Sex differences in recognition memory*

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Six males and females were tested on a recognition memory task by the method of old and new stimuli. A signal detection analysis of the data showed no difference in discriminability between males and females. It was suggested that previous work showing sex differences in perception might be better interpreted as showing (uncontrolled) response criteria differences.

Little attention has been paid to sex as a factor in perceptual recognition experiments, probably because there are no good (intuitive or a priori) reasons why it should be of any importance. Recently, however, Messé, Chisena, & Shipley (1968) reported finding males superior to females on a simple word recognition task. They considered the perceptual difference might be due to (1) inherent or experiential variables, or (2) differences in the ability to organize stimuli or in the tendency to respond to partial cues.

Two discrepancies may be found with the procedure and results of Messé et al. First, they employed the notoriously unreliable ascending method of limits to obtain recognition scores; the exposure duration at which a S first responded correctly to a stimulus was used as the recognition criterion. Second, their reported difference for male and female scores was actually no better than a chance occurrence ($p < .08$).

The present experiment was designed to reassess sex differences in perception/recognition memory using the method of "old" and "new" stimuli. Green & Swets (1966) point out, "this memory task is much like the yes-no task of detection in psychophysics . . . recognition memory has long been viewed as a threshold process, and the data have commonly been subjected to a correction for chance success [p. 337]." In contrast to the classical psychophysical procedures (e.g., method of limits), signal detection analysis allows for a measure of sensitivity unconfounded by varying response criteria; this analysis will be used here.

SUBJECTS

Six male and six female high school students served as Ss in this experiment. Their mean age was 16 years and all had corrected or uncorrected normal vision.

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APPARATUS

Stimuli consisted of 100 words selected at random from the A category (occurring between 50 and 100 times per million words) from the Thorndike & Lorge (1944) word count. Only two-syllable words of five or six letters were used. Each word was mounted on a 12.7 x 17.8 cm white card (Letraset No. 287, lowercase) and subtended a horizontal visual angle of approximately 1.0 deg when viewed in the tachistoscope. Viewing was binocular.

PROCEDURE

The words were assigned randomly to one of two blocks, $n_1 = n_2 = 50$. The words in one block ("old" stimuli) were first presented to each S at an exposure duration of 1 sec and an interstimulus interval of 5 sec. The words in both blocks were then randomized for a second presentation,

and the S's task was to decide whether each word shown was an "old" stimulus or a "new" stimulus (not seen in the initial presentation) and to rate his/her decision confidence on a 6-point scale from "old-positive" to "new-positive."

RESULTS

The index of discriminability, d_s , was calculated for each S from the cumulative probability distributions extracted from the confidence rating data. A test of the male-female d_s scores gave a t of 1.72 which, with 10 df, was nowhere near significance for either a one-tailed or a two-tailed hypothesis. The data from each sex group were cumulated and average ROC curves were calculated. Figure 1 shows the relationships between responding "old" when in fact the stimulus was old $P(O|o)$ and responding "old" when in fact the stimulus was new $P(O|n)$ for males and females. The mean d_s for males was 1.22 and for females was 1.49. The male discrimination index compares well with that obtained by Egan (1.20) in a similar recognition memory experiment (see Green & Swets, pp. 339-341).

Classically, recognition memory has been assessed in terms of global hit and false alarm rate scores. In the present experiment, for males, the mean hit rate was 0.74 and the mean false alarm rate was 0.28. For females,

Fig. 1. ROC curves for females and males plotted on linear normal-deviate coordinates. The axes are marked off in z scores.

the figures were 0.72 and 0.17, respectively. While females correctly discriminated fewer old stimuli, they also committed fewer errors than males.

DISCUSSION

Previous work on sex differences in recognition tasks has shown variable results: Males have sometimes performed better than females (e.g., Thompson, 1903), females sometimes better than males (e.g., Osgood, Suci, & Tannenbaum, 1957). Messé et al (1968) observed males to have lower recognition scores than females, but the present experiment has shown no sex difference in recognition memory. A similar state of confusion exists in vigilance behavior (Davies & Tune, 1969).

It is suggested that much of this confusion is a necessary result of diverse testing and analytic procedures. Messé et al (1968) commented that males might be more willing to take a chance and guess when operating under conditions of uncertainty than are females. Detection and hit rate scores will be biased in favor of a group which displays relatively high guessing behavior whenever classical analytic procedures are used. Signal detection analysis, on the other hand, allows for the meaningfulness of false alarms and assumes that information is handled "continuously" by the observer. It is probable that sex differences observed in many perception and recognition experiments reflect different response criteria and had allowance been made

for these, no "sex" differences would emerge.

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