

THE CASE OF THE MISTAKEN DEPENDENT VARIABLE

ALBERT BANDURA¹

Stanford University

In studying self-reinforcement (i.e., the process in which individuals control their own behavior by rewarding themselves when a certain standard of behavior is achieved) two types of research methodologies should be considered: one which studies how performance standards of self-reward are acquired and one which determines if self-administered consequences affect behavior. The distinction between the acquisition of standards and the self-maintenance of behavior is emphasized. Considerations which must be taken into account when interpreting studies of self-reinforcement are examined in terms of recent studies of modeling influences on children's standards of performance for self-reward.

The processes by which people can regulate their own behavior have begun to receive increasing attention in recent years. Among the various self-regulatory influences, the phenomenon of self-reinforcement occupies a prominent role (Bandura, 1971; Thoresen & Mahoney, 1974). Self-reinforcement refers to a process in which organisms maintain their own behavior by administering to themselves reinforcers under their control whenever they attain or surpass criterion performances.

A complete understanding of self-reinforcing functions requires two separate lines of research for which the methodologies necessarily differ. One set of studies is designed to explain how behavioral standards for self-reinforcement are acquired and modified. In experiments conducted for this purpose, standard-setting influences represent the independent variables, and the performance attainments that individuals self-reward and self-punish constitute the dependent events. The second line of research is designed to assess whether self-administered consequences do, in fact, serve a reinforcing function by influencing response output. In testing for reinforcing effects, self-administered consequences represent the independent variable and response frequencies the dependent events. The issues of when a person chooses to reward himself and whether the self-administered reward influences his subsequent behavior are separable; both must be investigated in elucidating self-reinforcement events.

¹ Requests for reprints should be sent to Albert Bandura, Department of Psychology, Stanford University, Stanford, California 94305.

Acquisition of Performance Standards of Self-Reinforcement

Behavioral standards for self-reinforcing responses can be established by direct training through selective reinforcement. Parents and other socialization agents prescribe standards that define the conduct worthy of reward. They generally respond positively when children achieve or exceed the standards and negatively when their behavior falls short of the valued levels. As a result of such differential treatment, children eventually come to respond to their own behavior in self-rewarding or self-punishing ways, depending on how it departs from the evaluative standards originally set by others.

People not only prescribe performance requirements for others but they also exemplify them in response to their own conduct. A series of experiments has analyzed conditions under which standards of self-reward are adopted through modeling (Bandura, Crusec, & Menlove, 1967; Bandura & Kupers, 1964; Bandura & Whalen, 1966). In the laboratory procedure, children observe a model performing a bowling task in which he adheres either to a high or to a low standard for self-reward. On trials in which the model achieves or exceeds his self-imposed requirements, he rewards himself tangibly and voices self-praise. When his attainments fall short of self-prescribed levels, he denies himself freely available rewards and reacts self-critically. Children later perform the bowling task alone, receiving a predetermined range of scores. The performance levels for which they reward and punish themselves are recorded. Results of these, and other studies, show modeling

to be an efficacious way of inducing standards of self-reward (Bandura, 1971).

Reinforcing Function of Self-Administered Consequences

That self-administered reinforcers can maintain behavior has been amply documented in paradigms examining variations in performance as a function of self-reinforcing practices. People who reward their own performances work longer and more accurately than if they engage in the same activities without reinforcement (Bandura & Perloff, 1967; Felixbrod & O'Leary, 1973; Glynn, 1970). Behavioral productivity can be enhanced as effectively by self-reinforcement as by externally administered consequences.

In a recent article on self-control, Premack and Anglin (1973) failed to distinguish between investigations concerned with induction of standards and those measuring response maintenance. Conceptual oversights are blended with factual errors into a surrealist portrait of research dealing with an important aspect of self-reinforcement.

In examining modeling influences on children's standards of self-reward, it is essential to control the patterns of scores they receive. Otherwise, variations in achievements may alter standards and thus confound the effects of modeling. If exemplified standards and how well children perform on a task were both allowed to vary simultaneously, it would be impossible to unravel whether the criteria that children adopt for rewarding themselves are products of modeling, or performance attainments, or of both factors.

The experiments that Premack and Anglin (1973) misinterpreted used a miniature bowling apparatus in which the target area was screened from view so that children could not tell how well they did except from the scores registered on the console after each trial. The scores were, in fact, preprogrammed. As clearly explained in the research reports, "all children received the same pattern of performance scores [p. 3]."

Premack and Anglin reported that since children exposed to high- and low-standard-setting models "played the game about equally well [p. 149]," these experiments fail to demonstrate that self-praise serves as a reinforcer by increasing the "frequency of the response class that it follows." Since the studies were designed to measure the performance attainments that children considered worthy of self-reward in a preprogrammed pattern, the reinforcers could not have affected the bowling scores. Moreover,

children did not do "about equally well," they all received identical scores.

Having misconstrued the experiments, Premack and Anglin (1973) proceeded to conduct a post-mortem into the possible causes of the missing performance differences. Perhaps "a ceiling effect" accounts for the failure to obtain significant variations in performance. More likely, the authors argued, self-praise did not produce a higher rate of bowling responses because it lacks reward value. Self-praise, of course, could not have influenced performance because it was a dependent variable and a secondary one at that. People are disinclined to talk aloud to themselves. Although the occasions on which children voiced self-praise or self-criticism were recorded, standards of self-reward were measured in terms of the performances for which children treated themselves to freely available candies or tokens redeemable for prizes.

Premack and Anglin speculated that maybe the tangible reinforcers are equally at fault based on some evidence that middle-class children may not increase play for candy but they eat candy for the opportunity to play a game. If reinforcer effectiveness were a relevant issue in these studies, which it is not, and if the latter findings had wide generality, which I doubt, evidence on how contingent events operate have little bearing on noncontingent arrangements. Reinforcers were freely available so that children could eat and play simultaneously. Those who adopted the high standards of self-reward exemplified by models rewarded themselves sparingly and only when they achieved superior performances, whereas those who adopted low standards rewarded themselves generously for comparable achievements—which is precisely what the experiments set out to test.

Neither low ceilings, nor feeble reinforcers, nor the relativity of reinforcing properties account for the alleged missing differences in performance. Rather, the problem lies in the eyes of the beholders. The studies in question investigated induction of standards of self-reward through modeling not performance enhancement through self-reward.

REFERENCES

- BANDURA, A. Vicarious and self-reinforcement process. In R. Glaser (Ed.), *The nature of reinforcement*. New York: Academic Press, 1971.
- BANDURA, A., GRUSEC, J. E., & MENLOVE, F. L. Some social determinants of self-monitoring reinforcement systems. *Journal of Personality and Social Psychology*, 1967, 5, 449-455.

- BANDURA, A., & KUPERS, C. J. Transmission of patterns of self-reinforcement through modeling. *Journal of Abnormal and Social Psychology*, 1964, 69, 1-9.
- BANDURA, A., & PERLOFF, B. Relative efficacy of self-monitored and externally imposed reinforcement systems. *Journal of Personality and Social Psychology*, 1967, 7, 111-116.
- BANDURA, A., & WHALEN, C. K. The influence of antecedent reinforcement and divergent modeling cues on patterns of self-reward. *Journal of Personality and Social Psychology*, 1966, 3, 373-382.
- FELIXBROD, J. J., & O'LEARY, K. D. Effects of reinforcement on children's academic behavior as a function of self-determined and externally imposed contingencies. *Journal of Applied Behavior Analysis*, 1973, 6, 241-250.
- GLYNN, E. L. Classroom applications of self-determined reinforcement. *Journal of Applied Behavior Analysis*, 1970, 3, 123-132.
- PREMACK, D., & ANGLIN, B. On the possibilities of self-control in man and animals. *Journal of Abnormal Psychology*, 1973, 81, 137-151.
- THORESEN, C. E., & MAHONEY, M. J. *Behavioral self-control*. New York: Holt, Rinehart & Winston, 1974.

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