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EFFECTS OF VICARIOUS SOCIAL PUNISHMENT AND REWARD, AND DIFFERENTIAL INSTRUCTIONS TO SUBJECTS, IN SUPPRESSING A RULE GOVERNED RESPONSE

by

Richard Turner Harvey

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I hereby recommend that this dissertation prepared under my direction by Richard Turner Harvey

entitled EFFECTS OF VICARIOUS SOCIAL PUNISHMENT AND REWARD, AND DIFFERENTIAL INSTRUCTIONS TO SUBJECTS, IN SUPPRESSING A RULE GOVERNED RESPONSE

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ABSTRACT

The effects of two degrees of vicarious social punishment (verbal rebuke) upon the imitative performance of a complex rule governed mode of response by 190 third grade child observers were investigated. Factorially combined with conditions of strong, weak, and no punishment were treatments of social (verbal) reward or no reward to the adult model, and directive, explicit, or control instructions to subjects. These instructional variations were designed to focus subjects' attention on the modeling display. A no model control group was also studied. Five boys and five girls were included in each treatment variation.

The task involved a word association paradigm in which subjects were asked to select one of three verbal associate options to each stimulus word. Those options included a high probability noun associate, and a verb and an adjective associate, each of very low probability.

Subjects were given a baseline trial, followed by one of the sets of instructions, differing in the degree to which they called attention to the modeling display and vicarious feedback operations which were to follow. An adult female model then performed the task, using a large stimulus board identical to the sheets previously used by the children. For each of the nine modeled instances of the high probability noun associate option, the experimenter delivered a verbal rebuke of either weak or strong intensity, or no punishment. Additionally, the experimenter delivered a positive statement after three modeled low probability

verb choices and three adjectives choices under the model reward condition. Response sheets nearly identical to those used before were then distributed for an imitation test phase. This was followed by a generalization test phase, with sheets which followed the same format, but had entirely different stimulus and response components.

A one-way analysis of variance showed no significant differences among the groups at baseline on the number of high probability noun associates, which was the dependent variable. The main analysis consisted of a 3 (punishment) X 2 (reward) X 3 (instructions) X 2 (sex) X 3 (phases) repeated measures analysis of variance. All factors except instructions proved to be significant. Differences were found among the punishment variations, there were differences among the phases, model reward was more effective in decreasing noun choices in imitation and generalization than no model reward, and boys chose fewer overall nouns than did girls. Post hoc analyses showed no difference between weak and strong punishment at either imitation or generalization, but the combined punishment treatments were significantly different from the no punishment condition at both test phases. Imitation and generalization phase performance revealed significantly fewer overall noun choices than at baseline. Comparisons between a model no consequences group and the combined punishment groups left little doubt that the diminution in noun choices during test phases resulted from the punishment feedback. No model controls did not change across phases, and did not differ from the no consequences group at either test phase. While reward in combination with punishment had a highly significant effect, reward feedback alone only produced a significant decrease in noun choices at the imitation phase.

Perhaps the greatest significance of this study is the extension of vicarious punishment effects to the domain of rule governed behavior. It also provides additional evidence contraindicating the notion of observational learning as literal mimicry. Within the realm of vicarious punishment effects upon complex rule governed behavior, a large number of parameters remain to be investigated.

INTRODUCTION

Recent research on observational learning, or "modeling," has clearly shown that modeled stimulus displays can efficiently transmit a wide variety of responses to observers. Modeling appears to be particularly efficient in teaching long, complex chains of sequential responding, in contradistinction to more traditional operant methods involving reinforcement of successive approximations, followed by stimulus-response chaining operations.

A portion of the prior research on imitative behavior studied only experimental paradigms under which modeling displays produced literal mimicry of response components by observers (Baer and Sherman 1964, Gewirtz and Stingle 1968, Miller and Dollard 1941, Skinner 1953). The bulk of modeling research, however, has been stimulated by the work of Bandura and his associates, who contend that modeling can transmit generalized modes of response, as well as strictly imitative responses. Considerable research evidence supports this claim. For example, the presentation of a modeled stimulus display has been shown to modify such generalized modes of response as the moral judgments of child observers (Bandura and McDonald 1963), the timing and amount of self-imposed reinforcement (Bandura, Grusec, and Menlove 1967a; Bandura and Mischel 1965), the amount of self-imposed punishment (Hanson 1971), and the production of abstract inkblot responses (Rosenthal and Hertz, in press). Modeling has also been shown to efficiently transmit more explicitly rule governed modes of response. Rosenthal, Alford, and Rasp (1972) obtained nearly perfect catagorical behavior following a modeling display of diverse instances of the rule, in young children whose premodeling baseline for such behavior was zero, and Rosenthal and Zimmerman (1972) demonstrated conservation responses in children who, prior to the modeling treatment, had been unable to perform conservation tasks correctly. Within the linguistic domain, modeling has been used to teach very complex linguistic structures to autistic children (Lovaas 1966), to modify children's use of the passive mood (Bandura and Harris 1966), prepositional constructions (Odom, Leibert, and Hill 1968), simple sentence patterns (Carroll, Rosenthal, and Brysh, in press), descriptive adjectives (Lahey 1971), and verb tenses (Rosenthal and Whitebook 1970). Additionally, a modeled stimulus display has been employed to create arbitrary, but rule governed, novel "sentence" formations (Leibert et al. 1969), to alter the formation of complex sentences and the use of the pluperfect tense (Rosenthal and Carroll 1972), and to modify the relative frequencies of complex conceptual and rule governed modes of inquiry (Rosenthal, Zimmerman, and Durning 1970). These data leave little doubt that modeling is indeed capable of creating or modifying abstract, conceptual, rule governed behavior.

Bandura (1969) distinguishes between vicarious <u>acquisition</u> of a response sequence, and the subsequent <u>performance</u> of that behavior, presenting convincing evidence that both vicarious acquisition and performance of a set of behaviors can occur in the absence of any overt reinforcement. It is relatively clear, however, that positive reinforcement will facilitate performance both when reinforcement is provided to the model (Bandura 1965; Bandura, Grusec, and Menlove 1967b; Bandura, Ross, and Ross 1963; Clark 1965; Porro 1968), or to the observer (Bandura 1965). Conversely, vicarious punishment has been shown to inhibit imitative performance. Bandura et al. (1963) demonstrated decreased imitative aggression in child observers after being exposed to an adult model punished for such behavior, relative to groups who witnessed the model receive positive social reinforcement or no consequences, and to a no model control group. Rosekrans and Hartup (1967) demonstrated that when aggressive behavior was initially vicariously rewarded and then vicariously punished, suppression of observers' aggressive responses resulted, and Benton (1966) found that observers who watched a model punished for handling prohibited toys later showed the same degree of response inhibition as did those subjects who had been directly punished. A series of studies on "resistance to deviation" demonstrated, in general, that when a model is punished for playing with some forbidden toys, observers will suppress such behavior in a test trial (Parke and Walters 1967; Walters, Leat, and Mezei 1963; Walters and Parke 1964; Walters, Parke, and Cane 1965). The positive or negative incentive operations in these studies were used in conjunction with relatively gross motor behaviors such as physical aggression, or playing with forbidden toys.

The results of incentive operations are not quite so clear in modeling studies investigating more explicitly cognitive behaviors. Bandura and Harris (1966) found model and subject reward (in combination with modeling and attentional set) to facilitate observers' performance of an imitative linguistic response, and Leibert and Fernandez (1970) found that reinforcement to the model increased observers' imitative preference choices. Other studies, however, have reported no greater facilitative effect for reinforcement than that produced by instructions to copy the modeled rule governed behavior (Rosenthal and Carroll 1972, Rosenthal and Whitebook 1970). This confuses our understanding of reinforcement effects in such situations, since the previous studies did not explicitly compare reinforcement to instruction effects. Similarly, the effect of vicarious punishment upon the acquisition and/or performance of complex, cognitive rule governed behavior is unclear. Though one could reasonably expect vicarious punishment to inhibit a class of such responses, as occurred on the preference choice task used by Leibert and Fernandez (1970), Harvey (1972a) failed to find such an effect, using a complex rule governed question-asking task with fifth grade child observers.

Other empirical issues in the domain of modeled rule governed behavior remain ambiguous. One of these is the effects of various types of instructional variations upon the acquisition or performance of such behavior. Most of the instructional variants investigated have aimed at focusing attention on the modeled stimulus display, cuing rehersal, or constraining subject response, but research results have not been consistant. Harvey (1972a) found no effect for attention constraining instructions, nor did Rosenthal et al. (1970) in three out of their four main conditions. Conversely, Rosenthal and White (1972) reported facilitation of various response classes as a result of instructions, as did Rosenthal and Carroll (1972) and Rosenthal and Whitebook (1970).

The purpose of the present study was threefold. First, since the effects of vicarious punishment upon imitative rule governed behavior have been unclear, it endeavored to measure the relative effects of two degrees of vicarious social punishment upon the imitative responses of child observers, using an abstract, rule governed mode of response. A word association task was employed, with one high probability and two very low probability associate options offered subjects. Second, the effects of vicarious reward versus no reward, factorially combined with the punishment conditions, were studied. Lastly, the effects of instructions designed to increase the saliency of modeling cues, without constraining subject response, were investigated.

Experiment I involved a 3 (strong, weak, or no punishment) X 2 (presence or absence of reward to the model) X 2 (presence or absence of attention focusing instructions to the subject) X 2 (sex) X 3 (phases) factorial design. In modeled punishment variations, child subjects observed the model receive either strong social punishment, weak social punishment, or no punishment from the experimenter after "incorrect" (high probability noun) responses. In the model reward conditions, subjects observed the model receive either verbal social reward from the experimenter or no reward (no consequences) following "correct" (low probability verbs or adjectives) responses. Additionally, subjects received either instructions focusing their attention on the vicarious feedback operations which they were about to observe, and directing them to try to discriminate the correct from the incorrect response class (explicit), or neutral (control) instructions. A baseline measure was taken, subjects were administered one of the sets of instructions, the modeled stimulus display was presented, and imitation and generalization test measures followed. A no model control group was included to control for the effects of simple repeated exposure to the stimuli. Experiment II repeated the above conditions, with the exception of the instructional variable. All subjects in this experiment were given instructions which were considerably more directive than those administered subjects in Experiment I.

Several hypotheses were suggested by previous modeling research in the cognitive domain, and by the punishment literature in general. Relative to the no punishment groups, those who witnessed the model receive strong or weak social punishment were expected to select fewer high probability noun associates in the imitation and generalization phases than they did in baseline. Further, due to possible negative emotional arousal engendered in subjects who observed the model receive strong verbal punishment, with a possible resultant lack of cooperation, it was expected that this treatment would be less, or no more, effective in suppressing the dominant associate response class than the weak punishment condition. With respect to the reward conditions, it was expected that those groups who observed the model receive reward for correct responses as well as punishment for incorrect answers would choose fewer high probability noun associate options in imitation and generalization phases than those who observed no reward procedures. Relative to those subjects who received control instructions, those who were given explicit instructions were expected to select fewer high probability noun associates in test phases. Overall, fewer noun associates were expected in the imitation and generalization test phases, in comparison with the baseline phase. Finally, baseline differences among the groups were not expected, and the no model control should show no significant changes across phases. Experiment II was conducted after completion of data collection for Experiment I, to ascertain whether or not differential effects would be obtained under highly directive instructions. Relative to the instructional conditions of Experiment I, it was hypothesized that directive instructions would result in a greater suppressive effect, such that explicit instructions would sponsor greater suppression of the dominant associate response than control instructions, and directive instructions would exceed the effect engendered by explicit instructions.

METHOD

Experiment I

Subjects and Experimenters

The subjects were 130 third grade children, equally divided as to sex, drawn from an elementary school serving a predominantly middle class district of Tucson, Arizona. Third grade children were used as subjects because of their ready availability, and because they fell within the approximate age range of subjects used in other studies in this area. Five boys and five girls were randomly assigned to each of the 13 total groups. A 27 year old Anglo-American male graduate student was the experimenter (*E*), and a 23 year old Anglo-American female was the model (*M*), and acted as assistant.

Materials and Procedure

The task involved a word association paradigm in which the subject was instructed to select one of three verbal associate options for each of 15 stimulus words, all of which were common nouns. Those options included a high probability noun associate, as well as a verb and an adjective option, each of very low probability. The probability of all associate options was controlled by selecting them from the Palermo and Jenkins (1964) word association norm tables, and the subjects' acquaintance with all stimulus and response components was assured through consultation with authorities on third grade reading skills, and by empirical pretesting. The identical stimulus format, except for differences in actual stimulus and response components and their probabilities, was used by Rosenthal and White (1972), and had been adapted from earlier work (Maller 1936, Terman and Miles 1936). This task was employed both because it provided a work sample of language rule acquisition, and because it had been successfully used in the similar Rosenthal and White study, thus increasing cross-study comparability. The 30 total stimulus words were randomized and separated into two lists, one for baseline and imitation, and the other to be used for the generalization phase. The associate options were arranged in a random sequence.

Groups of five randomly selected subjects of like sex were brought from their classroom by E and M to a grassy shaded area behind the school buildings. The adults did not interact with the children except to direct them to the experimental area. Assignment to the experimental and control conditions were prearranged in a random sequence. Upon their arrival, E asked the subjects to be seated on the grass, and introduced himself and the M. All subjects were seated facing a large stimulus board, which was covered when not in use.

Lap boards and mimeographed baseline sheets were then distributed to each of the subjects, and they were asked to print their full names and their room numbers in the designated spaces on the top of the page, and to circle either "BOY" or "GIRL." The adult then checked to assure that this was accomplished. This sheet was labeled "I" to indicate the baseline phase. Vertically along the left side of the page were listed two sample items, followed by the 15 stimulus words. A vertical line to the right of the stimulus words served to separate them from the three response options, which were listed horizontally across the page after each stimulus word (see Appendix A). The large stimulus board was identical to this sheet, except that the sample words and the identifying information blanks were omitted. E then held aloft a sample sheet and instructed all groups as follows: "Now look on the left; there is a column of starting words (emphasized and pointed towards). This (vertical) line is a kind of fence (emphasized and pointed towards); all of the other words past the fence are picking words (emphasized and pointed towards). Now, for each starting word, you will pick one of the three picking words to the right, past the fence, on the very same line. Look here at the top line (pointed towards). Next to the letter 'A' is the starting word 'LION,' and to the right of the fence on the very same line with 'LION' are the three picking words 'BITE,' 'ANIMAL,' and 'MAD.' Now, please draw a circle around the picking word that you think goes best with 'LION.'" The adults then checked to see that each child understood the procedure and had circled a word. The second practice item was introduced as follows: "Okay, let's do one more together. Look at the next line marked 'B.' The starting word is 'HOUSE,' and to the right of 'HOUSE' are the picking words 'LARGE,' 'SLEEP,' and 'HOME.' Draw a circle around the word that you think goes best with 'HOUSE.'" After checking to see that each child had followed the instructions to that point and understood what was to be done, they were told: "Now go ahead by yourselves and do the rest. There are 15 more lines; on each line you draw a circle around whichever of the picking words you think goes best with each starting word. If you can't read any of the words, just raise your hand and we will tell you what it is." When a subject completed his response sheet he was asked to turn it over and wait until everyone was finished, whereupon the sheets were collected by the adults and checked for omissions. If some were found, the protocol was returned to the errant child for completion. This completed the baseline phase.

Following this, all subjects were given one of the sets of instructions detailed below (except for subjects in the no model control group). Subjects in the control instructions groups were told: "Now I'm going to show you this board (_E_ removed the shield) which looks just like these other sheets, only bigger. This lady (_M_) will show you a way to play this game. She will choose a picking word for each starting word." Subjects in the explicit instructions groups heard these instructions: "Now I'm going to show you this board (_E_ removed the shield) which looks just like these other sheets, only bigger. This lady (_M_) will show you a way to play this game. She will choose a picking word for each starting word. Some of the words she picks will probably be _very good_ kinds of words to pick, and some will probably be _terrible_ kinds to pick. Watch and listen carefully, and see if you can tell which kind are good ones and which kind are bad ones." _E_ then turned to _M_ and said: "Okay Mrs. Palmer, choose a picking word for each starting word." _E_ then pointed to each successive stimulus word on the large board, _M_ pronounced the word out loud, paused, and then finally chose an associate. A copy of the board and the _M_'s choices are listed in Table 1. After _M_ selected each associate, she was given feedback by _E_, differentially, depending upon condition. Subjects in the reward conditions observed _M_ receive rewarding feedback after each low probability (correct) verb or

Table 1. Modeling Display with Response Choices*

1.	EARTH	DIRTY	GROUND	PLOW
2.	CABBAGE	FOOD	HARD	COOK
3.	PEOPLE	HELP	FUNNY	PERSON
4.	EAGLE	BIRD	EAT	NICE
5.	FINGERS	FIND	SMALL	HAND
6.	STEM	FLOWER	COLD	GROW
7.	COTTAGE	SLEEP	HOUSE	WOOD
8.	TABLE	ROUND	SET	CHAIR
9.	STREET	PLAY	BIG	ROAD
10.	BIBLE	BOOK	PRAY	GOOD
11.	RIVER	RUN	LAKE	LONG
12.	BABY	FUN	CHILD	SLEEP
13.	MOON	SUN	SHINE	PRETTY
14.	KING	RICH	QUEEN	RULE
15.	HAMMER	HEAVY	BUILD	NAIL

*Modeled response choices are underlined.

adjective associate response, plus either strong, weak, or no social punishment (silence) after each high probability (incorrect) noun associate choice. Subjects in the no reward variation witnessed M receive either strong, weak, or no social punishment after each incorrect choice, and silence after each correct choice. There were nine punishment trials, and six reward (or no reward) trials. The various punishment and reward feedback stimuli are detailed in Table 2.

New response sheets were then distributed for the imitation phase, and subjects were again asked to print their name on the top of the sheet. These mimeographed sheets were identical to the baseline sheets, except that the two sample items were omitted, and the top of the sheet was labeled "II." All subjects were then told: "Okay, now we'll go on and pick one of the picking words for each starting word again. Go ahead and start on your own." After all subjects finished, the sheets were collected and checked for omissions, and returned for completion if necessary. This completed the imitation phase.

New response sheets were again distributed for the generalization phase, and subjects were requested to print their name on the top of the sheet. The format of this sheet was similar to the previous ones, but the top was labeled "III" and the stimulus and response components were different, although the probabilities of the response options were comparable. The stimulus words and the response components, with their frequencies, are listed in Tables 3 and 4. These instructions were then given all subjects: "Okay boys (girls), for just this one more time, we want you to pick a picking word for each starting word. This time the starting words and the picking words will be different words

Table 2. Punishment and Reward Stimuli

Item No.	Stimuli
	Weak Punishment Stimuli
1.	That was not a good choice.
2.	Not good either.
4.	A poor choice.
5.	A bad one.
7.	Poor.
8.	Another poor one.
10.	Not good.
12.	Not so good.
13.	Bad choice.
	Strong Punishment Stimuli
1.	That was a very bad choice.
2.	Terrible.
4.	Very bad choice.
5.	Absolutely no good at all.
7.	Very bad.
8.	Completely wrong
10.	Just lousy.
12.	Not very good at all.
13.	Absolutely terrible.
	Reward Stimuli
3.	That was a very good one.
6.	Another good choice.
9.	Good.
11.	Quite good.
14.	Good choice.
15.	Another good one. Thank you, that will be all.

Table 3. Experimental Stimuli and Their Frequencies for Baseline and Imitation*

Stimulus	Noun	Freq.		Verb	Freq.		Adjective	Freq.	
		M	F		M	F		M	F
Earth	Ground	40	41	Plow	0	0	Dirty	1	0
Cabbage	Food	55	59	Cook	0	0	Hard	1	0
People	Person	46	52	Help	1	0	Funny	1	3
Eagle	Bird	178	199	Eat	1	0	Nice	1	1
Fingers	Hand	63	79	Find	0	2	Small	1	0
Stem	Flower	47	78	Grow	1	1	Cold	3	1
Cottage	House	85	108	Sleep	1	0	Wood	0	2
Table	Chair	108	108	Set	0	1	Round	1	0
Street	Road	50	62	Play	0	1	Big	1	1
Bible	Book	48	58	Pray	1	1	Good	3	1
River	Lake	66	71	Run	0	1	Long	0	1
Baby	Child	42	43	Sleep	2	0	Fun	0	1
Moon	Sun	54	57	Shine	1	4	Pretty	0	1
King	Queen	101	152	Rule	2	1	Rich	1	2
Hammer	Nail	69	98	Build	0	1	Heavy	2	1

*From Palermo and Jenkins (1964).

Table 4. Experimental Stimuli and Their Frequencies for Generalization*

Stimulus	Noun	Freq.		Verb	Freq.		Adjective	Freq.	
		M	F		M	F		M	F
Mountain	Hill	97	77	Climb	8	8	Rocky	0	1
Window	Glass	83	61	Wash	1	1	Cold	1	1
Fruit	Apple	63	64	Eats	0	1	Sweet	1	2
Boy	Girl	132	140	Run	1	0	Little	0	2
Carpet	Rug	130	137	Sweep	0	1	Big	0	1
City	Town	118	103	Live	1	7	Busy	0	3
Needle	Thread	56	96	Hurt	2	0	Long	1	1
Spider	Web	44	50	Climb	0	2	Slow	1	0
Butter	Bread	62	92	Melt	0	1	Rich	0	1
Salt	Pepper	82	108	Shake	1	3	Sweet	2	1
Dogs	Cats	95	113	Play	1	0	Hot	1	0
Thief	Robber	49	46	Steals	0	1	Mean	2	3
Ocean	Water	98	95	Swim	0	2	Deep	0	1
Cars	Trucks	46	53	Crash	1	0	Shiny	0	1
Doctor	Nurse	60	95	Fix	1	0	Well	3	0

*From Palermo and Jenkins (1964).

than they were before. For each starting word, you can pick whatever picking word you want to. Go ahead and pick a picking word for each starting word." After all subjects in the group were finished, the sheets were collected, checked for omissions, and returned if necessary. After all sheets for the group were placed in an envelope and sealed, the subjects were thanked for their participation and escorted back to their classroom.

Experiment II

Subjects and Experimenters

Sixty third grade children, equally divided as to sex, were drawn to serve as subjects in this experiment from an elementary school located within the same district as that from which subjects were drawn for Experiment I. Five boys and five girls were randomly assigned to each of the six total groups. The experimenter (E) and the model (M) were the same as in Experiment I.

Materials and Procedure

The experimental task was precisely the same as that used in Experiment I. The procedure was also identical to Experiment I, except that it was carried out in a small partitioned area inside a school building rather than outdoors, and desks and chairs were used instead of having subjects sit on the grass and use lap boards. This experiment was performed in order to test the effect of a set of instructions which were more directive than those of the previous experiment, in terms of the degree to which they urged subjects to apply what they had learned to their answers. Accordingly, rather than receiving the control or explicit instructional variations, all subjects in this experiment were administered these directive instructions prior to the modeling sequence: "Now I'm going to show you this board (<u>E</u> removed the shield) which looks just like these other sheets, only bigger. This lady (<u>M</u>) will show you a way to play this game. She will choose a picking word for each starting word. Some of the words she picks will probably be <u>very good kinds</u> of words to pick, and some will probably be <u>terrible kinds</u> to pick. Watch and listen carefully, and see if you can tell which <u>kind</u> are <u>good ones</u> and which <u>kind</u> are <u>bad ones</u>, because we'll want to use the good kind later. Okay Mrs. Palmer, choose a picking word for each starting word." Subsequent to the modeling display, the children were told: "Okay, now we'll go on and pick one of the picking words for each starting word again. Use what you have learned from watching Mrs. Palmer about what <u>kind</u> are <u>good ones</u> and what <u>kind</u> are <u>bad ones</u>, and try to circle <u>only</u> the <u>good kind</u>. Go ahead and start on your own." These instructions were given to subjects for the generalization phase: "Okay boys (girls), for just this one more time, we want you to pick a picking word for each starting word. This time the starting words and the picking words will be different words than they were before. Remember what you've learned about what <u>kind</u> are <u>good ones</u> and what kind are <u>bad ones</u>, and try to circle only the <u>good kind</u>. Go ahead and pick a picking word for each starting word."

RESULTS

In all cases, the dependent variable was the number of high probability noun associates chosen by the subject. A listing of the mean number of nouns chosen by each group is presented in Table 5. In order to assure that no initial differences in this variable existed among the groups at baseline, a one way analysis of variance was performed on these scores. The baseline scores from both experiments were combined for this analysis. Additionally, in order to detect any possible sex differences, the groups were split by sex. The analysis revealed no significant differences among the groups on the baseline measure (largest $F = 1.89$, $df = 1/152$, N.S.).

Experiment I

In order to assess the significance of changes from subjects' baseline performance to their scores in imitation and generalization, and also changes as a result of the various other factors, a 3 (punishment) X 2 (reward) X 2 (instructions) X 2 (sex) X 3 (phases) repeated measures analysis of variance was performed. This analysis revealed all main effects except instructions to be significant. Differences were found among the vicarious punishment variations ($F = 3.26$, $df = 2/64$, $p < .05$), and differences among the phases indicated a general reduction in noun choices from baseline to subsequent phases ($F = 39.00$, $df = 2/128$, $p < .001$). Subjects who witnessed the _M_ receive reward for correct responses chose significantly fewer noun associates overall than those

Table 5. Table of Means

			No Punishment			Weak Punishment			Strong Punishment		
			Baseline	Imitation	Generalization	Baseline	Imitation	Generalization	Baseline	Imitation	Generalization
Model Reward	Control Instructions	M	11.2	10.6	10.0	12.8	6.0	11.4	12.8	7.8	11.0
		F	13.0	11.6	11.4	12.6	6.4	12.4	14.2	7.0	12.2
	Explicit Instructions	M	12.4	8.8	10.4	11.6	4.2	3.8	13.2	5.6	8.0
		F	12.6	10.0	12.2	12.0	7.6	11.6	11.4	9.4	10.4
	Directive Instructions	M	11.6	10.4	12.8	13.8	2.0	3.2	12.4	6.2	9.6
		F	13.4	11.2	10.8	13.4	10.2	12.2	14.0	6.0	6.6

Table 5--Continued

			No Punishment			Weak Punishment			Strong Punishment		
			Baseline	Imitation	Generalization	Baseline	Imitation	Generalization	Baseline	Imitation	Generalization
No Model Reward	Control Instructions	M	12.6	10.8	12.6	12.8	12.0	12.4	11.4	10.0	8.2
		F	11.0	10.0	10.4	12.2	9.6	11.6	11.4	12.0	12.8
	Explicit Instructions	M	11.6	12.6	12.0	9.8	5.6	7.0	12.8	10.4	10.0
		F	13.4	12.0	12.8	12.0	12.2	13.6	12.2	11.6	13.4
	Directive Instructions	M	12.6	13.6	13.8	12.4	8.2	12.6	13.0	8.6	10.2
		F	13.8	13.8	13.6	13.0	10.6	10.0	11.6	7.8	9.6

Table 5--Continued

No Model Controls	Baseline	Imitation	Generalization
M	11.8	11.6	12.2
F	13.4	13.2	13.6

who observed the *M* receive no reward ($F = 6.20$, *df* = 1/64, $p < .025$). Groups who received the explicit instructional variation did not differ in the number of noun associates selected from those who received the control instructions. Boys selected fewer noun associates than did girls ($F = 8.54$, *df* = 1/64, $p < .005$). Additionally, several interactions attained significance. These included phase X sex ($F = 5.07$, *df* = 2/128, $p < .01$), phase X punishment ($F = 2.97$, *df* = 4/128, $p < .025$), sex X instructions ($F = 5.00$, *df* = 1/64, $p < .05$), and phase X reward ($F = 13.28$, *df* = 2/128, $p < .001$). Explication of these interactions by *post hoc* comparisons are detailed in a later section.

Experiment II

A 3 (punishment) X 2 (reward) X 2 (sex) X 3 (phases) repeated measures analysis of variance was performed on the data from this experiment. The results proved to be very similar to those of Experiment I. Significant differences among the vicarious punishment conditions were found to exist ($F = 6.37$, *df* = 2/40, $p < .005$), overall differences among the phases were detected as before ($F = 24.62$, *df* = 2/80, $p < .001$), and vicariously rewarded subjects selected fewer noun associates than subjects not vicariously rewarded ($F = 4.54$, *df* = 1/40, $p < .05$). No sex differences were found for subjects in this experiment. Again, a significant phase X punishment interaction was found ($F = 4.57$, *df* = 4/80, $p < .005$), as was a significant phase X reward interaction ($F = 4.42$, *df* = 2/80, $p < .025$). These interactions are explored through *post hoc* comparisons in the next section.

Combined Experiments

Because the results of Experiments I and II were similar, and in order to determine whether the addition of very directive instructions (Experiment II) would render the instruction variable significant, the data from both experiments were combined, and a 3 (punishment) X 2 (reward) X 3 (instructions) X 2 (sex) X 3 (phases) repeated measures analysis of variance was performed.

Once again, all main effects except instructions were significant. Differences were obtained among the punishment variations ($\underline{F}$ = 8.45, $\underline{df}$ = 2/88, $\underline{p}$ < .001), there were differences among the phases ($\underline{F}$ = 63.33, $\underline{df}$ = 2/176, $\underline{p}$ < .001), the reward condition proved superior to the no reward condition in decreasing the number of noun associates selected by subjects ($\underline{F}$ = 11.19, $\underline{df}$ = 1/88, $\underline{p}$ < .005), and boys chose fewer overall nouns than girls ($\underline{F}$ = 10.00, $\underline{df}$ = 1/88, $\underline{p}$ < .005). No differences among the instructional variations were found. As before, significant interactions were found. These were phase X sex ($\underline{F}$ = 3.09, $\underline{df}$ = 2/176, p < .05), phase X punishment ($\underline{F}$ = 6.69, $\underline{df}$ = 4/176, p < .001), phase X reward ($\underline{F}$ = 16.69, $\underline{df}$ = 2/176, p < .001), phase X sex X punishment ($\underline{F}$ = 2.55, $\underline{df}$ = 4/176, p < .05), and phase X sex X instructions ($\underline{F}$ = 2.37, $\underline{df}$ = 4/176, p < .05).

In order to assess the independent significance of the various experimental treatments, a number of post hoc comparisons were made. Comparisons were made between overall baseline and imitation, and between baseline and generalization using the Tukey HSD test. Scores in the imitation phase proved to be significantly lower than in baseline ($\underline{p}$ < .01), and this difference was maintained into generalization ($\underline{p}$ < .01). In vicarious punishment variations, no difference between weak and strong punishment was found at either imitation or generalization, again using the Tukey HSD test. Accordingly, the data from the weak and strong punishment variations were combined, and compared to the no punishment condition by the Sheffe' method. The combined punishment treatments proved superior to no punishment in suppressing the high probability noun response at both imitation and generalization (both $\underline{p}$'s < .01). In order to further demonstrate that the diminution in noun associate choices across phases was due to the vicarious punishment feedback rather than exposure to the modeling display without feedback, the no punishment-no reward (no consequences) group was compared with the combined punishment groups at imitation and generalization. Using the Sheffe' method, both comparisons were found to show significant differences (both $\underline{p}$'s < .01), such that relative to the no punishment-no reward condition, the combined punishment groups scored significantly lower at both test phases. Corroborating evidence comes from a comparison between the no punishment-no reward group and the no model controls. By analysis of variance, no significant differences were found between these groups at either imitation or generalization, and the no model controls did not change across phases. In order to determine the effect of reward feedback, independent of punishment, the no punishment-reward group was compared with the no punishment-no reward group by analysis of variance. Although the no punishment-reward group scored significantly lower than the no punishment-no reward group at imitation ($\underline{F}$ = 6.14, $\underline{df}$ = 1/48, $\underline{p}$ < .025), this difference was not maintained into generalization.

DISCUSSION

This study clearly demonstrated vicarious punishment effects for a class of children's rule governed linguistic behavior. The relative frequency of an initially very high probability associate response was significantly reduced subsequent to subjects' observation of punishment to a model for emission of that class of responses, both with, and without, reward to the model for alternative classes of response. Not only did subjects who witnessed the model punished decrease their choice of noun associates during the imitation phase, in which identical stimuli were presented, but they maintained this lower rate during the generalization trial, thus generalizing the punished and unpunished conceptual classes to new stimuli. Relative to subjects who did not see the model rewarded, the addition of vicarious reward for correct responses to the punishment treatment sponsored a greater suppression of the punished response class. The observation of model reward alone (without model punishment), however, had a relatively weak effect in that it led to significant decreases in the punished response class in the imitation phase only; these subjects did not generalize noun suppression to new stimuli. As expected, no baseline differences among the groups were found, nor did simple repeated exposure to the stimuli (no model controls) sponsor any changes. Exposure to a modeling display without any feedback operations had no effect, as the no punishment-no reward (no consequences) group did not differ from the no model controls at either imitation or generalization phases. No significant differences were found between the effects of weak versus strong punishment, nor did any of the instructional variations sponsor performance differences.

Perhaps the greatest significance of these findings is the extension of vicarious punishment effects to conceptual rule governed forms of behavior. That various types of social and non-social vicarious punishment operations will suppress simpler and more molar motor behaviors is well documented (Harvey 1972b). Similarly, vicarious reward has, in some cases, been shown to facilitate performance of complex rule governed behavior. This study, however, is the first unequivocal demonstration that complex, cognitively mediated rule governed behavior may be modified through the observation of punishment to a model, either with, or without the addition of model reward. This study also corroborates the findings of Rosenthal and White (1972). Using the identical task format, after determining response preferences in baseline, child subjects were exposed to a model who consistently responded with either a high probability noun, an intermediate probability verb, or a very low probability color associate for 15 trials. Imitation and free preference test trials followed. The results showed that subjects were indeed able to incorporate the modeled conceptual class from diverse instances, and thereafter to successfully emulate the model's choices. Subjects in the present study were able to discriminate the correct from the incorrect response class under considerably more difficult conditions. Whereas subjects in the prior experiment were exposed to 15 consistant instances of a single response class, subjects in the present study observed only three modeled instances of each of two correct (unpunished) classes of associate options of equal probability, and nine instances of the incorrect (punished) class. Dispite this smaller number of modeling cues, subjects were able to abstract the correct conceptual response classes, and thereafter to respond in accordance with their dictates. Thus, the present experiment corroborates and extends the prior findings along a dimension of difficulty of discrimination.

These findings also bear upon the issue of observational learning as literal mimicry. Various linguists have espoused the position that the realm of imitative linguistic behavior includes only literal mimicry of modeled response components by observers (Chomsky 1964, Slobin 1968). Clearly, this is not the case. That modeling, as a learning modality, is capable of transmitting abstract concepts to observers, in the form of simple or complex rules, is already well documented (vide Bandura 1969). The present results corroborate and add to this rapidly mounting body of evidence. From diverse modeled instances of correct and incorrect response classes (as discriminated by the feedback operations), child observers were able to abstract a rule which would correctly govern their subsequent responses, namely, that associate options which described some aspect of the stimulus word (adjectives) or named a related action (verbs) were to be chosen, instead of words which named a physical referent (nouns). Alternatively, subjects may have correctly responded on the basis of a rule concerning response probability such as "I am to choose any one except that which would ordinarily be my first choice." The procedure confounded linguistic word class with response probability, simply because not enough low probability nouns and high probability verbs and adjectives could be found in the tables (Palermo and Jenkins 1964) to construct a randomly balanced list. It could be argued that subjects were more probably using the latter rule due to its seemingly greater simplicity. Post-test interviews might have identified which rule was being used more frequently, but in either case many of the same elements must have been discriminated in order to identify the associate option to be suppressed, and the issue must remain an empirical one. Although some exact copying of correct modeled responses occurred in imitation, many subjects chose correct options on trials in which the model had chosen an incorrect one. That subjects had indeed identified a correct rule, however, was conclusively shown when they successfully generalized the rule to entirely new stimuli in the generalization phase.

The sex differences which were found are of no particular significance or conceptual interest for the present research. Sex was included as a factor in the statistical analysis simply because groups of separate sexes within each condition were run through the procedure individually, and because error variance in the analysis was reduced by doing so. No particular explanation for the sex difference is apparent, and because it was not conceptually relevant to the present study, no further consideration will be given to the sex variable.

It will be recalled that no performance differences were found as a result of differences in punishment intensity. Mild punishment should be at least as effective as strong punishment because of possible interference due to negative emotional arousal in subjects observing strong punishment, who might plausably then engage in active avoidance of the modeling display, and/or endow the experimenter with a negative valence, perhaps leading to subsequent failure to cooperate. There is abundant evidence of vicarious negative emotional arousal (vide Bandura 1969), and some evidence that subjects will actively attempt to avoid watching a model who is undergoing aversive stimulation (Bandura and Rosenthal 1966). Additionally, Aronson and Carlsmith (1963) found mild threat to be more effective than strong threat in reducing preschool subjects' attraction to a toy, and Freedman (1965) found mild threat to be more effective in suppressing play with a prohibited toy than strong threat. From this, one might expect that mild punishment to the model would have reduced subjects' choice of nouns to a greater extent than strong model punishment because it is relatively unlikely to lead to negative emotional arousal and subsequent avoidance of the modeling display, or noncooperation with the experimenter's instructions. One possible explanation for its failure to be more effective in this experiment relates to lack of discriminability. Careful examination of the two sets of punishment stimuli will reveal relatively minimal differences in subjective intensity. Unfortunately, the intensity of the strong punishment was about as high as school officials could allow. Having recognized this problem prior to beginning the study, an effort was made to add discriminability to the stimuli by delivering the strong punishment in a more forceful manner than the weak punishment, i.e., the strong punishment was delivered in a louder voice, and was more exclamatory. If subjects did discriminate these differences, it did not affect their performance differentially. A more plausable explanation involves subject induced interference in their attention to the modeling display, or active attempts to lessen the aversive aspects of the strong punishment. This came in the form of some subjects laughing when the experimenter delivered a strongly punishing statement to the model. This was observed a number of times during strong punishment, but never during weak punishment operations, lending support to the hypothesis that the difference was indeed discriminated by subjects, who may have been making an active attempt to diminish the aversive aspects by laughing.

There is no doubt, however, that the punishment stimuli were primarily responsible for the observed decrement in noun choices. This is shown by a significant difference between the no punishment-no reward group (who observed the entire modeling sequence except for the feedback), and the combined punishment groups. The observation of the modeling sequence without any vicarious feedback had no effect, since there was no difference between this group and the no model controls, who failed to change across phases. In combination with the punishment treatment, the addition of reward for alternative responses clearly facilitated the reduction of noun choices in imitation and generalization. This was expected, since it added six confirmatory instances of behavior which followed the correct abstract rule, i.e., it explicitly confirmed exemplars of the correct response classes, as opposed to punishment feedback which confirmed only negative instances. Thus, it increased the total information value of the modeling display, and may have induced a more positive valence towards the experimenter. Reward alone, without the punishment feedback, had relatively weaker effects. Relative to the no punishment-no reward group, the reward only group selected significantly fewer nouns in imitation, but this difference was not maintained into generalization. This weak effect was also expected, since only six confirmatory instances were observed, and the noun class was never explicitly punished. Thus, subjects in this condition were never given any information indicating that nouns should be avoided. Contrary to expectations, neither of the experimental instructional variations produced significant decrements in the frequency of the noun response, relative to the control instructions. The experimental instructions were designed to alert subjects to the punishment and reward operations, thereby increasing their interest in and attention to the modeling cues, and making the contrast between punished and unpunished responses more salient. The instructions were worded so as to avoid constraining subject response, since earlier research had suggested that excessive constraint might prove detrimental to performance. It should be noted, however, that the directive instructions used in Experiment II did, in fact, constrain subject response to some degree, in that subjects were instructed to use "<u>only</u> the <u>good kind</u>." The effects of instructional variables have been inconsistent in previous research within the domain of rule governed behavior (Harvey 1972a; Rosenthal and Carroll 1972; Rosenthal and White 1972; Rosenthal and Whitebook 1970; Rosenthal et al. 1970). One possible explanation for the absolute lack of instruction effects in this study is that the demand characteristics of the situation may have been such that subjects' attention to the stimuli was maximized at the outset, so that attention focusing instructions would have little impact. This becomes plausible when one considers an experimental situation involving novel stimuli such as being taken outdoors by two strange new people, engaging in a relatively novel task, and watching a demonstration involving the adult strangers. Through observing the experimenter's reaction to the model's answers, each child could ascertain the correctness of his previous response to that item. Under circumstances providing both novelty and response feedback, it seems likely that childrens' attention would be engaged at high levels. Informal observation corroborates this explanation, as very few subjects appeared to be distracted by their surroundings. Instructions directly requesting subjects to apply what they had learned to their answers may not have been more effective than instructions in which this request was not verbalized, simply due to the demand characteristics of a school-like task. In most schoolwork situations, one is required to apply what is learned to subsequent tasks of that nature. Thus, it is reasonable to expect subjects in the present circumstances to generalize without specific directions to do so. The combination of this schoolwork ethic with maximized attention to modeling cues might account for the lack of difference between neutral and experimental instructions.

The relatively straightforward results of this study should not remain totally unqualified. One qualification pertains to subjects' concept attainment, which often appeared to be an all or none phenomenon. Although very few differences in attention to the modeling display were apparent, there may well have been some subjects who appeared to be attending, but actually were not. Individual differences in intelligence may also be invoked as a factor influencing the probability that a given subject acquired the correct concept. Additionally, it was informally noted that those subjects who hurried through their papers in imitation and generalization usually failed to perform in accordance with the rule, while those who paused to consider each item individually usually performed more correctly. Perhaps some subjects were engaged in a competitive race to finish first, allowing speed to interfere with accuracy. More troublesome is the fact that, in some cases, entire groups appeared to exhibit this all or none kind of performance. The most outstanding example of this was a group of girls under conditions of weak punishment, reward, and directive instructions. While the baselines for both boys and girls under this condition were comparable (13.8 and 13.4), the boys' mean score in imitation was 2.0, and 3.2 in generalization, while the girls' scores were 10.2 and 12.2, respectively. No plausable explanation for such behavior seems available, but the data remain to qualify the results.

Another qualification involves the degree to which subjects who statistically performed in accordance with the rule actually did so. For the combined punishment groups, the baseline mean was 12.45, the imitation mean 8.10, and the generalization mean 10.15. Although the imitation and generalization means were significantly lower statistically, one may question why these means remained so high if these subjects had actually learned the correct rule. One answer is that subjects may have simply been careless, may have been hurrying to finish, or may have had reading decrements which affected their performance. It was informally noted that at least one subject in each group had to be told what several of the words were, dispite careful pretesting of subjects' familiarity with the words. Another is that they may have so overlearned the association between each stimulus word and its high probability noun response that the response had become almost automatic, and was not greatly disturbed by a learning experience involving so few trials. It should be noted that many of the rewarded low probability alternatives to the dominant noun associates had rather arbitrary relationships to the stimulus nouns. Of those rewarded, only two seem particularly plausable (to "KING," "RICH," and to "HAMMER," "BUILD"), while the other four appear more arbitrary (to "PEOPLE," "HELP;" to "STEM," "COLD;" to "STREET," "PLAY;" and to "RIVER," "LONG"). It may be that better rule apprehension and/or willingness to change from an initially dominant paradigm requires better concordance with the children's private cannons of appropriate word associates than were provided by many of the non-noun associate options. Some subjects, of course, performed in almost perfect accordance with the rule, while others maintained their baseline performance, rendering the mean figures somewhat biased.

Further research in this paradigm along a number of dimensions would be of interest. Because of the incomplete penetration of the rule discussed above, it would be of interest to investigate the effect of increasing the number of modeling trials by a factor of three or four, massing the trials under some conditions, and spacing the trials under others. One might, additionally, vary the relative proportion of punishment versus reward trials, or mass all of the punishment trials in the first or the last part, as opposed to distributing them in a fashion such that the model appears to have learned to avoid noun responses, and does so in the last few trials. The addition versus deletion of nonverbal facial pain cues from the model may also effect performance. Other parameters might include social versus nonsocial forms of model punishment, greater intensities of punishment (e.g., mild punishment consisting of a simple softly spoken "no," versus strong punishment involving the experimenter shouting and screaming at the model), or vicarious versus punishment directly applied to the subject. The effects might also be different depending upon the subject's age, or differential verbal ability. The durability of noun suppression after modeling would be an informative parameter to investigate, both in terms of decrement over time, and as a result of increasing response cost.

Obviously, the present study has served only as a beginning. The area could not be considered throughly researched until such variations as those mentioned have been investigated, although very few of these dimensions have yet been adequately investigated within the general punishment domain.

APPENDIX A

SAMPLE RESPONSE SHEETS

Table A-1. Baseline and Imitation*

			I	
A.	LION	MAD	ANIMAL	BITE
B.	HOUSE	SLEEP	HOME	LARGE
1.	EARTH	DIRTY	GROUND	PLOW
2.	CABBAGE	FOOD	HARD	COOK
3.	PEOPLE	HELP	FUNNY	PERSON
4.	EAGLE	BIRD	EAT	NICE
5.	FINGERS	FIND	SMALL	HAND
6.	STEM	FLOWER	COLD	GROW
7.	COTTAGE	SLEEP	HOUSE	WOOD
8.	TABLE	ROUND	SET	CHAIR
9.	STREET	PLAY	BIG	ROAD
10.	BIBLE	BOOK	PRAY	GOOD
11.	RIVER	RUN	LAKE	LONG
12.	BABY	FUN	CHILD	SLEEP
13.	MOON	SUN	SHINE	PRETTY
14.	KING	RICH	QUEEN	RULE
15.	HAMMER	HEAVY	BUILD	NAIL

*The imitation response sheet was identical, except that the sample words were omitted, and the top was labeled "II."

Table A-2. Generalization

		III		
1.	MOUNTAIN	CLIMB	ROCKY	HILL
2.	WINDOW	COLD	WASH	GLASS
3.	FRUIT	APPLE	EATS	SWEET
4.	BOY	LITTLE	GIRL	RUN
5.	CARPET	RUG	SWEEP	BIG
6.	CITY	BUSY	TOWN	LIVE
7.	NEEDLE	LONG	THREAD	HURT
8.	SPIDER	WEB	CLIMB	SLOW
9.	BUTTER	BREAD	RICH	MELT
10.	SALT	SHAKE	PEPPER	SWEET
11.	DOGS	CATS	HOT	PLAY
12.	THIEF	MEAN	ROBBER	STEALS
13.	OCEAN	SWIM	DEEP	WATER
14.	CARS	TRUCKS	SHINY	CRASH
15.	DOCTOR	WELL	FIX	NURSE

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