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EFFECTS OF DIFFERENTIAL PRIOR EXPOSURE ON YOUNG CHILDREN'S SUBSEQUENT OBSERVING AND CHOICE OF NOVEL STIMULI.

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DESCRIPTORS- *PRESCHOOOL CHILDREN, *KINDERGARTEN CHILDREN, *STIMULUS BEHAVIOR, CURIOSITY, BEHAVIOR CHANGE, PATTERNED RESPONSES, *SELECTION,

TWO EXPERIMENTS WERE PERFORMED TO INVESTIGATE THE EFFECT OF RELATIVE NOVELTY ON CHOICE BEHAVIOR. IN THE FIRST, 48 CHILDREN OF MEAN AGE 4.4 YEARS WERE PREEXPOSED TO 1 OF 2 SETS OF TOYS FOR 0, 1, 3, OR 5 MINUTES. EACH WAS THEN GIVEN 10 OPPORTUNITIES TO PLAY WITH 1 SET FOR 30 SECONDS. THE MEAN NUMBER OF CHOICES OF THE NOVEL SET INCREASED WITH THE PREEXPOSURE TIME FROM 5.1 TO 7.7. THE NUMBER OF ALTERNATIONS OF CHOICE IN THE 10 TRAILS TENDED TO FALL WITH INCREASED EXPOSURE TIME. IN THE SECOND EXPERIMENT, 80 KINDERGARTEN CHILDREN OF MEAN AGE 6 YEARS WERE PREEXPOSED TO 1 OF THE 2 TOY SETS FOR 1/2, 1-1/2, 3, OR 5 MUNUTES. THEY WERE THEN GIVEN 16 OPPORTUNITIES TO LOOK AT BOTH SETS AND CHOOSE 1 TO PLAY WITH FOR EITHER 5 OR 30 SECONDS. THE TIME SPENT OBSERVING EACH SET PRIOR TO CHOOSING WAS RECORDED. IN THIS EXPERIMENT THE AMOUNT OF PRIOR EXPOSURE TIME DID NOT AFFECT THE CHOICES. THE AMOUNT OF TIME SPENT LOOKING AT THE SETS BEFORE CHOOSING DECREASED EXPONENTIALLY WITH TRIALS. THE MEAN NUMBER OF CHOICE ALTERNATIONS WAS 11.1, SIGNIFICANTLY HIGHER THAN THE EXPECTED VALUE OF 7.5. IT IS FELT THAT THIS MAY BE DUE TO A "TAKING TURNS" PROPENSITY NOTED IN CHILDREN OF THIS AGE, AND THAT THIS ACCOUNTS FOR THE LACK OF AGREEMENT WITH EXPERIMENT I. (DR)

Effects of Differential Prior Exposure on Young Children's Subsequent Observing and Choice of Novel Stimuli

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Two experiments are reported in the present paper. The main purpose of Exp. I was to explore the effects of varying the relative novelty of two sets of toys on preschool children's tendencies to choose the more novel of the two sets to play with. Exp. II was performed, in part, to reexamine with kindergarten children the results obtained in the first experiment with preschool children.

Experiment I. In Exp. I it was predicted that with an increase in the amount of prior exposure to one of two sets of toys, that over a series of 10 choice trials there would be both an increase in the number of choices of the novel set (or in other words, of the set not previously exposed), and a decrease in the number of choice alternations between the two sets. These two predictions were based on a proposition found in several current models of curiosity behavior that organisms tend to approach stimuli as a function of their novelty, and on the assumption that both the number of novel toy set choices and the number of alternations between the two sets reflect a subject's tendency to maintain commerce with novel stimuli (Dember, 1957; Berlyne, 1960; Fowler, 1965).

In Exp. I, 48 preschool children with a mean age of 4.4 years were pre-exposed to one of two sets of seven dime store toys for either 0, 1, 3, or 5 minutes. Table 1 contains a description of the toys in each set. During the pre-exposure period, the subjects were invited to play with

Table 1

Description of Toys in Each Set Employed in Experiment I with Preschool Subjects.

Set A	Set B
Black Rubber Knife	Red Plastic Gun
Brown Plastic Dog	Blue Plastic Mouse
Rubber Doll	Doll in High Chair
Wooden Rolling Pin	Girl's Plastic Watch
Red Metal Car	Red Metal Tractor
Wood & Metal Zylophone	Green Plastic Whistle
Blue Plastic Airplane	Blue Plastic Telephone

the exposed toys at the child-sized table on which both sets were arrayed. A cloth cover was placed over the non-exposed set during the prior exposure interval.

Following prior exposure, each subject received 10 trials on which he could choose one of the two sets to play with for 30 seconds. A trial presentation consisted of the experimenter simultaneously lifting the cloth covers from both sets and inviting the subject to select a toy set to play with for 30 seconds.

Figure 1 presents the mean number of choices of the novel set across the 10 trials for the subjects in each of the prior exposure groups; i.e., in G0--the group receiving zero minutes of prior exposure, in G1--the group receiving 1 minute of prior exposure, in G3, and in G5. As predicted, there was a significant increase in the number of novel set choices with an increase in pre-exposure to the other set.

Figure 2 presents the mean number of alternations between the two sets across the 10 trials for the subjects in each of the four prior exposure groups. While as predicted, there was a tendency for the mean number of alterations to decrease with an increase in prior exposure, this result failed to reach the 5% level of confidence.

Finally, inspection of the subject's choices on trial 1 revealed that all 36 of the subjects who had received some exposure to one set (i.e., for 1, 3, or for 5 minutes) chose the other, novel set on the first trial.

Experiment II. In light of the rather "straight forward" results from the first study with preschool children, we decided to initiate a more ambitious study with a group of kindergarten children. In addition to gather

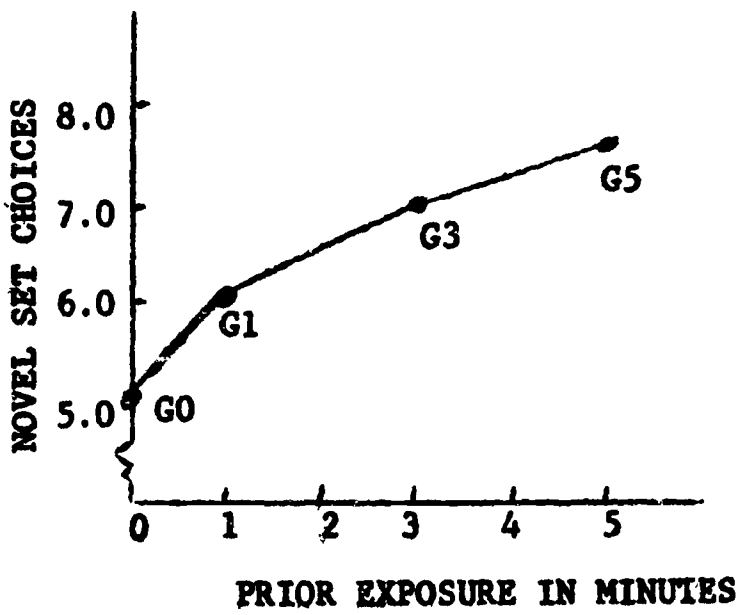

Figure 1. Mean Number of Novel Set Choices Over 10 Trials for Subjects in Each Prior Exposure Group.

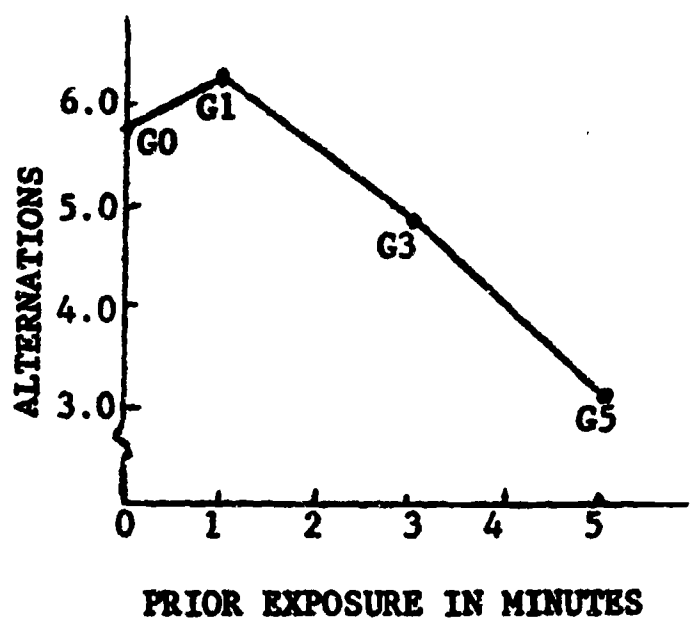

Figure 2. Mean Number of Alternations Over 10 Trials for Subjects in Each Prior Exposure Group.

ing choice data, we developed a means of recording the observing behavior that occurred prior to choice on each trial. Further, in addition to varying the amount of prior exposure to one of two sets of toys as in Exp. I, we also included two other independent variables--trial blocks and length of time that the subject was allowed to play with a toy set following his choice on each trial. The latter variable is subsequently referred to as choice trial play time. Thus, the second study with kindergarten children consisted of determining the effects of prior exposure, trial blocks, and choice trial play time on several measures of observing and choice behavior.

In Exp. II, 80 kindergarten children with a mean age of 6.0 years were pre-exposed to one of two sets of eight dime store toys for either ½, 1½, 3, or 5 minutes. Table 2 contains a description of the toys in each set. Half of the 20 subjects in each of the four prior exposure goups were assigned to a 30-second play time on each choice trial condition (which was similar to the amount of play time on each choice trial employed in the first study), and half were assigned to a 5-second play time on each choice trial condition.

Following the pre-exposure period, each subject received 16 trials on which he could choose one of the two sets to play with for either 30 seconds or 5 seconds. A measure of pre-choice observing behavior was obtained by placing a large panel in front of the table on which the two sets were arrayed. The subject was asked to look through the two small apertures in the center of the panel at the toy sets to decide which set he wanted to play with. By moving a sliding door, which covered the apertures, to right or left, the subject could look at one or the other of the toy sets. The time a subject

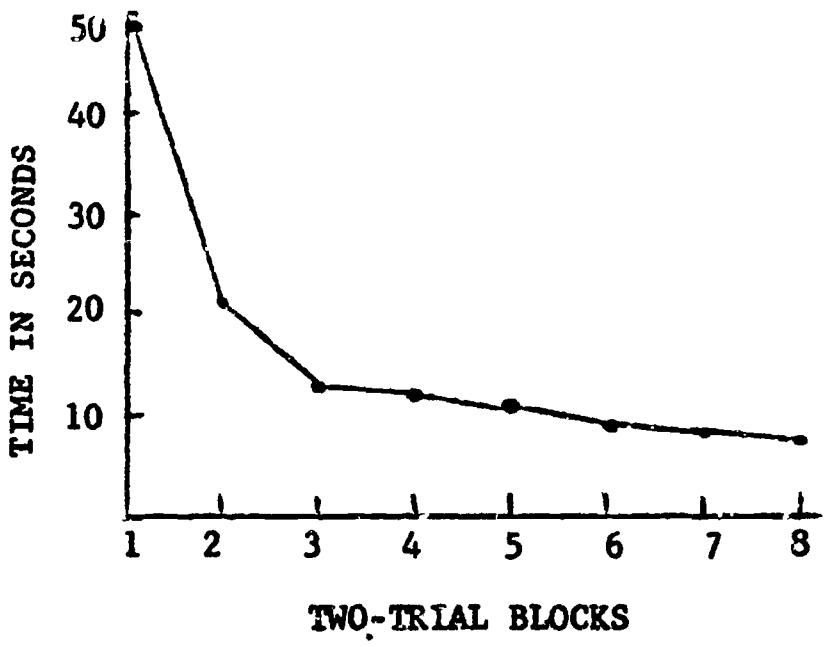

Figure 3. Mean Time Spent Looking at Toy Sets Across Eight Two-Trial Blocks.

held upon the door to look through each aperture at the corresponding toy set automatically recorded.

The results of the subjects observing and choice performance on trial 1 appears in Table 3. Inspection of Table 3 indicates that variations in the amount of prior exposure to one set failed to produce significant variations in any of the observing or choice measures. However, inspection of the trial 1 results also indicate, and appropriate statistical tests confirmed, that the subjects in all four prior exposure groups tended to: (1) look first at the novel set rather than first at the pre-exposed set; (2) look relatively longer at the novel set than at the pre-exposed set; and (3) choose the novel set rather than the pre-exposed set.

Next, we shall consider the results across the 16-trial session. In addition to the novel set choice and alternation data, four measures of observing behavior were obtained on each trial. These were: (1) the set looked at first; (2) the time spent looking at the novel set; (3) the time spent looking at the pre-exposed set; and (4) the proportion of the total looking time spent viewing the novel set. Separate three-factor analyses of variance were performed on each of the six response measures.

Summarizing the more important results of these and other follow-up analyses: (1) There was no evidence to indicate that the amount of prior exposure or the length of choice trial play time differentially affected any of the observing or choice performance measures. Thus, for example, contrary to the findings with the preschool children in Exp.1,there was <u>no</u> increase in prior exposure to the other set. We will return later to consider why the novel set choice findings in Exp. I were not confirmed with the kindergarten subjects in Exp. II.

Table 3

Summary of Trial I Data

Dependent Measures	Prior Exposure Groups*			
	0.5	1.5	3.0	5.0
Number of Ss Looking First at the Novel Set	12	13	12	12
Proportion of Total Time Spent Viewing the Novel Set	.62	.62	.57	.69
Number of Ss Looking Longer at the Novel Set	16	17	14	18
Number of Ss Choosing the Novel Set	20	18	16	19

* N = 20 per group

(2) As had been predicted, the subjects spent significantly less time viewing both the novel and the pre-exposed sets across successive trial blocks. The tendency for the subjects to spend successively less time looking at both the novel and the pre-exposed set over trials confirms trends noted by several investigators in recent years with infants and young children and employing novel, incongruous, complex, and surprising stimuli (Cantor & Cantor, 1964; Charlesworth, 1966; Clapp & Eichorn, 1966).

In order to more clearly describe the function between observing time and trials, each subject's total observing time on each trial was grouped into eight two-trial blocks. Figure 3 portrays the mean time that the 80 subjects spent looking at both sets, before choosing one to play with, across eight two-trial blocks. It is apparent from Figure 3 and confirmed by the results of a trend analysis that the mean amount of pre-choice looking behavior was a negatively decelerated function of trial blocks.

(3) Finally, the subjects in all conditions alternated their choices across trial blocks significantly more than could have been expected by chance. The high level of alternation--a mean of 11.1 when 7.5 was expected by chance in 15 trials--was perhaps the most surprising result of the study for us. Further, this strong alternation pattern provides us with a post hoc explanation for our failure to confirm the novel set choice findings that had been obtained with the preschool children in Exp. I.

Before speculating about the role that alternation tendencies played in "washing out" our predicted effect of prior exposure on novel set choices, we decided to run a follow-up study with a small group of preschool children using the same experimenter, apparatus, toy sets, and procedures as those employed in the second study with kindergarten children. This was done

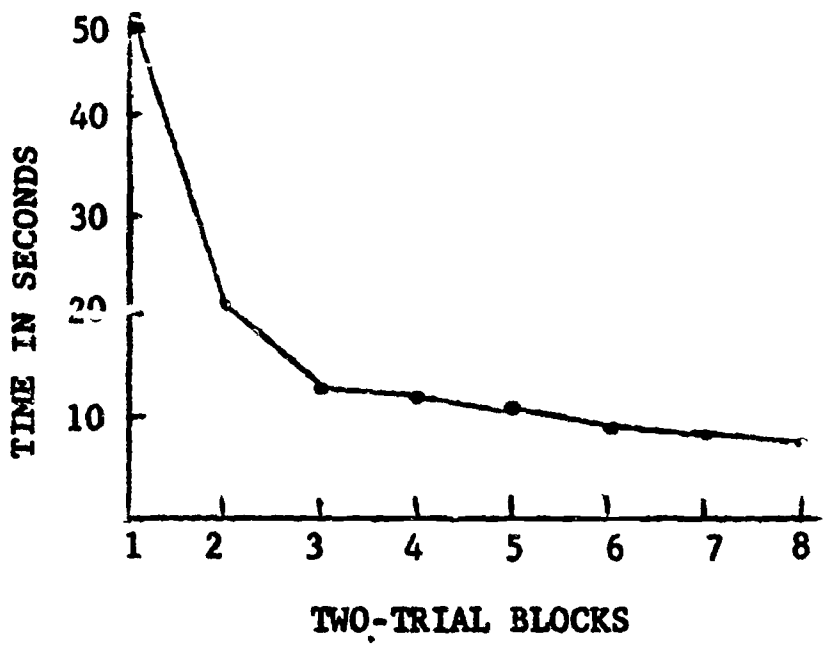

Figure 3. Mean Time Spent Looking at Toy Sets Across Eight Two-Trial Blocks.

to rule out the possibility that methodological differences were largely responsible for our failure in Exp. II to confirm the positive relationship betwen pre-exposure and novel set choices found in Exp. I. Confirming the novel set choice findings of Exp. I, eight subjects pre-exposed to one set for 5 minutes made significantly more novel set choices over six trials than did seven subjects pre-exposed to one set for ½ minute.

The hypothesis that we have offered to account for the nonsignificant prior exposure effects in Exp. II is that six year old children, in contrast to four-year olds, enter two-choice tasks with very strong tendencies to alternate their choices, and that in the present kindergarten study these strong alternation tendencies overrode the effects of variations in prior exposure on nove set choice performance (and perhaps on observing time performance as well). A sizable literature has accumulated in recent years to indicate that alternation tendencies in two-choice probability matching and in two-choice discrimination learning tasks become increasingly dominant from approximately three to eight years of age (e.g., Grath, 1959; Schusterman, 1963; Jeffrey & Cohen, 1965). (There is also evidence to indicate that alternation tendencies decrease again in later childhood). Consistent with previous three-to-eight year old findings was the result that during the first 10 trials the kindergarten children in Exp. II were alternating more than the preschool children in Exp. I over the whole range of pre-exposure values.

One hypothesis frequently offered to explain these developmental changes in alternation tendencies stresses the changes in children's response strategies in problem-solving situations. However, since the toy-

set-choosing game was not a learning task, it would be necessary to assume that an alternation strategy may also be aroused in non-learning two-choice tasks as well.

A second commonly offered hypothesis states that the increasing tendencies for young children to alternate choices with an increase in age reflects their "curiosity" or their tendencies to maximize stimulus change, particularly in relatively boring tasks. It is reasonable to suggest that the kindergarten subjects were relatively more bored with the toy set choosing task than were the preschool subjects--certainly the former group has had more opportunity than the latter to play with similar inexpensive dime store trinkets. On the other hand, there were no obvious signs that the older children were, in fact, more bored.

However, observation did suggest yet another hypothesis. Several of the kindergarten subjects, but none of the preschool subjects, spontaneously reported that they were "taking turns" with the toy sets or indicated that they "must" choose the other set on the next trial. This observation has led us to speculate that six year old children may tend to apply the social ethics rule of "taking turns", a rule that they are being increasingly encouraged to adopt, to many two-choice situations, including discrimination learning and probability matching tasks, where such "polite" or "fair" behaviors are not appropriate for successful performance. Gratch (1959) offers a similar interpretation of his findings in a probability matching study with six to eleven year old children. Noting that several of his six year old subjects reported that the two events which might be guessed should "take turns", he appealed to Piaget's proposition that young children

tend not to distinquish between moral rules and physical laws and project the former upon physical events.

REFERENCES

1. Berlyne, D. E. Conflict, arousal, and curiosity. McGraw-Hill, 1960.

2. Cantor, H. and Cantor, G. N. Children's observing behavior as related to amount and recency of stimulus familiarization. J. exp. child Psychol., 1964, 1, 241-247..

3. Charlesworth, W. R. Persistence of orienting and attending behavior in infants as a function of stimulus-locus uncertainty. Child Develpm., 1966, 37, 473-492.

4. Clapp, W. F. and Eichorn, D. H. Some determinants of perceptual investigatory responses in children. J. exp. child Psychol., 1965, 2, 371-388.

5. Dember, W. N. and Earl, R. W. An analysis of exploratory, manipulatory, and curiosity behaviors. Psychol. Rev., 1957, 64, 91-96.

6. Fowler, H. Curiosity and exploratory behavior. Macmillan, 1965.

7. Gratch, G. The development of the expectation of the nonindependence of random events in children. Child Develpm., 1959, 30, 217-227.

8. Jeffrey, W. E. and Cohen, L. B. Response tendencies of children in a two choice situation. J. exp. child Psychol., 1965, 2, 246-254.

9. Schusterman, R. J. The use of strategies in two-choice behavior of children and chimpanzees. J. comp. physiol. Psychol., 1963, 56, 96-100.