Response technique as a factor in determining children's preference for complexity¹

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Studies of preferences for levels of complexity have commonly used either verbal reports or duration of fixation time as the dependent variable. Results of this study indicate, however, that the preference function obtained from children's responses to random shapes depends upon what response measure is taken. Thus, the assumption that verbal reports and duration of fixation yield the same preference function in studies with young children has not been supported.

Studies of preference for different levels of complexity have commonly used one of two different response measures. Experiments in which infants and preschool age children are tested have used the duration of time each stimulus is fixated as the dependent variable, and have found looking time to be a monotonically-increasing function of stimulus complexity, at least for children between three and 41 months of age (Brennan, Ames, & Moore, 1966; Munsinger & Weir, 1967). With school-age children, however, a verbal or written response is typically obtained, and stated preference has been shown to be an inverted-U function of complexity, at least for Ss above the fourth grade (Munsinger et al, 1964).

Comparisons among these age groups requires, however, the assumption that stated or written responses yield the same preference functions as does the duration of fixation time. Thomas (1966) found both measures of preference yield a monotonically-increasing function of preference for complexity with six- to 12-year-olds. However, he failed to find significant differences between all pairs of stimuli with his youngest group, thus suggesting that the six-year-olds yielded a slightly different preference function than did the older Ss. Furthermore, he did not test any Ss younger than six years. The present study was designed to provide data concerning the preferences for complexity by children of the age ranges between those of the Munsinger and Weir (1967) and the Thomas (1966) studies, and to compare the two response techniques with children less than six years of age.

Method. Fifty-four children from 29 to 66 months were placed into three age groups for testing. The mean ages were 35.8, 47.1, and 59.1 months. A parent brought each child individually to a mobile laboratory on each of two consecutive days. Pairs of random shapes were back-projected onto a 2 ft x 4 ft translucent screen. The projected stimuli were approximately 8 x 8 in., separated by approximately 18 in. There were three examples of each of the four levels of variability (5, 10, 20, and 40 turns), paired in all possible combinations of stimulus complexity and left-right position. The resulting 12 pairs were shown in the same random order four times in succession each session.

The child was seated about two feet from the screen. E observed S's eye movements through a 2 x 2 in. one-way mirror below the screen. The approximate amount of time spent looking at each of the stimuli in each pair was recorded on a printing timer. During each 30 sec stimulus pair presentation, the stimulus viewed longest was considered the "preferred" stimulus of that pair. For stated preference, S was asked to choose the pattern he liked best in each pair. For each child, fixation time or stated preference scores were taken on separate days by a counter-balanced order within each age group.

Results and Discussion. The number of times each stimulus complexity level was preferred in each of its pairings was subjected to a complete paired-comparison scaling analysis (Torgerson, 1958). The resulting scale scores would ordinarily be analyzable by means of a 4 by 3 by 2 by 2 factorial analysis of variance, with four levels of complexity, three age levels, two response techniques, and the day on which the child was tested with each

measure. However, in this experiment the paired-comparison, forced choice procedure yielded 48 preference judgments for each S from each of the two response techniques. Thus, the main effects of age, type of response technique, and day of testing are completely constrained, with each S receiving a score of 48. To avoid the problems inherent when certain main effects are constrained, the scale scores of each S for each of the four levels of variability were multiplied by orthogonal polynomials appropriate for linear, quadratic, and cubic trends. These weighted scores were then analyzed by means of three 3 (age) by 2 (response technique) by 2 (day of testing) analyses of variance. In these analyses, any main effect of age, response technique, or day of testing is interpretable as an interaction (linear, quadratic, or cubic in form) of that variable with level of stimulus complexity.

The main effect due to age and all interactions of age with other variables were nonsignificant. However, the main effect of response technique was significant in both the linear $F = 28.89$, $df = 1/48$, $p < .01$, and quadratic $F = 5.03$, $df = 1/48$, $p < .05$ analyses. It is apparent in Fig. 1 that there is an interaction of response technique and level of stimulus complexity. Thus, the degree of preference for figures differing in complexity depended upon the response technique used. The children clearly fixated shapes of highest complexity longer, while their stated responses showed no definite preference for any level.

The interaction of response technique and day of testing in the analysis of linear scores was also significant, $F = 5.09$, $df = 1/48$, $p < .05$. Inspection of the data reveals that the relationship shown in Fig. 1 was even more pronounced on the second day of testing than on the first, resulting in the significant interaction. This indicates that the difference between the stated preferences and looking time techniques for assessing preference for complexity is even more marked when the Ss have already responded using the other technique.

It should be noted that the flat curve for stated responses in Fig. 1 would also result if Ss do not understand the stated preference task, and thus respond inconsistently from trial to trial. If this were true, the comparison between the two response techniques would be meaningless. Therefore, the consistency of each S's preference pattern was determined by dividing the stated preference data into half-sessions. The resulting split-half reliabilities of the scale scores for each level of complexity were

Fig. 1.

significant (r ranged from .45 to .65, all p 's < .01), indicating a significant degree of consistency in the S's stated responses in the first and second halves of their sessions. It therefore appears that the essentially flat stated preference curve shown in Fig. 1 is not the result of random or highly inconsistent responding by individual Ss. Instead, individual Ss were displaying relatively consistent preferences among the four complexity levels throughout the task, with individual Ss preferring different levels of complexity. These differential preferences among the Ss tended to cancel one another, resulting in the flat stated preference function. It should be noted, however, that such consistent responding does not necessarily mean that the Ss *understood* the stated preference task. It remains to be determined whether the children were stating *preferences* for the figures, or whether they were responding according to some other criterion.

Nevertheless, the significant finding of this experiment is that the preference function obtained from 29- to 66-month-olds' responses to random shapes of different levels of complexity depends upon what response measure is taken. Children of these ages show a preference for looking at figures with higher levels of complexity, while they do not necessarily *report* a preference for those figures. Although it is possible, as shown by Thomas (1966), that older children do fixate longest those shapes for which they

state a preference, the present results indicate that caution must be maintained in comparing studies which have used these different response measures.

REFERENCES

- BRENNAN, W. M., AMES, E. W., & MOORE, R. W. Age differences in infant's attention to patterns of different complexities. *Science*, 1966, 151, 354-356.
- MUNSINGER, H. L., KESSEN, W., & KESSEN, M. L. Age and uncertainty: Developmental variations in preference for variability. *J. exp. Child Psychol.*, 1964, 1, 1-15.
- MUNSINGER, H. L., & WEIR, M. W. Infants' and young children's preference for complexity. *J. exp. Child Psychol.*, 1967, 5, 69-73.
- THOMAS, H. Preferences for random shapes: Ages six through nineteen years. *Child Developm.*, 1966, 37, 843-859.
- TORGERSON, W. S. *Theory and methods of scaling*. New York: Wiley, 1958.

NOTE

1. This paper is based upon a thesis submitted by the first author in partial fulfillment of the requirements for the degree of Master of Arts in Psychology at the University of Illinois, and was supported in whole by a grant, MH-08933, from the National Institute of Mental Health. We thank Nona J. Hartsell for her aid in data collection and reduction and Dr. Harry Munsinger and Dr. Leslie B. Cohen for their aid at various stages of the research.