

# Facilitation of free recall of category names and instances by indirect part-set cuing

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High-school students recalled category names and instances after a study period and a recognition test, which was intended to serve as a kind of indirect part-set cuing. They recalled both category names and noncued instances better after the part-set cuing. The amount of such cuing (one, two, or three of the four instances studied per category) made no difference. This form of indirect part-set cuing thus seems to produce facilitation, rather than the inhibition in retrieval that is so often found to result from more direct provision of partial cues, and thus may help to establish one kind of boundary condition for that phenomenon.

This experiment was designed to test the effects of amount of immediately prior part-set cuing on the recall of category names and instances. Increased impairment in recall of noncued category instances as a result of greater proportions of cued instances provided at recall has been reported by Rundus (1973) and Roediger (1973).

A different kind of part-set cuing was used in this exploratory experiment. Four instances of each of 16 categories were first presented for study. The subjects were next shown zero, one, two, or three instances from each set, each such instance paired with a similar but not previously studied instance, and were asked to select the one that had been previously shown. A standard free-recall test was then administered.

## METHOD

### Subjects

A total of 44 first- and second-year senior-high-school students from four classes in a private school participated.

### Lists

Four lists were used in the study phase, one for each class. Each list consisted of 16 category names (e.g., U.S. presidents, automobiles, trees, birds) and four instances (e.g., Harry Truman, John Kennedy, Richard Nixon, Abraham Lincoln) in each category. To control for item specificity, the four instances in each category were randomly assigned a prerecall cuing frequency of zero, one, two, or three, and the corresponding number of instances was randomly drawn from the four. In the first list there were thus four categories with a prerecall cuing frequency of zero, four with one, four with two, and four with three instances. The four sets of category thereby formed were then systematically rotated in prerecall cuing frequency over the remaining three lists. Thus each category occurred one time in each of the four prerecall frequencies (sequences of 0, 1, 2, 3; 1, 2, 3, 0; 2, 3, 0, 1; and 3, 0, 1, 2).

### Procedure

The subjects were tested in their normal classroom settings (14, 10, 12, and 8 in attendance). They were informed that the experiment concerned memory and that they would be shown for study a series of

categories with four examples in each. Words were presented by means of 16 slides, each with a category name underscored at the top and four instances below. A study time of 10 sec was allowed for each slide.

Part-set cuing was administered in the form of a recognition test given immediately following the study phase. Subjects were shown a series of 24 slides, each containing one of the studied words and a distractor word, which was always an unstudied instance from the same category. The series was randomly arranged, with the restriction that no more than one instance from any category could occur within any quadrant of the series. Each slide was shown for 5 sec. Because the purpose of this test was simply to provide part-set cuing, the answers were not scored.

The free-recall test followed immediately. Subjects were instructed to write the studied category names and instances as they thought of them. They were cautioned to work quickly because of limited testing time and to recall as many of the categories as they could rather than all of the instances from just a few categories. They were allowed 3 min.

## RESULTS

### Category Names

The mean number of category names recalled was .52, 1.55, 1.68, and 1.75 for the categories with zero, one, two, and three cued instances, respectively. A chi-square analysis was used to test the increments from zero to one and from one to three cued instances. Of the 44 subjects, 34 recalled more category names from the one-cued than from the zero-cued condition, 5 showed the opposite result, and there were 7 ties. With ties distributed evenly between proportions and a 50-50 chance distribution assumed, the increment from zero- to one-cued instances was reliable ( $\chi^2 = 16.56, p < .01$ ).

A more numerically exact control for item specificity is made possible by direct comparison of the zero-cued and two-cued conditions for the two groups of subjects who were given these conditions for the same sets of categories in opposite arrangement. Thus Class 1 had category Set A zero-cued and Set C two-cued, whereas Class 2 had Set A two-cued and Set C zero-cued; a similar arrangement of Sets B and D occurred for Classes 3 and 4. A chi-square analysis of the number of subjects recalling a greater number of the two-cued category names (29) and those recalling a greater number of the zero-cued

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names (5), with 10 ties, again indicated a reliable difference ( $\chi^2 = 13.10$ ,  $p < .01$ ).

Fifteen of the 44 subjects recalled more one-cued than three-cued category names, 20 subjects showed the opposite tendency, and there were 9 ties. This difference was not reliable ( $\chi^2 = .56$ ,  $p > .05$ ).

### Noncued Instances

The mean number of noncued words recalled for each of the cuing conditions was 1.18, 1.82, 1.13, and .62 for zero-, one-, two-, and three-cued conditions, respectively. When these means are corrected for opportunity to recall (four, three, two, and one per category for the zero-, one-, two-, and three-cued conditions, respectively), the probabilities of recall of any one noncued word become .07, .15, .14, and .16 for the same cuing conditions. Noncued word recall was approximately twice as frequent for cued categories, but the amount of cuing did not affect that frequency.

The reliability of the increment in recall from zero- to one-cued conditions is indicated by the fact that 25 of the subjects recalled a higher proportion of noncued instances in the one-cued condition than in the zero-cued condition, compared with 9 showing the opposite result and 10 ties ( $\chi^2 = 5.82$ ,  $p < .05$ ). When the zero-cued and the two-cued conditions were compared, using the analysis described earlier, a similar result occurred: 31 subjects recalled a higher proportion of noncued instances in the two-cued than in the zero-cued condition, 4 showed the opposite result, and there were 9 ties ( $\chi^2 = 16.56$ ,  $p < .01$ ).

Comparison of the frequencies of recall of noncued words in the one-cued and the three-cued conditions by

individual subjects confirmed the null result indicated by the means: 19 subjects showed a higher probability of recall under the one-cued condition, 17 under the three-cued conditions, and there were 8 ties.

## DISCUSSION

The major significance of these results is that they indicate a methodological limitation of the part-set cuing phenomenon. Prerecall cuing of the sort used in this experiment apparently produces facilitation rather than inhibition in retrieval. Future research needs to address whether this difference in results is due to the time interval between cuing and testing that necessarily occurs with prerecall cuing or to some other factor.

In light of the fact that there is no one compelling theoretical interpretation of the inhibition in retrieval generally found with part-set cuing (Nickerson, 1984), the negative results of this experiment may suggest one kind of boundary constraint of the sort that needs to be established in understanding the phenomenon.

The present results clearly confirm the previously noted fact that a single part-set cue is sufficient to produce greater recall of categories than does no cue and that adding more part-set cues provides no further effect (Slamecka, 1972). It is of interest that the proportion of noncued instances recalled seems to follow the same pattern for the indirect part-set cuing used in this experiment.

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