The influence of induced affective states on the effectiveness of social and nonsocial reinforcers in an instrumental learning task

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Social approach and avoidance motivational states were proposed as mediating Byrne's similarity-attraction relationship. In a 3 by 2 factorial design, three experimentally induced affective states (elation, neutral, and depression) and two types of reinforcers (social reinforcers—positive personal evaluations—and nonsocial reinforcers—$.05) were employed. Analysis of variance indicated that the hypothesized Reinforcer by Affective State interaction was significant in the extinction of a leverpulling response, but not in the acquisition of this response. The performance curves indicated that, whereas a differential magnitude of reward interpretation of affective states is inadequate, a differential drive interpretation is appropriate.

Byrne and his associates have gathered a considerable amount of evidence supporting the similarity-attraction relationship (e.g., Byrne, 1961). There have been several proposals attempting to explain what motivational systems mediate the similarity-attraction function. Effectance motivation (Byrne & Clore, 1967), the need for vindication (Palmer, 1970), and the need for social approval (Ettinger, Nowicki, & Nelson, 1970) have been suggested as needs or motives relevant to this function. A fourth motive is now proposed as mediating the similarity-attraction relationship—a social approach and avoidance motive. This fourth motive is suggested because of the importance of affective processes in interpersonal attraction (e.g., Byrne & Clore, 1970; Gouaux, 1970), and because of the concomitance of various social approach and avoidance behaviors with, respectively, positive affective states and negative affective states.

Izard (1964) and Gouaux (1970) found that Ss in whom positive affective states were experimentally induced gave significantly more positive interpersonal evaluations than did Ss in the negative affect conditions, regardless of whether the other person or persons in the experiment were responsible for the S's affective state. In a longitudinal study conducted by Wessman & Ricks (1966), Ss made daily self-ratings of their moods and social behavior. Ss experiencing negative or depressed moods indicated decreased interests in their social environment as compared with elated Ss. They found that elation was correlated with successful social activities and gratifying personal functioning, whereas depression was related to loss of self-esteem and social withdrawal and isolation. All of these studies indicate that increased social approach behavior is associated with elation or positive affective states, and social avoidance behavior is associated with depression or negative affective states.

Byrne & Clore (1970) proposed a reinforcement model of evaluative responses in which positive and negative reinforcements, e.g., similar and dissimilar attitudes, respectively, act as unconditioned stimuli which evoke implicit affective responses. Moreover, any discriminable stimulus associated with these unconditioned stimuli becomes a conditioned stimulus which evokes the implicit affective response. The implicit affective response mediates the overt evaluative response, or interpersonal attraction response. Now, it is suggested that this implicit affective response and the social behavior that it evokes together constitute social motivational states which mediate the similarity-attraction function established by Byrne. Social approach motivation consists of the behavior sequence of aroused positive affect and the subsequent social approach behavior, whereas social avoidance motivation consists of the sequence of negative affect and social avoidance behavior. The meaning of these motivational states can perhaps be made clearer by pointing to certain parallels between motivational states and drive states, namely, the cue aspects of drive states, drive stimuli, and the drive-incentive relation.

Numerous studies in animal learning have shown that drive stimuli, i.e., particular internal physiological responses characteristic of certain drive states, can guide particular behavior appropriate to the reduction of the need state. Rats can learn to associate different drive stimuli with different patterns of behavior which reduce the drive state (e.g., Hull, 1933; Kendler, 1946). The second point of comparison of motivational states with drive states is the drive-incentive relation. For a given drive, such as hunger, a specific incentive, food, is appropriate and relevant (e.g., Elliott, 1928). The appropriate and relevant incentive is one which removes or reduces the drive state by satisfying a need.

Now, it was proposed that in the affect-social motivation relationship, affective states produce cues which elicit social behavior previously associated with the cues. Positive affective states generate cues eliciting social approach behavior toward others, because other people have been previously associated with these affective states, i.e., with the maintenance and enhancement of positive affect. Negative affective states provide cues eliciting social avoidance behavior, because others have previously been associated with the maintenance, or the lack of termination, of negative affect. In terms of the drive-incentive relation, it would seem that, whereas social reinforcers (e.g., positive personal evaluations) would be appropriate and relevant to elated Ss, they would not be for depressed Ss. In fact, they could be somewhat aversive to depressed Ss. Moreover, nonsocial reinforcers irrelevant to these effective states should be equally effective for elated and depressed Ss. Accordingly, it was hypothesized that for Ss in either elated, neutral, or depression affective states, receiving either social or nonsocial rewards in the acquisition and extinction of a simple instrumental learning task, there would be a Reinforcer by Affective State interaction. Whereas elated Ss would respond at a higher level than depressed Ss for social reinforcers, they would respond at about the same level for nonsocial reinforcers.

METHOD

The Ss were female students in the introductory psychology course at Purdue University. Females were used because they perform consistently better than males in studies involving the induction of affective states (e.g., Velten, 1968). Early in the semester the Ss completed a 32-item survey of attitudes. A month later the Ss were seen individually for the experimental

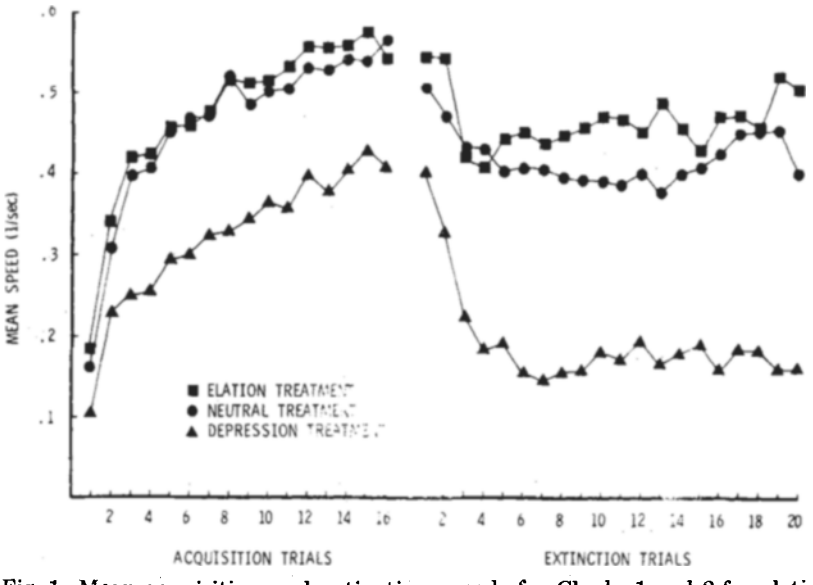

Fig. 1. Mean acquisition and extinction speeds for Clocks 1 and 2 for elation, neutral, and depression groups receiving social reinforcers.

session.

Upon entering the experimental room, Ss filled out a series of six semantic differential rating scales (M1). Then each S, according to the affect condition in which she was randomly placed, was given a written set of instructions describing the nature of the mood induction and how the S was to participate in the experiment. The S then was given a set of 60 cards appropriate to the affect treatment. These instructions and mood cards were identical to those used by Velten (1968). The elation and depression cards contained self-referent statements representative of the respective moods of elation and depression. The neutral treatments served as a control for the possible effects of reading statements and of performing in an experiment. The neutral statements were factual non-self-referent statements which were in no way related to mood conditions or feelings.

Subsequent to reading her respective mood cards, the S completed a second set of semantic differential rating scales (M2). Then the S participated in a simple leverpulling task. The apparatus consisted of a large gray panel with a red ready light, a lever which could be pulled down from its normally raised position, and a slit in the panel through which reinforcements were delivered. Two performance times were recorded—the time between the onset of the ready light and the movement of the lever from its raised position (Clock 1) and the time required to move the lever from its raised to its lowered position (Clock 2). Ss received 16 continuously reinforced acquisition trials, reinforced with either positive personal evaluations, purportedly given by other students, based on the Ss' attitude surveys, or money (5 cents). These rewards were equated for neutral-mood Ss in a pilot study. The Ss were then given 20 extinction trials. After completing this leverpulling task, Ss filled out the semantic differential rating scales for the third time (M3) and were then dismissed. Thus, a 3 by 2 factorial design was used, with three induced affective states (elation, neutral, and depression) and two types of reinforcers, social and nonsocial, having 19 Ss per treatment condition.

RESULTS

With regard to the measurement of the Ss' affective states, the M1 means for the six groups were found to be very similar, ranging from 28.52 to 31.58. The differences between M2 group means were highly significant ($F = 102.47$, $df = 5/108$, $p < .0001$), with the elated groups having means of 36.0 and 38.84, compared with the neutral groups, 27.42 and 29.0, and the depression groups, 16.57 and 15.84. The means of the elated groups rose about 9 points on the 6- to 42-point semantic differential scales, while the depression groups fell about 15 points. The M3 means show that both of the elated groups dropped about 3 points, the neutral groups rose a point or two, and the depression groups rose about 11 points. The M3 means also are significantly different ($F = 4.36$, $df = 5/108$, $p < .001$).

With regard to the acquisition and extinction data, it was found that the differences between the groups on the first trial of acquisition were not significant for both of the performance times and the total time (the sum of Clock 1 and Clock 2 times). Contrary to the hypothesis, an analysis of variance of the acquisition data indicated the absence of a significant Reinforcer by Affective State interaction for either of the performance times and the total time. Both the affective state main effect ($F = 4.67$, $df = 2/108$, $p < .05$) and the trials effect ($F = 114.24$, $df = 15/1620$, $p < .001$) were significant for the total time (and also both performance times). With regard to the extinction data, however, there was a significant Reinforcer by Affective State interaction for the total time ($F = 5.24$, $df = 2/108$, $p < .01$), as well as for both performance times. Again, the affective state main effect ($F = 6.35$, $df = 2/108$, $p < .01$) and the trials effect ($F = 14.44$, $df = 19/2052$,

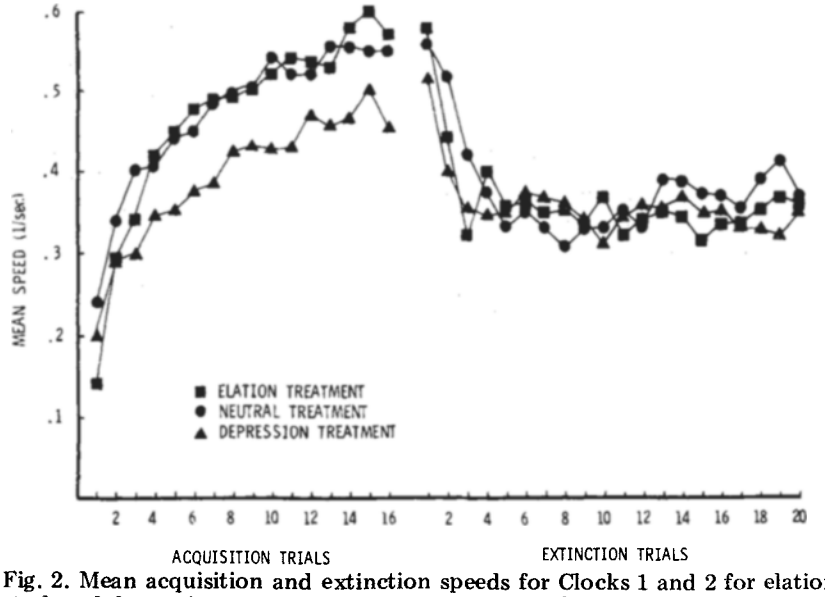

Fig. 2. Mean acquisition and extinction speeds for Clocks 1 and 2 for elation, neutral, and depression groups receiving nonsocial reinforcers.

$p < .001$) were significant for the total time, as well as for both performance times. Figures 1 and 2 indicate the performance curves for the social and nonsocial reinforcers, respectively, for Clocks 1 and 2. Though the predicted interaction was not significant in acquisition, an analysis of variance of the last four acquisition trials indicated that, whereas the three affect groups which received social reinforcers were significantly different ($F = 4.03$, $df = 2/54$, $p < .05$), the three groups receiving nonsocial rewards were not significantly different ($F = .82$). This finding concerning the last four acquisition trials was similar for both performance times and the total time and similar to the finding when the neutral groups were omitted.

DISCUSSION

The specific question under investigation here was: Do positive and negative affective states arouse, respectively, specific social approach and avoidance motivational states for which social reinforcers are particularly relevant and appropriate? The present results suggest an equivocal answer to the question. There is evidence for the validity of the social motivational interpretation of affective states, namely, the Affect by Reinforcer interaction in extinction. However, adequate evidence is lacking, since the predicted interaction was not found with the acquisition performance times. The depression group receiving nonsocial reinforcements reached a higher level of acquisition performance than the depression group receiving social reinforcers, though this difference was nonsignificant, but the elated groups performed at about the same level for social and nonsocial reinforcers.

Though the results give limited support to the social motivational interpretation, the data indicate that a motivational or drive interpretation of affective states might be appropriate. Griffitt (1966) suggested that any stimulus condition that influences the affective state of the S should be considered a reinforcer. He proposed that interpersonal attraction was a function of direct reinforcement given by the stranger and of reinforcement associated in time with the stranger. Now, the acquisition curves of this study could be interpreted either as the performance of groups having different levels of motivational states, i.e., with the elation group in a high-drive state and the depression group in a low-drive state (e.g., Zaretsky, 1965), or of groups receiving different magnitudes of reward, i.e., with the elation group receiving a large magnitude of reward and the depression group receiving a small magnitude of reward (e.g., Wagner, 1961). The extinction curves, however, suggest that a differential magnitude of reward interpretation is inadequate. For, if the elated and neutral curves represented larger magnitudes of reward, as compared with the depression groups, then one would expect them to extinguish much faster than the depression groups (e.g., Wagner, 1961). Indeed, the curves in extinction more appropriately represent the extinction curves of groups having differentially induced drives or motivational states, with the high-drive (elation) group more resistant to extinction, or at least not less resistant to extinction, than the low-drive (depression) group.

The acquisition and extinction data for the social reinforcers are consistent with the results of Gouaux (1970) and Gouaux, Lamberth, & Friedrich (1970). In both experiments, elated Ss responded at a higher level than depressed Ss to social reinforcers. Taken together, the results of these experiments point to the significance of the quality of the affective state of the S. Or, stated differently, the reinforcement value of social reinforcers, and perhaps nonsocial reinforcers also, changes with the affective state of the S. According to the results of the analysis of the extinction data and the last four acquisition trials for both performance times, it seems that the reinforcement value of nonsocial reinforcers changes less than that of the social reinforcers. But more data is needed to indicate the reinforcement value of different classes of reinforcers for Ss experiencing positive and negative affective states.

The significant affect main effect in acquisition indicates that affective states may have general arousal or motivational properties. Izard (1964) found that Ss experiencing positive affective states performed at a more productive rate on several intellectual tasks than those Ss in the negative affect conditions. Velten (1968) found that elated Ss were consistently superior to depressed Ss on several tasks, including writing speed, decision time, and word association time. These studies tend to indicate that affective states have general motivational characteristics. Izard, Wehmer, Livsey, & Jennings (1965) consider that positive affective states generally contribute to harmonious functioning of the personality subsystems and lead to integrative behavior and effective functioning. On the other hand, negative affective states lead to nonintegrative behavior and less effective functioning. Affect, according to these theorists, influences internal processes of arousal and activation and thus contributes to the individual's level of performance and general effectiveness of functioning. More research is needed to determine whether the motivational states associated with affective states are of a general nature, i.e., influence a considerable range of behavior, or of a more specific nature in affecting a more limited range of behavior.

REFERENCES

BYRNE, D. Interpersonal attraction and attitude similarity. Journal of Abnormal & Social Psychology, 1961, 62, 713-715.

BYRNE, D., & CLORE, G. L. Effectance arousal and attraction. Journal of Personality & Social Psychology, 1967, 6(4, Whole No. 638).

BYRNE, D., & CLORE, G. L. A reinforcement model of evaluative responses. Personality, 1970, 1, 103-128.

ELLIOT, M. H. The effect of change of reward on the maze performance of rats. University of California Publications in Psychology, 1928, 4, 19-30.

ETTINGER, R. F., NOWICKI, S., & NELSON, D. Interpersonal attraction and the approval motive. Journal of Experimental Research in Personality, 1970, 4, 95-99.

GOUAUX, C. Induced affective states and interpersonal attraction. Paper presented at the meeting of the Southwestern Psychological Association, St. Louis, April 1970.

GOUAUX, C., LAMBERTH, J., & FRIEDRICH, G. Affect and interpersonal attraction: A comparison of trait and state measures. Unpublished manuscript, University of Texas Southwestern Medical School, 1970.

GRIFFITT, W. B. Attraction toward a stranger as a function of direct and associated reinforcement. Psychonomic Science, 1966, 11, 147-148.

HULL, C. L. Differential habituation to internal stimuli in the albino rat. Journal of Comparative Psychology, 1933, 16, 255-273.

IZARD, C. E. The effects of role-played emotion on affective reactions, intellectual functioning and evaluative ratings of the actress. Journal of Clinical Psychology, 1964, 20, 444-446.

IZARD, C. E., WEHMER, G. M., LIVSEY, W. J., & JENNINGS, J. R. Affect, awareness, and performance. In S. S. Tomkins and C. E. Izard (Eds.), *Affect, cognition, and personality*. New York: Springer, 1965. Pp. 2-41.

KENDLER, H. H. The influence of simultaneous hunger and thirst drives upon the learning of two opposed spatial responses in the white rat. Journal of Experimental Psychology, 1946, 36, 212-230.

PALMER, J. Interpersonal attraction as a function of attitude similarity, topic importance, competence, and the "need for vindication." Unpublished manuscript, McGill University, 1970.

VELTEN, E. A laboratory task for induction of mood states. Behavioral Research & Therapy, 1968, 6, 473-482.

WAGNER, A. R. Effects of amount and percentage of reinforcement and number of acquisition trials on conditioning and extinction. Journal of Experimental Psychology, 1961, 62, 234-242.

WESSMAN, A. E., & RICKS, D. F. *Mood and personality*. New York: Holt, Rinehart & Winston, 1966.

ZARETSKY, H. H. Runway performance during extinction as a function of drive and incentive. Journal of Comparative & Physiological Psychology, 1965, 60, 463-464.