The effect of cue size on the utilization of partially valid cues in perceptual identification¹

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A perceptual identification task with partially valid cues was presented to 35 college students. Size of cue was hypothesized to account for differences in cue utilization. Results indicate that size is a factor in the differential use of cues. The effect of stimulus intensity on attention is discussed as a possible underlying explanation. Suggestions for future research are offered.

Bruner & Postman (1948) presented an intervening variable, that of "perceptual accentuation—...the differential vivification of different parts of the perceptual field..." (p. 100). Later studies (Postman, 1953a; 1953b; Bruner, 1957) showed that "accentuation" was determined by the range of values of the attributes which the S had experienced in the past and by the frequency and amount of reinforcement associated with the object.

In a study of the use of probabilistic cues in perceptual identification, Goodnow (1954) discovered differences in cue utilization that could not be accounted for by their relative validities. For example, when confronted with two cues, each with the same predictive capacity, S for no apparent reason would overvalue one and undervalue the other.

These results were interpreted by Bruner, Goodnow, & Austin (1956) in terms of the impressiveness or preferential value of the different attributes imposed on the perceptual processes by the structure of our language and logic. The present experiment was designed to investigate the role of cue size as a determinant of this tendency, cf., Fiske and Maddi's discussion of intensity and meaningfulness (Fiske & Maddi, 1961). Thus it is hypothesized that, other things equal, larger cues are overvalued relative to smaller cues in perceptual identification.

METHOD

Subjects

The 35 Ss were students enrolled in introductory psychology at Iowa State University. Ss received extra points toward their grades for participation in the experiment.

Stimulus materials

The perceptual stimuli were 68 white cards, 3 x 4 in. Each card had one or two figures on one side and one of two letters on the other. Figures were large square (LS), small square (SS), large circle (LC), and small circle (SC); and the letters were either X or Y. Forty-eight cards had only a single figure (12 of each), while the remaining 20 had two figures, 10 each, LS-SS and LC-SC.

Procedure

Probabilistic validities were assigned to each single figure stimulus such that each was valid in predicting the letters X and Y in the ratio of either 10:2 or 2:10. These values were assigned so that a large and small figure of the same shape had opposite ratios. Response bias for a particular letter was controlled by counterbalancing the predominant letter on figures of the same size.

The S was instructed as follows: "I want to see how well you can do in a rather unusual problem situation. These cards have four types of figures on them: LS, SS, LC, SC; and two letters: X and Y (showed examples). After you have shuffled the cards, look at the top card and show whether you expect the other side to be X or Y by saying the proper letter aloud to me... Be sure to always make your guesses aloud before turning the card over. When you have finished the deck, I'll hand it back to you and you'll then reshuffle it and go through the guessing procedure again."

In the first four trials only the 48 single figure stimuli cards were used. In this training stage each trial consisted of going through the entire deck once. The test stage consisted of the presentation of the 20 two-stimuli cards. E presented the cards with the instructions: "I'm now going to show you some cards which you haven't seen before. I want you to make a guess, X or

Y, as to what these cards would be on the basis of what you've seen up to now. One thing will be different, however, . . . I'm not going to show you the answers right away, I merely want to know what you would guess from what you know about the other cards." E then held up a card and recorded each response as soon as it was given.

Scoring and Analysis

The dependent variable, response tendency in conflicting cue situations, was assumed to be an index of overvaluation. The 20 responses to the two-figure stimuli were combined into one general tendency for each S. The discrete classes were: (1) tendency to respond to the large cues and (2) tendency to respond to the small, or no tendency.

This measure differs from that of Goodnow (1954) who compared per cent choices of the more probable category with the objective ratio of the cues. It was felt that forced choices in conflicting cue situations would provide a more sensitive measure of relative valuation by S.

RESULTS

Contingency between cue size and response tendency as defined above was highly significant (Chi-square = 10.3, 1 df, $p < .005$). Thus, when Ss were confronted with two conflicting cues, each with the same objective capacity for prediction, their responses indicated an overwhelming reliance on cues of larger physical size.

DISCUSSION

The results of this experiment indicate that cue size is an important variable affecting S's use of probabilistic cues. The explanation of overvaluation phenomena in terms of cue size relates to the work of Restle (1962) who offers a mathematical model of hypothesis testing in which Ss serially test hypotheses about the task presented them. It may be that in the face of uncertainty and a large amount of information with which to deal, the individual chooses temporarily to ignore a portion of that information. In the training phase Ss appeared to single out a cue, concentrate on it alone, and ignore the others until that cue had been learned. A reason for singling out the larger cues may have been that they were easier to attend to. If so, this would also fit the theoretical framework of Fiske & Maddi (1961) who state, "Other things being equal, an intense stimulus has more effect on the organism than a weak one."

Suggestions for future research include: (1) a factorial examination of intensity level across several dimensions, such as brightness, loudness, and color saturation, as well as size; (2) analyses which vary levels of probabilistic validity and number of learning trials; (3) attempts to assess the effects of learning on this phenomenon, perhaps at the infrahuman level; and (4) a close analysis of the early responses to single cue instances.

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NOTE

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