Task specific decrements in the duration of attention¹

BRUCE T. LECKART
OHIO UNIVERSITY

Eighty undergraduates viewed a series of 80 color photographs under instructions asking them to view each stimulus for as long as they wished. The results indicated that a significant decrease in looking time occurred as a function of the number of previous stimuli viewed. These results were interpreted in terms of considering the looking situation as an information processing task.

A rapidly increasing number of studies have been concerned with the duration of attention, i.e., free looking time or the amount of time S spends looking at a stimulus when he is free to look at it for as long as he wishes. The general finding of these studies is that the duration of attention is a function of stimulus as well as subject variables (e.g., Bakan & Leckart, 1966; Berlyne, 1958; Leckart, 1966; McReynolds, 1963; Zamansky, 1958).

However, as research in this area continues to expand, the importance of determining the influence of variables within the looking situation itself is being recognized (Brown & Farha, 1966; Leckart, Keeling, & Bakan, 1966; Murray & Brown, 1967). Hopefully, the possession of additional information about the looking task per se will provide a more solid basis for future experimentation.

The purpose of the present study was to determine if any decrements occur in looking time as a function of the number of stimuli previously attended to. At least two studies in this area suggest that decrements do occur. Accordingly, Haywood (1962) found that looking time for both novel and familiar stimuli decreased from the first 15 trials to the second 15 trials of a free looking task. And, Day (1966) found a decrement in looking time between the first half and the second half of a series of 60 stimuli composed of color photographs, geometric line drawings, and Barron-Welsh Art Scale patterns. But, in both cases, there was a picture by trials confounding which does not permit the reader to unequivocally decide if the decrement was due to the number of previous stimuli viewed or to the particular stimuli occurring at the beginnings and ends of the lists. The present study was designed to eliminate this confounding and to provide more specific information on the course of the decrements.

Subjects

The Ss were 80 undergraduates selected from the introductory psychology course at Ohio University.

Apparatus

The stimuli were 129 color slides of landscapes, single objects, and arrays of objects which were

rated by 137 Ss on a 7-point complexity scale. On the basis of the mean complexity ratings, 80 stimuli were selected from the middle of the complexity range.

The 80 stimuli were first consecutively numbered from 1 to 80 according to the mean complexity ratings. The most complex stimulus was given the number 1 and the least complex stimulus was given the number 80. The stimuli were then divided into eight blocks of ten stimuli each. Stimuli 1 to 10 comprised Block A, stimuli 11-20 comprised Block B, etc. A random order of the eight blocks was then selected. Then, one stimulus was randomly selected from each of the eight blocks. These eight stimuli, when arranged in the random block order, comprised the first eight stimuli in the experimental list. Stimuli 9-16 were selected, one each, from the eight blocks in such a way that Stimulus 9 came from the same block as Stimulus 1, Stimulus 10 came from the same block as Stimulus 2, and so on. Stimuli 17-24, 25-32...73-80 were selected in a similar manner such that stimuli numbered 1, 9, 17...73 all came from within the same complexity block, Stimuli 2, 10, 18...74 all came from the same complexity block, and Stimuli 8, 16, 24...80 all came from the same complexity block. Constructing the experimental list in this manner made every consecutive block of eight stimuli approximately equal in mean complexity rating to any other block of eight consecutive stimuli that might be selected. Thus, each of the 80 Ss could begin at a different point in the experimental list with the assurance that consecutive blocks of eight stimuli would have approximately equal mean complexity ratings. Thus, the crucial variables of stimulus complexity could be controlled while picture by trials confounding could be prevented.

The stimuli were projected on a white lenticular screen by a Kodak Carousel 700 projector placed 8 ft from the screen. Ss sat in a chair placed 5 ft from and facing the screen on which a 20 x 30 in. image was projected.

Procedure

Subjects were instructed to look at the stimuli one at a time for as long as they wished. They were told that the experiment was "not a test of your memory" and that they would "not be asked to remember any of the stimuli or anything about them." A button provided Ss enabled them to change the stimuli. Looking times were recorded to the nearest .1 sec with an Esterline-Angus event recorder. Neither

Fig. 1. Mean looking time per picture for the 10 blocks of trials.

the recorder nor the supporting electronics could be seen or heard by the Ss. In order to minimize experimenter effects, the instructions were tape recorded. Initially Ss were informed that they would be given further instructions when they finished looking at the pictures. Immediately after the looking task Ss were asked to complete two self-rating checklists. These tasks served to give Ss closure on the experimental task.

Results

Ten scores were obtained for each S, the mean looking time per picture for each of the 10 consecutive blocks of eight stimuli. These mean looking times are presented in Fig. 1. An analysis of variance of these scores revealed a significant trials effect ($F=10.77$, $df=9/711$, $p<.01$) which reflects the decrement in looking time as a function of the number of previous stimuli viewed.

Discussion

The present study indicates that decrements occur in looking time as a function of the number of previous stimuli viewed. As such, the present data support the less rigorous observations of previous researchers (Haygood, 1962; Day, 1966).

The present study also provides information about the course of the decrement in looking time. It indicates that the majority of the decrement occurs between the first block of eight trials and the fourth block of eight trials. Within the span of these four blocks there is an approximate 20% decrease in looking time. The data also indicate that a second decremental trend occurs after the seventh block of trials, or after 56 stimuli have been viewed. This second decrement is considerably smaller and more gradual than the first. No leveling off of this second trend was observed.

One rather simple explanation of these findings is that the Ss merely "get tired" of looking at pictures and attempt to leave the laboratory by completing the task as quickly as possible. However, the absolute sizes of the decrements are small and not what one might expect if Ss merely "give up."

One alternative explanation is based on information theory. According to this position, if attending to pictures is conceived of as an information processing task, then the duration of attention should be (a) directly related to the amount of information available in the stimulus, (b) inversely related to S's speed in processing this information, and (c) directly related to the proportion of the originally available information processed. However, in the present experiment the amount of information did not vary across trials, since there was no picture by trials confounding. Therefore, it can be argued that the decrements observed in the present study were due to either (a) an increase in the rate of processing, or (b) drops in the proportion of information processed, or (c) a combination of both. It can only be speculated that an increase in the rate of processing might be due to Ss "learning to process" or developing some facilitating set, and that a decrease in the proportion of information processed might be due to some fatiguing aspect of the information processing task.

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Note

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