eliciting Brief Oral Responses from Children

BACKGROUND

In obtaining samples of the vocabulary and articulatory responses of pre-school children, the use of pictures or objects as speech eliciting stimuli is well established. Unfortunately, little experimental evidence is available with respect to the effects of variation in the mode of presentation of the stimuli. This project studied the effects of (1) item recognition, (2) response latency, (3) articulatory accuracy, and (4) subject preference of the following four modes of presenting the test stimuli: (1) actual objects, (2) color transparencies, (3) color prints, and (4) black and white prints.

PROCEDURE

Subjects

One hundred and thirty-three children form the Head Start Programs of Kansas City, Missouri, and Olathe, Kansas, were tested during the period from March 14, 1967, through May 16, 1967. These 133 children represented the total number actually present in the cooperating classes at the time of the testing.

The children were divided into four age groups of three months each. Age Group I ranged from 4 years, 6 months through 4 years, 8 months inclusive; Age Group II, from 4 years, 9 months through 11 months inclusive; Age Group III, from 5 years through 5 years, 2 months inclusive; and Age Group IV, from 5 years, 3 months through 5 months inclusive. Because of these limits, 13 children were dropped from the original 133. Table 1., The Distribution of the subjects by Age Group and Sex, summarizes these data.

Test Materials

Form I of The Multi-Modal Artivulation Analysis was used. This test consists of 112 one-word items selected (1) for frequency of occurrence and (2) for including collectively the vowels, diphthongs, consonants and common blends of American English in their usual phonetic positions. Four complete versions of this test (object, color slide, color print, and black and white print) were available.

Personnel

The actual field testing was accomplished by Mrs. Rita Beasley, Mrs. Bonnie Flemming, and Mr. Wallace Henning of the University of Kansas Head Start Evaluation and Research Center. These individuals were trained in the administration of the Multi-Modal Articulation Analysis by Mrs. Joan Draper, a research assistant on the project. Mrs. Beasley scored the responses on latency, word identification, and articulatory accuracy; either Mrs. Flemming or Mr. Henning, depending primarily on schedule, assisted in the test situation.

Techniques

The color transparencies were presented on a portable, manually controlled back projector. The child was seated comfortably in front of the screen. Both the color and black and white prints, which were approximately 4" square, were displayed individually to each child. Each object

was displayed by the examiner but not actually given to the child.

Latency was timed with a stop watch from the moment of each stimulus presentation to the onset of the child's response. Values briefer than one second could not be recorded accurately.

Word recognition was scored by comparing actual responses against a prepared list; possible categories were: desired; synonym; wrong; and no response.

Articulation was evaluated for purposes of this portion of the total experiment as correct or incorrect. Evaluations were made by one highly trained listener.

Preference for mode of stimulation was established by asking the child to indicate, after having finished the complete test, which of the four modes he would choose in a repetition of the test.

Design

The 112 item Multi-Modal Articulation Analysis was administered to each child. The this experiment, the test was presented to each child in four consecutive segments of 28 items each. The mode of stimulation (black and white print, color print, color slide, or actral object) was systematically varied by segment for each child so that order and item effects could be controlled. The key variables of item recognition, latency, and articulation could then be studied by mode, age, and sex.

Because of the sampling procedure used, only descriptive statistics have been employed.

FINDINGS

Vocabulary

The essential data on vocabulary are displayed in Table 2. Mean Number of Vocabulary Responses by Category of Response, Age Group, and Sex, Table 3. Mean Number of Desired Word Responses by Age, Sex, and Mode of Presentation, and Table 4. Mean Number of Failures to Respond by Age, Sex, and Mode of Presentation.

In Table 2, the Desired Response category was defined as one in which the subject said the particular word sought. The category of Synonym Response was defined as a word different from the test word itself but as appropriate to the stimulus. The category of Wrong Response was defined as a word whose meaning was inappropriate to the stimulus. The category of No Response was defined as silence or as a failure to say any recognizable word. The category of Combined Response was defined as including the responses from both the Desired and Synonym categories.

Table 2 presents central tendency data only. For the 116 children of this study, the following general trends can be noted:

1. The ability to respond appropriately to the stimuli presented tends to increase for the age period studied whether efficiency is measured by a increase in the categories of Desired Synonym, and/or Combined, or by decreases in the categories of Wrong and No Response.
2. Little consistent sex difference can be observed in any of the five reported categories.
3. The vocabulary of the test falls within the ability range of the children.

Appendix I, Vocabulary Sulmary, presents frequency data for the 112 test words for all 133 children studied.

Table 3 is concerned with the effects of mode of presentation on vocabulary efficiency as measured by Desired Responses. Table 3 supports the general conclusion that item recognition by the children of this study is not strongly modified by mode of stimulation.

Table 4 is concerned with the effects of mode of presentation on vocabulary efficiency as measured by the category of No Response. These data also support the conclusion that mode of presentation is not a significant factor for these children.

High-quality, black and white or color prints, and high-quality slides seem to serve adequately as substitutes for the actual objects.

Latency

Table 5, Mean Latency in Seconds Per Response by Age, Sex, and Mode of Presentation presents central tendency data on latency. Latency was studied primarily because it has been suggented that this measure is related to the certainty and accuracy of stimulus recognition. Although wide range in latency was found, with isolated latencies of up to 60 seconds being recorded, latency as studied in this project did not vary importantly with make of presentation, age, or sex.

Preference

Table 6, Preference as Expressed for Mode of Presentation by Age Group and Sex in Number and Percentage of Choices presents central tendency data for mode choice. This table suggests the following conclusions:

1. For all age groups and both sexes, the objects tend to be preferred.
2. For all age groups and both sexes, black and white prints are generally the least liked.
3. Color may be the important choice factor.

The technique used in this investigation did not provide a measure of individual intensity of choice. At the moment, we have no reason to believe that this intensity is high.

Articulation

Table 7, Mean Number of Correct Articulatory Responses by Age Group and Sex presents central tendency data on articulation. Articulation was not studied by mode, although the data are available. Two general statements may be made relative to Table 7:

1. Articulatory ability as measured tends to increase for the the age groups studied.
2. Sex differences are small.

SUMMARY

This project has been analyzed primarily in terms of the testing media. A revision of the Multi-Modal Articulation Analysis is now being prepared. Major changes are:

1. Certain vocabulary items will be changed in the interests of greater recognizability.
2. The black and white prints and actual object versions of the test will be dropped; the color slide and color print versions will be retained.

It is planned to administer the revised test to a series of population samples.

FOOTNOTES

1. The research reported herein was performed pursuant to a contract with the Office of Economic Opportunity, Executive Office of the President, Washington, D.C., 20506. The opinions expressed herein are those of the author and should not be construed as representing the opinion or policy of any agency of the United States Government.

TABLE 1. Distribution of subjects by age group and sex.

Age Group	Sex		Totals
	Boys	Girls	
I 4 years (6,7,8) months	14	18	32
II 4 years (9,10,11) months	14	14	28
III 5 years (0,1,2) months	13	18	31
IV 5 years (3,4,5) months	15	10	25
Totals	56	60	116

LE 2. Mean number of vocabulary responses by category of response, age group and sex.*

Boys						Girls						Total					
Number	Category of Response: Desired Response	Synonym	Combined Col. 1 and 2	Wrong Response	No Response	Number	Category of Response: Desired Response	Synonym	Combined Col. 1 and 2	Wrong Response	No Response	Number	Category of Response: Desired Responses	Synonym	Combined Col. 1 and 2	Wrong Response	No Response
14	72.6	8.3	80.9	18.5	12.6	18	71.2	9.3	80.5	16.7	14.83	32	71.8	8.9	80.7	17.4	13.84
14	78.8	9.0	87.8	14.9	9.2	14	74.7	10.3	85.0	13.0	14.0	28	76.8	9.6	86.5	14.0	12.0
13	81.3	9.5	90.8	14.9	6.3	18	78.6	8.0	86.6	14.7	10.7	31	79.7	8.6	88.3	14.8	8.8
15	80.9	9.8	90.7	12.7	8.6	10	75.6	8.0	83.6	15.6	12.8	25	78.8	9.0	87.8	13.8	10.2
56	78.41	9.16	87.57	15.21	9.21	60	75.0	8.93	83.93	15.03	13.05	116	76.64	9.04	85.68	15.12	11.19

ossible responses in four basic categories = 112.

E 3. Mean number of desired word responses by age, sex, and mode of presentation.*

Boys						Girls						Total					
Number	Mode of Presentation				Complete	Number	Mode of Presentation				Complete	Number	Mode of Presentation				Complete
	Black and White	Color Pictures	Color Slides	Objects			Black and White	Color Pictures	Color Slides	Objects			Black and White	Color Pictures	Color Slides	Objects	
14	17.71	17.92	18.50	18.42	72.57	18	18.50	18.11	16.50	18.11	71.22	32	18.15	18.03	17.37	18.25	71.81
14	19.07	19.64	19.64	20.30	78.85	14	19.07	17.64	18.14	19.85	74.71	28	19.07	18.64	18.89	20.17	76.78
13	20.46	20.53	20.00	20.30	81.30	18	20.16	19.27	19.38	19.83	78.66	31	20.29	19.80	19.64	20.03	79.77
15	20.46	19.66	20.26	20.53	80.93	10	18.50	17.90	18.50	20.70	75.60	25	19.68	18.96	19.56	20.60	78.80
56	19.42	19.42	19.60	19.94	78.41	60	19.13	18.31	18.08	19.46	75.50	116	19.27	18.85	18.81	19.69	76.64

ossible score for each test segment = 28; for total test = 112.

4. Mean number of failures to respond by age, sex, and mode of presentation.*

Boys						Girls						Total					
	Mode of Presentation						Mode of Presentation						Mode of Presentation				
Number	Black and White	Color Pictures	Color Slides	Objects	Complete	Number	Black and White	Color Pictures	Color Slides	Objects	Complete	Number	Black and White	Color Pictures	Color Slides	Objects	Complete
14	3.50	3.07	2.28	3.71	12.57	18	2.94	4.05	4.11	3.72	14.83	32	3.18	3.62	3.31	3.71	13.84
14	2.78	1.92	2.42	2.07	9.21	14	2.71	5.14	4.07	2.07	14.00	28	2.75	3.53	3.25	2.07	11.60
13	1.61	1.38	2.00	1.30	6.30	18	2.00	2.72	3.22	2.72	10.66	31	1.83	2.16	2.70	2.12	8.83
15	2.46	2.60	1.93	1.60	8.60	10	3.40	3.80	2.90	2.70	12.80	25	2.84	3.08	2.32	2.04	10.28
56	2.60	2.26	2.16	2.17	9.21	60	2.68	3.86	3.63	2.86	13.05	116	2.64	3.09	2.92	2.53	11.19

*ossible responses for each test segment = 28; for total test = 112.

5. Mean latency in seconds per response by age, sex, and mode of presentation.

Boys						Girls						Total					
Number	Mode of Presentation				Complete	Number	Mode of Presentation				Complete	Number	Mode of Presentation				Complete
	Black and White	Color Pictures	Color Slides	Objects			Black and White	Color Pictures	Color Slides	Objects			Black and White	Color Pictures	Color Slides	Objects	
14	7.06	6.89	6.15	6.61	6.67	18	6.28	6.51	6.74	6.32	6.50	32	6.62	6.67	6.48	6.45	6.55
14	6.11	6.24	6.07	6.11	6.13	14	7.53	8.80	7.49	6.88	7.67	28	6.82	7.52	6.78	6.49	6.90
13	5.53	5.95	5.50	6.03	5.75	18	5.43	5.75	5.88	6.10	5.79	31	5.47	5.84	5.72	6.07	5.77
15	5.63	5.77	6.02	5.49	5.72	10	6.69	6.44	6.32	5.96	6.35	25	6.05	6.03	6.14	5.68	5.97
56	6.08	6.21	5.94	6.05	6.07	60	6.38	6.80	6.59	6.32	6.52	116	6.24	6.52	6.28	6.19	6.30

TABLE 6. Preference as expressed for mode of presentation by age group and sex in number and percentage of choices.

	Boys					Girls					Total				
Age Group	Number	Mode of Presentation				Number	Mode of Presentation				Number	Mode of Presentation			
		Black and White	Color Pictures	Color Slides	Objects		Black and White	Color Pictures	Color Slides	Objects		Black and White	Color Pictures	Color Slides	Objects
I	14	0 0%	4 28%	2 14%	8 57%	18	2 11%	6 33%	4 22%	6 33%	32	2 6%	10 31%	6 18%	14 44%
II	14	1 7%	5 36%	3 21%	5 36%	14	0 0%	5 36%	3 21%	6 43%	28	1 3%	10 36%	6 21%	11 39%
III	13	0 0%	1 8%	4 31%	8 61%	18	0 0%	5 28%	2 11%	11 61%	31	0 0%	6 19%	6 19%	19 61%
IV	15	1 7%	4 27%	2 13%	8 53%	10	2 20%	3 30%	2 20%	3 30%	25	3 12%	7 28%	4 16%	11 44%
Tot.	56	2 3%	14 25%	11 20%	29 52%	60	4 7%	19 32%	11 18%	26 43%	116	6 5%	33 28%	22 19%	55 47%

TABLE 7. Mean number of correct articulatory responses by age group and sex.*

Age Group	Number	Boys	Number	Girls	Number	Combined
I	14	78.00 69%	18	80.00 71%	32	79.20 70%
II	14	85.00 75%	14	83.5 74%	28	84.20 75%
III	13	90.4 80%	18	89.8 80%	31	90.00 80%
IV	15	85.7 76%	10	93.6 83%	25	88.90 79%

*possible number = 112

Appendix I. Cummulative errors in word recognition for 133 children.

shoe	1	ball/baseball	12	crayons	30	shovel	61
chair	1	toothbrush	13	basket	33	jar/jam/jelly	63
spoon	1	coins/pennies/ money	13	mouth	35	flashlight	65
pen/pencil	1	three	13	screwdriver	35	ties	66
glasses	2	dog	14	boot	38	squirrel	69
comb	2	blocks	16	turtle	39	mouse	73
airplane/plane	3	dress	16	cat	40	can	74
gun	3	one	17	bat	43	feather	74
hat	3	cup	19	sleeping	43	fan	75
hammer	4	box	19	bread	43	sponge	77
apple	4	thumb	20	boy	43	yellow	80
scissors	4	bus	20	snake	44	sidewalk	81
santa claus	5	wristwatch/watch	20	ladder	44	pipe	81
car	5	key	21	jumprope	46	saw	82
pins	6	glass	21	grapes	46	refrigerator	93
boat	6	brush	22	star	47	rake	98
knife	7	nose	22	zipper	50	letter	100
fork	8	matches	22	baby	50	lock	102
bottle	8	clown	22	quack	51	dishes	106
record	9	stove	23	pan	51	strawberries	106
train	9	book	24	this/that	52	fruit	107
candy	9	potatoe	24	skate	55	vacuum/cleaner	108
table	9	milk	24	present	57	measuring	109
bathtub	11	egg	25	witch	57	ice cube	124
telephone	11	banana	27	smile/smell	58	mitten	125
bed	11	swinging	28	bucket	59	twins	127
whistle	11	ring	28	yo-yo	60	pitcher	131
wagon	11	soap	29	doghouse	61	sprinkling can	134