Speed of choosing in relation to the preference value of the incentive¹

PAUL S. SIEGEL, JOANN WILLIAMS² AND SANDRA SZABO
UNIVERSITY OF ALABAMA

Speed of choosing was found to relate positively to the magnitude of the difference in preference value holding between pairs presented to retardates.

In a binary choice situation, with outcome certain (p of success = 1.00) and alternatives positive, speed of decision should bear a positive relation to the difference in preference value separating the two alternatives. This relation can be derived from widely differing conflict models (cf. Barker, 1942; Miller, 1959). It is the purpose of the present paper to examine this relation within a procedure that permits a precise specification of the strength of the incentive values involved. Related studies have been conducted by Dashiell (1937), Godbeer (1940), Shipley, Coffin, & Hadsell (1945), and Barker (1942).

Method

Thirty mentally retarded Ss (18 males and 12 females) were recruited from the institutional population of Partlow State School, Tuscaloosa, Alabama. Chronological ages ranged from 12 years, 11 months to 29 years, 11 months with a mean of about 23 years; IQs (WAIS, WISC, or S-B) ranged from 50 to 69 with a mean of 60. Four additional Ss were tried and discarded because of failure to cooperate fully or inability to grasp instructions. No S possessed earlier laboratory experience with the incentives used in the present study.

The apparatus consisted of a 4 x 6 in. tray which presented two white plastic wells 1-3/4 in. in diameter centered 9-1/2 in. apart, a screen interposed between S and E, and a timing circuit. At the limit of its forward excursion, the tray exposed the two wells and activated an electric timer. The S signaled his choice by pressing one of two Lucite buttons 1-1/2 in. in diameter (Grason-Stadler keys) located 5 in. above each well in a sloping panel. The chosen incentives were delivered immediately by a chute located midway between the two wells, just in front of the tray. They accumulated in a paper cup located in S's central visual field. Neither consumption nor manipulation of the incentives was permitted in the test situation.

The experiment was conducted on two successive days. On the first, the operation of the apparatus was explained in detail and S was given six practice trials, insuring familiarity with all six incentives. He was then given the reward cup and its contents and dismissed with the comment that he could now eat the candies.

The experiment proper, conducted on the following day, was introduced as follows: "You remember how you do this. Each time this tray slides out you can have either one of the two candies on it. Just touch the button above the one you want."

The E first administered four practice trials, presenting each time a choice between a gumdrop and a candy mint in a RLLR positional sequence, and then said: "Now I'm going to put some other candies on the tray. You just continue to do as you've been doing and touch the button above the candy you want."

Without further comment, E administered an experimental series of 21 trials. The series provided for a single pairing of each of six incentives against every other one once and only once (15 unique pairs). Order was random within the restriction that the same incentive was never repeated on successive trials. The six incentives were: miniature Tootsie Roll, Hershey's foil-covered kiss, a single piece of candy corn, an M&M (brown only), a miniature marshmallow, and a single piece of Cracker Jack. Scattered throughout the series, at intervals of every two or three trials, were presentations of the six possible pairs of identical incentives (Tootsie vs Tootsie, kiss vs kiss, etc.).

To control for order effects, every S experienced a different 21-trial sequence. And to control for a possible position effect, half the Ss were assigned at random to a series that presented one member of the incentive pair on the right; the other half to a series that presented that particular member on the left. This control was favored over the usual double series because of possible complications arising should the candy economy of S be "flooded."

Sessions were conducted mid-morning, mid-afternoon, and early evening, 2-3 h after S had eaten.

Results and Discussion

The six incentives were scaled utilizing Guilford's treatment of Thurstone's law of comparative judgment (Guilford, 1954, pp. 169-171). The scale values thus obtained were: Tootsie, 1.55; kiss, 1.24; corn, .61, M&M, .61; Marshmallow, .46; and Cracker Jack, .00 (arbitrary origin).

The difference between the two scaled preference values (scale separation) was computed for each of the 15 unlike pairs, e.g., 1.55 for Tootsie minus .46 for marshmallow equals a difference of 1.09; 1.24 for kiss minus .61 for corn equals a difference of .63, etc. The resulting distribution, ordered from high to low, is presented as column 2 of Table 1. Mean choice

speed associated with each of the unlike pairs is presented as column 3 of Table 1. A mixed design variance analysis of the speed values indicated reliable differences ($F=3.37$, $df=14/406$, $p<.01$).

Figure 1 presents our principal finding. Mean speed values for the 15 unlike pairs (column 3, Table 1) have been plotted against the associated preference scale value differences (column 2, Table 1). A positive correlation is evident and a straight line has been fitted by the method of least squares to lend focus. As a simple test for trend, the overall mean speed yielded by the 30 Ss for the seven largest scale differences (rows 1-7 of Table 1) was compared with the average yielded for the seven smallest scale separations (rows 9-15 of Table 1). These means were found to be 60.4 and 52.0, respectively. By t test, the difference was established as statistically reliable ($t=4.28$, $df=29$, $p<.01$).

Mean choice speeds for the six like pairs (bottom one-third of Table 1) did not separate reliably in statistical evaluation ($F=1.40$, $df=5/145$, $p>.10$). Nevertheless, the very slow choice time accompanying the Cracker Jack-Cracker Jack pairing is best not viewed as a random occurrence. Cracker Jack was the least preferred of the six incentives. And the finding of associated slowest choice speed agrees with the Shipley et al study (1945). It also seems in

Fig. 1. Mean choice speed as a function of the preference value difference holding between paired incentives.

disaccord with a hypothesis proposed by Berlyne (1960, pp. 32-37) who has made the not unreasonable assumption that conflict, as known through "reaction time," is in part a function of the absolute strength of the competing reaction tendencies involved. If preference value is admitted as an index of reaction tendency strength, the Cracker Jack-Cracker Jack pairing should generate the least conflict, hence, the fastest choice speed.

Table 1
Choice Speed (1/Response Time in Sec x 100)
in Relation to Incentive Pairings

Unlike Pairs	Scale Value Difference	Mean Speed	SD
Tootsie vs Cracker Jack	1.55	61	24.2
Kiss vs Cracker Jack	1.24	55	19.2
Tootsie vs Marshmallow	1.09	64	25.0
Tootsie vs Corn	.94	65	25.2
Tootsie vs M&M	.94	64	28.7
Kiss vs Marshmallow	.78	57	21.7
Kiss vs M&M	.63	57	23.2
Kiss vs Corn	.63	57	24.3
M&M vs Cracker Jack	.61	54	20.2
Corn vs Cracker Jack	.61	50	20.8
Marshmallow vs Cracker Jack	.46	50	17.9
Tootsie vs Kiss	.31	52	23.7
Corn vs Marshmallow	.15	54	17.9
M&M vs Marshmallow	.15	53	21.4
Corn vs M&M	.00	51	20.7
<u>Like Pairs</u>			
Tootsie vs Tootsie		51	24.3
Kiss vs Kiss		55	22.8
Corn vs Corn		56	24.7
M&M vs M&M		53	18.2
Marshmallow vs Marshmallow		54	17.9
Cracker Jack vs Cracker Jack		48	18.8

References

- BARKER, R. G. An experimental study of the resolution of conflict by children: Time elapsing and amount of vicarious trial-and-error occurring. In Q. McNemar & M. A. Merrill (Eds), *Studies in personality*. New York: McGraw-Hill, 1942, Pp. 13-34.
- BERLYNE, D. E. *Conflict, arousal, and curiosity*. New York: McGraw-Hill, 1960.
- DASHIELL, J. F. Affective value-distances as a determinant of esthetic judgment-times. *Amer. J. Psychol.*, 1937, 50, 57-67.
- GODBEER, E. Factors introducing conflict in the choice behavior of children. Unpublished Masters thesis, Yale University, 1940.
- GUILFORD, J. P. *Psychometric methods*. New York: McGraw-Hill, 1954.
- MILLER, N. E. Liberalizations of basic S-R concepts: Extensions to conflict behavior, motivation and social learning. In S. Koch (Ed), *Psychology: A study of a science*. Vol. 2. New York: McGraw-Hill, 1959, Pp. 196-292.
- SHIPLEY, W. C., COFFIN, J. I., & HADSELL, K. C. Affective distance and other factors determining reaction time in judgments of color preference. *J. exp. Psychol.*, 1945, 35, 206-215.

Notes

1. We are deeply grateful for the cooperation lent by the administrative staff of Partlow State School, Tuscaloosa, Alabama. This study was conducted during the residence of the second author as a Fellow in the University of Alabama Mental Retardation (Experimental) Training Program supported by a grant from NICHD (HD 124).
2. Now at Auburn University.