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Whitmarsh (1957). Four categories of words were chosen: countries, musical instruments, birds, and cloths. A triad of words drawn from the musical instrument category was designated as the critical triad (trumpet, harp, cello).

CONDITIONS

The experimental problem was to assess the effects of particular STM histories upon the recall of a common triad. Three histories were constructed: Condition 1—A heterogeneous history provided by a triad of countries, a triad of cloths, and a triad of birds. Condition 2—A homogeneous history consisting of three triads of words drawn from the same category as the words of the critical triad, i.e., musical instruments (this condition was the control condition for PI release). Condition 3—A homogeneous history consisting of three triads of words drawn from a different category, i.e., countries, than that from which the critical words had been drawn.

Two retention intervals of 5 sec and 15 sec were used. There were, therefore, six groups designated as: Condition 1, 5 sec; Condition 1, 15 sec; Condition 2, 5 sec; Condition 2, 15 sec; Condition 3, 5 sec; Condition 3, 15 sec.

PROCEDURE

Each S in each group received four trials, the three trials of the experimental history and the critical trial. A trial was composed of the following events presented as a sequence of slides by means of a Kodak Carousel projector and controlled by means of a tape-timer; first, a ready signal of 2-sec duration; second, a word triad of 2-sec duration that S read aloud once; third, a three-digit number present throughout the retention interval of either 5 or 15 sec from which S counted backwards aloud by three's to the beat of a metronome set at 60 beats

Taxonomic categories and proactive interference in short-term memory¹

M. T. TURVEY, J. J. CREMINS, and T. LOMBARDO, *University of Connecticut, Storrs, Conn. 06268*

The Ss were given four successive short-term memory trials with word triads. The retention interval was either 5 sec for all four trials or 15 sec for all four trials. When the word triads on each trial were drawn from different taxonomic classes, proactive interference was not found to develop across trials for either the 5-sec or 15-sec retention intervals. Furthermore, when the word triads on Trials 1-3 were from the same taxonomic class and the word triad on Trial 4 was from another taxonomic class, a release from proactive interference was obtained in both the 5-sec and 15-sec retention interval conditions. The results suggest that proactive interference in short-term memory is relatively class-specific and that release from proactive interference is best explained by an interference interpretation rather than a novelty interpretation.

Recently Loess (1967) has shown that proactive interference (PI) does not develop across taxonomic categories in short-term memory (STM). Also, Loess (1967) demonstrated the release from PI effect (Wickens, Born, & Allen, 1963) by presenting words from a second category after PI had been built up through successive presentations of words from a single taxonomic category. Loess's results indicate, therefore, that PI is relatively class-specific and that the phenomenon of PI release is due to the new items being free from the interference generated by the preceding items.

The present experiment was conducted to further assess these relationships, between taxonomic category change and PI, in STM.

In regard to the lack of PI development across taxonomic classes observed by Loess (1967), two methodological points may be raised. First, Loess used a 9-sec retention interval. Given the observation (Keppel & Underwood, 1962) that PI is greater the longer the retention interval, it is possible that the interval used by Loess was too short to allow for the effective development of PI across taxonomic classes. Second, in the Loess study a 6-sec intertrial interval was used. Since PI has been shown to weaken over the intertrial interval (Peterson & Gentile, 1965), this 6-sec rest period may have allowed for the dissipation of PI. The intertrial interval used by Loess was considerably less than those examined by Peterson and Gentile (1965), but it may have been of sufficient duration to eliminate PI effects in this particular instance, when words from specific taxonomic classes were used as the stimulus items.

The present experiment was, therefore, designed to take into account these considerations. Furthermore, it was designed to allow for a direct comparison between the "no PI build-up" condition and the "release from PI" condition. A prediction, on the basis of Loess's data, is that a word triad from a particular taxonomic class should be recalled equally as well after a taxonomically different homogeneous history as after a taxonomically different heterogeneous history.

SUBJECTS

The Ss were 180 undergraduates from the introductory psychology program at the University of Connecticut. Each S was allocated, in order of appearance at the laboratory, to one of six groups, with 30 Ss per group.

MATERIALS

Word triads were prepared from the list generated by Cohen, Bousfield, &

Fig. 1. Per cent recall over trials for the 5-sec conditions.

Fig. 2. Per cent recall over trials for the 15-sec conditions.

per minute; fourth, a question mark of 10-sec duration that was S's cue to recall the word triad. With termination of the recall phase, the ready signal appeared to begin the next trial. S's recall and performance on the interpolated task were recorded by E. S was scored for number of correct words without regard for order.

The triads in an experimental history were counterbalanced across the three trials.

RESULTS

The recall data as a function of trials and conditions for the 5-sec retention interval are presented in Fig. 1, and the recall data as a function of trials and conditions for the 15-sec data are presented in Fig. 2.

The questions of primary interest were: (1) Is the lack of PI development across taxonomic classes restricted to short retention intervals? (2) Is a word triad from a particular taxonomic class recalled equally as well after a taxonomically different homogeneous history as after a taxonomically different heterogeneous history? Observation of Figs. 1 and 2 indicates that whereas PI developed in Condition 2, 5 sec, Condition 3, 5 sec, Condition 2, 15 sec, and Condition 3, 15 sec, there was no similar development of PI in Condition 1, 5 sec, and Condition 1, 15 sec. The data of Condition 1, 5 sec, and Condition 1, 15 sec, for all four trials were cast into a 2 (retention interval) by 4 (trials) analysis of variance with repeated measures on one factor. The main effect of trials was insignificant ($F < 1$) as was the main effect of retention interval ($F < 1$) and the Trials by Retention Interval interaction ($F < 1$). This analysis clearly indicates that PI did not develop across taxonomic categories for either the 5-sec or 15-sec retention interval and that the recall level of Condition 1, 15 sec, did not differ from the recall level of

Condition 1, 5 sec. A second analysis of variance was performed on the Trial 4 data for all conditions. This analysis yielded a significant conditions effect ($F = 26.7$, $df = 2, 174$, $p < .001$) showing that the recall of the critical triad on Trial 4 was a function of the preceding STM history. Observation of Figs. 1 and 2 reveals that the recall of the critical triad subsequent to the taxonomically different heterogeneous history (Condition 1) and the taxonomically different homogeneous history (Condition 3) was significantly higher than the recall of the same triad after the taxonomically the same, homogeneous history (Condition 2). The analysis of variance also showed that the retention-interval effect was insignificant ($F < 1$), and that there was no Retention Interval by Conditions interaction.

In regards to the second question, observation of Fig. 1 shows that there was no difference between Condition 1, 5 sec, and Condition 3, 5 sec, in the recall of the critical triad. Figure 2, however, indicates that the absolute recall of the critical triad after the Condition 1, 15 sec, history was slightly inferior to the recall of the critical triad after the Condition 3, 15 sec, history. An a priori comparison showed, however, that this difference was insignificant ($F = 1.91$, $df = 1, 174$, $p > .05$).

DISCUSSION

In brief, the results of the present experiment corroborate the Loess (1967) study. PI did not develop across taxonomic categories, and PI release was obtained with a shift from one category to another. The present results compliment Loess's (1967) data by showing that, even without an intertrial interval, PI did not develop across taxonomic categories for either the short or long retention intervals of 5 sec and 15 sec, respectively.

The fact that the recall of the critical triad, subsequent to the taxonomically different homogeneous history, was the same as the recall of the critical triad after the taxonomically different heterogeneous history favors a "freedom from interference" interpretation of PI release over a novelty or perceptual enhancement interpretation. It may be suggested that novelty operates in Condition 3 because the S receives a series of words from one particular category and then receives a triad of words from a different category. The description "novel" is not applicable, however, to the appearance of the critical triad in Condition 1, yet both Condition 3 and Condition 1 have equivalent effects on the recall of the critical triad. It would seem, therefore, that for the sake of parsimony, a perceptual enhancement interpretation of the augmented recall of the critical triad in Condition 3 must succumb to an interpreta-

tion couched in terms of interference processes.

The observation that Condition 1, 15 sec, did not display lower recall over the four trials than Condition 1, 5 sec, raises a problem for decay theory. In both conditions some forgetting occurred. The averages across the four trials for Condition 1, 5 sec, and Condition 1, 15 sec, were 84% and 85.7%, respectively. However, the degree of forgetting did not, as clearly indicated by these figures, increase with the increase in retention interval. This suggests, therefore, that when interference is prohibited in an STM test series, forgetting is not an increasing function of the retention interval.

Finally, a comparison between the present experiment and experiments by Turvey (1968) suggests that taxonomic classification and connotative classification may operate somewhat differently in STM. Turvey (1968) showed that recall of a common triad of words from a particular connotative class was significantly better after a connotatively different homogeneous history than after a connotatively different heterogeneous history and that PI developed across connotative classes. The difference between the present experiment and the Turvey (1968) experiments could be due to imperfections in the connotative classification of words by the "Semantic Differential" (Osgood, Suci, & Tannenbaum, 1957), or they could be due to the fact that the connotative classification of a verbal item in STM, and the taxonomic classification of a verbal item in STM, obey somewhat different contingencies.

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