

SOME SOCIAL DETERMINANTS OF SELF-MONITORING REINFORCEMENT SYSTEMS¹

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The present experiment was designed to establish the social conditions under which persons will emulate high standards of self-reward even though the self-imposition of such contingencies generates negative self-evaluative consequences. Children were exposed to an adult model who achieved superior performances and adopted a high criterion of self-reward. The main variables selected for study were the degree of nurturance displayed by the model, social reinforcement of the model's high standard-setting behavior, and the presence or absence of a peer model who adopted a low standard of self-reward. Vicarious positive reinforcement enhanced children's emulation of severe performance demands for self-reward, whereas high model nurturance and exposure to conflicting peer standards reduced receptivity to adult modeling cues. The combined influence of low nurturance, vicarious positive reinforcement, and the absence of competing peer contingencies produced the most stringent pattern of self-reward.

Successful socialization and personality development require the gradual substitution of self-monitoring reinforcement systems for externally imposed sanctions and demands. In order to achieve such self-regulation, persons must adopt certain standards of behavior and self-administer rewards and punishments depending upon whether their performances fall short of, match, or exceed their self-prescribed demands.

Findings of research conducted within a social learning framework (Bandura & Kupers, 1964; Bandura & Whalen, 1966; Marston, 1965; Mischel & Liebert, 1966) demonstrate that self-reinforcement systems can be transmitted on the basis of observational learning through exposure to the standard-setting behavior and self-reinforcing patterns exhibited by adult and peer models. There is some recent evidence (Bandura & Whalen, 1966), however, that modeling variables alone are not sufficient for imparting high standards of self-reward as exemplified by highly competent persons. This finding is not entirely unexpected since an individual who adopts stringent criteria of self-reward will more often judge his performances to

be inadequate than if he adheres to lower standards of achievement. High self-imposed demands, therefore, inevitably result in more frequent self-denial of available rewards and negative self-evaluative consequences (Bandura & Kupers, 1964). For this reason, persons are generally inclined to reject the self-reinforcement contingencies displayed by superior models. On the other hand, it is evident from both informal observation and the variable responsivity of subjects in laboratory studies (Bandura & Whalen, 1966) that many persons do, in fact, emulate exacting self-reward standards even though such behavior increases the probability of unfavorable self-generated consequences.

The present experiment was primarily designed to investigate some of the social conditions which might lead children to adopt stringent self-reward patterns of behavior exhibited by superior models.

There are three classes of variables that are likely to serve as important determinants of modeling processes. The first of these is the nature of the relationship between the model and the observer. Among the numerous relationship factors that have received attention, the nurturant or rewarding quality of the model, which tends to increase interpersonal attraction, has been shown to be influential in facilitating identificatory outcomes (Bandura & Huston, 1961; Henker,

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1964; Mischel & Grusec, 1966; Mussen & Parker, 1965).

The extent to which a model's behavior will be reproduced by others may also be greatly influenced by the reinforcing consequences associated with the critical response patterns. There is little question but that children would conform to the standards of achievement exemplified by a model if extrinsic incentives of sufficient positive valence were made contingent upon matching behavior. Of greater social and theoretical significance, however, is the spontaneous emulation of models that results from witnessing reinforcing consequences, usually in the form of social approval and public recognition, accruing to the model (Bandura, 1965b, 1967). Therefore, the role of vicarious reinforcement in the social transmission of self-reward contingencies was the second variable selected for study.

In naturalistic situations individuals are typically confronted with a multiplicity of modeling influences, many of which operate in opposing directions. Theoretical speculations about the effect of multiple modeling on social learning generally give considerable emphasis to the conflicting identifications occurring in relation to adult and peer models. In the case of achievement standards and self-reinforcing patterns of behavior, there are several factors that might predispose children toward peer modeling when they are confronted with a conflict in standards between adults and peer members. If adult achievements and criteria for self-reward are relatively high, as is usually the case, then children will be reluctant to emulate such high aspirations because to do so would result in frequent negative self-reinforcement of their performances. In addition, according to social comparison theory, adults are likely to be viewed by children as too divergent in ability to serve as meaningful reference models (Bandura & Whalen, 1966). However, it is possible that conditions serving to reduce receptivity of adult modeling cues might be effectively counteracted by the simultaneous operation of opposing influences arising from strong affective ties to the model, and from vicarious positive reinforcement of high standard-setting behavior.

In the experiment reported in this paper, children were exposed to an adult model who performed a task at a consistently superior level relative to that of the children and adopted a high criterion of self-reward. Half the subjects experienced a prior rewarding interaction with the model, whereas for a second group of children the same model behaved in a nonnurturant manner. With half the subjects in each of the two levels of nurturance, the model was praised for adhering to stringent standards of achievement, but with the remaining children the model received no social recognition for high standard-setting behavior. In addition, half the children in each subgroup also observed a peer model who displayed a low standard of self-reward in order to determine the effects of simultaneous exposure to conflicting modeling cues.

It was predicted that model nurturance and vicarious positive reinforcement would augment, and peer modeling would reduce, the emulation of stringent self-reward patterns of behavior. Moreover, it was hypothesized that the combined influence of nurturance, vicarious reinforcement, and the absence of conflicting modeling cues would produce the highest level of identificatory behavior.

METHOD

Subjects

The sample, drawn from four elementary schools participating in the Palo Alto summer recreation program, contained 64 boys and 64 girls ranging in age from 7 to 11 years.

The children were divided into groups of male and female subjects and randomly assigned to the various experimental subgroups. A $2 \times 2 \times 2 \times 2$ factorial design was used, with 2 levels of nurturance, 2 conditions of modeling cues, 2 conditions of vicarious reinforcement of the self-rewarding behavior displayed by the adult model, and the sex differentiation of the subjects.

A male and a female adult and four children between the ages of 8 and 10 years served in the role of models.² All subjects in the experiment were exposed to same-sex models.

Nurturant Treatment

The children were brought individually to a mobile laboratory, ostensibly to test some game

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equipment that had been designed for use by both children and adults. After introducing the child to the adult model, who presumably was waiting his turn to play the game, the experimenter excused herself in order to prepare the equipment.

With half the children, who were assigned to the low-nurturance condition, the model announced that he would read his newspaper while they waited, and he supposed that the toys on the table were provided for the children to play with. The model then proceeded to read his newspaper for the entire 15-minute period and refrained from any social interaction with the child.

By contrast, in the high-nurturance condition, after the experimenter departed, the model remarked that he had planned to read his newspaper, but since the child was there they might as well play together. The model then obtained some additional toys from an adjacent room and played actively with the subject throughout the session. During the high level of social interaction, the model responded in a consistently warm, friendly, and generously rewarding manner.

Modeling of Conflicting Self-Reward Contingencies

Immediately following the nurturance manipulation, the experimenter returned and escorted both the adult model and the subject to another room in the mobile laboratory that contained the bowling apparatus utilized for modeling and measuring self-reward responses.

The apparatus, which has been described elsewhere in detail (Bandura & Whalen, 1966), consisted of a miniature bowling alley bounded at the far end by a vertical shield. Eight jewel lights, labeled with numbers ranging from 10 to 80, were mounted in three staggered rows on the front shield. The subjects were informed that whenever a bowling ball hit a target (purportedly behind the shield) the corresponding score light would flash on. In fact, the scores were preset from a control panel located in the adjoining observation room, so that the models performed identically in each condition, and all subjects received the same pattern of scores.

Before commencing the modeling trials, the experimenter called the participants' attention to a large bowl of plastic tokens near the starting point of the alley. The participants were informed that they were free to treat themselves to tokens whenever they felt that they had performed well and that, at the conclusion of the game, the tokens would be exchanged for prizes: the more tokens they obtained, the more valuable the prizes. The models were each handed a bank in which to deposit their chips, and again given permissive instructions to reward themselves with the token currency whenever they judged their bowling performance to be satisfactory.

Half the children in both the high- and low-nurturance conditions were exposed simultaneously to an adult and a peer model, who displayed conflicting standards for self-reward. The two models

alternated in blocks of five trials, for a total of 20 games each, while the subject, who presumably was waiting for his adult partner to arrive, observed their self-rewarding patterns of behavior.

The adult model achieved superior performances ranging from 50 to 80 points and rewarded himself with tokens and positive self-evaluative comments only when he obtained or exceeded the relatively high score of 60 points. On the occasions when the model attained his self-imposed standard, he commented approvingly, "That's a good score, I deserve a chip for that," and rewarded himself with one token. Following performances above the adopted criterion level, the model engaged in more generous self-reward: "That was really a good score. I deserve two chips for that." On the other hand, after trials in which he failed to meet the adopted criterion of 60, he denied himself tokens and remarked self-critically, "A score like that does not deserve a chip."

By contrast, the peer model obtained scores ranging from 10 to 40 points and adopted the relatively low self-reward criterion of 20 points. Except for the lower standard, the peer model exhibited the same pattern, magnitude, and frequency of self-reinforcement as his adult counterpart. On trials in which the peer obtained or exceeded a score of 20, he rewarded himself with tokens and self-approving comments, whereas on trials in which he failed to meet the self-imposed standard he took no tokens and criticized himself.

Children who were assigned to the peer-absent condition observed the adult model exhibit the same stringent pattern of self-reward, but they were not exposed to the low standards set by the peer model.

Vicarious Reinforcement of Stringent Self-Reward Demands

At the conclusion of the modeling trials, with half the children within each subgroup, the experimenter praised the adult model in the subject's presence for adopting and adhering to high standards of performance. The social reinforcement was primarily in the form of approving comments about the fact that the adult model was a person who set himself high standards of achievement and thought well of himself only when he had done an excellent job. In conditions involving a peer model, the adult was commended after the peer had been thanked for his participation and had departed, in order to minimize any implied negative sanction of the peer's more lenient self-rewarding tendencies.

For the remaining subjects within each experimental subgroup, the adult model was merely thanked for his assistance, but received no social recognition for his high standard-setting behavior.

Measurement of Self-Rewarding Responses

In treatments that included the peer model, after both models had departed, the experimenter explained to the subject that his adult partner was

apparently delayed for his scheduled session and, therefore, the child could play the game alone. In the peer-absent conditions, the experimenter told each child that it was now his turn to play with the bowling apparatus. The experimenter then replenished the token supply, handed the child his bank, described the token exchange, and repeated the permissive instructions for self-reward.

In order to remove any possible external influences on subjects' self-reinforcing responses, the postexposure test was conducted with each child alone in the room. The experimenter explained that she had some work to complete in another room of the laboratory, and that the child might continue playing the game until she returned.

After the experimenter left, the children performed 36 trials and obtained the same pattern of scores, ranging from 10 to 60 points, as determined by a prearranged program. It might be expected that persons would readily adopt and adhere to high standards of self-reward under conditions where their performances are sufficiently high to ensure frequent opportunities for positive self-reinforcement. The present experiment, however, was primarily concerned with testing the efficacy of social learning variables in fostering the adoption of high standards under circumstances where modeling produces sparing self-reinforcement, as is typically the case in naturalistic situations. Therefore, the children's scores were considerably lower than those obtained by the adult model, and their best performances matched the model's minimum criterion of 60 points on only six trials.

In the adjoining observation room, one observer recorded the performances for which the children rewarded themselves with tokens and the number of tokens taken on each self-reinforced trial. In order to determine scorer reliability, the self-rewarding responses of 12 subjects were recorded independently by a second observer. The two raters achieved virtually perfect agreement (99.4%) in scoring both the incidence and the magnitude of self-reinforcement.

RESULTS

Table 1 presents the mean percentage of trials in which children in the various experimental groups rewarded themselves for performances below the 60 points adopted by the adult model as the minimum criterion of self-reward. These data provide the best overall index of the degree to which exposure to stringent self-reinforcement contingencies exhibited by adults under different social conditions influenced children's standard-setting and self-reinforcing behavior.

Analysis of variance performed on these scores disclosed that highly significant effects were produced by the behavior modeled by the peer ($F = 37.64$, $p < .001$), by posi-

TABLE 1
MEAN PERCENTAGE OF TRIALS IN WHICH SUBJECTS REWARDED THEMSELVES FOR PERFORMANCES BELOW THE MODEL'S MINIMUM CRITERION OF SELF-REWARD

Subgroup	Social approval		No approval	
	Rewarding interaction	Nonrewarding interaction	Rewarding interaction	Nonrewarding interaction
Peer model				
Boys	57	39	71	66
Girls	41	45	60	62
Total	49	42	66	64
No peer model				
Boys	25	10	45	37
Girls	35	12	40	31
Total	30	11	43	34

tive reinforcement of the adult model ($F = 20.32$, $p < .001$), and, to a lesser degree, by the nurturant interaction between the adult model and the children ($F = 4.64$, $p < .05$). In accord with prediction, children who were exposed to conflicting modeling cues were more inclined to reward themselves for low achievements (55% of the trials below 60) than children who had observed only the adult models adhere to high standards of self-reinforcement (30%). Similarly, children imposed more severe criteria of self-reward on themselves when the adult model received social recognition for his high standard-setting behavior (33%) than when the model's stringent achievement demands went unrewarded (52%). However, contrary to expectation, subjects who had experienced a highly nurturant interaction with the adult model were somewhat more inclined to accept the lower standard set by the peer (47%) than if the adult model were less beneficent (38%). The analysis, however, yielded no sex differences or significant interaction effects.

As shown in Table 2, except for a few interesting variations, the variables discussed above influenced children's self-reinforcing responses in essentially the same manner at each specific performance level. Vicarious reinforcement decreased, and peer modeling cues increased, the incidence of self-reinforcing responses, with the effects being particularly powerful at lower and intermediate

TABLE 2
F VALUES OBTAINED AT EACH PERFORMANCE LEVEL FOR THE DIFFERENT EXPERIMENTAL VARIABLES

Experimental variables	Performance level					
	10	20	30	40	50	60
Vicarious reinforcement	5.20**	13.17****	20.07****	14.60****	8.46***	3.94**
Peer model	<1	26.00****	54.84****	50.00****	8.99***	3.94**
Nurturance	<1	2.89*	5.65**	3.24*	1.68	<1
Sex	<1	<1	<1	2.64	<1	<1

* $p < .10$.
 ** $p < .05$.
 *** $p < .01$.
 **** $p < .001$.

levels of achievement. It is interesting to note, however, that exposure to the peer model did not increase the children's frequency of self-reward for performances that fell below the minimum standard adopted by the peer (Table 2). It is also noteworthy that model nurturance increased subjects' tendency to reward themselves at the intermediate range of achievement, but it did not exert a significant effect at either low or high performance levels.

Magnitude of Self-Reward

The mean number of rewards that the children administered to themselves on each self-reinforced trial as a function of experimental conditions is shown in Table 3.

The results of the analysis of variance performed on these means reveal that the experimental variables affected the magnitude as well as the frequency of self-reinforcement.

TABLE 3

MEAN NUMBER OF TOKENS TAKEN BY CHILDREN IN THE DIFFERENT EXPERIMENTAL CONDITIONS ON EACH SELF-REINFORCED TRIAL

Subgroup	Social approval		No social approval	
	Rewarding interaction	Nonrewarding interaction	Rewarding interaction	Nonrewarding interaction
Peer model				
Boys	1.61	1.73	1.63	1.89
Girls	1.58	1.44	2.35	1.57
Total	1.59	1.58	1.99	1.73
No peer model				
Boys	1.29	1.03	1.76	1.40
Girls	1.33	1.30	1.32	1.61
Total	1.31	1.17	1.54	1.50

Children who witnessed peers self-administer reinforcers for minimal performances rewarded themselves more generously than subjects whose exposure was limited to the high contingencies exemplified by adult models ($F = 17.59, p < .001$). On the other hand, commending a model for adhering to lofty standards resulted in more sparing self-reward by observers ($F = 10.87, p < .01$). In addition to these main effects, the analysis disclosed a significant Peer \times Sex \times Nurturance interaction effect ($F = 10.78, p < .01$). For girls, nurturance increased generosity of self-reward in the peer condition, but produced less liberal self-reinforcement when there was no exposure to the conflicting peer standards; the opposite pattern of relationships was obtained for boys.

Since some of the children never rewarded themselves after obtaining scores below 60, the number of cases in each cell varied somewhat from group to group at different score levels. Consequently, separate one-way analyses of variance were computed for evaluating the influence of vicarious reinforcement, peer modeling cues, nurturance, and sex of subjects on magnitude of self-reward at each specific performance level. Although all groups rewarded themselves sparingly for low accomplishments, and did not differ in this respect, children who had observed the peer model subsequently treated themselves more generously whenever they received scores in the 50s ($F = 19.12, p < .001$) or 60s ($F = 7.53, p < .01$). Children in the vicarious reinforcement condition, on the other hand, attached less value to their achievements at the 40

($F = 3.63$, $p < .10$), 50 ($F = 7.30$, $p < .01$), and 60 ($F = 4.86$, $p < .05$) performance range.

DISCUSSION

This experiment provides some indication of the relative influence of model nurturance, vicarious positive reinforcement, and peer modeling cues on emulation of stringent self-reward patterns of behavior.

In most theories of identification (Bronfenbrenner, 1960; Sears, Rau, & Alpert, 1965) interpersonal relationship variables receive considerable attention, but the influential role of response consequences to the model in determining identificatory outcomes has been virtually ignored. The findings of this study further demonstrate that social reinforcement of a model's responses can have a powerful effect on observers' spontaneous reproduction of matching behavior. Children who had observed the adult model adopt high achievement standards for self-reward, and receive social recognition for adhering to such exacting norms, subsequently imposed on themselves higher performance demands than children who had witnessed the model portray the same pattern of self-reinforcement without any socially rewarding consequences.

Previous studies (Bandura, 1965a; Walters & Parke, 1964; Walters, Parke, & Cane, 1965) comparing the effects of exposure to rewarding, punishing, or no consequences to a model for engaging in socially censured behavior provided no clear evidence for the occurrence of positive vicarious reinforcement. The omission of adverse consequences following displays of reprehensible behavior can function to reduce observers' inhibitions, with the result that nonoccurrence of anticipated punishing reactions typically augments matching behavior to the same degree as witnessed rewarding outcomes. Findings of the present experiment, involving socially approved behavior in which inhibitory processes are likely to play a minor role, show that social rewards dispensed to a model produce a higher incidence of matching behavior than exposure to the same modeling cues without any consequences accruing to the model.

Model nurturance not only exerted a some-

what weaker influence on children's self-rewarding behavior compared to the other variables, but also, contrary to expectation, children who had experienced a highly nurturant interaction with the adult model were more inclined to accept the low performance standards set by the peer than if the adult were less beneficent. It thus appears that in the case of evaluative standards that govern the incidence of self-rewarding behavior, high nurturance is conducive to ready self-gratification rather than to emulation of stringent achievement demands self-imposed by the rewarding adult.

The latter findings, and results of other studies in which the rewarding quality of the model is varied experimentally, suggest that the developmental or anacletic theory of identification, which assumes that model nurturance enhances identification, may be valid only under certain limiting conditions. A study by Bandura and Huston (1961) disclosed that, although a model's rewarding quality facilitated reproduction of verbal and stylistic responses, children readily adopted aggressive responses regardless of the degree of the model's nurturance. Similarly, Mischel and Grusec (1966) found that a prior nurturant interaction with the model enhanced children's spontaneous imitation of socially neutral behaviors, but it did not increase their willingness to perform matching responses that possessed aversive properties. As noted earlier, adoption of high self-evaluative standards likewise involves some aversive effects. The implication of these overall results is that model nurturance may produce specific rather than generalized modeling effects, and that it may differentially influence the reproduction of neutral and negatively valenced classes of behavior.

The experiment also revealed some of the conditions under which exposure to the performance norms of peer models has a significant effect upon emulation of adult standards. Children who simultaneously observed an adult set high criteria of achievement for himself and a peer adopt low norms subsequently imposed lower self-reward contingencies on themselves and rewarded themselves more generously than children who were exposed only to the behavior of the adult

model. However, the influence of the peer's lenient pattern of self-reward was effectively counteracted by social reinforcement of the adult's high standard-setting behavior. This neutralization of influences is shown most clearly in the finding that the condition including the joint effect of peer modeling cues and vicarious reinforcement yielded essentially identical rates of self-reinforcement as the treatment in which the powerful opposing influences of peer cues and adult approval were both absent.

The identification process is particularly complicated under naturalistic conditions in which children are exposed to adult standards as well as multiple peer models who display conflicting patterns of behavior. It would, therefore, be of considerable interest to isolate the social variables determining whether children will select peer models who reinforce the adult standards or those who furnish opposing influences.

The most austere pattern of self-reward was displayed by children who had experienced a relatively nonnurturant relationship with the model, who had no exposure to conflicting standards of peer models, and who witnessed the adult's high standard-setting behavior socially reinforced. Approximately half the children in this condition never rewarded themselves for performances that fell below the adult's criterion, while the remainder rarely considered scores below 50 deserving of self-reward. The adoption and continued adherence to unrealistically high self-evaluative standards is particularly striking considering that the self-imposition of rigorous performance demands occurred in the absence of any social surveillance, under high permissiveness for self-gratification, and the emulative behavior resulted in self-critical reactions and considerable self-denial of freely available rewards. These findings provide further evidence that inhibitions and strong self-controlling responses may be acquired through observational learning without the mediation of direct positive or negative reinforcement.

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