Conflict of interest and attraction in the development of cooperation[1]

RANDY FISHER and WILLIAM P. SMITH, Vanderbilt University, Nashville, Tenn. 37203

Attraction to partner and conflict of interest were experimentally varied for like sex pairs playing a prisoner's dilemma game. Cooperation was more frequent for low conflict of interest than for high, and females cooperated more than did males; there was some tendency for cooperation to vary with attraction to partner.

The relationship between interpersonal attraction and cooperation should be simple and obvious, both according to most theoretical analyses and common sense. Deutsch (1962) and Heider (1958) both have suggested that liked others are more likely to be benefited by a person than are disliked others or strangers. Krauss (1966) found this to be true, using the Deutsch & Krauss (1960) trucking game. Krauss manipulated attraction through indicating to each S that her partner was either similar or dissimilar to her in attitudes. Krauss found that the effect of attraction was considerably weaker where attraction was weakly anchored, i.e., Ss were not very confident of their judgments of each other, than where anchoring was strong; further, the effects of conflict of interest were considerably stronger where attraction anchoring was weak than where it was strong.

Swingle (1960) obtained quite different results when he had Ss play a game similar to prisoner's dilemma with either a liked, disliked or unknown partner whose actual performance was programmed for competition by the E. He found that retaliation was more likely when the partner was liked than when he was disliked, while retaliation toward a stranger fell between these conditions. Swingle's predictions of these results was based on a balance theory analysis, which suggested that matching the behavior of the other would avoid imbalance where the other was liked, and would increase imbalance if the other were disliked.

This contradiction in the findings of these studies may be explained in part by the differences in the experimental situations. Swingle admits that his predictions hold only under the conditions found in most experimental games, that is, where rewards are small, withdrawal from the situation difficult, and where retaliation must be in kind. It may also be contended that these predictions will hold only over the short run, and where one member is led to believe that the other has abrogated his trust, which may be in fact an unusual occurrence if other is a friend. Furthermore, using persons chosen as liked or disliked by one another may cause experimental groups to differ in several ways other than just the degree of mutual liking. Friends, in addition to liking each other, will also have established norms and patterns of interaction, as well as feelings and cognitions about each other which may be relevant to the experimental setting. That the relationship between friendship and cooperation can be affected by such subtle situational factors as these is evidenced by the findings of Oskamp & Perlman (1967) who found that friends cooperated more than strangers when the Ss were drawn from a liberal arts college, while the opposite result was found with the Ss drawn from an adjacent business college.

The present study was concerned with the relationship between experimentally established attraction and cooperation in a prisoner's dilemma game under two levels of conflict of interest, where interaction was genuine. It represents an attempt to determine whether or not Krauss' (1966) findings

for attraction and conflict of interest in a bargaining game would generalize to a prisoner's dilemma game. The anchorage variable was not of concern here. It was expected that there would be less cooperation under high conflict of interest than under low, in accord with Krauss, and with Rapoport & Chammah (1965), and that cooperation with an attitudinally similar other would be greater than with an unknown other, which would in turn be greater than that with a dissimilar other.

METHOD

Subjects were 120 student volunteers, 60 males and 60 females, from introductory psychology courses at Vanderbilt University. Half of the Ss played a high conflict of interest (HC), and half played a low conflict of interest (LC) prisoner's dilemma game (see Fig. 1) in like-sex pairs; within each conflict of interest condition, one-third (10) of the pairs received a positive attraction (HA) manipulation, one-third received a negative attraction manipulation (LA), and one-third received no attraction (NA) manipulation. Finally, within each of the attraction/conflict-of-interest conditions half of the pairs (five) were male and half female.

The Ss were asked to be seated in one of two soundproofed cubicles when they arrived at the laboratory, and then to fill out a questionnaire on salient campus attitudes. They were then given a set of instructions to read which described play in the prisoner's dilemma game. After they read the instructions and had indicated to the E that they understood them, they were given a completed questionnaire and told that it was the one which had just been filled out by the other S. In reality it was filled out by the E according to a schedule and was made to appear either highly similar (in the HA condition) or highly dissimilar (in the LA condition) to the S's own. The NA Ss received no questionnaire. The Ss in the HA and LA conditions were then asked to rate each other on a series of 10 Semantic-Differential items loaded on the evaluative dimensions (Osgood, Suci, & Tannenbaum, 1957). To increase the impact of the manipulation, the Ss were told that "intelligent college students can make these judgments rather accurately." The Ss then played 100 trials of prisoner's dilemma. They indicated their choices on each trial by pushing a switch on a panel in front of them either to the right or the left, and the E announced their payoff for each trial after both had indicated their choices. The announcement was made via an intercom system. Payoffs were of no specified value to Ss. After the play was completed, all Ss were asked to rate each other on the same 10 Semantic-Differential items. After this the

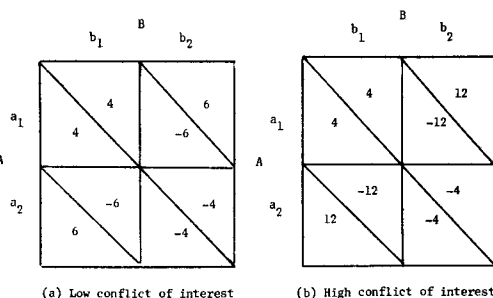(a) Low conflict of interest   (b) High conflict of interest

Fig. 1. Prisoner's dilemma game. Possible responses for Person A are represented by rows, those of B by columns. Payoffs to A and B are, respectively, above and below the diagonal of each cell.

experimental deceptions were explained to the Ss and all questions about the procedure were answered.

RESULTS

As a check on the effectiveness of the attraction manipulation, the preinteraction ratings of partners by Ss in the HA and LA conditions were examined in an analysis of variance. There was a very strong effect for Attraction ($F = 97.49$; $df = 1,72$; $p < .001$) in the expected direction, and a main effect for Sex ($F = 3.99$; $df = 1,72$; $p < .05$), with females giving more favorable ratings than did males.

The major index of cooperation was frequency of play in the $a_1 b_1$ cells of the two matrices. For analysis, frequencies were summed over 25 trial blocks; the pair was the unit of analysis. Due to heterogeneity of variance, analysis of variance was performed on arcsin transformed scores ($X' = 2$ arcsin $\sqrt{X}$). Frequency of cooperative play decreased from Block 1 to Block 2, and thereafter increased (main effect for trials: $F = 3.14$; $df = 3,144$; $p < .05$). In addition, a main effect for conflict of interest ($F = 3.58$; $df = 1,48$; $p = .06$) indicated that the LC generated more cooperation than HC, while females tended to cooperate more than did males ($F = 3.24$; $df = 1,48$; $p = .07$). Although the HA means were higher than the LA means, the effect was not significant. However, a tabulation of mutually cooperative "lockins" (15 trials of $a_1 b_1$ play out of any set of 20 consecutive trials) suggested that such lockins were increasingly likely as attraction increased ($\chi^2 = 6.91$; $df = 2$; $p < .05$). For HA conditions there were 12 cooperative lockins, for NA, 7, and for LA, 4.

Examination of mutual punishment (the a_2, b_2 cell) yielded results similar to those for cooperation; there was more mutual punishment in the HC than in the LC condition ($F = 4.18$; $df = 1,48$; $p < .05$); and more for males than for females ($F = 5.01$; $df = 1,48$; $p < .05$). Kruskal-Wallis nonparametric analysis of variance (Hays, 1963) of effects of attraction upon mutual punishment, for LC and HC separately shows a significant difference by attraction in the expected direction for the HC condition ($p < .05$), though not for LC condition. In addition, $a_2 b_2$ lockins are related to attraction: eight of the LA pairs, six of the NA, and none of the HA pairs have such lockins ($\chi^2 = 9.68$; $df = 2$; $p < .05$).

Finally, the effects of interaction upon attraction were examined by including the average pre- and postinteraction ratings on the Semantic-Differential items in an analysis of variance. Interpretation was rendered difficult by a four-way (Attraction by Conflict of Interest by Sex by Time) interaction ($F = 4.96$; $df = 1,32$; $p < .05$). However, in general it appears that males became less attracted to each other over time, except for those in the LA, HC condition, where they became more attracted; females become more attracted to each other over time.

DISCUSSION

Results from the present study provide no support at all for the balance position (Swingle, 1966), and suggest that dyadic cooperation in the prisoner's dilemma game and in the bargaining game used by Krauss (1966) is affected in similar ways by attraction and conflict of interest. Whether the discrepancy between the present results and those implied by Swingle's study is due to the absence in the present study of competition-relevant norms which may accompany friendship, or to the presence of a presumably rare event of trust violation by a friend in Swingle's study is not clear. However, the agreement of some of the Oskamp & Perlman (1967) findings with those of Swingle suggests that differences between mere attraction and friendship contain the explanation.

REFERENCES

DEUTSCH, M. Cooperation and trust: Some theoretical notes. In M. Jones (Ed.), *Nebraska Symposium on Motivation.* Lincoln: University of Nebraska Press, 1962. Pp. 275-318.
DEUTSCH, M., & KRAUSS, R. M. The effects of threat upon interpersonal bargaining. Journal of Abnormal & Social Psychology, 1960, 61, 181-189.
HAYS, W. L. *Statistics for psychologists.* New York: Holt, Rinehart & Winston, 1963.
HEIDER, F. *The psychology of interpersonal relations.* New York: Wiley, 1958.
KRAUSS, R. M. Structural and attitudinal variables in interpersonal bargaining. Journal of Experimental Social Psychology, 1966, 2, 42-55.
OSGOOD, C. E., SUCI, G. J., & TANNENBAUM, P. H. *The measurement of meaning.* Urbana, Ill.: University of Illinois Press, 1957.
OSKAMP, S., & PERLMAN, D. Effects of friendship and disliking on cooperation in a mixed motive game. Journal of Conflict Resolution, 1966, 10, 221-226.
RAPOPORT, A., & CHAMMAH, A. M. *Prisoner's dilemma: A study in conflict and cooperation.* Ann Arbor: University of Michigan Press, 1965.
SWINGLE, P. G. Effects of emotional relationship between protagonists in a two-person game. Journal of Personality & Social Psychology, 1966, 4, 270-279.

attraction in the same manner. In addition, the correlation between attraction responses and anticipated positiveness of interaction responses was equal to .73 ($p < .001$, $df = 25$). It seems reasonable, then, to interpret the findings of the previous investigation (Griffitt, 1968) in conjunction with the present findings as being in support of the hypothesis that: Similarity-Dissimilarity (RS) → Anticipated Positiveness (AR) → Attraction.

An additional finding of the present investigation is that the proportion of similar attitudes expressed by the fictitious problem-solving partner was significantly related to the estimated speed of success in solving the pending problem. The latter finding is in accord with results obtained by Lott & Lott (1966) demonstrating that learning performance in a group situation is positively related to the degree of attraction among members of the group.

REFERENCES

BYRNE, D. Attitudes and attraction. In L. Berkowitz (Ed.), *Advances in experimental social psychology.* Vol. 4. New York: Academic Press, 1968.
BYRNE, D., & CLORE, G. L., JR. A reinforcement model of evaluative responses. Psychological Review, in press.
BYRNE, D., YOUNG, R. K., & GRIFFITT, W. The reinforcement properties of attitude statements. Journal of Experimental Research in Personality, 1966, 1, 266-276.
DOOB, L. W. The behavior of attitudes. Psychological Review, 1947, 54, 135-156.
GRIFFITT, W. B. Anticipated reinforcement and attraction. Psychonomic Science, 1968, 11, 355.
HULL, C. L. *A behavior system.* New Haven: Yale University Press, 1952.
MOWRER, O. H. *Learning theory and behavior.* New York: Wiley, 1960.
LOTT, A. J., & LOTT, B. E. Group cohesiveness and individual learning. Journal of Educational Psychology, 1966, 57, 61-73.