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CONTRIBUTIONS OF BEHAVIOR ANALYSIS TO THE STUDY OF HUMAN SOCIAL BEHAVIOR

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The psychological study of human interaction can be traced back to the late 19th century. In the first experimental study in social psychology, Triplett (1898) examined several facets of competitive behavior and concluded that increased performance was due to "dynamogenic" factors present in the competitive context. Since that time, traditional social psychologists have studied extensively those variables purported to influence and control the social behavior of both human and nonhuman organisms. To date, this approach to the study of social behavior has resulted in the acquisition of a substantial amount of knowledge regarding social interaction.

Another approach to the study of human social behavior is based on the early writings of B. F. Skinner. This approach, known as the experimental analysis of behavior (EAB), traditionally has been concerned with discovering basic principles that govern behavior and has provided a unique means of examining both human and nonhuman animal behavior. Behavioral interpretations for phenomena as diverse as emotions, verbal behavior, self-control, thinking, governmental practices, and religion have been provided. More recently, researchers have suggested that basic behavioral principles may be used to explain human social behavior.

Behaviorally defined, social behavior is behavior for which the controlling stimuli are mediated by the behavior and/or behavioral products of one or more individuals. The experimental analysis of social behavior (EASB) began with the early writings of Miller and Dollard (1941), Keller and Schoenfeld, (1950), and Skinner (1953). Later, Hake (1982) recommended that basic research on social behavior commence with humans because these complex behaviors lie in the middle of the basic-applied continuum and are less accessible in nonhumans. Unfortunately, few have followed Hake's exhortations. Early investigations of human social behavior had little influence on subsequent experimental analyses, and numerous topics such as sharing, altruism, and trust remain essentially unexplored (e.g., Buskist & Miller, 1982; Dougherty, Nedelmann, & Alfred, 1993).

By far, the social behavior that has received the most attention within EASB is cooperation. Most definitions of cooperation allude to the combined behavior of two or more individuals and an equitable distribution of reinforcers. In contrast, competition has been defined as a situation in which two or more persons respond, but reinforcers are distributed based on relative performance. Although not examined as extensively as cooperation, competition has been the focus of numerous experimental analyses. Finally, a smaller number of studies have examined several other social behaviors including sharing, altruism, imitation, trust, and social comparison.

As with most areas of scientific inquiry, a critique of EASB has identified several positive experimental practices (e.g., precisely defining the social behavior under study and isolating important social variables). Unfortunately, the number of social phenomena, as well as the quantity of studies investigating these phenomena, has remained relatively small. Clearly, considerable work remains, but past research has laid the groundwork for subsequent analyses of important social variables. Researchers would do well to direct their attention to one of the most pervasive of all human behaviors—social behavior.

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DELAY DISCOUNTING AND PERFORMANCE ON THE PRISONER'S DILEMMA GAME

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The degree to which delayed reinforcers are discounted in value (delay discounting) may help in understanding impulsive and self-control choices (Green, Fry, & Myerson, 1994). Specifically, when choosing between a small immediate and a large delayed reinforcer, an impulsive choice will occur if the value of the large delayed reward is discounted so much that it falls below that of the small immediate reinforcer. If the large delayed reinforcer is discounted to a lesser degree, however, its present value will exceed that of the small immediate alternative, and a self-control choice thus will be made.

The prisoner's dilemma game is a popular model of social interaction and conflict situations involving two players who must independently choose to either "cooperate" or "defect." The consequence of each choice depends on the choice made by the other player. When both players cooperate, they receive a moderate payoff (3 points each). When both defect, they receive a smaller amount (2 points each). When one player cooperates and the other defects, the cooperator earns the lowest possible payment (1 point), while the defector earns the highest payment (4 points) (McClintock & McNeel, 1966).

An interesting choice exists after the player defects against an opponent playing the tit-for-tat strategy (always copying the player's last move). Choosing to defect again will earn the player 2 points, while cooperating will result in 1 point. Choosing to cooperate, however, means that the opponent will do the same on the next trial: cooperating from this point forward will result in 3 points per trial. Thus, the player must choose between a smaller reward relatively soon (2 points now) and a larger reward later (1 point now and 3 points on all subsequent trials). Rachlin (1997) has suggested that individuals who greatly discount the value of delayed reinforcers (i.e., those making impulsive choices) are more likely to defect, and thereby choose the smaller more immediate reward.

The present research examined the relation between delay discounting and performance on the prisoner's dilemma game against an opponent playing tit-for-tat. Thirty-five participants completed a discounting exercise developed by Rachlin, Raineri, and Cross (1991) involving choices between immediate and delayed monetary rewards. Indifference points, or points at which the immediate and delayed rewards were of equal subjective value, were established across eight delay periods. Following the discounting exercise, each participant played 40 trials of the prisoner's dilemma game against a computer opponent.

Mazur's (1987) hyperbolic discounting function was used to analyze participants' indifference points between the immediate and delayed monetary rewards across the eight delay periods:

$$v_d = A / (1+kd). \quad (1)$$

In Equation 1, v_d is the present discounted value of a delayed reward (i.e., the current subjective value of the reward), A is the amount (magnitude) of the delayed reward, k is an empirically derived constant proportional to the degree of delay discounting, and d is the duration of the delay. This hyperbolic discounting function provided an excellent fit of these data, accounting for 89% of the variance.

A one-tailed Pearson's test of correlation revealed a significant positive relation between the between the log k values and percentage of defections on the prisoner's dilemma game ($r = 0.415$, $p = 0.01$). These data support the contention that high levels of impulsivity are related to defecting against an opponent playing tit-for-tat on the prisoner's dilemma game.

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