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The Association Value of Thirty Meaningful Words¹

PAUL R. HAGER AND MARILYN E. MARSHALL

Abstract. Forty-one men and women undergraduates individually wrote down the verbal associations arising in relation to each of 30 three-letter meaningful words, with a time allowance of 1 min. per word. The association value of each word was defined as the mean number of "acceptable" words written in response to it. Two sets of words were then chosen from the list for subsequent use as response terms in a verbal-motor transfer experiment. One set, formally similar, was found to have a mean association value of 8.752. The other set, formally distinct, had a satisfactorily comparable mean association value of 8.792.

A growing body of literature indicates that, in general, the pretraining of verbal responses to stimuli subsequently used in a discriminative motor task has a facilitating effect upon criterion (motor) performance. Commonly, the index of facilitation used is the positive difference in criterion performance between groups receiving verbal pretraining on criterion-relevant stimuli and groups given pretraining on stimuli irrelevant to the criterion task.

Two major theoretical schemes have been proposed to account for the superior criterion performance of Relevant over Irrelevant pretraining groups. One of these schemes, perceptual in orientation, is advanced by Gibson and Gibson (1955). This view holds that verbal pretraining is facilitative because learning to respond differently to the different stimuli results in the extinction of generalized responses to them, and discrimination among the stimuli is thereby increased. Within this frame of reference, the nature of the verbal responses learned during pretraining is irrelevant.

The other major hypothesis, growing out of the work of Dollard and Miller (1950) and Miller and Dollard (1941) on verbally mediated generalization, states that the nature of the verbal response learned is itself a relevant variable. This hypothesis allows for two possible outcomes of verbal pretraining. Every set of stimuli possesses greater or lesser intra-set similarity. Given a set of such stimuli, when verbal responses are learned to them the responses themselves produce interoceptive stimulus elements which through the learning process become associated with the stimulus. In this scheme, the stimulus complex changes

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as a function of the learning of verbal responses, becoming more or less discriminable as a function of the greater intralist similarity or distinctiveness of the verbal responses learned.

As a test of the Miller-Dollard notion, a study was designed in the Iowa Laboratory to determine the effects of four different kinds of verbal pretraining upon the subsequent acquisition of simple motor responses. The verbal response variables to be investigated were meaningfulness, already shown to be a strongly effective variable in verbal learning, and similarity, also a potent verbal learning variable.

Four sets of six verbal responses each were required. Two of these sets, one possessing high intraset similarity, one low similarity, were to be composed of nonsense syllables (Sets LS and LD). These syllables were of the consonant-vowel-consonant form, chosen from the 0% and 6.67% lists of Glaze (1928). High similarity syllables had the first two letters in common, the final consonant changing from syllable to syllable. The low similarity list contained no consonant repetitions in the same position and one vowel repetition.

The aim of the study reported here was to obtain formally comparable verbal units which were meaningful. High similarity and low similarity lists had to be constructed which were approximately equal in mean association value (Sets HS and HD).

METHOD

Subjects

Forty-one students taking a course in elementary psychology served as Ss. These students were credited with the equivalent of two examination points for their participation. The results for one S were discarded because he lacked proficiency in the use of the English language.

Procedure

A list of 30 three-letter words was drawn up for use as stimuli. Of these, 10 words were formally highly similar, differing only in the final letter. The remainder were formally distinct from the first set and from each other. The words were presented to the Ss in the form of a dittoed booklet with one of the stimulus words at the top of each page. Space was provided on each page for Ss to write as many as 20 responses.

Ss were asked to write as many words as possible that were brought to mind by the stimulus word in the time allotted, and were instructed to think back to the stimulus word after every response. At the end of one minute, they were asked to turn to the next page and respond to the second word in the same

manner. This procedure was repeated until the Ss had responded to all 30 words. Ss were not asked to identify themselves until the end of the experiment.

RESULTS

Since it was not possible to control completely the particular stimulus element eliciting a response, not all responses were meaningfully related to the stimulus word. To eliminate such responses before determining the frequency of responses to each of the stimulus words, a set of identifying criteria was formulated.

The original intention was to use the criteria described by Noble (1952). Noble eliminated three kinds of responses: (1) Illegible responses, (2) Perseverative responses, and (3) Failures of set. A response was considered perseverative if S had already given that response to the stimulus word in question. The third category, failure of set, was subdivided into

- a) Free or tangential association, where the response was apparently either to the preceding response or to extraneous stimuli
- b) Clang or alliterative associations, where the response was apparently made because of factors unrelated to to meaningfulness

In the present experiment, however, the application of these criteria led to the elimination of some responses given by several Ss to a given word. For example, several Ss gave "cotton" as a response to "cot," which would have been eliminated as a clang response. Since a response which is elicited from more than one S by a stimulus word might reasonably be considered to be associated in some way with that word, the retention of such responses should result in an index of association value more suited to the purposes of the present experiment.

However, retaining responses which apparently were made to extraneous stimuli would result in spuriously high association values for some of the stimulus words. Since no objective criterion for eliminating such responses suggested itself, they were eliminated on the basis of the judgment of the Es as to the meaningful relationship of a given response to the stimulus word in question.

The three criteria finally used for unacceptable responses were: (1) Illegible responses, (2) Perservative responses, and (3) Extraneous responses.

In the third category, responses given by only one S were
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eliminated unless, in the opinion of two of the three judges, the response word was meaningfully related to the stimulus word. All responses given by more than one S to the same word were retained.

On the basis of these criteria, the mean number of responses to each stimulus word was determined. These are presented in Table 1. HS and HD lists were then selected, as shown in Table 2 with the LS and LD lists from Glaze.

Table 1. Mean Number of Associations to Thirty Words.

Low Similarity		High Similarity	
Word	Mean No. Responses	Word	Mean No. Responses
BED	11.825	COW	12.825
DEN	10.775	COP	10.575
CUP	10.750	COD	10.436
CUT	10.600	COT	8.650
SON	10.550	COB	8.450
PEN	9.950	COY	7.450
JOB	9.525	COG	6.950
KID	9.300	CON	4.875
SAW	9.200	COX	4.450
WEB	9.150	COL	3.875
BAG	8.658		
GUT	8.375		
SIP	8.050		
JIG	8.175		
VAT	7.850		
POD	7.475		
BAN	7.400		
CAP	7.050		
FAG	6.800		
JIB	5.225		

Table 2. Mean Number of Meaningful Responses to Words Selected for HD and HS Lists, and Percent of Subjects Giving Responses to Nonsense Syllables Selected for LD and LS Lists Taken from Glaze (1928).

HD		HS		LD		LS	
CUT	10.600	COP	10.575	DAQ	6.67	YOQ	6.67
SON	10.550	COD	10.436	VUX	6.67	YOX	6.67
WEB	9.150	COT	8.650	YOZ	6.67	YOZ	6.67
JIG	8.175	COB	8.450	CEF	0.00	YOF	0.00
POD	7.475	COY	7.450	JID	0.00	YOP	0.00
FAG	6.800	COG	6.950	ZIL	0.00	YOV	0.00
Total	52.750		52.511		20.01%		20.01%
Mean	8.792		8.752		3.33%		3.33%

The two lists have approximately the same mean association value and represent the same range of association values. The words in both lists were selected so that only one vowel occurs in more than one word.

DISCUSSION

The results of this study suggest that Noble's technique for determining the association value of meaningful words is in

general adequate for this sort of endeavor. The basic additional assumption of the study reported here is that responses which are not meaningfully related to the stimulus word are responses to extraneous cues. Consequently, it is unlikely that more than one S would give the same response to the same extraneous stimulus. If this is the case, responses given by more than one S may be considered meaningful responses even when the relationship to the stimulus word is not apparent. This assumption also provides some basis for eliminating unique responses which have no apparent meaningful relationship to the stimulus word.

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