

# Cue saliency: A relevant variable in the utilization of a mnemonic structure\*

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Following Glanzer (1969), cue saliency was proposed as another variable in the utilization of a mnemonic structure. Three levels of saliency, represented by three mnemonic cueing paradigms designed to increase serial organization, were presented to 36 Ss in a multitrial, ordered recall task. Cue saliency was found to be directly related to the efficiency with which output was serially organized. The levels of serial organization were also related to overall retrieval, irrespective of ordinal position.

When presented a free-recall task, Ss tend to impose their own idiosyncratic organization upon output of items. In a recent study, Glanzer (1969) demonstrated that time and number of intervening words were two important variables in a mnemonic structure. Mnemonic structure is defined as any organizational system wherein the presence of one element will increase the probability of recalling the other. However, additional control of mnemonic elements seems to warrant investigation, since Ss often formulate their own idiosyncratic organization even when presented with a highly effective mnemonic (Olton, 1969).

In the present study a mnemonic, presented at different levels of saliency, was employed to enhance serial organization during output. A high degree of saliency is interpreted to mean a close and obvious relationship between mnemonic elements, while low saliency would imply elemental relationships so distant or obscure that Ss apply a wide range of idiosyncratic organization. Finally, it was desirable to investigate the effects of stress, since this variable has been shown to affect cue utilization as well as trace storage.

## SUBJECTS

The 36 Ss, who were introductory psychology students at Ohio University, were randomly distributed, six per group, into six groups formed by the factorial combination of two levels of stress instructions and three levels of cue saliency. Each S was given five trials.

## PROCEDURE

In the present study, the levels of cue saliency were represented by the presence or absence of (1) initial letters of the syllables combined with (2) instructions explaining the function of the mnemonic.

The lists for all Ss were composed of 15 trigrams alphabetized from "A" through "O." The meaningfulness ( $\bar{X} = 2.79$ ,

SD = .67) was determined by pronounciability norms (Underwood & Schulz, 1960). List 1 was composed of the 15 syllables printed in alphabetical order, while List 2 had the initial letter of the syllable located one inch to the left of each syllable

(e.g., A ALI)

All lists were presented serially on a memory drum with a 1-sec exposure time for each item. Following the presentation of the 15 items, a 2-min intertrial interval served as a test period in which Ss wrote their responses.

The alphabetical nature of the lists was brought to the Ss' attention at three levels. Saliency 1 (Sal 1) consisted of presenting List 1. Saliency 2 (Sal 2) was represented by presenting List 2 with instructions indicating that the single-letter cues were merely to indicate relative positions of words in the list. The highest level of cue saliency, Sal 3, presented List 2 with specific instructions pointing out the nature of the alphabetized list and suggestions for utilizing this serial characteristic during recall. All Ss given high-stress instruction were additionally told that high intelligence was associated with high recall and that their performance was an index of intelligence. Those in the low-stress conditions were given no supplementary instructions.

## RESULTS AND DISCUSSION

The overall effectiveness of the serial mnemonic would be reflected in the extent to which Ss alphabetized either part or all of their responses. When all syllables are recalled in perfect order, the maximum number of adjacent alphabetized pairs must always equal the total correct minus one. An index reflecting the degree of organizational efficiency was computed as: Efficiency Ratio (ER) =  $N \text{ Adjacent Pairs} / (\text{Total Correct} - 1)$ . This ratio ranges from 0 for no organization to 1 for perfect serial order. The ER is conceptually similar to Mandler & Dean's (1969) ratio with the

major exception that the ER is an intratrial measure rather than an index of concordance between trials. The ERs were then subjected to an arcsin transformation to stabilize the variances of these proportions (Winer, 1959) and were analyzed by a three-factor analysis of variance (Stress by Saliency by Trials) with repeated measures. The saliency [ $F(2,30) = 7.33, p < .002$ ], and trials [ $F(4,120) = 39.03, p < .001$ ] factors were highly significant, while no others reached a level of significance. An appropriate Duncan's Multiple Range Test was used to compare the means of the three levels of saliency. The mean for Sal 1 was found to be significantly different ( $p < .05$ ) when compared with the means of Sal 2 and Sal 3, but Sal 2 did not differ significantly from Sal 3.

The ERs associated with the three levels of cue saliency are presented in Fig. 1 with the levels of stress combined. Here it is clearly evident that the efficiency with which output is serially organized is directly related to the level of cue saliency. The suggestion that Ss will serially order output whenever possible (Mandler & Dean, 1969) might also be augmented on the basis of the present findings since Ss organized their output when the level of cue saliency was sufficient to permit effective seriation.

In addition to affecting organizational efficiency, cue saliency was also found to affect the total number of correctly recalled syllables. In Fig. 2 it can be seen that the highest level of correct recall of items was also associated with the highest level of cue saliency. It should be noted that ER and total number of items correct are not necessarily related since it is possible for Ss to recall all of the items, but not in serial order. The data on the number of correctly recalled items were also analyzed with a three-factor analysis of variance which revealed that the saliency [ $F(2,30) = 3.67, p < .037$ ] and trials [ $F(4,20) = 91.91, p < .001$ ] were significant while all other factors were not. An appropriate Duncan's range test showed

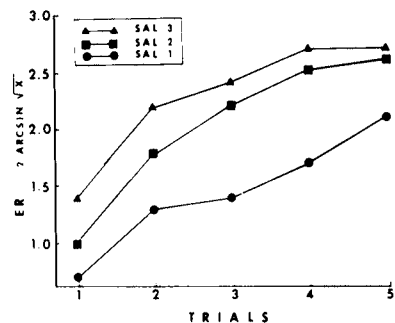


Fig. 1. Arcsin transformed efficiency ratios (ERs) for three levels of cue saliency.

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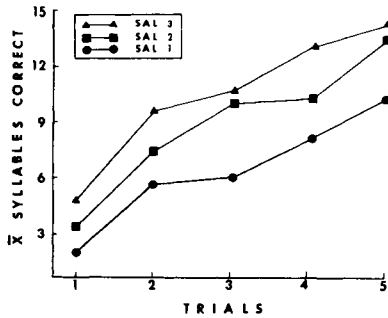


Fig. 2. Acquisition of trigrams for three levels of cue saliency.

that the mean of Sal 1 was significantly different from Sal 3 while all other comparisons were not. This suggests that seriation during output does serve to facilitate overall retrieval.

By manipulating cue saliency through the use of instructions and fragment cues, this study may well have met the requirements of optimal cueing suggested by Allen (1969). An analysis of the serial position effect for the three experimental groups revealed the typical inverted-U curve for Sal 1, but this effect was absent in Sal 2 and Sal 3. This would tend to agree with previous studies which show that Ss who effectively employ mnemonic structures fail to show the usual serial position effects (Persensky & Senter, 1969). Apparently, where organization was minimal in the Sal 1 condition, the serial nature of cueing during recall was not fully

utilized. The high levels of organization associated with Sal 2 and Sal 3 suggest there was little left in storage to cue since recall was optimal. The failure to find significant differences between Sal 2 and Sal 3 offers support for this interpretation.

The results of this study suggest the necessity for explicit clarification of elemental relationships when presenting Ss with a mnemonic structure. The failure of the E to clearly communicate the intended function of such paradigms will result in an inadequate utilization of the mnemonic and the introduction of unnecessary "error variance."

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magnitude it should have a greater effect upon the judgment of the series, but this has been demonstrated not to be the case.

Sarris<sup>2</sup> has suggested that the decline in the effectiveness of the anchor, even though it is further from the series values, is a function of "attention." Thus, one could say that although the physical magnitude of the anchor is increased, it is now perceptually "out of range," so to speak, and we do not attend to it. A class hypothesis is then implied. Once the anchor is judged outside of the stimulus class, based on the series values, it is not attended to.

To test Sarris's notion that attention has a role in the effectiveness of the anchor in a judgmental task, the following rationale was conceived.

Witkin et al (1962) have argued that people can be differentiated by their ability or inability "... to overcome an embedding context and to experience items as discrete from the field in which they are contained." Gardner et al (1959) have suggested that not only do people differ in their ability to differentiate stimuli from the context, but the Ss differ in the way they attend to aspects of the stimulus configuration. One who has been labeled as field independent could be defined as that person who has the ability to overcome the effect of contextual factors and select the stimuli from the field. Added to this is the extension that the field-independent person selectively attends to those parts of the stimulus field that are task relevant. Assuming that people can be so differentiated, it was hypothesized that an anchor should have a greater impact on the field-dependent Ss than on the field-independent Ss, since when asked to judge the numerosity of a series of random-dot patterns and told to ignore the anchor, the field-independent Ss should best be able to ignore the anchor.

## Field independence and anchor effectiveness

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To test the notion that attention is the mediator of contextual influence, it was assumed that field-dependent Ss' judgments should reflect greater anchor effectiveness than field-independent Ss. The data did not support this hypothesis. Both field-dependent and field-independent Ss appear to be equally influenced by contextual effects in magnitude estimates.

The use of the anchor paradigm<sup>1</sup> to study contextual effects has been common and the fact that the anchor has an effect upon judgments is well established (see, for example, Adamson, 1967; Bevan, 1968; Brown, 1963; Helson, 1964; Sarris, 1967; White, Alter, Snow, & Thorne, 1968). The specific way in which the anchor functions in the judgment situation is, however, open

to question. Sarris (1967, 1969) has shown that the anchor, as its value is moved away from the series values, increases in its impact on judgment, reaches some value of maximum effectiveness and then decreases in its impact on judgment. This is noteworthy because the logical argument from physical parameters would seem to be that as the anchor increases in physical

#### SUBJECTS

Forty undergraduate students at the State University of New York at Albany were given the short form of Witkin's embedded figures test (EFT) (Jackson, 1956). From these 40 Ss, the 5 males and 5 females having the highest field-independent scores and the 5 males and 5 females having the lowest field-independent scores (from hereon called the field-dependent group) were chosen to be recalled for the judgment task. Thus, these 20 Ss were contacted about a week after they took the EFT and asked to participate in another experiment. On the evening that the judgmental phase of the study was conducted, all 10 of the field-independent Ss (5 males, 5 females) returned; however, only 8 of the