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ABSTRACT

To vicariously condition either fear or a positive emotional response, films in which a 5-year-old male model manifested one or the other response were shown to nursery school children. The measure of vicarious conditioning was the children's rate of response to the conditioned stimulus and a controlled stimulus in several operant situations after watching the film. In Experiments 1 and 2, fear responses were vicariously conditioned; after viewing the film, the children rated lower in operant responses to the fear stimulus than to the control stimulus. In Experiments 3 and 4, after viewing a positive film, the children showed a higher rate of operant response to the positive emotional stimulus than to the control stimulus. The experiments show that human operant responses can be affected by both vicarious fear conditioning and vicarious positive emotional conditioning. In all experiments the conditioning effect was short term and easily neutralized. Further research suggested includes: consideration of the age factor; use of live models rather than films; and reduction of experimenter bias, expectations, and generalization by employment of automated apparatus and maximally different test stimuli. References and appendix are included. (AJ)

Final Report

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THE VICARIOUS CONDITIONING OF EMOTIONAL RESPONSES IN NURSERY SCHOOL CHILDREN

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J.R.V.

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SUMMARY

Nursery school children were shown films in which a model manifested either fear responses or positive emotional responses to a stimulus which was neutral for them. The purpose of the films was to vicariously condition either fear or positive emotional responses in the children. The measure of vicarious conditioning was the children's rate of response to the conditioned stimulus and a control stimulus in several operant situations in which the children were placed after watching the film.

In Experiments 1 and 2, fear responses were vicariously conditioned. After watching the fear film, the children showed a lower rate of operant response to the fear stimulus than they did to the control stimulus in one of the operant situations. However, this effect was relatively short-term and easily neutralized by instructional and reinforcement conditions. In Experiments 3 and 4, positive emotional responses were vicariously conditioned. After watching the positive film, the children showed a higher rate of operant response to the positive emotional stimulus than they did to the control stimulus in one of the operant situations. Again, however, the effect was short-term and easily neutralized.

The experiments show that human operant responses can be affected by both vicarious fear conditioning and vicarious positive emotional conditioning. However, the films and procedures used in the present studies had relatively brief and specific effects on the children's operant behavior.

INTRODUCTION

Vicarious Conditioning

Over the past decade an impressive body of research has been accumulated on the role of vicarious processes in learning. This research has demonstrated that most forms of learning which result from direct experience can also occur by observing others undergoing direct experiences (Bandura, 1969, p. 118).

Among the forms of learning that are acquired vicariously are conditioned emotional responses. According to Bandura, both direct and vicariously conditioned emotional responses are "governed by the same basic principle of associative learning, but they differ in the source of the emotional arousal. In the direct prototype, the learner himself is the recipient of pain or pleasure-producing stimulation, whereas in vicarious forms somebody else experiences the reinforcing stimulation, and his affective expressions, in turn, serve as the arousal stimuli for the observer. This socially mediated conditioning process thus requires both the vicarious activation of emotional responses and close temporal pairing of these affective states with environmental stimuli" (Bandura, 1969, p. 167). In other words, a model's emotional responses serve as the unconditioned stimuli for an observer's unconditioned emotional responses; and a neutral stimulus present when the model's emotional responses occur becomes a conditioned stimulus for the observer's emotional responses (see Figure 1).

An essential requirement for the demonstration of vicariously conditioned emotional responses is that the observer's emotional responses be aroused by the emotional responses of the model, and not by other stimuli present when these responses occur (Berger, 1962). This requirement is best met by making sure that the stimulus which elicits the emotional responses in the model either cannot be seen by, or is of neutral valence for, the observer (Bandura, 1969, p. 169).

Vicarious Fear Conditioning in Children

Although the phenomenon of vicariously conditioned fear responses has been clearly established (Bandura and Rosenthal, 1966; Berger, 1962, Craig and Weinstein, 1965; Craig and Lowery, 1969; and Crooks, 1967), its study in young children has been neglected. Why this is so is difficult to understand, for much learning is known to take place during the pre-school years. Moreover, young children engage in considerable imitative behavior. These observations, when coupled with Dysinger

and Ruckmick's (1933) finding that scenes of danger, conflict and tragedy elicited stronger emotional reactions in young children than older children and adults, strongly suggest that young children might be especially prone to the acquisition of vicariously conditioned fears.

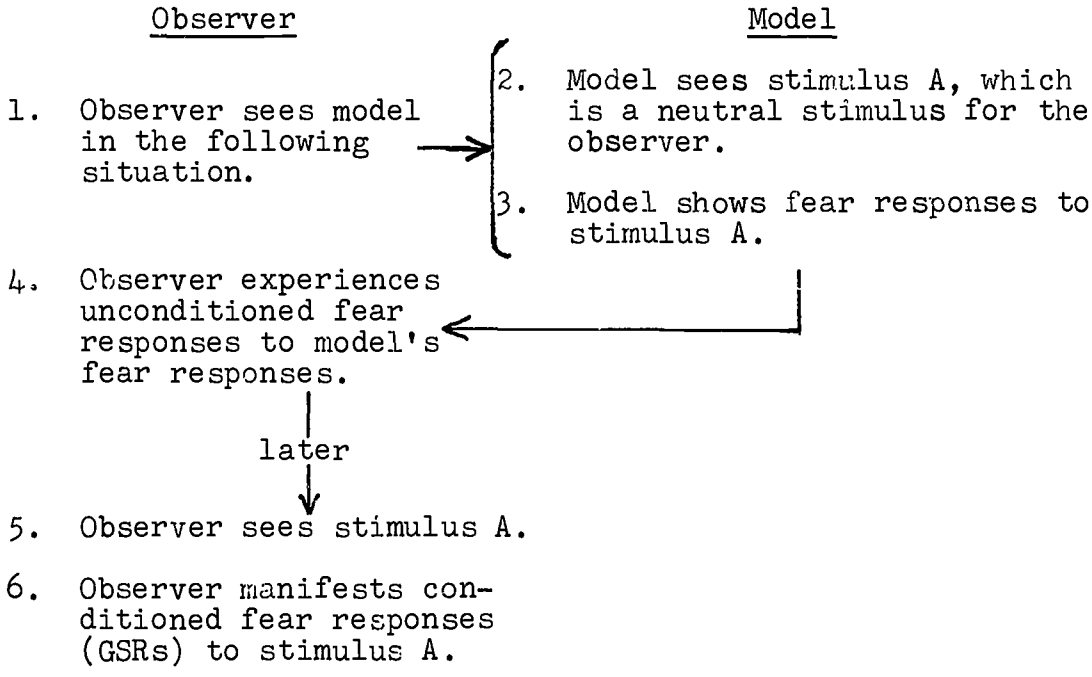

Fig. 1. Paradigm for vicarious fear conditioning.

Measures of Vicarious Fear Conditioning: GSR and Depression of Operant Response Rate

Galvanic skin response (GSR), a measure of the change in the electrical resistance of the skin and an autonomic correlate of fear, is the typical response measure employed in vicarious fear conditioning research. Crocks (1967), however, in a study involving primates, used depression of the rate of operant responding as the measure of vicarious fear conditioning. The rationale for using this response measure is that it has been employed as a measure of direct fear conditioning (Estes and Skinner, 1941) and thus in theory should be a legitimate measure of vicarious fear con-

ditioning inasmuch a fear acquired in any manner should result in an avoidance of a feared stimulus.

The relationship between GSR and depression of rate of operant responding as measures of fear responses has not been studied extensively by researchers concerned with direct conditioning of fear, and apparently not at all by those interested in vicarious fear conditioning. In those few instances in which this relationship has been investigated, the results have been mixed. Anderson, Plant and Paden (1967) found that rats conditioned with shock ran more slowly toward a goal box, reversed direction more and showed lower basal skin resistance levels than control rats who were not shocked. Bolles (1968), however, found no such relationship between conditioned suppression and change in skin resistance. He concluded his report with this statement: "When all is said and done, we know whether our subjects are frightened by how they respond, and not by what is going on in their autonomic nervous systems. . . . Perhaps as Rescorla and Solomon (1967) have suggested, it is in instrumental (operant) behavior itself that we will find our most serviceable definition of fear" (Bolles, 1968, p. 1250).

Vicarious Conditioning of Positive Emotional Responses

One would assume that if a negative emotional response could be learned vicariously, so too could a positive one; and Bandura's theory of vicarious emotional conditioning permits such a prediction. However, researchers seem to be as disinterested in this problem as they have been in the direct conditioning of positive emotional responses (Keller and Schoenfeld, 1950, p. 344), for only one experimental study of this phenomenon seems to have been done, and this one (Kriazhev, 1934) employed dogs as subjects.

Long Term Effects of Vicarious Conditioning

Studies in which behavioral changes have been demonstrated are frequently criticized for their failure to provide evidence that demonstrated modifications are long-lasting. And investigations of vicariously conditioned emotional responses justly deserve such criticism. Although long-term follow-up studies are desirable, and indeed necessary, logic dictates that one should inquire first about the persistance of behavioral changes over short periods of time, i.e., hours and days.

Directly conditioned fear responses are known to be quite persistent. And while the evidence for the permanence of directly conditioned positive emotional responses

is less firm, it has been naturalistically observed that positive (as well as negative) social and ethical values, which in some cases are thought to be learned through direct classical conditioning, are often resistent to change. In light of these observations and Bandura's suggestion that both direct and vicariously conditioned emotional responses are governed by the same general principle (Bandura, 1969, p. 167), it seems reasonable to expect vicariously conditioned emotional responses to persist for at least a short time.

Objectives

The objectives of this investigation are threefold:

First, to determine if a fear response can be vicariously conditioned in nursery school children, using depression in the rate of an operant response as the measure of the vicariously conditioned fear response. It is hypothesized that a neutral stimulus, after having been paired with the fear responses of a model, will become aversive or negative in valence to an observer, and that this will result in his responding less frequently to it than to a control stimulus.

Second, to determine if a positive emotional response can be vicariously conditioned in nursery school children, using an increase in operant responding as the measure of the acquisition of the vicariously conditioned positive emotional response. It is hypothesized that a neutral stimulus, after having been paired with the positive emotional responses of a model, will become positive in valence to an observer, and that as a consequence he will respond more frequently to it than to a control stimulus.

Third, to determine if these vicariously conditioned emotional responses persist over a 24-48 hour period.

REVIEW OF THE LITERATURE AND RELATED RESEARCH

The review of the literature and related research was accomplished by searching ERIC, Psychological Abstracts, Dissertation Abstracts, recent reviews of the literature on vicarious processes in learning (Bandura, 1969; Flanders, 1968), and recent volumes of major psychological journals.

In vicarious conditioning, it is essential that the observer be emotionally aroused by the affective expressions of the model rather than by the stimulus to which the model shows fear. Several studies have shown that this can be accomplished. In a study by Lazarus, Speisman, Mordkoff and Davidson (1962), college students were shown a film that depicted a crude genital operation being performed on an adolescent as part of a puberty ritual by a primitive group of natives. Subjects manifested increased levels of autonomic responding (heart rate and skin resistance) while viewing this film. That the emotional expressions of the model played a role in the increased arousal of subjects was made clear in a follow-up study (Speisman, Lazarus, Mordkoff, and Davidson, 1964) in which the deletion of vocal pain cues resulted in a significant reduction in autonomic responding.

The phenomenon of vicariously conditioned fear responses has been clearly established (Bandura and Rosenthal, 1966; Berger, 1962; Craig and Weinstein, 1965; Craig and Lowery, 1969; and Crooks, 1967). Berger's study (1962) is worthy of special mention for it provides a laboratory method for conducting research on this phenomenon with human subjects, is methodologically sound, and illustrates the use of GSR as a response measure. In this study an observer watched a model who pretended to be shocked everytime a light dimmed. A buzzer preceded the dimming of the light. GSRs of the observer were recorded as a measure of his fear responses. Whenever the light would dim and the model was supposedly shocked, he would jerk his arm. The buzzer was the conditioned stimulus. The unconditioned stimulus was the model's fear response, which the observer inferred from the dimming of the light and the model's arm movement. Observers (college students) in this condition responded with a greater number of GSRs to the presentation of the buzzer on the conditioning test than did observers in three other conditions set up to

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[1]The assistance of Dr. Albert Bandura (personal communication) in answering questions pertaining to portions of this section of the report is gratefully acknowledged.

control for the effects of pseudo-vicarious instigation of fear responses.

Crooks (1967), in an unpublished experiment, studied the vicarious learning of fear responses to a neutral stimulus. She first tested her subjects, four rhesus monkeys, for the number of times they made contacts with a nonaversive object. Subjects then underwent vicarious fear conditioning. They heard a tape recording of a demonstrator monkey's fear vocalizations immediately after they observed the demonstrator monkey approaching the nonaversive object. Subjects received a control condition in which they heard the fear vocalizations played backwards (and thus distorted) whenever the demonstrator monkey approached a different object. On the post-conditioning test, subjects made significantly fewer contacts with the feared object than they did with the control object.

A phenomenon related to vicarious conditioning of fear responses is vicarious punishment. Here, as the result of observing a model undergoing negative response consequences, an observer manifests a reduction in the same kind of behavior engaged in by the model. A number of studies have demonstrated this effect (Bandura, 1965; Benton, 1967; Walters, Leat and Mezei, 1963; and Walters, Parke and Cane, 1965). In Benton's study, children observed an experimenter verbally reprimanding a model either as he approached prohibited toys (early condition) or after he picked up these toys (late condition). On a resistance to temptation test the observers and models in the early condition showed equal amounts of response suppression. The essential distinction between vicarious punishment and vicarious conditioning of fear responses is that in the former the emotional responses in the observer may be instigated by the punishing stimuli themselves, whereas in the latter the emotional responses of the observer are a function of the emotional responses of the model.

One of the earliest studies of the vicarious conditioning of emotional responses was conducted by a Russian investigator, Kriazhev (1934). This study is noteworthy because it may have been the only one to have undertaken specifically an investigation of the role of observation on the acquisition of a positive emotional response. Kriazhev's subjects were seven pairs of dogs. One animal of each pair observed the other undergo a conditioning procedure in which the unconditioned stimulus was either food or shock and the conditioned stimulus was either a bell or metronome. Although the observing animals of each pair were neither shocked nor fed, they later showed salivary responses to the conditioned stimuli for food and responses of agitation to the conditioned stimuli for shock. It is possible that the salivating re-

sponse was a vicariously conditioned positive emotional response. But it is impossible to say from the brief report provided, because (1) it is not clear whether Kriazhev controlled for the possibility that the observer's salivery responses were elicited by the sight of food rather than the salivating responses of the model, and (2) it is not known if the models were absent when the observers were tested. If they were not, salivating responses of observers may have been elicited by salivating responses of models rather than by the conditioned stimuli.

An ingenious study which did not concern itself directly with the vicarious conditioning of positive emotional responses, but which may have resulted in the development of such responses is one done by Duncker (1938). Nursery school subjects were given a pre-test in which they chose an unknown but pleasant food over an unknown but unpleasant one. They were then told a story in which the hero "violently abhorred" a sour-tasting food similar in appearance to the food preferred by the subjects and "enthusiastically relished" a sweet-tasting food very much like the food rejected by the subjects. The purpose of this study was to see if subjects would change their natural order of preference by the influence of an opposite order of preference on the part of the hero. On the post-test, the subjects did indeed change their preferences significantly. Change in preference may have been due, at least in part to a change in the emotional valence of the food initially rejected, i.e., a positive emotional response may have been vicariously conditioned. However, certain aspects of the study argue against this explanation. First, there was no control for the possibility that the changed responses were a function of modeling per se; this effect was actually encouraged in the initial stage of the post-test, in which subjects were made to perform the story while selecting their foods. And second, the story may not have been very emotionally arousing, for it was told in a low and unimpressive voice.

Summary. Vicarious fear conditioning has been clearly demonstrated in adults and animals but not in young children. In humans, this phenomenon has been measured exclusively by autonomic responses. The vicarious conditioning of positive emotional responses has not been systematically studied. And it has not been determined if vicariously conditioned emotional responses persist.

OVERVIEW

A series of four experiments was undertaken to determine if fear and positive emotional responses could be vicariously conditioned in nursery school children by films. In the first experiment a film was tested for its capacity to arouse fear responses vicariously; in the second experiment this film was used to vicariously arouse fear responses. In the third experiment another film was tested for its capacity to arouse positive emotional responses vicariously; and in the fourth experiment this film was employed to vicariously condition positive emotional responses.

Follow-up studies were conducted to determine if vicariously conditioned emotional responses persisted for 24-48 hours.

The films employed in this series of studies were made by the author with the aid of a professional photographer, using an inexpensive Kodak super-8 camera. After the films had been processed and edited, they were magnetically striped so that dialogue could be recorded on the films.

EXPERIMENT I

Purpose

The purpose of Experiment I was to determine if the film to be used for vicarious fear conditioning had the capacity to arouse Ss vicariously.

Method

Subjects. The Ss for this experiment were five girls and three boys of nursery school age enrolled in the Effie Ann Johnson Day Care Center in Staunton, Virginia.

Equipment and materials. This experiment was conducted in the director's office of the Effie Ann Johnson Day Care Center. S was seated in a chair at one end of the office and a movie screen was placed at the other. A super-8 sound projector was placed to the front and left of S.

The film tested in this experiment showed a male model five years old manifesting fear responses of screaming and withdrawing when his mother attempted to present one stimulus (fear stimulus) to him, and emotionally neutral responses of looking about the room and irrelevant verbailization when his mother tried to give him another stimulus (control stimulus). The stimuli used in this film were plastic figures of Mickey Mouse and Donald Duck. Mickey Mouse was designated as the fear stimulus and Donald Duck as the control stimulus by random assignment.

A galvanometer (Maico's Affectometer) was placed on a desk to S's right to measure his GSRs to the film. A stopwatch mounted on a stand was placed next to the galvanometer to measure the intervals in which GSRs were recorded. Duplicates of the fear and control stimuli were employed for a post-film test.

Procedure. Before S was taken to the testing room, E explained to him that they were going to see a movie. As soon as S was seated, his right hand was loosely tied to his thigh by placing it in a fingerless glove to which were sewn two tie strings. This procedure reduced hand movement while GSRs were being recorded. After electrodes were attached to the fingers of S's gloved hand, he was shown the film. The fear and control scenes were alternated and each was shown eight times. The fear scene was shown first. Each scene consisted of three elements in the following

order: (1) a close-up of the stimulus by itself; (2) the attempted presentation of the stimulus to the model and his responses to it; and (3) another close-up of the stimulus by itself. During each scene S's GSRs to the model's responses to the stimulus were recorded. After S had seen the film, he was shown duplicates of the stimuli seen in the film and asked to choose the one he liked best.

Response measures. A GSR was counted if there was any per cent change in the direction of lowered resistance within three seconds after the occurence of the model's responses to the presentation of the stimulus. GSRs were recorded visually from the meter of the galvanometer. A response of choosing was counted if S picked up or pointed to one of the duplicates of the stimuli.

Results

Ss made significantly more GSRs to the model's fear responses than they did to his emotionally neutral ones (Sign test, $r=0$, $p<.01$). Table 1 in the Appendix gives the GSR data for each S. After the film when Ss were asked which of the stimuli they liked better, seven out of eight chose the control stimulus ($X^2=4.50$, $p<.05$). These results indicate that the film was capable of vicariously arousing Ss and affecting their choice of the neutral stimulus over the feared one.

EXPERIMENT 2

Purposes

The main objective of this experiment was to determine if a fear response could be vicariously conditioned in nursery school children using depression in the rate of an operant response as the measure of vicariously conditioned fear. It was hypotheiszed that a neutral stimulus, after having been paired with the fear responses of a model, would become aversive or negative in valence to an observer and that this would result in his responding less frequently to it than to a control stimulus.

A related purpose was to determine if vicariously conditioned fear responses would persist over a 24-48 hour period.

Method

Subjects. The ten Ss for this experiment were three boys and one girl of nursery school age enrolled in the Child Health Care Center, Verona, Virginia, and four boys and two girls enrolled in the Mary Baldwin College Nursery School, Staunton, Virginia.[2] Ss from the former school were randomly selected, while those from the latter were made up mainly of volunteers. Each S served as his own control. The method for securing Ss from the Mary Baldwin Nursery School was necessitated by the refusal of several of the children in the random sample to participate.[3] Any bias resulting from this sampling procedure probably operated to reduce the effect of the experimental variable because the volunteers were probably more intrepid than their classmates.

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[2]Parents of children selected for this experiment were apprised of its nature and given an opportunity to discuss it with E. All permitted their children to participate in the experiment.

[3]The director of the Mary Baldwin College Nursery School speculated that the refusal of some Ss to participate was a result of their not being accustomed to the classroom in which testing took place.

Equipment and materials. The experiment was conducted in empty classrooms in the participating schools. S was seated at a large table on which was placed before him an operant conditioning apparatus (Figure 2). This device consisted of two telegraph keys arranged side by side. Mounted on each was a plastic figure (Mickey Mouse or Donald Duck toy) which served as a test stimulus. Over each stimulus was a signal light. An M & M dispenser was mounted between the two test stimuli. The signal lights and M & M dispenser were remotely controlled by E, who sat to the right of the apparatus, partially out of S's sight. A stopwatch mounted on a stand was placed next to the controls to record time. An assistant sat directly behind the apparatus, out of S's view, recording responses from electronic counters which were connected to the telegraph keys.

A galvanometer (the same one used in the first experiment) was placed on a second table.

Duplicates of the test stimuli, pictures of the test stimuli secured from a coloring book, and completed magnetic puzzles of the test stimuli were provided for a supplementary post-test.

A super-8 sound projector and screen were placed in back of S so that he had only to turn around in order to see the film. The film used in this experiment was the one tested in the first experiment.

Pretest for vicarious fear conditioning. Before S was taken to the testing room, E explained that they were going to play a game and see a movie.

In order to ascertain S's preferred hand, he was asked upon entering the testing room to pick up a ball and throw it to E. His non-preferred hand was then loosely tied to his thigh by placing it in the fingerless glove used in the first experiment. E explained to S that this was done to make sure he did not use both hands to push the keys. S was then seated before the apparatus so that the shoulder of his preferred hand was equi-distant from the two test stimuli. The position of the test stimuli was reversed from S to S to control for position effects.

Pretest instructions were then given as follows: "Listen, (S's name), this is how you play the game.

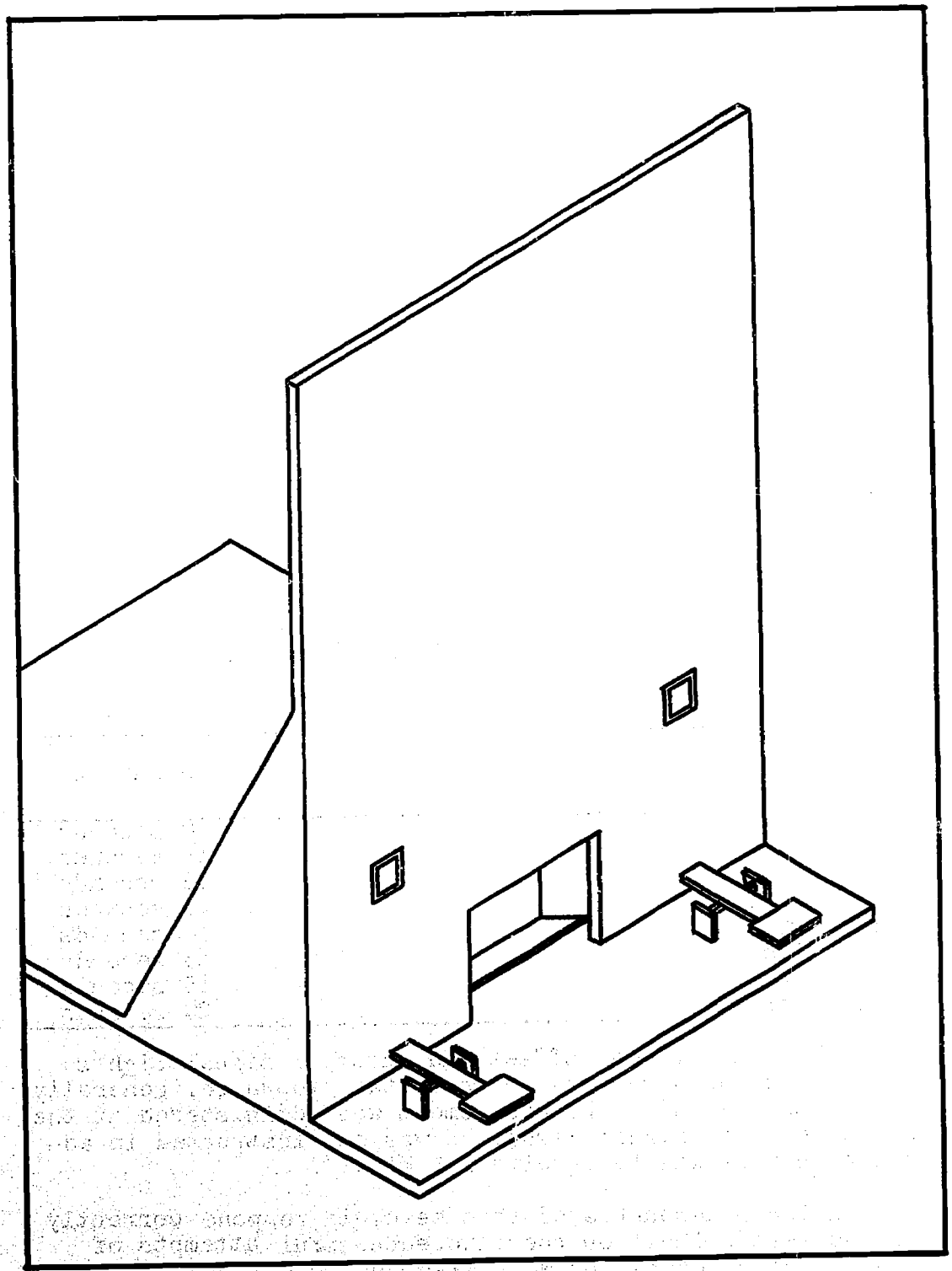

Fig. 2. Operant conditioning apparatus.

When this light goes on, grab Mickey Mouse like this and push him this fast. (E demonstrated by grabbing Mickey Mouse and pushing him at about march tempo. the rate at which most trial Ss pushed the test stimuli.) When this light goes on, grab Donald Duck the same way and push him as fast as you did Mickey Mouse. (E again demonstrated.) When this light goes off, stop pushing Donald Duck. Be sure to watch the lights so you'll know which toy to push and when to stop pushing him, O.K.? Now let's begin. Watch the lights."

The order in which the signal lights were presented and the time they remained on were varied to control for the effects that position and time may have had on the rate of responding to the test stimuli (see Table 1). This procedure, which permitted each test stimulus to be pushed twice and for 30 seconds each minute, was repeated until S met the criterion for equal baselines of operant responding, which occurred when S made the same number of responses per minute (plus or minus 5%) to each of the test stimuli for three consecutive minutes.

TABLE 1

Order and Duration of Signal Lights

Order	Duration
Right light	10 seconds
Left light	15 seconds
Left light	15 seconds
Right light	20 seconds
Left light	10 seconds
Right light	15 seconds
Right light	15 seconds
Left light	20 seconds

The time between offset and onset of signal lights was as long as necessary to reset the stopwatch, generally one to two seconds. Reinforcement was administered at the offset of each signal light. S was not instructed in advance that he was to receive M & M's.

After S demonstrated that he could respond correctly to the test stimuli on cue (two successful attempts of 10-15 seconds each), he was asked not to eat any of his M & M's until the game was over. To make sure that this

instruction was followed, a piece of clear plastic material was taped over the opening of the M & M dispenser. This procedure permitted the M & M's to be seen but not touched. Equal baselines of operant responding to the test stimuli were then conditioned.

An attempt was made to measure GSRs to signal lights as a second dependent variable measure, but had to be abandoned when it proved impossible to get equal baselines.

Vicarious fear conditioning. Once equal baselines of operant responding to the test stimuli were conditioned, S's chair was turned around and the electrodes were attached to the fingers of his gloved hand. He was then shown the film in which the model responded with fear when offered the fear stimulus, and in an emotionally neutral manner when presented with the control stimulus. These scenes (fear and control) were alternated, each having been presented three times. (Each scene was shown only three times in this experiment because GSR data in the first experiment indicated that adaptation to the fear stimulus began to occur after the third scene.) The fear scene was shown first. During each scene S's GSRs to the close-ups of the test stimulus by itself and to the model's responses to the test stimulus were recorded. GSRs to the model's responses to the fear stimulus were regarded as signs of vicarious emotional arousal. And GSRs to the close-ups of the test stimuli (except the very first one, of course) were regarded as indicators of vicariously conditioned responses.

Post-tests for vicarious fear conditioning. When trial Ss for this experiment were run, it appeared as though the combination of pretest instructions and successful completion of the pretest set up such strong expectations about how Ss were supposed to behave as to render the duplication of the pretest insensitive as a post-test measure. In order to test this hypothesis and to seek a more sensitive dependent variable measure, two major post-tests were used. The first gave S some choice as to which test stimulus he wished to push; the second duplicated the pretest.

Immediately after S had seen the film, the electrodes were removed and he was again seated before the apparatus as before. He was given the following instructions: "Now I want to see if you can earn some more M & M's, but this time we are going to play the game a different way. This time I am going to turn on both lights at the same time, and you can push either toy you want to and you can change toys anytime you want to, O.K.? But don't forget to stop pushing when the lights go off. Now let's begin." S was then presented with the signal lights as follows: both lights on

for 10 seconds, then 15 seconds, then 15 seconds, then 20 seconds. The time between offset and onset of signal lights was the same as for the pretest, generally one to two seconds. Reinforcement was administered at the offset of the signal lights. This procedure was followed for each of the three minutes of this post-test (Post-test A).

As soon as Post-test A was completed, S was instructed as follows for Post-test B: "Now let's play the game the way we did before. When I turn on this light, you push Mickey Mouse; and when I turn on this light, you push Donald Duck, O.K.? Now let's begin." S was then presented the signal lights for the test stimuli for three minutes in the same order and for the same times as they had been for the pretest. Reinforcement was also administered as it had been for the pretest.

A Supplementary Post-test designed to evaluate choice behavior was given after Post-test B. S was first presented with duplicates of the test stimuli and asked which he liked better; next, he was shown pictures of the test stimuli and asked to select one to keep; and last, he was shown completed puzzles of the test stimuli and asked which he would prefer to work.

To make sure S understood and remembered the salient features of the film, an interview consisting of the following questions was held immediately after the Supplementary Post-test was concluded: (1) Tell me what you saw in the movie. (2) Which toy did the boy in the movie like best? (3) Why do you think he liked that toy best? (4) Which toy in the movie did you like best? (5) Why do you like him the best?

Delayed measures. After 24-48 hours had elapsed, all post-tests were repeated.

Response measures. On the pretest and the post-tests an operant response was counted if, in the presence of a signal light (s), S depressed the test stimulus sufficiently to cause a switch at the base of the telegraph key to close and thus activate an electronic counter.

A GSR was recorded if there was any per cent change in the direction of lowered resistence within 3 seconds after the occurrence of the model's responses to the presentation of the test stimulus or the onset of the close-ups of the test stimuli by themselves. GSRs were recorded visually from the meter of the galvanometer.

A response of choosing on the Supplementary Post-test was counted if S picked up or pointed to one of the test stimuli when each pair was presented.

Results

Table 2 summarizes the results of this experiment and Figure 3 shows the same data plotted in graph form.

TABLE 2

Average Rate of Operant Responses per Minute

Test Stimulus	Pretest	Post-test A	Post-test B	Delayed Post A	Delayed Post B
Fear	58.97	47.00	64.20	54.34	65.96
Control	59.17	75.57	66.00	76.66	69.53
Mean Difference	.20	28.57	1.80	22.32	3.57
t - D	.50	1.98*	1.10	1.63	2.68*

*$p < .05$ for a one tailed hypothesis

On the Pretest, the difference between the average number of responses per minute to the fear and control stimuli was less than one response per minute. Thus Ss responded at an equal rate to the test stimuli before they saw the film.

On Post-test A Ss responded an average of 28.57 more responses per minute to the control stimulus than to the fear stimulus. This difference, which was significant for a one tailed hypothesis, indicates that when Ss were given a choice they avoided the fear stimulus and responded to the control stimulus.

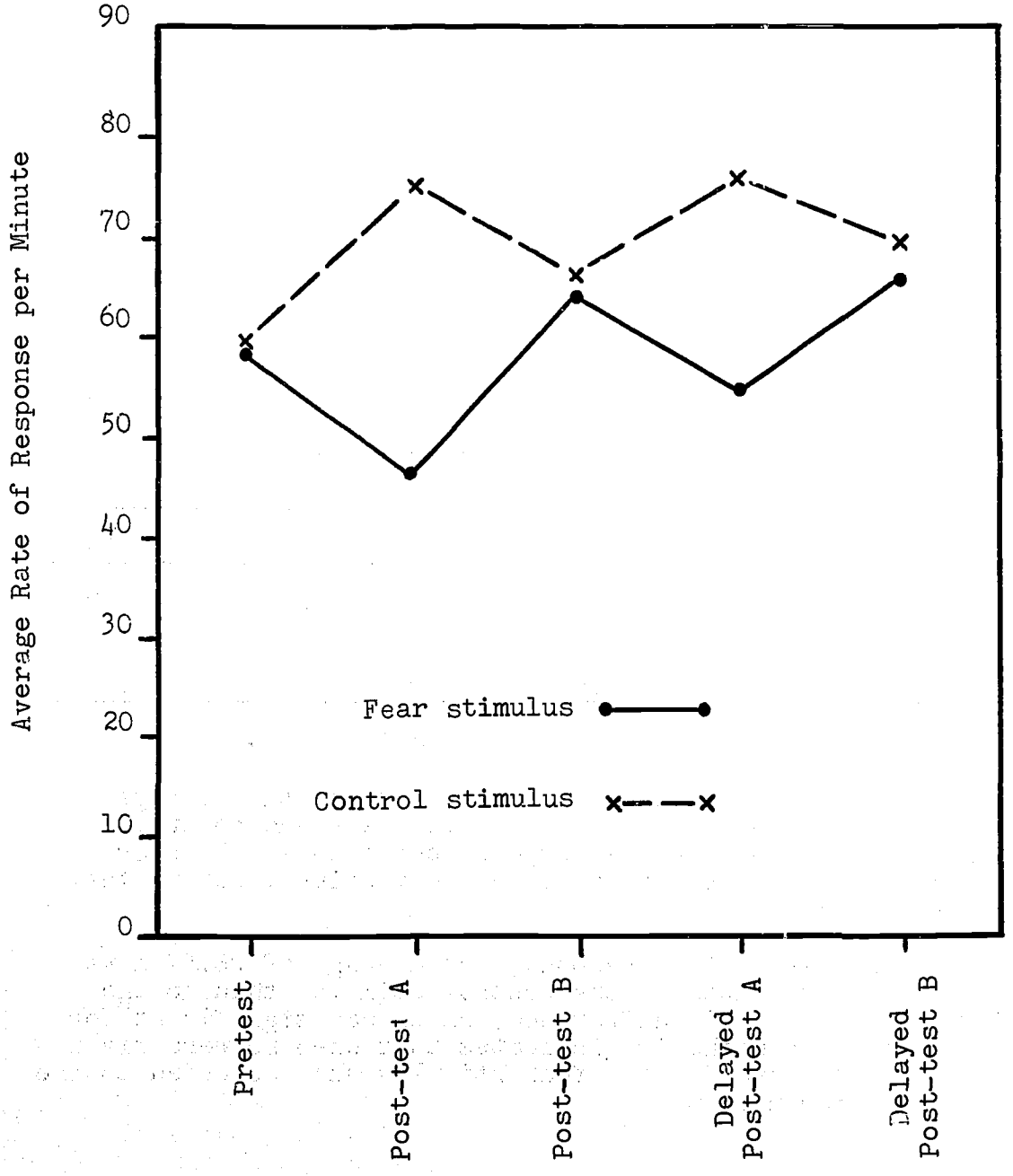

Fig. 3. Average differences in rate of operant responses per minute to the fear and control stimuli

However, on Post-test B Ss did not respond differently to the two stimuli. This result is interpreted as evidence for the hypothesis that the combination of pretest instructions and successful completion of the pretest would set up such strong expectations regarding how Ss were to behave that the duplication of the pretest as a post-test measure would be rendered insensitive.

On Delayed Post-test A Ss responded much more frequently to the control stimulus than to the fear stimulus (an average difference of 22.32 more responses per minute). Though large, this difference was not reliable. That this difference was both smaller and less reliable than that obtained 24-48 hours earlier on Post-test A suggests that the effect of the experimental variable on Ss' responses to the fear stimulus in a choice situation had weakened. That this difference was larger than that obtained on Post-test B 24-48 hours before is further evidence that strong expectations affected performance on Post-test B.

On Delayed Post-test B Ss made an average of 3.57 more responses per minute to the control stimulus than to the fear stimulus. Though reliable ($p<.05$), little can be inferred from this difference because of its size (several times smaller than the mean differences for Post-test A and Delayed Post-test A).

The results of the supplementary post-tests are summarized in Tables 3 and 4.

TABLE 3

Choice Behavior on Supplementary Post-test

Test Stimulus	Fear	Control	df	X^2
Expected # of Responses	15	15	1	3.34($p>.05$)
Obtained # of Responses	10	20		

As is shown in Table 3, Ss chose the fear stimulus less frequently than they did the control stimulus on the Supplementary Post-test, but this difference was not significant. The results of the Delayed Supplementary Post-test were likewise not significant.

TABLE 4

Choice Behavior on Delayed Supplementary Post-test

Test Stimulus	Fear	Control	df	X^2
Expected # of Responses	15	15	1	0($p > .05$)
Obtained # of Responses	15	15		

The failure to obtain a significant difference on the Supplementary Post-test was a little surprising in light of the results of Post-test A and inasmuch as a significant difference was obtained on a more limited test of choice behavior when the film for this experiment was tested in the first experiment (Table 2, Appendix). A possible explanation for this discrepancy is that the effect of the experimental variable may have weakened by the time Ss were exposed to the Supplementary Post-test.

The performance of certain Ss (Tables 3 and 4, Appendix) deserves comment. S 1 showed very little difference in his responses to the fear and control stimuli on Post-tests A and B but substantial differences in the expected direction on Delayed Post-tests A and B. This suggests the possibility of an incubation effect for this S, i.e., the strength of the fear response may have increased with the lapse of time, without further conditioning (Brady, 1951). S 1's GSR record is also interesting. He was vicariously aroused each time the model responded to the fear stimulus, but made more and larger responses to the close-ups of the control stimulus than he did to the close-ups of the fear stimulus, an indication that his performance on Delayed Post-tests A and B may have been an artifact.

S 2 showed large differences in his responses to the fear and control stimuli (in the expected direction) on Post-test A and Delayed Post-test A; this S also responded all three times to the control stimulus on the Supplementary Post-test, but reversed himself on the Delayed Supplementary Post-test.

S 3's difference score on Post-test A was rather large (22.33) and in the expected direction, but of the stimuli he saw in the film he liked the fear stimulus better. His GSR record showed that he was vicariously conditioned to the close-up of the fear stimulus but not to the control stimulus. These data may indicate that operant behavior of some individuals can be altered even though their choice behavior is not.

Ss 5 and 7 showed a vast difference between their performance on Post-test A and Delayed Post-test A. On the former, S 5's difference score was 63.67 (in the expected direction) while on the latter it was 1.66 (in the other direction). S 7's difference score was 123.00 for Post-test A vs. 29.00 for Delayed Post-test A. This reduction over a 24-48 hour period may be an indication of how quickly the effect of the experimental variable diminished in these Ss.

Ss 9 and 10 showed considerable evidence that they had not been vicariously conditioned. Both indicated a preference for the fear stimulus during the interview and S 10 made no GSRs to the close-ups of the fear stimulus in the film. On Post-test A, the difference scores for both were rather large in the wrong direction. Also, both chose the fear stimulus more frequently than the control stimulus on the Supplementary and Delayed Supplementary Post-tests.

EXPERIMENT 3

The purpose of this experiment was to determine if the film to be used for vicarious positive emotional conditioning had the capacity to arouse Ss vicariously.

Method

Subjects. The Ss for this experiment were five boys and seven girls of nursery school age enrolled in the Child Health Care Center in Verona, Virginia.

Equipment, materials, and procedure. This experiment was carried out in an empty classroom in the Child Health Care Center. Except for the galvanometer, which was not used in this experiment, and the film, which was different, the equipment, materials and procedure were the same as those employed in the first experiment. The film tested in this experiment depicted a model (same one that appeared in the fear film) making positive emotional responses of smiling, approaching and affectionate remarks ("I love him so much; he makes me feel so good.") when one of the stimuli (positive stimulus) was presented to him by his mother and the same emotionally neutral responses he made in the fear film when the other stimulus (control stimulus) was offered to him. The stimuli were the same toys used in the fear film. Mickey Mouse was designated as the positive stimulus and Donald Duck as the control stimulus by random assignment. The positive and control scenes were alternated, and each was shown eight times. The positive scene was shown first. Each scene consisted of three elements in the following order: (1) a close-up of the stimulus by itself; (2) the presentation of the stimulus to the model and his responses to it; and (3) another close-up of the stimulus by itself.

Response measure. A response of choosing was counted if S picked up or pointed to one of the duplicates of the stimuli.

Results

After the film when Ss were asked which of the stimuli they liked better, 10 out of 12 chose the positive stimulus ($X^2=5.34$, $p<.05$). Table 5 in the Appendix gives the data for this experiment and indicates that the film consistently affected the Ss' choice of the positive stimulus over the control stimulus. It was inferred from this behavior that the film vicariously aroused all but two of the Ss.

EXPERIMENT 4

Purposes

The major purpose of this experiment was to determine if a positive emotional response could be vicariously conditioned in nursery school children, using an increase in operant responding as the measure of the acquisition of the positive emotional response. It was hypothesized that a neutral stimulus, after having been paired with the positive emotional responses of a model, would become positive in valence to an observer, and that as a consequence he would respond more frequently to it than to a control stimulus. A related purpose was to determine if vicariously conditioned positive emotional responses would persist over a 24-48 hour period.

Method

Subjects. The ten Ss for this study were four boys and three girls from the Child Health Care Center and one boy and two girls from the Effie Ann Johnson Day Care Center. All Ss were randomly selected, and each served as his own control.

Equipment and materials. This experiment was conducted in an empty classroom of the Child Health Care Center and the director's office of the Effie Ann Johnson Day Care Center. Except for the galvanometer, which was not used in this experiment, and the film, which was different, the equipment and materials used in this experiment were the same as those employed in the second experiment.

Pretest for vicarious positive emotional conditioning. The pretest for vicarious positive emotional conditioning was the same one used in the second experiment.

Vicarious positive emotional conditioning. Once equal baseline rates of responding to the test stimuli were conditioned, S was shown the film in which the model responded with positive emotional responses when he was offered the positive stimulus and emotionally neutral responses when he was presented the control stimulus. The scenes were alternated, and each was shown four times. (Each scene was shown only four times in this experiment because the attention of many Ss in the third experiment began to wander after each scene had been presented about four times.) The positive scene was presented first.

Post-tests for vicarious conditioning of positive emotional responses. The post-tests for this experiment were

the same as those used for the second experiment. To make sure that S understood and remembered the salient features of the film an interview consisting of the following questions was held immediately after the Supplementary Post-test was conducted: (1) Tell me what you saw in the movie. (2) Which toy in the movie did the boy like best? (3) Which toy in the movie did you like best?

Follow-up. After 24-48 hours had elapsed, all post-tests were repeated.

Response measures. Except for GSR, which was not recorded, the response measures for this experimental condition were the same as those employed in the second experiment.

Results

Table 5 summarizes the results of this experiment, and Figure 4 shows the same data plotted in graph form.

TABLE 5

Average Number of Responses per Minute

Test Stimulus	Pretest	Post-test A	Post-test B	Delayed Post A	Delayed Post B
Positive	59.47	72.67	61.77	61.63	58.73
Control	58.93	53.10	62.57	58.26	58.90
Mean Difference	.54	19.57	-.80	3.37	-.17
t - D	1.74	1.84*	.86	.58	.19

*$p < .05$ for a one tailed hypothesis

On the Pretest, the difference between the average number of responses per minute to the positive and control was less than one. This result indicates that Ss responded at an equal rate to the test stimuli before they saw the film.

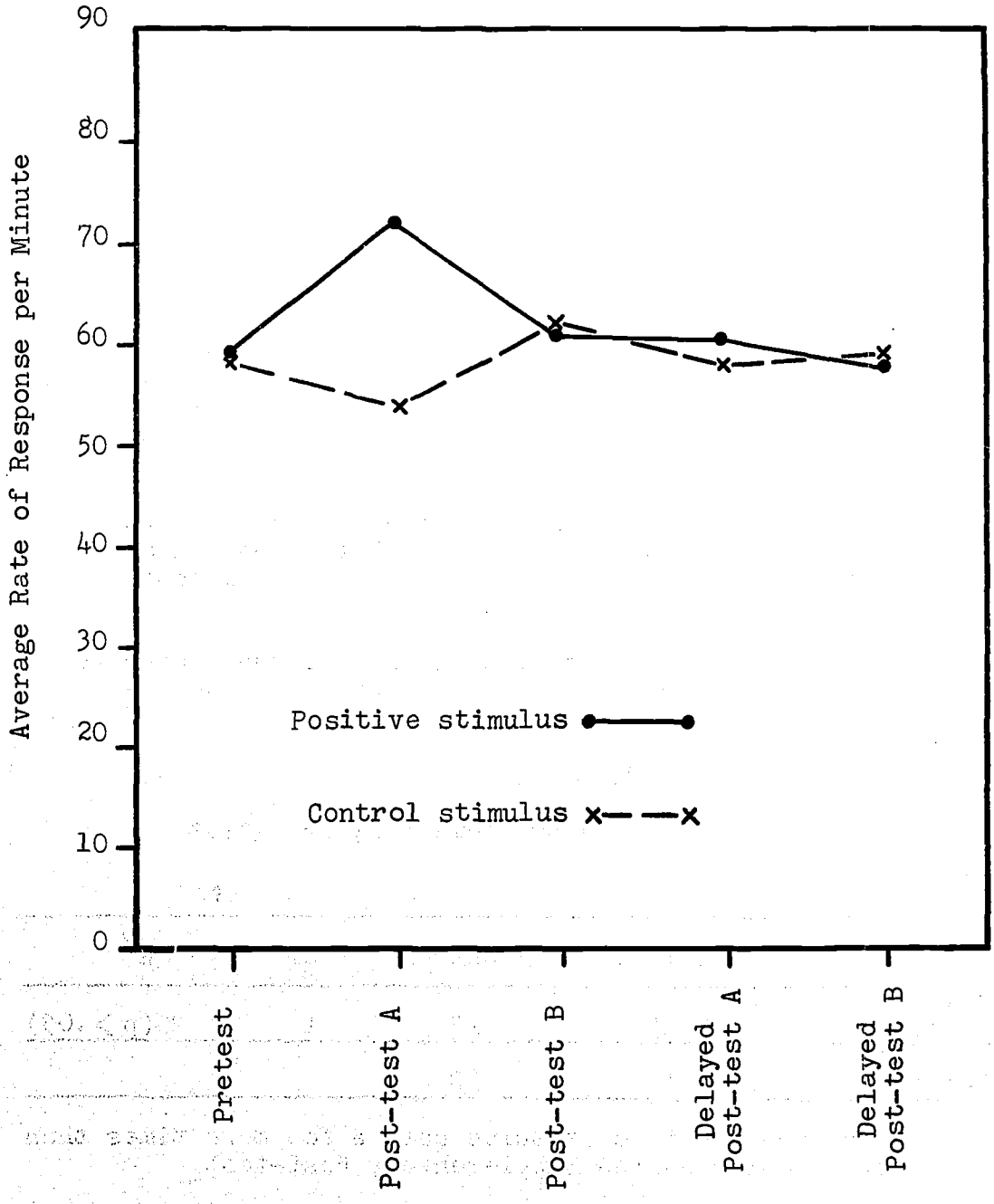

Fig. 4. Average differences in rate of operant responses per minute to the positive and control stimuli.

On Post-test A, Ss responded an average of 19.57 more responses per minute to the positive stimulus than to the control stimulus. This difference, which was significant for a one tailed hypothesis ($p < .05$), indicates that when Ss were given a choice they approached the positive stimulus and neglected the control stimulus after they had been exposed to the experimental variable.

On Post-test B, Ss responded at the same rate to the two stimuli. This result is interpreted as evidence that strong expectations made Post-test B in this experiment insensitive, too.

On Delayed Post-test A, Ss made a few more responses to the positive stimulus than to the control stimulus (3.37 more per minute), but this difference was not significant. This result suggests that the effect of the movie had worn off after 24-48 hours elapsed.

On Delayed Post-test B, Ss responded at the same rate to the two stimuli, further suggesting that strong expectations affected the duplication of the Pretest as a post-test measure.

Tables 6 and 7 summarize the results of the choice behavior which was measured on the Supplementary and Delayed Supplementary Post-tests.

TABLE 6

Choice Behavior on Supplementary Post-test

Test Stimulus	Positive	Control	df	X^2
Expected # of Responses	15	15	1	1.20($p > .05$)
Obtained # of Responses	18	12		

Ss chose the positive stimulus only a few more times than the control stimulus on the Supplementary Post-test.

On the Delayed Supplementary Post-test, Ss split evenly in their responses to the positive and control stimuli.

Inasmuch as a significant difference was found for a

TABLE 7

Choice Behavior on Delayed Supplementary Post-test

Test Stimulus	Positive	Control	df	X^2
Expected # of Responses	15	15	1	0 ($p > .05$)
Obtained # of Responses	15	15		

more limited test of choice behavior when Ss were shown the positive film in the third experiment (Table 5, Appendix), the failure to obtain a significant difference on the Supplementary Post-test for this experiment was surprising. A possible explanation for this discrepancy is that the effect of the film may have weakened by the time Ss were given the Supplementary Post-test.

The performance of certain Ss in this experiment (Tables 6 and 7, Appendix) also deserves mention. Ss 1 and 4 responded much more frequently to the positive stimulus than to the control stimulus on Post-test A. Each also chose the positive stimulus five out of six times on the Supplementary and Delayed Supplementary Post-tests.

Ss 3 and 9 were the only ones to respond more frequently to the control stimulus than to the positive stimulus on both Post-test A and Delayed Post-test A. S 3 was also the only S who failed to correctly identify the stimulus the model liked better. Although S 9 selected the positive stimulus as her preferred toy in the film, she chose the control stimulus all three times on the Supplementary Post-test. The behavior of these Ss strongly suggests that they were not affected by the film.

S 7 is worthy of mention because of a comment he made to his mother after the experiment. He told her that he felt sorry for Donald Duck (the control stimulus) because the boy in the movie did not like him. This emotional response, if general, could in part account for the relatively small average differences for Post-test A and Delayed Post-test A (as compared to these same tests for the second experiment).

A possible limitation of this study is that Post-test A for the second and fourth experiments was somewhat different from the pretest employed. There is, of course, no way of knowing if Ss would have responded equally to both test stimuli on a pretest identical to Post-test A. However, inasmuch as Ss reversed their preference for the test stimuli from Post-test A of the second experiment (Donald Duck) to Post-test A of the fourth (Mickey Mouse), it seems unlikely that they had a definite preference before they were exposed to the experimental variable.

DISCUSSION

The effect of vicarious fear conditioning on human operant responses. The results of Experiments 1 and 2 show that a human operant response can be affected by vicarious fear conditioning learned from a film. The procedure by which this occurs is illustrated by Figure 5, which is an extension of the paradigm for vicarious fear conditioning depicted in Figure 1.

Several alternative explanations of these results do not seem as convincing. That Ss responded more frequently to the control stimulus than they did to the fear stimulus could not have been a function of a loss of interest in the fear stimulus because Ss had equal experience with both stimuli before the post-tests. Nor can a sensitization explanation account for the observed differences. According to this interpretation Ss become more sensitive to all stimuli as the result of hearing a fear vocalization, and thus would have avoided both stimuli. However, Ss responded more frequently to the control stimulus after the film than before. Nor are the results a function of simple modeling because the responses required of Ss on the tests were entirely different from the ones made by the model in the film.

The effect of vicarious fear conditioning on operant response rate when alternate responses are available and when they are not. The results of Post-test A of the second experiment are very similar to those obtained by Crooks (1967). They are also remarkably similar to the outcome of investigations which have studied the effects of the availability of alternative responses on the suppressive power of punishment (Herman and Azrin, 1964; Holtz, Azrin and Ayllon, 1963; and Mowrer, 1940). These studies have found that when organisms are given the opportunity to make alternative responses, punished responses diminish in frequency. According to Bandura (1969, p. 315), these findings suggest that individuals who have no alternative responses available to them will be slow to give up behavior that results in negative consequences. Inasmuch as Ss avoided the fear stimulus when given an opportunity to do so (Post-test A), but continued to respond to it when they were not provided an alternative response (Post-test B), it would seem that Bandura's hypothesis might be broadened to incorporate fear as well as punished responses.

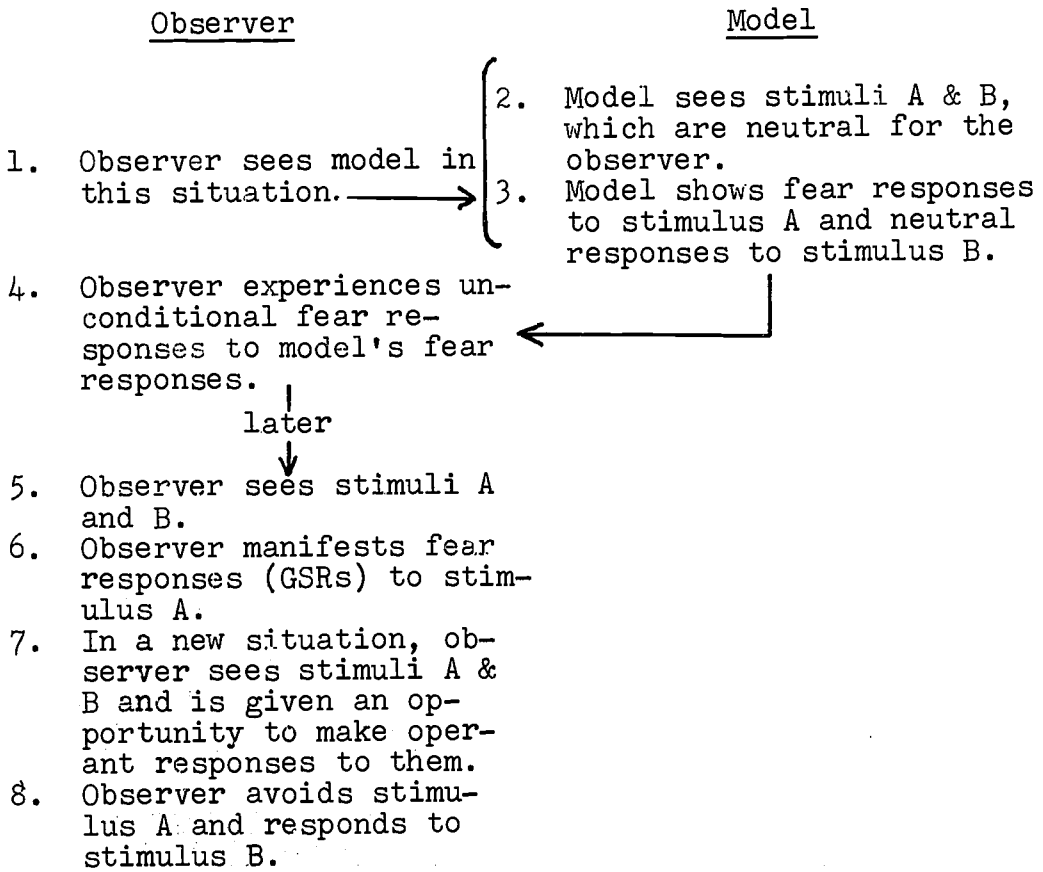

Fig. 5. Extension of paradigm for vicarious fear conditioning.

Vicarious arousal through film. The GSR data recorded while Ss in Experiment 1 were viewing the film (Table 1, Appendix) indicate that nursery school age children can be vicariously aroused by a film. This finding is in agreement with the results of Lazarus, et al. (1962).

The effect of vicarious positive emotional conditioning on human operant responses. The results of Experiments 3 and 4 indicate that a human operant response also can be affected by vicarious positive emotional conditioning learned from a film. An outline of how this occurs is provided by Figure 6.

Alternative explanations of these results do not seem to be as persuasive. The failure of Ss to respond as frequently to the control stimulus as they did to the positive stimulus could not have been a function of a loss of interest in the control stimulus, for Ss had equal experience

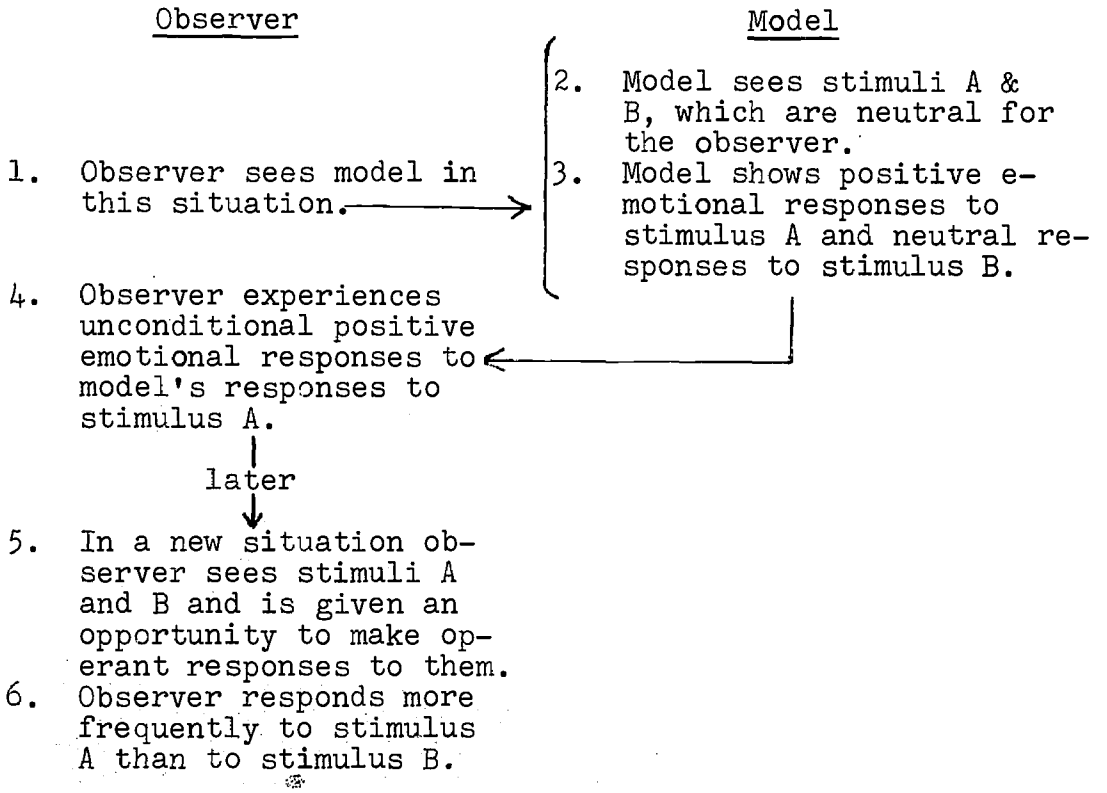

Fig. 6. Paradigm for vicarious positive emotional conditioning.

with both stimuli before the post-tests. Nor was this difference a function of simple modeling, because the responses made by Ss on the tests were entirely different from those made by the model in the film. And although the conditioning of operant responses to the test stimuli during the Pretest may have resulted in Ss' having acquired positive emotional responses to the positive test stimuli in advance of post-testing, this source of contamination would seem to have been controlled by simultaneously conditioning Ss to respond at the same rate to the control stimulus.

The magnitude of vicariously conditioned emotional responses. Ss did not always avoid the fear stimulus or approach the positive stimulus in Post-test A of either the second or fourth experiments. Thus, vicarious conditioning was less than absolute. Several factors might have been at play to produce this less than perfect result. Bandura (1969, pp. 179-180) has found that a filmed model is less effective than a live model in vicarious extinction, which suggests that the filmed model in this investigation may have limited the effectiveness of the experimental variables in both the fear and positive experiments.

Because the stimuli employed in both films occur together so frequently in the culture, there is the possibility that fear and positive emotional responses may have generalized to the control stimuli. Some evidence for this is provided by the occurrence of GSRs to the close-ups of the control stimulus in the fear film. Six Ss made GSRs to this stimulus at some point in the film, although only two made them after the second scene.

It is possible that the rate at which Ss responded on the Pretest may not have permitted the full effect of the experimental variables to be shown. Had Ss been conditioned to respond at a faster rate on the Pretest for the second experiment and at a slower rate on the Pretest of the fourth experiment, the post-tests for the experiments might have been more sensitive to the effect of the experimental variables.

The intensity of the emotional responses of the model may not have been of sufficient magnitude to cause observers to avoid the fear stimulus or approach the positive stimulus exclusively. The effect of stimulus intensity on level of emotionality is discussed at length by Prescott (1938). Evidence for the possibility that the experimental variables might not have been especially intense for nursery school children was provided by some of E's students (college females). Although these young ladies knew what the fear film was about before they saw it, each was visibly affected by the fear responses of the model in the first scene. However, none of the children in the experiments manifested visible signs of being frightened by the film. This observation is not in agreement with Dysinger and Ruckmick's (1933) findings, but rather, would seem to support Hebb's (1966, pp. 243-244) contention that emotional susceptibility increases with age.

The conditioning of equal baselines of operant responses to both stimuli on the Pretest for the second

experiment probably resulted in the conditioning of a positive emotional response to the fear stimulus before the experimental variable was introduced. In the fourth experiment this same procedure may have resulted in the conditioning of a positive emotional response to the control stimulus before Ss were exposed to the movie. The result in both experiments would have been to reduce the effect of the experimental variable.

And finally, some Ss may have felt sorry for the control stimulus in the fourth experiment because the model did not respond to it. As was mentioned before, one S expressed such a feeling to his mother, and his difference scores on Post-test A were among the smallest.

The strength of vicarious conditioning. Overall the results of Post-test B and the Supplementary Post-tests for both the fear and positive experiments suggest that the effect of vicarious conditioning is weak, i.e., short term. Several factors seem to have operated to weaken its effect. One was the strong expectations Ss apparently developed during pretesting. Another factor was the number of extinction experiences Ss had on Post-test B of both experiments. Ss were "presented" the conditioned stimulus for the fear and positive responses several times in the absence of the unconditioned stimulus for these responses (model's fear and positive responses). A further factor was that Ss received considerable reinforcement on Post-test B for responding to the fear stimulus in the second experiment and the control stimulus in the fourth experiment. The result of this, of course, would have been to weaken the effect of the experimental variables on the Supplementary Post-tests. It is interesting to note that neither of the last two factors operated when the two films were being tested, which probably explains why significant differences in choice behavior were obtained in the first and third experiments, but not in the second and fourth.

A word of explanation is in order about the small but significant difference obtained on Delayed Post-test B for the second experiment. Perhaps the absence of the Pretest ard instructions for it on the day this test was given worked to break up some of the strong expectations Ss had as to how they were to behave on it.

Vicarious fear vs. vicarious positive emotional conditioning. Overall the differences were greater for vicarious fear conditioning than they were for vicarious positive emotional conditioning. One reason for this may have been that many Ss in the fear experiment knew the

model and therefore indentified with him more closely. The model was not known by any of the Ss in the positive experiment. Another possible reason for this difference is that fear responses are seldom faked in a child's environment, whereas positive emotional responses often are; e.g., "This castor oil is so delicious, darling. Yum, Yum." Thus, if there had been a history of models' positive emotional responses failing to correspond with Ss' subsequent experiences, vicarious positive emotional conditioning may have been weakened. A third possible explanation is that several Ss may have felt sorry for the control stimulus in the fourth experiment because the model ignored it. One S expressed this feeling.

Dependent variables of vicarious processes. It proved impossible to measure GSRs while operant responses were being made because arm movements produced irrelevant GSRs, which made the establishment of equal baselines to the test stimuli impossible. Little difficulty was encountered, however, in the recording of GSRs during the film. In the second experiment, only one of the eight Ss who were judged to have been vicariously conditioned in terms of GSRs failed to respond in the expected direction on Post-test A. It therefore appears that GSR can be a reasonably good measure of vicarious fear acquisition in young children so long as they can be kept from moving.

As the results of these experiments suggest, when two test stimuli are employed, an operant situation in which Ss are given a choice is to be preferred because it is less likely to result in the development of strong irrelevant expectations that mask the effect of the experimental variable. This type of response measure also seems to be a more natural one for the hypotheses tested than the operant situation which is under the control of the experimenter.

The choice behavior response employed in the Supplementary Post-tests seemed weak. This insensitivity may have been due to the fact that Ss were not required to manipulate the test stimuli.

Implications. The implications of the major findings of these experiments are numerous. The results of Post-test A of the second and fourth experiments suggest that it may be possible to undertake the systematic training of operants through vicarious conditioning; e.g., reducing rate of response to dangerous objects and situations while increasing rate of response to objects and situations where it would be of benefit to an individual. Such procedures would be more

economical of time and perhaps more efficient than incidental direct conditioning.

The results of Post-test A of the vicarious fear conditioning experiment would seem to suggest an additional explanation (in addition to direct conditioning) for the occurrence of unreasonable fears in children, and lends some support to the psychoanalytic notion that a child can become fearful as a function of having a fearful mother.

The results of the experiment on vicarious fear conditioning suggest that the effect of T.V. viewing on behavior is quite complex. That Ss did respond more frequently to the control stimulus than they did to the fear stimulus after seeing the fear film certainly argues for the strong possibility that fears can be acquired through the medium of television. However, inasmuch as the effect of the experimental variable diminished after 24-48 hours, and perhaps even sooner, it is equally possible that fears acquired from television may diminish in very short order, for television would seem to provide many opportunities for youngsters to undergo extinction or adaptation. Adding to the complexity of this problem is the observation that college females showed more overt signs of being affected by the film at the time it was shown than the nursery school Ss did, which suggests the possibility that nursery school children are less affected by T.V. viewing of fearful situations than their parents are. Hebb (1966) has already advanced this proposition.

Suggestions for further research. This investigation would seem to offer several suggestions for future research. First, it would be interesting to see if vicarious conditioning is affected by age. Second, it would seem useful to determine if live models are more effective than filmed models in conditioning children vicariously. And third, future studies which employ operants as response measures should be so designed as to avoid the development of strong expectations as to how Ss are to behave on post-tests. Moreover, such studies should employ maximally different test stimuli in order to reduce the possibility of generalization of responses from one to the other stimulus. Finally, such studies should employ an automated apparatus in order to reduce experimenter bias and to make it possible to use differential low and high rate schedules of reinforcement for pretesting.

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APPENDIX

TABLE 1

Ss' GSRs to the Model's Responses to the Test Stimuli (First Experiment)

S	M's Responses to Fear Stimulus	M's Responses to Control Stimulus	Sign
1	0	0	0
2	3	0	+
3	2	0	+
4	4	1	+
5	2	1	+
6	4	0	+
7	6	0	+
8	5	3	+

TABLE 2

Ss' Choice Responses to Test Stimuli after They Had Viewed Film (First Experiment)

Test Stimulus	Fear	Control	df	X^2
Expected # of Responses	4	4	1	$4.50 (p < .05)$
Obtained # of Responses	1	7		

i

TABLE 3

Average Rates of Response, GSR Data, and Interview Results (Second Experiment)

S	Test Stimulus	Pre	VR*	Post A	Post B	Delay A	Delay B	Interview**	Remarks
1	Fear	64.00	Yes	82.33	80.33	41.43	82.00	X /	VRs to both stim.: vic. cond. doubtful
	Control	62.67	Yes	80.67	82.00	117.00	87.67	/ X	
2	Fear	45.00	Yes	18.00	46.33	00.00	65.33	X /	VRs to control stim. much larger
	Control	45.33	Yes	98.33	42.00	120.33	67.67	/ X	
3	Fear	71.33	Yes	64.00	76.00	61.00	72.33	X /	Interview suggests vic. cond. doubtful
	Control	71.33	No	86.33	73.33	77.00	69.00	/	
4	Fear	50.00	Yes	38.00	45.33	40.00	32.00	X /	
	Control	50.33	No	41.67	45.00	33.33	35.00	/ X	
5	Fear	66.67	Yes	00.00	68.33	75.33	80.67	X /	
	Control	66.33	No	63.67	71.00	73.67	81.00	/ X	
6	Fear	58.00	Yes	49.33	65.33	48.33	51.00	X /	
	Control	59.67	No	62.67	65.33	58.67	56.33	/ X	
7	Fear	44.00	Yes	00.00	61.67	55.00	61.33	X /	
	Control	44.33	No	123.00	59.00	84.00	66.33	/ X	
8	Fear	59.00	Yes	64.67	61.00	68.67	63.33	X /	
	Control	60.33	No	72.67	66.00	51.00	64.33	/ X	
9	Fear	69.67	Yes	82.00	75.33	90.33	81.67	X /	Interview suggests vic. cond. doubtful
	Control	67.67	No	70.00	88.67	81.33	94.33	/	
10	Fear	62.00	No	71.67	62.33	63.33	70.00	X /	Inter. & VRs suggest no vic. cond.
	Control	63.67	No	56.67	67.67	70.33	73.67	/	

*Vicarious responses in terms of GSRs: were said to have occurred if S manifested GSRs to close-ups of stimuli during the last scene.

**X to left of diagonal shows S remembered model was afraid of fear stimulus; X to right of diagonal shows S chose control stimulus as toy he liked better in movie.

TABLE 4

Choice Behavior of Each S to Fear and Control Stimuli on Supplementary and Delayed Supplementary Post-tests (Second Experiment)

S	Stimulus	S.P-T	Delayed S.P-T
1	Fear	1	1
	Control	2	2
2	Fear	0	3
	Control	3	0
3	Fear	1	0
	Control	2	3
4	Fear	1	2
	Control	2	1
5	Fear	0	1
	Control	3	2
6	Fear	1	1
	Control	2	2
7	Fear	0	1
	Control	3	2
8	Fear	1	1
	Control	2	2
9	Fear	2	3
	Control	1	0
10	Fear	3	2
	Control	0	1

TABLE 5

Ss' Choice Responses to Test Stimuli after They Had Viewed Film (Third Experiment)

Test Stimulus	Positive	Control	df	X^2
Expected # of Responses	6	6	1	5.34($p < .05$)
Obtained # of Responses	10	2		

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TABLE 6

Average Rates of Response and
Interview Results (Fourth Experiment)

S	Test Stimulus	Pre	Post A	Post B	Delay A	Delay B	Interview*	Remarks
1	Positive	77.67	112.00	72.67	85.00	73.67	X /	
	Control	75.33	30.00	73.67	90.67	72.67	/ X	
2	Positive	50.00	71.33	62.67	59.67	56.67	X /	
	Control	50.33	47.33	58.67	64.67	53.33	/ X	
3	Positive	71.33	51.67	65.33	48.67	55.67	/	May not have been vicariously conditioned
	Control	70.00	75.00	70.00	58.00	55.33	/ X	
4	Positive	62.67	107.00	75.00	83.00	69.67	X /	
	Control	61.66	35.33	70.33	46.33	71.67	/ X	
5	Positive	64.33	83.33	72.67	89.00	82.33	X /	
	Control	63.66	62.33	75.00	62.33	84.67	/ X	
6	Positive	50.33	67.67	56.00	49.33	47.00	X /	May not have been vicariously conditioned
	Control	49.66	46.67	59.33	57.67	50.67	/	
7	Positive	41.67	42.67	35.67	24.67	18.00	X /	Reported that he felt sorry for control stim
	Control	42.66	38.00	36.67	18.33	18.33	/ X	
8	Positive	68.00	84.67	67.33	70.00	65.67	X /	
	Control	67.00	82.33	69.00	54.33	64.00	/ X	
9	Positive	58.33	51.00	59.00	53.67	63.33	X /	
	Control	58.33	62.33	60.67	76.67	67.33	/ X	
10	Positive	50.33	55.33	51.33	53.33	55.33	X /	May not have been vicariously conditioned
	Control	50.66	51.67	52.33	53.67	51.00	/	

*X to left of diagonal shows S remembered model liked the positive stimulus; X to right of diagonal shows S chose positive stimulus as toy he liked better in movie.

TABLE 7

Choice Behavior of Each S to Positive and Control Stimuli on Supplementary and Delayed Supplementary Post-tests (Fourth Experiment)

S	Stimulus	S.P-T.	Delayed S.P-T.
1	Positive	3	2
	Control	0	1
2	Positive	3	1
	Control	0	2
3	Positive	3	3
	Control	0	0
4	Positive	2	3
	Control	1	0
5	Positive	2	0
	Control	1	3
6	Positive	0	0
	Control	3	3
7	Positive	2	2
	Control	1	1
8	Positive	0	1
	Control	3	2
9	Positive	3	2
	Control	0	1
10	Positive	0	1
	Control	3	2