DOCUMENT RESUME

ED 080 158 PS 006 637

AUTHOR Yussen, Steven R.
TITLE Determinants of Visual Attention and Recall in Observational Learning by Preschoolers and Second Graders.
INSTITUTION Wisconsin Univ., Madison. Dept. of Educational Psychology.
PUB DATE Mar 73
NOTE 24p.; A brief version of this paper was presented at the biennial meeting of the Society for Research in Child Development (Philadelphia, Pa., March 29-April 1, 1973)

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Age Differences; *Attention; Grade 2; *Observation; Overt Response; Preschool Children; *Re[illegible] l (Psychological); *Reinforcement; Technic[illegible] Reports; Visual Stimuli

ABSTRACT

Seventy-two preschoolers and 72 second graders observed a model choose his "favorites" in a series of common object trios and were then asked to recall the model's choices. Children at each age witnessed the procedure under a fixed level of distraction, under instructions either to 'look' or 'remember,' and under one of three vicarious consequence treatments (reward, neutral, punishment). A series of analyses of the children's overt visual attention to the modeled activity and their recall revealed: (1) highly significant positive correlations between attention and recall, (2) a facilitation of attention and recall with instructions to remember, (3) a facilitation of attention and recall under vicarious reward and vicarious punishment treatments only when instructions were to look, and (4) age increases in relevant overt attention and recall. (Author)

Under editorial consideration
Developmental Psychology
A brief version of this paper was read at SRCD 1973



Determinants of Visual Attention and Recall
in Observational Learning by
Preschoolers and Second Graders

Abstract

Seventy two preschoolers and 72 second graders observed a model choose his "favorites" in a series of common object trios and where then asked to recall the model's choices. Children at each age witnessed the procedure under a fixed level of distraction, under instructions either to 'look' or 'remember', and under one of three vicarious consequence treatments (reward, neutral, punishment). A series of analyses of the children's overt visual attention to the modeled activity and their recall revealed (a) highly significant POSITIVE correlations between attention and recall, (b) a facilitation of attention and recall with instructions to remember, (c) a facilitation of attention and recall under vicarious reward and vicarious punishment treatments only when instructions were to look, and (d) age increases in relevant overt attention and recall.

Determinants of Visual Attention
and Recall in
Observational Learning by Preschoolers
and Second Graders[1]

Steven R. Yussen[2]

Department of Educational Psychology
University of Wisconsin--Madison

Determinants of Visual Attention

and Recall in

Observational Learning by Preschoolers

and Second Graders

Much of what we learn is the product of observing the behavior of other individuals. In recent accounts of observational learning (e.g., Bandura, 1969), investigators have argued that attentional processes play a large role in what and how well the organism learns. Bandura (1969), for example, stated that: "A number of attention-controlling variables, some related to incentive conditions, others to observer characteristics, and still others to the properties of the modeling cues themselves, will be influential in determining which modeling stimuli will be observed and which will be ignored (p. 136)." Although the assumption of a strong relation between attention and observational learning seems to be a highly reasonable one, there is actually little direct evidence to support it. There are only a small number of studies in which investigators have directly measured the attention of observers (e.g., Ball & Bogatz, 1970; Turnure & Zigler, 1964; Ruble & Nakamura, 1972) and related it to their learning. Furthermore, there is virtually no support for claims that particular aspects of a modeling situation influence observational learning by virtue of influencing the observer's attention to relevant details of modeled responses. The purpose of the present experiment is to demonstrate that a number of variables previously shown to influence the level of observational learning in children may derive their effect from the impact they have on children's ongoing attention to modeled responses.

The main prediction for the experiment is that highly attentive observers will recall more of the model's responses than will inattentive observers. As a consequence, any experimental manipulation which influences the observer's level of attention should also influence his level of recall. The relation is assumed to be direct and positive. The following sources of variation were introduced in order to sample some of the main considerations that have entered into previous studies in observational learning--vicarious consequences, instructions, age of the observer, sex of the model, and sex of the observer.

Vicarious consequences. A number of psychologists (e.g., Kagan, 1967; Bandura, 1969) have suggested that an observer, who witnesses a model being rewarded or punished for his responses, will exhibit a higher level of attentional involvement in the model and the model's behavior. There is a great deal of evidence that children's level of imitation and recall of modeled responses will be enhanced by vicarious reward (cf., Bandura, 1969). However, findings are mixed for vicarious punishment. Level of imitation is typically lowered if the model is punished (cf., Bandura, 1969), while level of recall is not affected (e.g., Liebert and associates, 1969, 1970, 1973). Perhaps vicarious reward enhances the observer's motivation to emulate the model as well as his attention to the model's responses, while vicarious punishment lowers the observer's motivation to emulate the model but neither increases nor decreases the observer's attention to the model's responses relative to a neutral modeling treatment. The second main prediction in the study is that vicarious reward will enhance observers' overt visual attention to the modeled activity while vicarious punishment will have a neutral effect.

Instructions. The results of studies in which young children are instructed to remember the responses made by a model, suggest that the instruction to remember or pay attention is not particularly useful (e.g., Bandura, Grusec, & Menlove, 1956; Bandura & Harris, 1966). In these investigations, the child observers apparently maintained a high level of global attention to the modeling situation, but failed to selectively attend to delimited aspects of the modeled responses. In the current study, a strong distractor was employed in order to produce some global inattention or distractibility in observers. In such an environment, it was expected that instructions directing the child to remember the model's responses, would increase the child's global attention to the model. The third prediction is that the instruction to remember what the model does will increase the observers' overt attention to the modeled responses relative to an instruction which directs the observers to look at the model's activity if they wish.

Age. In order to assess the age generalizability of the effects of vicarious consequences and instructions, children of two ages were tested--5 and 7 years. Since the study utilized a somewhat novel task design (a distractor along with a model), it was deemed appropriate to examine the effects of consequences and instructions across the age period in which some psychologists have postulated radical shifts in attention mobilizing power (e.g., White, 1965). The third prediction in the study is that there will be an increase in the level of observers' overt attention from the preschool to the second grade level.

Sex of O and M. Models of both sexes were provided for observers of both sexes, in order to assess observer and model sex effects. No specific predictions are offered for the influence of sex of the model and sex of the observer. Previous research (cf., Bandura, 1969) has led to a complex set of results in which the nature of the modeled activity, age of the model and observer, interaction of model and observer, and many other considerations, combine to influence the observer's level of learning. However, there is no evidence that sex by itself is the important determinant of learning.

## Method

The experiment consisted of a procedure in which children observed an adult model select his favorite items in a multiple choice series of 15 object trios. A distractor was employed to direct the observers' visual attention away from the model. Immediately after the sequence was shown to the adult, the child was presented with the same series and asked to recall the model's preferences.

Subjects

The Ss were 144 boys and girls drawn from preschool and second grade classes in Twin city area schools. The preschoolers ranged in age from 4.5 to 5.5 with a mean of 5.0 years. The second graders ranged in age from 6.6 to 8.5 with a mean of 7.3 years. At each age, 36 boys and 36 girls were tested. The preschoolers were obtained from two private nursery schools in a suburb of Minneapolis and the second graders were obtained from a public school in the suburb of St. Paul. The children in all schools were predominantly white, and middle class.

Design

At each age, children were randomly assigned to one of three vicarious consequence conditions--reward, neutral, punishment. Within each condition, half of the Ss were randomly assigned to the remember instruction and the remaining half to the look instruction. Sex of model and sex of subject were counterbalanced within each of the preceding treatments. Two female and two male college undergraduates served as the models. Within a given sex of the model treatment, assignment of one or the other undergraduates to a subject was done on a semi-random basis, with the rule that each model had to be present for at least one S in every cell of the design. The resulting experiment had a five way factorial design in which each independent variable was crossed with every other independent variable: Age (2) x Vicarious Consequence (3) x Instruction (2) x Sex of Model (2) x Sex of Subject (2).

Stimuli

The stimuli consisted of 15 trios of common objects found around the house. All stimuli were pilot tested to eliminate sex and age related preferences for items. Within each trio, the items were visually distinctive, approximately equal in size, and drawn from a simple semantic category (e.g., candy, toy animals, writing instruments). For each S, the stimuli were presented in a fixed order with a L-M-R position sequence designed to minimize common response strategies.

Distractor

As the modeling procedure progressed, a series of static nature scenes flashed on and off a side wall of the experimental room by a projector timed to automatically change slides every 15 seconds. The projector was placed on a table directly behind the child and aimed at a spot on the wall three feet away and 90° to the right of the child's straight ahead line of sight. If a child looked at a scene to his right or turned around to examine the projector during the brief interval when the model responded, it was impossible for him to note the model's response choice. The still scenes consisted of color pictures of wildlife and scenery photographed in the Canadian Rocky Mountains. The pictures were highly abstract, devoid of easily nameable objects and events, and, in pretesting, generated a great deal of interest among young children.

Apparatus

The entire experiment was conducted in a laboratory trailer containing two experimental rooms. In one room, experimental observers could view the entire procedure through a one way mirror and operate a video tape system. The video system consisted of a Sony DXC 5000A camera, a Sony CV 2200 recorder, and a Sony 18" TV monitor. No sound recording was taken--only video records were obtained. In the experimental room, nature scenes were produced by a Kodak #850 Carousel projector and a series of 2" x 2" color slides.

Procedure

Each child was individually brought to the laboratory trailer by the E (the writer). M was seated at the front of the experimental room and as E entered with each S, M was briefly introduced. The M had been previously instructed to minimize verbal interaction with each S and a typical introduction consisted of the M merely saying hello and reciting his or her name. S was seated in a chair five feet in front of and facing the stimulus table. E sat on the left side of the stimulus table and M at the right. The child was positioned in such a way that his straight ahead line of sight crossed the center of the table.

The E instructed the child that both he (S) and the M were to play a game and that M would play first, since M had been waiting. It was explained that in the game, M would see a series of objects in which he would point to his favorite things. E then placed a practice trial trio on the table and asked M to pick his favorite item. M hesitated a moment, quickly pointed to a prearranged item with his index finger, and withdrew his hand after about one second. If S was in the remember group, E asked S to come up to the table and point to the object which M had just chosen. If S was in the look group, E asked S to come up to the table and point to his own (S's) favorite object. The S was then reseated and E walked to the slide projector. E explained that a number of slides would be shown while M was playing the game and that S could watch the slide show, the M, or both, during the game period. To rationalize the presentation of the slide show, E explained that the projector was occasionally turned on to insure that it worked properly in a game to be played with some other children. After turning on the projector E allowed two slides to advance automatically with each picture appearing for 15 seconds and the exchange of slides lasting about 1/2 second. E stopped the machine, re-emphasized the child's options to view the game and/or the slides, and explained what the child would do when the M's game was completed. In the remember instruction, S was told that he would have to point to all the things that M picked as favorites and was encouraged to remember M's responses. In the look instruction, S was told that he would point to his own (S's) favorite things and that he was welcome to observe what M did. E turned the projector on, sat down facing M, and placed the first stimulus trio on the table. Each trio was arranged so that the objects faced S, not M. For each trio, E asked M "Which one is your favorite?" M then hesitated to point until just after the projector advanced to the next slide. M's response was kept brief (about one second) and timed to coincide with the moment when the picture first appeared on the wall. Pilot testing had revealed that this moment in the slide interval was more distracting than others, with children quickly turning their heads to examine the side wall (90° turn) or the projector itself (180° turn). After M indicated his preference, E acknowledged this response, removed the stimuli to a spot behind a screen, and readied the next set of items. A particular trio was thus visible on the table for about 15 seconds, with the start and finish of the stimulus interval 6-7 seconds out of phase with the start and finish of the slide interval.

In the vicarious reward condition, E acknowledged each of M's responses by saying "You picked a good one!" or simply "Good one!" and adding a piece of bubble gum from a hidden bag to a plastic container (fastened to the wall two feet above the table on the left part of S's visual field). As the bubble gum was added, E continued addressing M with: "So you get a (another) piece of bubble gum!" Throughout, E attempted to make his voice reflect pleasant exuberance. No bubble gum was actually given to the M. After the modeling procedure, E told M that the gum would be delivered to him at a later date. At the end of the recall-recognition procedure, S was debriefed about the procedure and told that the bubble gum had simply been a ruse to insure his interest in the game.

In the vicarious punishment condition, E acknowledged each of M's responses by saying "You picked a bad one!" or simply "Bad one!" and removing a piece of bubble gum from the plastic container into the hidden bag. As each piece of bubble gum was removed, E continued addressing M with "So you lose a (another) piece of bubble gum!" Throughout, E attempted to make his voice reflect annoyance and disappointment.

In the neutral consequence condition, E acknowledged each of M's responses by saying "Okay, you picked that one!" or simply "Okay, that one." No bubble gum was dispensed or removed and E attempted to keep his tone of voice neutral.

After the modeling procedure was completed, M entered the observational room, S was seated at the table facing the mirror, and E began the recall-recognition test. E presented each trio of items in the same order and in the same position as they appeared in the modeling sequence and instructed S to recall (by pointing) each of the model's choice responses. If S failed to respond after viewing a particular trio for 15 seconds, he was encouraged to guess.

## Results

Ten preschoolers failed to complete the experiment due to fear, fatigue, or refusal to respond in the recall phase. Each one was replaced to simplify analyses. All of the older children completed the procedure.

### Attention

Two measures of attention were obtained for each S. One was based on the number of modeling trials in which the S was visually oriented to the modeling task at the moment when M pointed to a particular object. This will be referred to as the frequency of attention measure. The other measure was based upon the total amount of time that S was oriented to the modeling task. This will be referred to as the duration of attention measure. Both measures were computed from film records by the author, after two film raters (the author and one of the M's) obtained interobserver agreement indexes of .89 for frequency of attention and .91 for duration of attention with independent ratings of records for 12 randomly selected Ss. For the frequency measure, each subject received the following scores for each modeling trial: 1 when the rater thought that S observed the response, 0 when the rater thought that S did not observe the response, and 1/2 when the rater was not sure. Scores for S's could thus range from 0 to 15 in half integer steps. In the duration measure, each subject received a percentage score ranging from 0 to 100, based upon the equation, $\frac{\text{TOTAL TIME ORIENTED}}{\text{TOTAL TIME ELAPSED}} \times 100$, and reckoned from the moment M made the first pointing response to the moment M made the last (15th) pointing response. The total elapsed time on the average was 215 seconds with a S.D. of 7 seconds due to slight error in the slide projector's timing equipment, unevenness in the videorecorder speeds, and occasional missed intervals (i.e., M forgot to point as a slide changed, so he waited until the next change.).

Frequency of Attention. A five way analysis of variance was performed on frequency of attention scores. Significant effects were associated with the main variables of age, $F\ (1,96) = 5.05$, $p < .05$, and instruction $F\ (1,96) = 31.50$, $p < .001$. Second graders had a higher mean frequency of attention than preschoolers (11.22 versus 9.83) and instructions to remember produced a higher mean frequency of attention than instructions to look (12.19 versus 8.74). Only one two way interaction produced a significant result, instruction x vicarious consequence, $F\ (2,96) = 4.79$, $p < .05$. Table 1 provides the mean performances for interpreting this interaction. The remember instruction produced a relatively high degree of

Insert Table 1 about here

frequency of attention among all consequence groups, whereas the look instruction produced a higher degree of frequency of attention in the reward and punishment groups than in the neutral group. Tukey comparisons supported this interpretation. No significant differences were found among the remember consequence groups. In the look condition, however, pairwise comparisons revealed that vicarious reward and punishment groups each had a greater frequency of attention than the neutral consequences group, $q\ (5,96) > 7.35$, $p < .01$ (for each comparison).

None of the higher order interactions was significant.

Duration of Attention

A three-way analysis of variance was performed on the duration of attention scores for the variables of age, instruction, and vicarious consequence. The sex of the M and sex of the S factors were eliminated for two reasons. First, there were incomplete data for duration due to problems in video filming (8 scores were missing). A higher order analysis with incomplete data might reveal significant higher order interactions which are spurious. Secondly, no specific predictions were made for the influence of sex and no significant findings were obtained for sex effects with the frequency of attentior h

Since the number of observations in each cell of the design was not identical, Scheffe's approximation was used in computing the ANOVA. Significant effects were obtained for the main variables of instruction, $F$ (1,124) = 22.38, $p < .10$, and vicarious consequence, $F$ (2,124) = 5.75, $p < .01$. The group of Ss that was instructed to remember had a greater mean duration of attention than the group that was instructed to look (87.23 versus 70.65 percent). The group that experienced vicarious reward and the group that experienced vicarious punishment each had a greater mean duration of attention than the group that experienced a neutral treatment (reward = 81.8, neutral = 71.64, punishment = 83.78). Followup tests revealed both effects to be significant, $q$ (2,124) = 4.67, $p < .01$.

The two way interaction of instruction x vicarious consequence produced a significant effect, $F$ (2,124) = 14.01, $p < .01$. Table 2 displays the means for this interaction. As in the frequency of attention analysis, the significant interaction here resulted from the failure of vicarious reward and punishment to

Insert Table 2 about here

significantly influence attention in the remember instruction treatment, but to facilitate attention in the look instruction treatment, $q$ (5,124) > 18.22, $p < .01$ (for each comparison).

None of the other interactions was significant.

## Recall

A five way analysis of variance was performed on recall scores. Significant main effects were found for the variables of age, $F$ (1,96) = 24.14, $p$ < .001, instruction, $F$ (1,96) = 13.38, $p$ < .01, and sex of the $M$, $F$ (1,96) = 5.13, $p$ < .05. Second graders recalled more items than preschoolers (11.32 versus 9.36), instructions to remember produced greater recall of items than instructions to look (11.07 versus 9.61), and female models produced greater recall of items than male models (10.79 versus 9.89).

Significant effects occurred for the two way interactions of instruction x vicarious consequences, $F$ (2,96 = 9.25, $p$ < .01, and instruction x sex of the $M$, F (1,96) = 7.19, $p$ < .01. The means for these interactions are displayed in tables 3 and 4.

Insert Tables 3 and 4 about here

The first interaction is straightforward. In the look instruction, Ss who observed a rewarded or punished model recalled significantly more than Ss who observed a neutral model, $q$ (5,96) > 6.73, $p$ < .01 (for each comparison). However, in the remember instruction vicarious reward did not facilitate recall and the vicarious punishment group actually recalled significantly less than the neutral group, $q$ (2,96) = 4.41, $p$ < .05.

The second interaction is more complex. From the result of simple followup comparisons, it appears that the remember instruction produced significantly greater recall than the look instruction only for the female model treatment. However this result is qualified by a further significant interaction: instruction x consequence x sex of $M$, $F$ (2,96) = 3.57, $p$ < .05. In the vicarious reward condition, the differential instruction effect held up with female models, $q$ (11,96) > 11.02, $p$ < .01; in the neutral condition, the differential instruction effect held up for both male and female models, $q$ (11,96) > 12.20, $p$ < .01 (for each comparison); finally, in the vicarious punishment condition the differential instruction effect held up for neither sexed models.

Two additional higher order interactions were significant: the three way interaction of age x instruction x sex of the observer, $F$ (1,96) = 8.30, $p$ < .01, and the five way interaction, $F$ (2,96) = 4.02, $p$ < .05. These interactions proved difficult to interpret.

Intercorrelations

Pearson product-moment correlations were obtained among the recall scores and each of the attention measures. Whenever a missing score was encountered in the duration of attention measure, it was replaced using a means algorithm described in Winer (1971). The overall correlations were r = .79 for frequency of attention and recall, r = .55 for duration of attention and recall, r = .78 for frequency and duration of attention. For each correlation, $t$ > 9.39, df > 120, $p$ < .001.

Although these correlations were highly significant, it is possible that one or more of the independent factors reduced the strength of association among the measures. Accordingly, values for the correlations were computed separately for the different values of the different independent factors. None of these factor values altered the highly significant pattern of correlations and it was consistently found that the value of the correlation between duration of attention and recall was lower than the value of the other two correlations.

Verbal Behavior

In order to demonstrate that the high degree of association between overt attention and recall was not produced by some additional mediational activity (e.g., verbal rehearsal), video records were scrutinized for evidence of planful rehearsal activity (as in, for example, Flavell, 1970). Although 28 Ss talked, named stimuli, and moved their lips, most of this behavior centered on irrelevant objects in the modeling procedure. An informal analysis showed that the occurrence of the overt and covert verbal activity was not systematically related to one or more of the independent variables, to the Ss' level of attention, nor to the Ss' level of recall.

## Discussion

In order to minimize the social influence of the experimenter upon the subjects, the E confined his pre-experimental contact with the children to one or two short 15 minute rapport sessions. The failure of ten younger children to complete the procedure may have resulted from their fear or distrust of the E, who was a relative stranger.

The experiment provided striking proof that children's level of attention influences their level of learning in an observational setting. In the current experimental context, it appears as if this relation is direct and positive.

The focus of the children's attention cannot be precisely described in view of the attention measures employed. The children may have attended to the model's responses, the model himself, and/or the experimenter, as the modeling procedure progressed. However, the way in which the observers were positioned in the experimental room insured that they would observe M's responses, if they were visually oriented toward anything in the general modeling field. In future research, investigators should attempt to pinpoint the locus of observer's visual attention, because although specific locus of attention probably had minimal influence on the children's processing of modeled responses, in a slightly different context (e.g., Ruble and Nakamura, 1972) the influence might have loomed large.

The results clearly demonstrate that an instruction which directs the child to remember what he sees enhances his level of attention to the task, and as a consequence, his recall of it. In previous memory research (Appel, Cooper, Knight, McCarrell, Yussen, & Flavell, 1972) preschool children did not appear to differentially study items or recall item names when instructed to remember versus when instructed to look. A preliminary analysis in the current study indicated that the preschoolers' level of attention was enhanced just as the second graders' was by instructions to remember. In the Appel et al. study there was no opportunity for the children to be distracted, but if there had been, perhaps the investigators would have observed different levels of attention produced by the two instructions.

The results also clearly demonstrated that the presence of vicarious reward and punishment enhanced the child's level of attention to the model only when the child was not directed to remember the model's response choices. When the observers were instructed to remember, it apparently served to increase their attention to such a level that no other external motivation could increase it further. However, in the look instruction, valuation of the model's responses increased the child's attentional involvement in the task. The valence (positive or negative) of these consequences did not seem to matter.

Previous research has repeatedly demonstrated that vicarious reward enhances learning and retention (cf., Bandura, 1969). Perhaps the failure to find facilitating effects of vicarious punishment in previous studies is due to subtle 'demand characteristics' in experimental design which inhibited children's recall performance in such treatment conditions. Alternatively, it may be that the punishment manipulation was relatively mild in the current experiment and did not lead to adverse affective reactions in the observers, which could, in turn, have reduced attentional involvement in the task.

A simple age increase was associated with frequency of attention but not duration of attention. Apparently, the older children were capable of deploying attention in a more strategic fashion than the preschoolers. They looked more at the moments when looking had informational value, but did not look for a significantly longer period of time during the entire modeling sequence. As a consequence, the older children also recalled significantly more items than the preschoolers.

Although the sex variables did contribute to some significant recall interactions, the writer is frankly at a loss to explain--in any meaningful process fashion--why these results occurred. The difficulty lies in the fact that the model's sex and the child's sex did not influence the child's frequency of attention. The general failure to find any sex of model effects was probably due to the model's failure to display any personal (or sex typical) characteristics.

## References


Appel, L., Cooper, R., Knight, J., McCarrell, N., Yussen, S., & Flavell, J. The development of the distinction between perceiving and memorizing, Child Development, 1972, 43, 1365-1381.

Ball, S., & Bogatz, E. A. The first year of Sesame Street. An evaluation. Princeton: Educational Testing Service, 1970.

Bandura, A. Principles of behavior modification. New York: Holt, Rinehart & Winston, 1969.

Bandura, A., Grusec, J.E., & Menlove, F. L. Observational learning as a function of symbolization and incentive set, Child Development, 1966, 37, 499-506.

Bandura, A., & Harris, M. B. Modification of syntactic style, Journal of Experimental Child Psychology, 1966, 4, 341-352.

Flavell, J. H. Developmental studies of mediated memory. In H. W. Reese & L. P. Lipsitt (Eds.), Advances in child development and behavior , Vol. 5. New York: Academic Press, 1970, Pp. 182-211.

Kagan, J. On the need for relativism, American Psychologist, 1967, 22, 131-142.

Libert, R. M., & Fernandez, L. Vicarious reward and task complexity as determinants of imitative learning, Psychological Reports, 1969, 25, 531-534.

Liebert, R. M., & Fernandez, L. Effects of vicarious consequences on imitative performance, Child Development, 1970, 41, 847-852.

Liebert, R. M., & Swenson, S. A. Abstraction, inference and the process of imitative learning, Developmental Psychology, 1973, in press.

Ruble, D. N., & Nakamura, C. Y. Task orientation versus social orientation in young children and their attention to relevant social cues. Child Development, 1972, 43, 471-480.

Turnure, J. E., & Zigler, E. Outer directedness in the problem solving of normal and retarded children. Journal of Abnormal and Social Psychology, 1964, 69, 427-436.

White, S. Evidence for a hierarchical arrangement of learning processes. In L. P. Lipsitt & C. C. Spiker (Eds.) Advances in child development and behavior. Vol. 2. New York: Academic Press, 1965, Pp. 187-220.

Winer, B. J. Statistical Principles in Experimental Design. New York: McGraw-Hill, 1971.

TABLE 1

Means and Standard Deviations of Frequency of Attention in Various Instruction x Vicarious Consequence Treatments

| Instruction | Vicarious Consequence | | | | | |
|---|---|---|---|---|---|---|
| | Reward | | Neutral | | Punishment | |
| | Mean | SD | Mean | SD | Mean | SD |
| Look | 9.33 | 3.98 | 6.44 | 4.17 | 10.60 | 3.49 |
| Remember | 12.33 | 3.76 | 12.58 | 3.02 | 11.90 | 3.45 |

TABLE 2

Means and Standard Deviations of Duration of Attention

(By % time) in Various Instruction x Vicarious Consequence

Treatments by Age

| Age | Instruc | Vicarious Consequences | | | | | |
|---|---|---|---|---|---|---|---|
| | | Reward | | Neutral | | Punishment | |
| | | Mean | SD | Mean | SD | Mean | SD |
| Preschool | Look | 81.55 | 16.83 | 44.91 | 31.00 | 91.80 | 6.68 |
| | Remember | 80.00 | 28.94 | 89.19 | 12.12 | 86.58 | 18.50 |
| Second Grade | Look | 71.17 | 17.47 | 55.60 | 27.11 | 78.67 | 18.59 |
| | Remember | 94.33 | 6.47 | 93.42 | 7.19 | 79.42 | 27.04 |

TABLE 3

Means and Standard Deviations of Recall in Various Instruction x Vicarious Consequence Treatments

| Instruction | Vicarious Consequence | | | | | |
|---|---|---|---|---|---|---|
| | Reward | | Neutral | | Punishment | |
| | Mean | SD | Mean | SD | Mean | SD |
| Look | 9.92 | 2.96 | 8.13 | 3.15 | 10.79 | 2.93 |
| Remember | 10.92 | 2.65 | 11.87 | 2.11 | 10.42 | 2.76 |

TABLE 4

Means and Standard Deviations of Recall

in the Two Instruction Conditions

by Sex of M

| Instruction | Sex of Model | | | |
|---|---|---|---|---|
| | Male | | Female | |
| | Mean | SD | Mean | SD |
| Look | 9.69 | 3.10 | 9.52 | 3.39 |
| Remember | 10.08 | 2.46 | 12.06 | 2.29 |

## FOOTNOTES

[1]This article is based on a dissertation submitted to the University of Minnesota in partial fulfillment of the requirements for the Ph.D. degree. The author wishes to thank his major advisor, John Flavell, and the other members of the committee--Willard Hartup, John Masters, James Rest, and James Turnure--for the many helpful suggestions.

[2]Requests for reprints should be sent to Steven R. Yussen, Department of Educational Psychology, University of Wisconsin at Madison, Madison, Wisconsin 53706.