Effect of contextual meaningfulness on rated association value (m'), number of associations (m), and free recall¹

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Abstract

Ratings of 15 standard CVC words for meaningfulness (m') decreased significantly as m' value of 15 context words increased from low to medium and high, whereas actual number of associations (m) increased with increased context meaningfulness. Despite these differential context effects on absolute m' and m values, relative values for individual standard words remained remarkably stable across context variations. Subsequent recall of standard and context items showed only a superiority for numbers over words, even though meaningfulness values for numbers were lower than for words.

Introduction

Measures of meaningfulness of verbal materials correlate highly with one another and are also similarly related to speed of learning (e.g., Noble, 1963). Thus it has been assumed that various meaningfulness measures are interchangeable even though their comparability across conditions has yet to be examined directly. The present experiment compares two of Noble's (1963) indices of meaningfulness, mean number of produced associations (m) and numerical ratings of association value (m'), as they are affected by variations in contextual meaningfulness. Specifically, it concerns the dependence of m and m' for the same standard items (CVC English words) on manipulated variation in context items (CVC English words or numbers). Subsequent recall of rated items was also examined under the various context conditions.

Method

The Ss, mainly female teachers, were 88 members of a verbal behavior class at the University of California extension, Berkeley. Class members were assigned randomly to treatment groups from which 11 Ss were postexperimentally selected at random.

The eight experimental treatments constituted a 2 by 4 factorial design, combining m' and m measurement procedures with four different lists. Each list contained the same standard items, 15 CVC words with minimum variance in m' and a median m' value of 3.55 (Noble, 1961). Context items for the four 30-item lists were CVC words of either high (4.29), medium (3.55), or low (2.80) median m' values, or two-digit numbers rated high (2.43) in association value on a scale from 0-4 (Battig & Spera, 1962). The 15 standard words occupied identical serial positions in all lists, and constituted half of each block of 10 items. The same random order of the 15 context items within the remaining serial positions was used for all Ss in each group.

All Ss were run simultaneously in large groups; using four small rooms for m groups and one large room for m' Ss. Each room included Ss from all four context conditions. All Ss were given a small spiral notebook and a stapled booklet with instructions on page one and one of the four lists on page two. An E read the instructions aloud and answered questions before Ss saw the list.

The m' Ss were instructed to rate each item for the number of "thing: or ideas (it) makes you think of," using a seven-point scale ranging from *very very few* (1) to *very very many* (7), and to write each stimulus item and its numerical rating on a different page of the spiral notebook in the presented order. These ratings were self-paced, and typically required about 10 min.

Instructions for m conditions were maximally similar to the m' instructions, except that these Ss were told to "write the words that the stimulus item makes you think of." To minimize response contamination, Ss were directed to (a) write each stimulus item at the top of a different page in the notebook and write their associations in order below it, (b) re-read the stimulus prior to each response, and (c) never re-read previous associations. Items were presented and responded to sequentially at a 45-sec. rate.

All Ss were told to remember all the items, but the recall data were processed only for Ss under the m condition, because the m' Ss had subsequently scaled an additional 30 items and the length of their study period was uncontrolled.

Results

Table 1 presents the mean m' value of standard and context items for each m' group, and shows not only the expected decrease in ratings from high to low m' context words, but also a contrasting increase in ratings of the corresponding standard words. Although the slight overall difference between lists for standard and context items combined was not significant ($F < 1$), the List by Standard-Context interaction was highly significant, $F = 23.56$, $df = 3/40$, $p < .001$. Scheffe's Contrast indicated the differences between high, medium and low context words all to be significant ($p < .05$), as was the higher rating of standard words in the low m' list as compared with standard ratings in the other three lists combined.

Differences in m between context items (Table 2) were comparable to the m' differences of Table 1. However, the m values for standard words also decreased from high to the other three context conditions, producing a significant Lists main effect, $F = 5.53$, $df = 3/40$, $p < .01$. The only significant Scheffe Contrast ($p < .05$) was the greater number of associations occurring in the high m' than in the other three context conditions. A significant Lists by Standard-Context interaction was mainly attrib-

Table 1. Mean Rated Association Value of Standard and Context Word in the Four Lists

Type of Item	List			Numbers
	High m'	Medium m'	Low m'	
Standard	4.02	4.25	4.94	4.07
Context	5.56	4.57	3.37	4.41
Overall	4.79	4.41	4.16	4.24

Table 2. Mean Number of Associations Given to the Standard and Context Words in the Four Lists

Type of Item	List			Numbers
	High m'	Medium m'	Low m'	
Standard	7.50	6.04	4.08	6.44
Context	8.84	5.81	5.02	5.61
Overall	8.17	5.93	5.55	6.03

utable to the larger list differences for context than standard words, the latter being virtually equivalent in medium and low m' contexts.

The variance in the ratings of standard words was insignificantly larger for the medium (4.55) than for high (3.89), low (3.88), or number (3.53) contexts. Significant differences in mean ratings between the 15 standard words were obtained for medium, $F=3.46$, $df=14/140$, $p<.001$, and to a lesser extent high context words, $F=1.93$, $p<.05$, but not for either low ($F=1.68$) or number ($F=1.40$) context conditions. Moreover, despite their high level of homogeneity (Noble, 1961), the relative ratings of these standard words were highly consistent across conditions, and the highly significant overall differences between standard words, $F=227.17$, $df=14/42$, $p<.01$, were much larger than the interaction of standard words with context conditions, accounting for 88.3% of the total variance from these two sources.

Mean number of items recalled for the m groups was significantly larger for context (7.45) than standard (6.61) items, $F=4.14$, $df=1/40$, $p<.05$, due to the superior recall of numbers (9.45) over context words (6.79). However, neither the overall recall differences between lists nor the Lists by Standard-Context interaction was significant, $F_s=2.20$ and 2.45 , $df=3/40$, respectively, both $ps<.10$.

Discussion

Conventional measures of verbal meaningfulness (m and m') were significantly altered by variations in context items. Moreover, the directions of these context effects were diametrically opposed for the m and m' measures. Consistent with adaptation-level (AL) theory (Helson, 1964), "contrast" was obtained for m' ratings, i.e., standard words were rated higher in the context of low m' words and lower in a high m' context. These m' results also showed greater variability in ratings for medium (standard) words in a similar medium context than in different contexts. This commonly observed tendency for Ss to spread their ratings over the entire scale is consistent both with AL theory and with Amster's (1964) similar results for verbal pleasantness.

The contextual effects on m entailed instead an apparent "assimilation" effect, such that the large number of associations elicited by the high context words increased

the rate and/or number of associations to standard words. This may reflect either or both an associative facilitation involving an increase in interitem associations, and/or some type of generalization effect.

However, despite the marked context effects on absolute values, the relative m' values for the 15 standard words remained remarkably consistent across context conditions, in view of the highly homogeneous m' ratings for these items (Noble, 1961). Thus context effects upon m' values may be of little consequence as long as all items are rated in comparable contexts, a requirement which the present results indicate to be minimally necessary for valid scalings of meaningfulness.

The lack of context effects on standard-word recall may stem from inadequate differences in contextual m', since even the recall of high, medium and low m' context words did not differ significantly. Recall of context numbers, however, significantly exceeded that of words even though the m' ratings for numbers were if anything lower than for words. This finding suggests that the usual consistent relationship of meaningfulness to ease of learning may not hold across different classes of verbal materials. The greater qualitative differences between numbers and words might be expected to enhance differentiation among and organization of the two classes of items into sublists, although such an interpretation cannot account for the nonfacilitation of standard-word recall in the number context. Instead the superior recall of numbers may reflect a lesser magnitude of interference associated with these than with word or letter materials, as postulated by Broadbent and his associates.²

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Notes

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2. Nancy S. Anderson, personal communication, 1965.