NOTE

1. This study is supported in part by a postdoctoral fellowship at the Institute of Human Learning, University of California, Berkeley, and in part by Grant MH 12979-02 of

the National Institute of Mental Health. The author is grateful to Prof. Leo Postman for his assistance in facilitating this research. Many thanks are due to Elaine N. Blesi who collected the data.

($F = 2.72$, $df = 5/110$, $p < .025$), and that the difference between the replication and experimental conditions approached significance ($F = 3.14$, $df = 1/22$, $p < .087$).

Ten of the 12 stimulus nonsense words were rated as meaning something "better" when they appeared at high-frequency levels (i.e., 5, 10, and 25) than when they appeared at low-frequency levels (i.e., 0, 1, and 2). The chance of this occurring in 10 or more stimulus words has a probability of less than .002. An overall t test between the ratings of high- and low-frequency stimulus words indicated that the high-frequency words were seen as significantly "better" ($t = 3.34$, $df = 286$, $p < .005$). Nine of the 12 stimulus words were rated higher in the replication condition than in the experimental condition. This approaches significance ($p < .073$).

DISCUSSION

The demonstration of the exposure-frequency effect in the present study is consistent with the findings of Zajonc (1968) and others (e.g., Becknell, Wilson, & Baird, 1963; Johnson, Thomson, & Frinke, 1960). In subsequent studies using Chinese-like characters and yearbook photographs of men's faces, where pronunciation by either E or S was impossible, Zajonc demonstrated that visual input alone is sufficient to produce the effect. However, the average ratings in the three studies were not compared with each other as in the two conditions of the present study. The results here indicate both that the effect may be obtained with nonsense-word stimuli when E remains silent, and that the effect tends to appear lower on the "goodness"-of-meaning scale

Attitudinal effects of mere exposure: A replication and extension^{1,2}

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Three sources of stimulus input, one visual and two aural, were distinguished in Zajonc's (1968) study that demonstrated that rated "goodness"-of-meaning of nonsense words is a positive function of exposure frequency. In the present study, both a replication condition and an experimental condition that deleted one of the aural sources of input yielded the same function ($p < .025$). In the replication condition, the stimuli were rated somewhat more "good" than in the experimental condition ($p < .087$), indicating that the increased aural input enhanced the ratings. Possible areas of future research were mentioned.

In a 1968 monograph, Zajonc suggested, and presented evidence for, the hypothesis that repeated exposure to a stimulus enhances a S's attitude toward that stimulus. In this context, to enhance means to be rated higher on a "goodness"-of-meaning scale. In one study, 12 seven-letter nonsense words were presented at six different frequencies from 0 to 25. As each word was shown, S would pronounce it after E. When asked subsequently to rate each word on the "goodness"-of-meaning scale, Ss tended to rate a word higher as a function of its frequency of exposure. At each presentation of a word, S was exposed to the stimulus in three ways: seeing it, hearing E pronounce it, and hearing himself pronounce it. If one of these three types of exposure were eliminated, Zajonc's hypothesis would predict that S would show less of an enhancement to the stimulus, since he would be deprived of one source of input, reducing frequency of exposure by one-third. Ruling out S's pronunciation would not necessarily eliminate a subvocal pronunciation, still leaving three types of exposure at each presentation. Therefore, in the present study, an experimental condition deleted

E's pronunciation of the nonsense word.

METHOD

Twenty-four female registered nurses at the Hamilton Psychiatric Hospital, Hamilton, Ontario, served as Ss in the present experiment. In the replication condition, 12 Ss were presented with the stimulus nonsense words, as in Zajonc's study. They were told that each word was a Turkish adjective, and that they were to look at it and pronounce it after E. In the experimental condition, the 12 Ss were told just to look at each word and pronounce it. E did not pronounce it.

In both conditions, two nonsense words appeared at each exposure frequency (0, 1, 2, 5, 10, and 25). The 12 stimuli appeared an equal number of times at each frequency level under each condition. Six different combinations of stimuli and exposure frequencies were employed, each being used with two Ss per condition. Stimuli were presented on 3 x 5 in. index cards and were shuffled before presentation to each S.

After the stimulus presentations, S was told that her task was to guess what each word meant in Turkish, but that since this was quite difficult, it was suggested instead that she rate the "goodness" or "badness" of the word's Turkish meaning. The rating was done on a 7-point, good-bad, Likert type of scale. The order of presentation of stimulus words for rating was randomized for each S. Two additional stimuli, never seen by S (the 0 frequency presentation), were also rated.

Following these procedures, each S was told the true nature of the experiment, was thanked for her participation, and was asked not to reveal, for a reasonable length of time, the details of the task.

RESULTS

Figure 1 presents the ratings of "goodness"-of-meaning across each of the six exposure frequencies for the replication (E and S pronounce) condition and the experimental (S pronounce) condition. Analysis of variance indicated that the exposure-frequency effect was significant

Fig. 1. Average rated "goodness"-of-meaning of nonsense words as a function of frequency of exposure.

(see Fig. 1). This lower rating of "goodness," which approaches accepted levels of significance, may be occasioned by S's lower level of familiarity with the stimulus due to the omission of one of the aural sources of input (i.e., hearing E pronounce the word). Although the presence of this input source appears to enhance the ratings of the individual stimuli, it does not seem to attenuate the more general exposure-frequency effect.

Indirect evidence for the exposure-frequency effect was found in the comparison of individual words when used at low or high levels of exposure frequency. Although an overall t test indicated a significant difference, two words failed to be rated "better" in the high-frequency conditions than in the low-frequency conditions. The reason for this may have been an insufficient number of Ss. An unexpectedly small number were

available to the E (12 per condition), so that only one-sixth as many Ss participated in the present study as did in each of Zajonc's three studies. The same reason may provide a partial explanation for the more serious problem of the failure to reach accepted levels of significance between the replication and control conditions. This occurred in both the analysis of variance and the comparison of individual stimulus words in each condition. A replication of the present study may clear up this problem.

Future research into this effect may be directed toward the contribution of various combinations of input to S, and the weight of such inputs in determining where, on the "goodness" scale, the exposure-frequency effect will fall.

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NOTES

1. This research was carried out while the author was a psychological trainee during the Summer Training Programme 1969 of the Psychology Department, Hamilton Psychiatric Hospital, Hamilton, Ontario. Gratitude is hereby expressed to those staff members who cooperated in the execution of the project.

2. A special note of gratitude is expressed to Prof. Richard V. Thysell of the Department of Psychology, University of Waterloo, who provided editorial comment and suggestions on earlier versions of this paper.

ERRATUM

ELLIS, H. D. Illusions, aftereffects and iconic memory. *Psychonomic Science*, 1969, 17, 328-329.—P. 329, Fig. 1. The illusions have the wrong labels. They are labeled correctly in the figure to the right.

Hering Illusion

Zöllner Illusion