Effect of novelty on stimulus selection in children

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Thirty-nine four and five year old children were instructed to choose between looking at the picture behind one of two windows on each of 20 trials. The picture behind one window was always the same whereas the picture behind the other window changed on each trial. The results indicated that the frequency with which "varying" or novel stimuli were selected for viewing increased as familiarity with the "recurring" stimulus increased. The importance of this finding for the study of stimulus selection and exploratory behavior was discussed.

In the past 10 years a large number of studies have been concerned with "looking behavior." Studies of this type can be differentiated from more traditional studies of perceptual behavior by their emphasis on the voluntary aspects of visual behavior. For example, one group of "looking" studies centers around the dependent variable of free looking time, i.e., how long S looks at a stimulus when he is free to look at it for as long as he wishes (Bakan & Leckart, 1965; Brown & Farha, 1966; Day, 1966; Leckart, 1966; McReynolds, 1963; Zamansky, 1958). Experiments in this area seem to be important for at least two reasons: (1) they may reveal elements of the process of attention or stimulus selection, and, (2) they may provide information about human exploratory behavior thereby aiding in the construction of a theory of motivation.

One finding of looking time studies is that Ss spend less time viewing familiar stimuli in comparison to novel stimuli. In one study Berlyne (1958) exposed stimulus pairs for 10 sec and recorded the amount of time spent looking at each stimulus. On 10 consecutive exposures either the stimulus in the left or right position was "recurring" (familiar) whereas the other stimulus was "varying" (novel). An analysis of the time spent looking at the familiar and novel stimuli indicated that Ss spent more time viewing the novel stimuli.

In a related experiment Endsley (1967) manipulated stimulus familiarity by allowing Ss to play with one of two sets of toys. During a subsequent testing session Ss were permitted to select, for further play, either the familiarized set or a set not previously exposed. The results indicated that 100% of the Ss chose the novel stimuli on the first trial on which they were given a choice, and that the frequency of novel choices on a total of 10 choice trials was inversely related to the amount of familiarization with the original set of toys.

The main purpose of the present study was to investigate the influence of stimulus novelty upon stimulus selection operationally defined as looking or exploratory choice, i.e., the stimulus S selects for viewing when he is free to select one of two stimuli. On the basis of

Berlyne's looking time findings and Endsley's "play behavior" findings it was expected that if Ss were given an opportunity to choose between looking at a familiar ("recurring") stimulus and a novel ("varying") stimulus that they would choose the novel stimulus. It was also expected that the frequency with which the novel visual stimulus was selected would increase as familiarity with the familiar stimulus increased.

Method

Subjects. The Ss were 39 four and five year olds selected from the kindergarten class at the Putnam Elementary School in Athens, Ohio. Eighteen of the Ss were females and 21 males.

Apparatus. The apparatus was a gray cardboard screen 36.5 in. wide x 15.5 in. high in which two 4 in. x 4 in. windows were cut. The windows were centered 11.5 in. apart and placed 4.5 in. above the base of the screen. The numbers "1" and "2" were constructed out of 2.5 in. high white cardboard and mounted over the left and right windows respectively. Behind each of the windows was a frame in which pictures could be placed for presenting to the Ss.

The stimuli were 21 pictures of animals and children selected from two books, written by the same author, for four and five year old children. The stimuli were judged by the Es to be of about the same degree of interest to children.

Procedure. The Es first spent 1 h in each of the two classes from which the Ss were selected so that the children would become familiar with them. The Ss were then individually taken to an adjoining room to "play a short game" with E. The Ss were seated in front of and facing the screen in which two blank cards were visible.

The Ss were told that they could see a picture in one of the windows by pointing or calling out the number. The Ss were also told to choose the window they thought they "would enjoy looking at most." Immediately after Ss indicated their choice they were allowed to view the picture for about 5 sec. In an attempt to keep Ss attending to the stimuli, they were required to identify each stimulus selected.

A total of 20 choice trials were given. For one half of the Ss the familiar picture was always on the left and the novel picture on the right. For the remaining Ss the familiar picture was always on the right. The familiar picture was the same for all Ss and was selected by the Es as representative of the group of stimuli.

Results

Two scores were obtained for each S: the number of

Fig. 1. Frequency of selection of the novel stimuli on the first and last block of 10 trials.

times S chose the novel stimuli on the first and last block of 10 trials. The mean number of novel choices on the two blocks for the male and female Ss are presented in Fig. 1.¹ An analysis of the choices indicated a significant blocks effect ($F=27.12$, $df=1/37$, $p<.01$) and a significant Sex by Blocks interaction ($F=5.98$, $df=1/37$, $p<.05$). An inspection of the Sex by Blocks interaction indicates that it is mainly due to the females choosing proportionately more novel stimuli than the male Ss on the second block of trials. No interpretation of this finding will be offered.

Discussion

The results indicated that the frequency with which novel stimuli were selected for viewing increased as familiarity with the alternative stimulus increased. These results may be interpreted as providing information about the process of stimulus selection that has not been made available by previous studies in the area (Berlyne, 1958, Leckart, 1966, and Leckart & Wagner, 1967). In these previous studies the dependent variable has been free looking time. Accordingly, statements concerning the effects of stimulus novelty upon stimulus selection have been based upon the assumption that during each moment of a free looking period S is choosing to select that stimulus for attending to rather than view the next stimulus in the series. However, this assumption may not be valid in the sense that the process of selection being reflected in free looking times is the same as the process reflected when S must choose between attending to one of two or more stimuli.

But, in the present experiment, Ss are actually required to select one of two stimuli for viewing. Therefore it can be argued that the present results provide preliminary data for studying stimulus selection by a technique which may be closer to the selection process of primary concern to psychologists, "To which stimulus will this animal respond?" (Berlyne, 1960, p. 7).

The present data may also be important for the study of human exploratory behavior. Accordingly, presenting two alternative stimuli for subject selection is analogous to studies of animal exploratory behavior which have used choice point situations such as Y, E, or T mazes. Thus, the present data are analogous to animal studies indicating that Ss choose maze alternatives leading to novel stimuli in preference to alternatives leading to familiar stimuli (e.g., Denny & Leckart, 1965; Leckart & Bennett, in press).

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Note

1. When the trials are blocked in groups of three trials each it is found that the percentage of times the novel stimulus was chosen increased gradually over the 20 trials from 51% on the first block to 73% on the last block.