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NOTE

1. The author wishes to express his appreciation to Constance A. Miller for her assistance in the collection of the data, and to Drs. Roger W. Black, Richard A. Kasschau, and Harold R. Keller for their assistance in the preparation of this manuscript.

regarding the powerful influence of adjectives having strong connotative implications which was made by Cofer (1962) in the course of his studies of context effects in associative processes. It was predicted that vivid adjectives would be superior to dull adjectives in both immediate and delayed recall and that MVM containing vivid adjectives would show better recall than the same MVM having dull adjectives substituted for vivid adjectives. It was further hypothesized that nouns modified by vivid adjectives would be superior in recall to the same nouns modified by dull or colorless adjectives.

MATERIALS

The manipulated stimulus words consisted of 17 vivid and 17 dull adjectives selected from a pool of 68 adjectives for which ratings on a seven-point scale of the dimension "vivid-colorless" had been obtained from 30 male and female college Ss, and for which meaningfulness (*m*) data had been obtained from 50 male college Ss by the production method (Noble, 1952). The adjectives were selected in pairs of one vivid and one dull member, each appropriate for inclusion in the meaningful material to be presented to the Ss. Pair equivalence in *m* and in frequency of occurrence (Thorndike & Lorge, 1944) was closely approximated; the few discrepancies occurring were those which would work counter to the hypotheses concerning V. The meaningful material, into which either the vivid or the dull adjectives were inserted into 17 "slots" for presentation, consisted of a 112-word narrative concerning a professor and his students; it was designed to be interesting to Ss, but neither vivid nor dull in itself without the inclusion of the modifying adjectives. The experimental adjectives were the only adjectives occurring throughout the narrative.

PROCEDURE

The narrative in either its vivid or dull form was introduced to a total of four groups of Ss (two groups for each of the two conditions) as a brief memory task. Ss were asked to attend carefully during the oral presentation and immediately thereafter to write as much as they remembered as exactly as possible. After this free recall of the narrative, Ss were given approximately 30 min of interpolated activity consisting primarily of personality inventories. Following this interpolated activity, and having received no prior expectation of further requests for recall of the narrative, Ss were given mimeographed copies of the story in which the experimental adjectives had been replaced by blanks. Ss were asked to fill in as many of these blanks as possible; they were told that the exact words in their correct positions were preferred, "but if you can't remember exactly, guess." Ss were given up

Vividness of adjectives and the recall of meaningful verbal material

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Either vivid or dull adjectives (roughly equal in T-L frequency and m) were inserted into a narrative in 17 appropriate and identical slots. In immediate written recall after oral presentation 36 Ss hearing the vivid narrative showed greater productivity ($p < .01$) and greater recall of nouns ($p < .05$) than did 40 Ss who heard the dull narrative. Recall of the vivid and dull adjectives themselves showed no differences in immediate or delayed assisted recall. It is proposed that vividness of adjectives may involve an alerting or energizing function.

Vividness (V) as a variable in associative processes has a long history. Thomas Brown (1778-1820) proposed V as a secondary law of association, asserting that "... the parts of a train (of association) appear to be more closely and firmly associated, as the original feelings have been more lively [1854, Vol. 1, p. 372]." Despite its conceptual age, however, V has been explored in relatively few experimental studies. Early experimental work operationally defined V in terms of stimulus isolation which was achieved by such external manipulations as, e.g., printing particular trigrams or numerals in a color contrasting to that of others (Calkins, 1894; Van Buskirk, 1932) or stressing certain orally presented meaningful material by inflection, gesture, or verbal

emphasis (Jersild, 1929). So defined in terms of stimulus isolation, V has consistently shown a positive influence on retention.

In the course of recent studies, the variable of V has undergone a shift in its operational definition which suggests that V is conceived of as an "inherent" characteristic of verbal material rather than an externally imposed attribute. In the more recent work V has been defined by judges' ratings, usually under instructions which imply some similarity between V and imagery. Haagen (1949) defined adjective pairs of maximum V as "being highly colored and forceful, often emotionally toned"; adjective pairs of minimal V were described as "dull, lifeless, and lacking in intensity of feeling ... they bring to mind no graphic imagery." The reliability of such ratings was shown to be high. Tulving, McNulty, & Ozier (1965) found high V nouns superior to low V nouns in free recall; the potentially confounding effects of abstractness/concreteness, however, were uncontrolled. No recent studies were found which investigated V as a factor in other than rote learning tasks.

The present study was designed as an initial exploration of the V inherent in certain words as a factor in the immediate and delayed recall of meaningful verbal material (MVM). Adjectives were chosen as the experimental material; in addition to lessening the possible confounding effects of V with the abstract-concrete dimension, their selection was based upon a speculation

Table 1
Recall Scores of Meaningful Verbal Material as a Function of Vivid and Colorless Adjectives

Type of adjective in narrative	Recall Measures					
	Immediate Free Recall			Delayed Assisted Recall		
	Mean number of words produced (Pr)	Mean Adjectives (Adj)	Mean Nouns (Ns)	Mean adjectives correctly placed (Ac)	Mean adjectives anywhere (As)	Number of Ss leaving unfilled blanks (B)
Vivid (N = 36)	58.08	5.39	7.53	5.89	6.33	8
Colorless (N = 40)	48.50	5.18	6.38	5.17	5.92	20

to 5 min to provide this assisted delayed recall.

SUBJECTS

The Ss were 76 male Pennsylvania State University students recruited from introductory psychology classes in which participation in experiments was rewarded by a small increment in course grade. Thirty-six Ss were presented the vivid narrative and 40 Ss heard the dull narrative.

RESULTS

Immediate written recalls of the narrative were scored for experimental adjectives (Adj) appearing anywhere in the recall, four nouns (Ns) originally modified by these adjectives, and for gross number of words produced (Pr). The latter score has been shown by King (1960) to relate well to scaled accuracy of recall. The delayed "fill in the blanks" recalls were scored for number of experimental adjectives correctly placed (Ac), number of adjectives appearing anywhere in the narrative regardless of their correct placement (Aa), and ex post facto, for number of blanks (B) left unfilled by Ss.

Table 1 presents the various recall scores. It can be seen that all three immediate free recall scores are superior for the narrative containing vivid adjectives. Only two of these three scores, however, are significant: they are Pr ($p < .01$, two-tailed t test) and Ns ($p < .05$, two-tailed t test). Recalls of the vivid and dull adjectives are not significantly different. On delayed assisted recall, there are no significant differences between recall of vivid and dull adjectives, whether correctly in place or not. The B data yielded a chi square corrected for continuity (Siegel, 1956) significant beyond the .02 level of confidence ($\chi^2 = 6.50$, $df = 1$). It is unfortunate that the format for delayed recall, chosen because of particular interest in the adjectives themselves under the hypothesis of their differential delayed recall, does not allow for comparisons of Pr and Ns.

DISCUSSION

That the V of adjectives in MVM influences sheer productivity in immediate recall and the correct recall of the modified nouns suggests that adjectival V may involve an energizing or alerting function. The quality of V (as judged by raters) which is "inherent" in an adjective may serve a function similar to that of the external manipulations performed upon material in

the early work on V; better recall is obtained by printing a trigram in red vs the usual black (Van Buskirk, 1932), by verbal emphasis such as the phrase, "Now get this" (Jersild, 1929), or, in the case of the present study, by utilizing vivid rather than dull adjectives in a narrative. A supporting finding regarding the possible alerting or energizing function of vivid adjectives occurs in the delayed assisted recall data. The ex post facto inspection of the B data suggests that while the assisted adjective recalls of Ss hearing vivid adjectives were no better than those of Ss hearing dull adjectives, the former Ss were at least "more active" in the sense that they left fewer blanks unfilled. Taken together the findings of this exploratory study suggest that V may be a stimulus property conceptually related to other environmental variables affecting processes such as attention, selectivity, vigilance, and curiosity (Berlyne, 1960; Broadbent, 1958).

It is to be noted, however, that in the present study the vivid words *themselves* were not recalled either in immediate or delayed recall with statistical superiority over the dull words, whereas in the serial learning task of Tulving et al (1965) nouns rated high in V were recalled more readily than those rated low in V. As the two studies differ on a number of dimensions, their differing findings may only be speculated upon. The many and incompletely delineated differences between rote serial learning and the learning of MVM may, of course, be easily called to attention. A second suggestion is that the superiority of the Tulving et al (1965) high V nouns was related to their being more concrete than the low V nouns, which possibility was entertained by the authors themselves and is partially supported by data of Paivio (1965). That the key words for recall in the present study, which were adjectives and hence less appropriately referred to as concrete or abstract, were recalled with equal ease whether vivid or dull also lends support to this possibility. A third, and preferred, possible explanation lies in a difference between nouns and adjectives; adjectives modify nouns, and in the case reported here it would seem to be the differential *modifier impact* on associated nouns of vivid vs dull adjectives which is demonstrated.

As a variable, V has yet to be related to

more familiar dimensions such as those utilized by Osgood, Suci, & Tannenbaum (1957). It is hypothesized that V would correlate more highly with the familiar activity and potency factors of these investigators than with their primary factor of evaluation. A further speculation is that V may represent a special instance of degree of polarization or connotative strength, the vivid words used here being semantically located nearer their polar extreme than were the dull adjectives toward the opposite pole. Such possibilities are the basis of studies in progress on the further elucidation of the nature of V.

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