The associative basis of verbal organization: Some leads from a study on category clustering

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Clustering scores from an earlier study on short-term recall were correlated with an association test. The results indicated that specificity or generality of association is an important determinant of clustering. Several other correlations were presented which indicate some possible leads toward research supporting an associationistic interpretation of verbal organization.

There has been an interest for many years concerning the nature of verbal organization. It has only been in recent years, however, that this area has been studied experimentally, and writers still differ on the question of what should be postulated concerning the nature and formation of this verbal organization. The general views cover a range from those which are highly associationistic to those that stress the use of such concepts as schemata and employ the associationistic language very little (Kendler, 1966). The research to be reported here is of an exploratory nature and suggests some leads for further research that may provide support for an associationistic model.

The primary purpose of the research was to study differences in category clustering between Ss who had information about the names of categories into which words could be put (Information group) and Ss who had no knowledge that the words could be categorized (No-information group). This variable was also studied over different numbers of stimulus presentations. For more details see Hudson (in press). The research to be reported here concerns some auxilliary data which are related to this major variable.

Subjects. The Ss were 160 introductory psychology students selected at random from those attending the University of Arkansas in the spring of 1967.

Materials. Thirty-two stimulus words were selected from those scaled by Underwood & Richardson (1956). These words could be placed into one of four categories. The words, dominance level and category names were as follows. Small: atom (87), flea (86), germ (84), crumb (79), minnow (62), mouse (54), capsule (51), pup (50). Round: spool (74), barrel (72), baseball (70), dome (70), knob (68), head (66), button (61), saucer (59). White: milk (83), chalk (80), bandage (73), teeth (72), ivory (65), napkin (62), linen (59), rice (54). Smelly: ammonia (88), garbage (80), skunk (78), ether (70), sewer (61), garlic (58), sulphur (48), pine (44).

A 45-item forced choice association test, the Specific General Association Test (SGAT), was also used. Each item consisted of a stimulus word and four response words, one of which was more general than the stimulus word, one more specific, and two which were irrelevant.

Procedure. Upon appearing for testing the S was assigned at random to one of 16 cells, i.e., one of two levels of information about the category names (either complete information or none at all) and one of eight numbers of presentations of the stimuli (one through eight). The S then read task instructions which differed only in that the Information group was told the words they were about to see could be put into one of four categories and the category names. The S then received the correct number of presentations of the 32 words for his group each in a different random order, after which he was instructed to write down as many words as he could remember in the order in which they occurred to him. Four min were allowed for recall after which S took the SGAT.

Results. Two types of result are of interest here. The first concerns the order in which the words were recalled and the second concerns the correlation between the clustering index and score on the SGAT.

The order of recall concerns a correlation between order of recall and dominance level of the words. Four Spearman rank-order correlation coefficients were calculated for each S; one for each of the four categories of words. The words from each category were taken out of the total recall and rank-ordered in terms of rank-order of recall within the category without considering what rank they held in the total recall. The correlation, then, was between the rank-order of dominance level and the rank-order of the order of recall for the words within the group. Each of these four correlations was weighted with its number of degrees of freedom, and an average was taken as an index of how much the S tended to recall the words in the order of dominance level. These correlation indexes were, for the most part, very small. The mean for the combined Information groups was .05, while that for the combined No-information groups was -.06. The present interest, however, is in an analysis of the correlation index as a dependent variable. Because very few people in the one presentation group recalled enough words to allow calculation of a correlation index these two groups were dropped making the subsequent analysis a 2 by 7 factorial. Furthermore, an occasional S, three in all, in one of the other presentation groups did not recall enough words to allow a correlation index. Thus the analysis of variance calculated on these data used Yate's method for adjustment of row and column effects to take account of unequal Ns in the cells. The difference for the Information condition was significant ($F = 5.91$, $df = 1/123$, $p < .025$). The F ratios for number of presentations and interaction were both less than one.

The SGAT was scored by subtracting the number of general associations from the number of specific associations. For each of the 16 groups these scores were correlated, across the 10 Ss of a group, with the clustering index scores of the Ss. For the No-information groups these correlations ranged from -.63 to .11 and for the Information groups the range was from -.34 to .66. The mean over all eight No-information groups was -.24 and over all eight Information groups it was .21. These means were arrived at by using a Fisher's Z transformation.

Discussion. If verbal organization can best be looked at as associative in nature then the instances of a category do not stand in a strict equivalence relationship. Rather, they form a hierarchy reminiscent of one of Hull's habit families. If this is the case there should be some tendency for the words within a category to be recalled in a decreasing order of dominance level. The correlation indexes reported in this study are, on the average, very small. However, the fact that the Information group clustered significantly more than the No-information group and also had a significantly higher correlation index is encouraging. This is particularly true when one considers the very small range of dominance level used for this study within each category of words. One might also expect that the people who cluster more would tend to have a higher correlation index. The mean correlation, arrived at by doing a Fisher's Z transformation, for the Information groups was .25 and for the No-information groups was -.17. This might indicate that the clustering of the No-information groups was done on the basis of something other than the categorical relations as presented.

The correlations of the SGAT with clustering index appear at first blush to be somewhat contradictory since the mean of the Information groups was .21 and that of the No-information groups -.24. However when one looks at the recall process from an associationistic viewpoint and considers what each group knows, things begin to fall into place. Consider first the No-information groups. These Ss do not know that the words can be categorized. Thus the Ss who are most likely to associate up the abstraction scale are the ones most likely to come to the category names, either implicitly or explicitly, and thus would be more likely to code the words according to category and thus more likely to cluster. Thus the negative correlation between SGAT and the clustering index makes sense. On the other hand the Information groups already know the category names and thus the people most likely to cluster would be those who are most adept at going from the general to the specific. Thus the positive correlation between SGAT and clustering index makes sense for these Ss. These correlations are, to be sure, small. But since one is positive and one negative, the difference between them is of medium magnitude and one could make modest differential predictions about clustering behavior given the SGAT score of an S along with the information S has.

The results of this study are only indicative of some possible support for an associationistic model of verbal organization. They are, however, very interesting and encouraging.

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NOTE

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