Bulletin of the Psychonomic Society
1976, Vol. 8 (1), 19-21

Category width, confidence, expectancies, and perceptual accuracy

MALCOM W. HUCKABEE
Averett College, Danville, Virginia 24541

The relation of category width to accuracy of visual discriminations and estimates of expected performance and confidence were investigated for 55 student volunteers. Feedback (reported at 70% of actual performance accuracy) was provided to 28 subjects. Narrow categorizers were found to be more accurate, regardless of feedback. Feedback affected accuracy as well as expectancy and confidence. However, there were no differences in confidence or expectancy for different category width groups nor was category width a significant main effect in the analysis of changes in confidence and expectancy from pre- to postfeedback measures. Contrary to the findings of Phares and Davis (1966), there were no differences in generalization of expectancies between narrow and broad categorizers.

A number of investigators have noted the intra-individual consistency with which information is grouped and classified. Gardner (1953) used the term "equivalence range" to refer to the range of qualities which a person would treat as the same, while Pettigrew (1958) used the term "category width" to describe individual differences in cognitive category structure. Whether these differences in categorizing reflect differences in sensitivity or represent more abstract conceptual devices has not been well established.

Although Pettigrew (1958) referred to laboratory tests validating his Category Width Scale, the nature of the tasks is not clearly stated. Bruner and Tajfel (1961) found narrow categorizers to be more accurate in tests and interpreted their findings in terms of the greater sensitivity of narrow categorizers. Bieri (1969), however, found the relationship of category width classification and accuracy of discrimination to be very complex, being modified by the presence of extraneous stimuli, anxiety level, and the sex of the subject.

Phares and Davis (1966) reasoned that the qualities which influence sensory judgments would also influence a person's use of information about his experiences. Thus they hypothesized that broad categorizers should show greater generalization of expectancies than would narrow categorizers. The hypothesis was confirmed, but the authors cautioned that the generality of their findings might be limited by the use of female subjects only and by the use of a constant absolute value (15 points below the first estimates) in the feedback information prior to obtaining the generalization estimates.

John C. Koeppel sponsors this paper and takes full editorial responsibility for its contents. The author wishes to express his appreciation to Jack G. Ferrell, Jr., who collected the data for this paper.

The distinction between one's expectancies and his confidence in performance might also be important in such a situation. If broad categorizers are less confident of their initial performance than are those who use more narrow categories, the greater change in expectancies reported by Phares and Davis may reflect a lack of confidence in one's judgments rather than a generalization of expectancies per se. In addition, the Phares and Davis study did not include the readjustments of expectancies as a consequence of having made the first judgments.

This study was undertaken to investigate the relationships of category width with perceptual accuracy, performance expectancies, and confidence, using both feedback and nonfeedback groups. Based on Pettigrew's report (1958), it was hypothesized that Category Width would have a significant negative correlation with the number of correct perceptual judgments (accuracy). Following Phares and Davis (1966) it was also hypothesized that broad categorizers would show greater generalization of both expectancy and confidence than would narrow categorizers.

METHOD

Subjects

The 55 subjects in this study were students enrolled in an introductory psychology course. Twenty-eight of the subjects served in the feedback group, and 27 received no feedback. They received bonus points toward their grades for participation.

Materials

Equivalence range was assessed with the Category Width Scale (Pettigrew, 1958). The C-W scale produces a total score (CW) and two factor scores (CW-I, CW-II). All three scroes were computed for this study.

The perceptual task required subjects to make discrimination judgments of pairs of circles using the method of constant stimuli. The subject was to determine whether the second stimulus of each pair was larger or smaller than the first stimulus. The seven

variable stimuli ranged in size, when projected by a Kodak Carousel 700 projector with a 500-W bulb onto a beaded screen, from 23 to 26 in. in diam. The standard stimulus was 24½ in. in diam. Each standard-variable pair was presented seven times, for a total of 49 judgments. Each stimulus was presented for 3 sec, with a 1-sec interstimulus interval. The sequence of pairs was block randomized, with all subjects receiving the same sequence. Subjects were randomly assigned to feedback conditions.

Procedure

Prior to the presentation of each series of stimuli, the subjects were instructed to record the number of circles within the next series that they felt they would judge correctly (expectancy). After all 49 stimuli had been presented, the subjects were asked to record the number of circles they believed they had judged correctly out of the last 35 presented (confidence). The experimenter collected the data forms and left the room ostensibly to score the judgments. Subjects were unattended during this period. Members of the feedback group were given slips of paper which supposedly reported their accuracy on this series of perceptual judgments. The values reported were 70% of the subject's confidence score. Following the provision of feedback, the judgment procedure was repeated; subjects estimated accuracy, judged another series of stimuli, and again indicated confidence.

RESULTS

Accuracy was significantly correlated with all three of the Category Width scores for the first series of judgments: CW, $r = -.349$ ($p < .01$); CW-I, $r = -.297$ ($p < .05$); CW-II, $r = -.409$ ($p < .01$). As large CW scores indicate broad categorizers, the negative correlations demonstrate superior accuracy for narrow categorizers. Accuracy scores for the second (postfeedback) series were also significantly related to overall CW score ($r = -.324$, $p < .01$) and CW-II score ($r = -.337$, $p < .01$) but not with CW-I scores ($r = -.234$, $p < .05$). These findings support the hypothesis; narrow categorizers tend to make more accurate perceptual judgments.

The distribution of CW scores was divided into thirds, and subjects were classified as broad (CW score 61-83), medium (CW score 68-60), or narrow (CW score 15-47) categorizers. An analysis of variance performed on the accuracy scores for the second judgment series produced no significant feedback effect ($F = 2.02$, $df = 1/49$, $p > .05$) or interaction ($F < 1$) although the Category Width effect was significant ($F = 3.53$, $df = 1/49$, $p < .05$).

None of the correlations of CW scores with measures either of expectancy or of confidence were significant for either the prefeedback or the postfeedback series. Thus levels of confidence and expectancy were not related to categorizing. It might also be noted that neither expectancy nor confidence correlated significantly with accuracy. An analysis of variance for initial expectancy scores produced no significant CW effect ($F = .137$; $df = 2/49$), no significant feedback group differences ($F = .352$; $df = 1/49$), and no significant interactions. Analysis of variance for initial confidence scores likewise produced no significant CW effect ($F = .353$; $df = 2/49$), feedback group differences ($F = .248$; $df = 1/49$), or interactions.

The amount of change in both confidence and expectancy from the first perceptual judgment series to the second was used as the data to evaluate the hypothesis regarding generalization. (Because of the high correlations between the three scores derived from the Category Width Scale, subsequent analyses were performed using the CW score only.) The magnitude of the change scores was not a function of initial expectancy or confidence as the correlations between these measures and the change values were not significant. (Expectancy: $r = -.133$; confidence: $r = .209$), a result which is consistent with the findings of Phares and Davis (1966). The analysis of variance for change in expectancies produced only a significant feedback group effect ($F = 7.936$; $df = 1/49$, $p < .01$). Neither the main effect of categorizing style nor the interaction was significant. The hypothesis regarding generalization of expectancies did not receive support. The analysis of the change scores for confidence likewise yielded a significant feedback effect ($F = 25.064$, $df = 1/49$, $p < .01$) but no significant Category Width effect ($F < 1.00$).

DISCUSSION

The significant correlations between the various Category Width scores and perceptual accuracy offer support for the findings of Bieri (1969) and the laboratory test validation of the Category Width Scale reported by Pettigrew (1958). Evidently persons who establish narrow categories for their cognitive work tend to make more perceptually accurate judgments. In addition, feedback about previous performance does not seem to affect such accuracy. The effects of restructuring the task situation to include distractors, increased anxiety, or other of Bieri's (1969) moderating variables, remain to be explored.

Contrary to the findings of Phares and Davis (1966), broad categorizers did not demonstrate greater generalization of expectancies from the prefeedback judgment to the postfeedback situations. Regardless of Category Width score, changes in both expected accuracy and confidence in judgments were the result of feedback conditions only. Among these subjects, negative information about their performance resulted in lower levels of expectation and confidence. The subjects who had no feedback changed neither their levels of expectancies nor their confidence statements.

Several factors may account for the differences in the findings of this study and those of Phares and Davis. Their subjects were classified on the basis of an adapted Category Width Scale; while the entire scale was used in this study. The task in this study was presented basically as a perceptual accuracy task and the same task was repeated. Phares and Davis used tasks which were less specifically perceptual in nature, and they had different, although related, tasks for the two expectancy estimations. The variety of procedural differences between the two studies makes it impossible to determine the basis for the conflicting findings. It may well be that the relation of categorizing width to generalization of expectancies is limited to certain tasks or is subject to other moderator variables. The specification of such variables is needed, and, until such specifications are made, it would seem that the relation of style of categorizing to generalizations of expectancies is ambiguously defined.

REFERENCES

BIERI, J. Category width as a measure of discrimination. *Journal of Personality*, 1969, **37**, 513-521.

BRUNER, H. S., & TAJFEL, H. Cognitive risk and environmental change. *Journal of Abnormal and Social Psychology*, 1961, **62**, 231-241.

GARDNER, R. W. Cognitive styles in categorizing behavior. *Journal of Personality*, 1953, **27**, 187-195.

PETTIGREW, T. F. The measurement and correlates of category width as a cognitive variable. *Journal of Personality*, 1958, **26**, 532-544.

PHARES, E. J., & DAVIS, W. L. Breadth of categorization and the generalization of expectancies. *Journal of Personality and Social Psychology*, 1966, **4**, 461-464.

(Received for publication March 21, 1976.)