

DOCUMENT RESUME

ED 048 999

RE 003 393

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TITLE Effects of Modality on Response Word Association Tasks.  
PUB DATE Dec 70  
NOTE 8p.; Paper presented at the National Reading Conference, St. Petersburg, Fla., Dec. 3-5, 1970  
AVAILABLE FROM Twentieth Yearbook of the National Reading Conference, Inc., Marquette University, 1217 W. Wisconsin Ave., Milwaukee, Wis. 53233 (In press)  
EDRS PRICE MF-\$0.65 HC Not Available from EDRS.  
DESCRIPTORS Adolescents, \*Association Tests, \*Associative Learning, Aural Stimuli, \*Elementary School Students, Emotionally Disturbed, \*Junior High School Students, Reading Research, Response Mode, \*Verbal Ability, Verbal Tests, Visual Stimuli

ABSTRACT

How the mode of input of stimuli affects the quality or type of response was studied by comparing the number of paradigmatic responses and syntagmatic responses to both orally and visually presented stimulus words. The following groups, totaling 194 subjects, were involved in four experiments: (1) 18 institutionalized disturbed adolescents, (2) 96 seventh- and eighth-grade boys and girls from an urban junior high school, (3) 40 southern rural third-grade boys and girls, and (4) 40 southern rural fifth-grade boys and girls. Nineteen stimulus words, all nouns, were presented orally to half the subjects and visually to the other students. They were all required to write down their first response. In experiments 1, 3, and 4 there were significantly more paradigmatic responses in the oral presentation than in the visual presentation. In experiment 2 there was a slight edge for the oral presentation. The need for further research of the effect of modality on cognitive responses was indicated. The role of the reading teacher in affecting a congruence in the associations of modalities was also noted. References are included. (DH)

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Effects of Modality on Response in Word Association Tasks

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In the psychological literature there are numerous studies using word association tasks. However, these studies seem to take little note of the possible consequences to responses that may be related to the method of presentation of the stimulus words. This study is directed toward the examination of the effects of the mode of input of stimuli on the type or quality of output. Specifically, the concern is whether or not the production of paradigmatic responses is influenced by oral or visual presentation of stimulus words across several groups.

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Forgus (1966) maintained that "the informational aspects of the stimuli impinge upon the various sense organs, which selectively transduce specific kinds of information." If this transduction process is occurring, varying the input modality should cause differentiation in responses. This idea would challenge to some degree the central processing concept wherein all stimuli are decoded and held to be nothing other than sensorily different forms of the same perception.

Forgus' approach suggests that impulses received visually differ from impulses received auditorially and may be acted upon differentially in a central processing system. If learning or cognition is the sum set of one's past experiences, and if one's experiences are made meaningful through association, then it should not seem unreasonable that associations to visual stimuli may be different from associations to auditory stimuli.

Berg (1955) maintained that mode of input is essentially an irrelevant factor, that information received to the brain is basically the same regardless of how it is received. Otto (1962, 1964, 1965) in his investigation into verbal and pictorial presentations of stimuli materials found that responses were qualitatively different when the materials were presented differently.

Reynolds, Palmatier and Ulmer (1969) in a study of responses of adult illiterate Ss found that the production of responses was unrelated to the mode of presentation of stimulus materials. In a sequel to that study, Reynolds and Palmatier (1969) found that the quality of the responses varied considerably as a function of presentation mode. They suggested a rationale to explain this finding and suggested a paradigm for convergence of modalities from independence to dependence as S moved in the direction of becoming a master reader.

Some researchers, (Deese, 1962; Ervin, 1957) suggest that the grammatical category of word presentation may have a bearing on the outcome. Deese found, for instance, that adverbs produced an overwhelming amount of syntagmatic responses while nouns produced a majority of paradigmatic responses. Ervin stated that adults made more paradigmatic responses while children gave more syntagmatic responses. Ervin (1961), Entwisle, Forsyth, and Muuss (1969) found that as the person gets older there is a tendency to produce more paradigmatic responses regardless of grammatical class.

The purpose of the present investigation is less to challenge previous research than to try to see whether the manner of presentation of stimulus words affected the response; that is, do more paradigmatic responses occur when the stimulus words are administered orally than when they are given visually (graphically). If so, then the studies cited above may deserve reconsideration, and these researchers may have overgeneralized observations which are more appropriately idiosyncratic to a sensory mode.

#### Procedure

Four experiments were undertaken involving a total of 194 Ss of divergent backgrounds. Ss in Experiment 1 were 18 institutionalized emotionally disturbed adolescents. Experiment 2 involved 96 seventh and eighth grade boys and girls from one northeastern urban junior high school. Subjects for the third experiment were 40 southern rural third grade boys and girls. The fourth experiment replicated the third except that the sample was drawn from a fifth grade population.

#### Instrument

A list of nineteen lexical words was established as the basis for the experimental task. All stimulus words were nouns, concrete words which were

expected to elicit paradigmatic responses according to Deese (1962). All Ss had a reading command of these words. An addition to Deese's definition required that for any response to be clarified as paradigmatic it must meet one of the following relationships to the stimulus word: part-whole, substitute, superordinate-subordinate, or coordinate.

#### Criteria

All responses were written by each student. Each response was then independently rated as to whether or not it was paradigmatic by two judges. Interrater reliability over all experiments was found to be highly satisfactory (average reliability=.96) when the total number of paradigmatic responses per individual was used as the basis of comparison.

#### Treatment Conditions

Students were assigned in classrooms according to their treatment and condition. Only one modality was given to any particular student. In the oral treatment subjects were presented the stimuli by the tester aloud, repeated after five seconds and then requested to write down their first response. No admonition against multiple responses was given. In the visual treatment condition the presentation was the same except that all words were presented using an overhead projector with the stimulus words printed on transparencies.

#### Results

In the first experiment the data were analyzed relative to sex, age, and I.Q. It was found that these three variables produced no differences; however, the major variable of concern, oral vs. visual presentation did yield significant differences. For both males and females more paradigmatic responses were produced in the oral presentation than in the visual presentation.

The ratio of paradigmatic responses to oral presentations was nearly two to one over the visual. In the second experiment using the 96 seventh and eighth grade children, no significant differences between oral and visual presentation were found although here, too, there was a slight edge for the oral presentation. The third experiment produced significantly more paradigmatic responses in the oral presentation over the visual presentation. Although the difference here was not as dramatic as in the first experiment, the oral was clearly producing more mature responses for every stimulus word. The final experiment using the fifth grade subjects almost identically replicated the results of the third grade group. Again, there were significantly more paradigmatic responses in the oral presentation than in the visual presentation.

#### Conclusion

The results of these experiments indicated that the associations made by extremely divergent groups have a common thread running through them. In no group of the four tested did the visual presentation of stimuli produce as mature responses as did the oral presentation. This finding suggests verification of the results obtained by Reynolds and Palmatier (1969) and further indicates that the argument for tying associations to modalities may be tenable. If this is the case one of the clear responses of the researcher in reading is to further explore the effect of modality; one of the responsibilities of the teacher of reading is to effect a congruence in the associations of the modalities. A conflict in cognition may develop for the burgeoning reader if what he hears produces different concepts from what he reads. Investigation into the feasibility of bringing about this congruence is currently under way. Further investigation of the associational effects

of varying modalities must of necessity concern themselves with the appropriateness of the measurement criterion. The use of paradigmatic responses as a measure of response maturity gnaws somewhat at the investigational purity of any study of this nature; however, the consistency of the results over different populations, different age groups, different social economic groups and different geographical groups suggest that modality is a subject of concern to the psychologist as well as to the researcher in the basic elements of reading.

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