Reward power and attraction in interpersonal conflict

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Seventy-two males and 72 females played a prisoner's dilemma game, modified to include occasional promises to the S stating that he would be given extra points if he cooperated on the next trial. The probability and magnitude of promised reward and the overall cooperativeness of the promisor were manipulated. Females cooperated more and evaluated the promisor more favorably than did males. It was concluded that the norm of reciprocity overrode the effects of the manipulations on compliance for the reason that the promisor was unconditionally accommodative on the promise trials. An indirect relationship between ratings of the promisor's potency and his rewardingness was obtained.

In interpersonal mixed-motive conflict, rewards and punishments are dependent upon the actions or choices of all parties to the interaction. Studies of such conflicts have consistently disclosed that conflict without communication results in failure to coordinate mutual benefits (Becker & McClintock, 1967). The addition of unilateral announcements of the intention to cooperate (noncontingent promises) to the prisoner's dilemma (PD) paradigm has been shown to have the effect of increasing cooperation (Gahagan & Tedeschi, 1968; Loomis, 1959). However, noncontingent promises are not often offered during time of conflict, since such gestures require that the communicator make himself vulnerable and that he must, therefore, trust the very party with whom he is in conflict. Contingent promises of the form: "If you do X, I will do Y," (Y being rewarding to the target) require no trust by the promisor, although perhaps the target must believe the communicator to be trustworthy in order to comply with the request made.

A contingent promise has properties equivalent to French & Raven's (1959) definition of reward power. They predict that the strength of reward power increases both with the magnitude of reward and the perceived probability that the reward will be given. They also conclude that the source of rewards would be liked by the target individual. The present study investigates the two components of reward power described by French and Raven as they apply to the effectiveness of contingent promises in eliciting cooperative behavior from target Ss during a mixed-motive conflict and, also, the resultant liking for the promisor.

A 3 by 3 by 2 by 2 factorial design included reward probabilities of 10%, 50%, and 90%; reward magnitudes of 5, 10, and 20 points; overall cooperativeness of the promisor of 50% and 90%; and the sex of the target Ss. From the literature (Becker & McClintock, 1967), it would not be expected that the strategy factor would significantly affect target cooperation, unless promised rewards and attendant liking, when added to the PD, somehow transformed the nature of the conflict.

SUBJECTS AND APPARATUS

The 144 Ss, 72 males and 72 females, partially fulfilled an introductory psychology course requirement at the University of Miami by their participation. Ss confronted a game board which had mounted upon it: (1) the four-celled payoff matrix, each cell of which could be separately illuminated to indicate the outcome after each trial; (2) add-subtract cumulative counters from which the S could read his own and the other player's point total at any time; (3) two columns of printed messages, each with a light to indicate when incoming and buttons to push in order to send replies; (4) two pushbuttons for the cooperation and the defection strategy choices; (5) cue lights to indicate when to make a strategy selection, when the communication system was open, and when a reward could be given. The payoff matrix had the values: R = 4, T = 5, S = −5, P = −4.[1]

The Ss signed up for the experiment in like-sex pairs. Upon reporting, they were placed alone in the experimental cubicle and were handed printed instructions to read. Ss were specifically instructed that their goal was to get as many points as they could during the experiment.

The promise message sent occasionally to S by the simulated player (SP) read, "If you make Choice 1 on the next trial, I will add x points to your score"; x was 5, 10, or 20 points. S was required to respond to each promise message by using one of three posted replies: (1) I will make Choice 1 on the next trial, (2) I will make Choice 2 on the next trial, and (3) I do not wish to disclose my intentions.[2] The SP did not declare his intentions, but he always cooperated on the promise trials.

In order to manipulate credibility in this study, a criterion of establishing 10 successful promises (target compliances) was set. The number of unsuccessful promises would, of course, be greater to the less compliant Ss. The SP attempted to achieve one successful promise in each of the first 10 blocks of 10 trials. In each of the blocks, an average of 3.3 trials was specified to use as promise trials *if required*. If no successful promises were achieved in a block, the SP would attempt to achieve two successful promises in the next block. But in no instance was the SP to attempt to achieve more than two successful promises in any one block. In this way, the successful promise trials, with their reward potential, could not become so clustered together as to become independent of the ongoing regular PD play.

The SP gave the appropriate reward on even-numbered successful promise trials in the 50% credibility condition, on all but the fifth successful promise trial in the 90% credibility condition, and on only the fifth successful promise occasion in the 10% credibility condition. Once 10 successful promises to a S were established, the remaining trials of the total of 150 were played without any further message exchanges. The overall strategies of 50% or 90% cooperation were randomly determined. At the conclusion of PD play, Ss filled out a semantic differential rating of SP.

RESULTS

Behavioral Measures

Except for a four-way interaction ($p < .03$), no differences between experimental conditions were found on the total number of promises sent to establish criterion, an indirect measure of behavioral compliance. That measure, however, was highly correlated with the dependent variable of overall cooperativeness. Therefore, the former variable served as the covariate in an analysis of covariance of the latter. The only significant finding was a main effect of sex ($F = 9.48$, $df = 1/107$, $p < .003$). Females cooperated 50.2% of the time, and males were 42.3% cooperative over all 150 trials.

Interpersonal Impressions

Each of the independent variables affected the ratings of the SP by target Ss. Duncan range tests showed that the main effect of promise credibility on potency ($F = 3.11$, $df = 2/108$, $p < .049$) was attributable to the difference between the 90%

($\bar{X} = -2.94$) and 10% ($\bar{X} = -1.48$) credibility conditions; the 50% credibility Ss ($\bar{X} = -1.94$) were intermediate but not significantly different from the other two groups of Ss.

A main effect of strategy on potency ($F = 9.98$, $df = 1/108$, $p < .002$) indicated that the Ss who played the 50% cooperative SP considered him ($\bar{X} = -1.35$) to be more potent than did Ss who played the 90% cooperative SP ($\bar{X} = -2.89$). The 50% cooperative SP ($\bar{X} = 0.85$) was also perceived as more active than the 90% ($\bar{X} = -3.36$) cooperative SP ($F = 35.99$, $df = 1/108$, $p < .001$). Strategy interacted with reward magnitude in determining the Ss' impressions of SP's potency ($F = 5.17$, $df = 2/108$, $p < .007$). In the 50% strategy condition, increasing reward magnitude created an impression of decreasing potency, while in the 90% cooperation condition, the impression of potency increased as the reward promised increased; the two curves converged at the 20-point reward level.

Finally, females evaluated SP more favorably than did males ($F = 7.19$, $df = 1/108$, $p < .008$).

DISCUSSION

The behavioral results imply that the promise of reward, regardless of credibility or reward magnitude, which invariably preceded a cooperative choice by the SP, was perceived and responded to as a signal of intentions. Furthermore, the responses to the signal were conciliatory and not exploitative. As Gouldner (1960) has postulated, there is a universal norm of reciprocity which states that one should help those who help him. Since he always cooperated himself when sending promises, the promisor was predictably helpful on the promise trials, and the S responded differentially on those trials; mean cooperation on promise trials was 59% compared to 45% on the nonpromise trials. The importance of the message as a signal is stressed by the fact that the manipulation of overall cooperation by the SP had no effect on the Ss' level of cooperation. If merely the high proportion of cooperation on the promise trials, without the signal, was responsible for the predominantly cooperative behavior by the Ss, then there also should have been a difference between the 50% and 90% cooperative strategies.

Only the factor of sex had a significant effect on the Ss' overall cooperativeness. Females have been consistently found to be more cooperative than males when the PD is modified to include communications (Tedeschi, Bonoma, & Lindskold, 1970; Tedeschi, Horai, Lindskold, & Gahagan, 1968; Tedeschi, Powell, Lindskold, & Gahagan, 1969). Females are more conforming, persuasible, and concerned with presentation of self; males are more concerned with success in solving the task. A number of reviews report the same pattern of sex differences across a variety of experimental procedures (Lynn, 1962; McGuire, 1969; Marlowe & Gergen, 1969). McGuire specifically suggests that female superiority in message reception may account for the difference.

Semantic Differential Impressions

The greater cooperativeness of the females was reflected in their more positive rating of the SP. This correspondence of a behavioral and an attitudinal measure resonates well with Deutsch's (1968) conclusions that greater attraction develops in more cooperative groups. Less liking was registered in the less cooperative "male pairs." However, the evaluative ratings for both sexes were well over on the positive end of the scale, giving support to Homan's (1958) notion of the return of approval in exchange for help and to French and Raven's prediction that the use of rewards increases attraction.

However, French and Raven's hypothesis that the strength of reward power increases both with the magnitude and probability of reward runs contrary to the Ss' impressions. All potency ratings were on the impotence side of the scale, suggesting that withholding rewards, and not granting them, is perceived as potent in the competitive American culture. Parallels to these results, connecting withholding and potency, might be drawn with social deprivation studies (Gewirtz & Baer, 1958); the finding of greater effectiveness of reinforcement from a nonchosen than from a chosen classmate (Tiktin & Hartup, 1965); and the finding that potency increased as the deception rate increased (Benton, Gelber, Kelley & Liebling, 1969).

It is plausible that the side payoff (reward) was considered by the Ss to be foolishly excessive in offering greater inducement that was necessary to gain compliance. If so, French and Raven's theory that reward power is a function of probability and magnitude of reward apparently requires modification to include the factor of whether the rewards are perceived as inadequate, adequate, or excessive. Using Homan's principle of distributive justice as a basis for interpretation, it would be suggested that SP could not reap a profit commensurate with his proposed expenditure; this made him the object of derogation.

The significant interaction of reward magnitude and simulated strategy upon the potency ratings shows that, within the more potent and more competitive 50% condition, the SP was perceived as less potent as he offered more as a side payoff. He was not losing heavily to the S, and it would be considered an appropriate competitive maneuver to offer a 5- or 10-point reward for compliance if SP stood to lose 10 points in the event the S exploited him. But to offer 20 points reward to avoid a loss of 10 could only be considered imprudent or irrational squandering of resources. The 90% cooperative strategy was considered extremely impotent for the reason that SP then was almost entirely dependent upon the S. But SP apparently gained some strengthening of his very weak image when he had the capacity to give a reward large enough to offset or to exceed the 10-point advantage the S could gain by exploiting the SP on the promise trial. Perhaps this capacity afforded him some face saving and gave him some perceived behavior control over the S on the promise trials.

The strategy difference in activity rating confirms previous results (Lindskold, Bonoma, & Tedeschi, 1969), indicating that inactivity is related to the more invariant strategy.

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NOTES

1. See Rapoport (1964) for the notation used.

2. The analysis of message behavior is not included in the present report. Obtained differences were mainly from the sex factor and were consistent with those found in related PD influence studies such as Tedeschi et al (1968) and Tedeschi et al (1969).

Olfactory intensity of diluted n-aliphatic alcohols*

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Psychophysical scales were constructed from magnitude estimates of 90 Os who judged the olfactory intensity of stimulus concentrations of a typical geometric dilution series prepared for each of nine alcohols in the homologous series C_2-C_{10}. The scales, which resembled power functions with exponents from .027 to .359, had slopes that varied inversely with carbon chain length throughout the series except for pentanol, which was out of its ordinal place in the series by one step. Results confirmed the widely held assumption of an inverse relationship.

The results of stimulus efficiency studies involving homologous alcohols have cast doubt on basing predictions about olfactory intensities at suprathreshold levels on threshold data alone (Kruger, Feldzamen, & Miles, 1955). The unreliability of such predictions has received considerable support from the work of Engen (1965). He has emphasized that not only do threshold concentration and the intensity of undiluted alcohols vary inversely with carbon chain length, but also, apparently, dilution of an alcohol with a smaller chain length may produce a greater range of intensive discriminations than does one with a larger chain length over a given stimulus concentration range. These inverse relationships have led to the conclusion that suprathreshold predictions must be based on the natures of the appropriate psychophysical scales, primarily their slopes.

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In reaching this conclusion, Engen (1965) had assumed, as a result of one of his experiments, that the slopes of psychophysical intensity scales for different diluted alcohols varied inversely with chain length. The assumption was based on magnitude responses to only two alcohols, n-propanol (C_3) and n-octanol (C_8), which are relatively far apart in the homologous series of n-aliphatics. Recently, additional evidence has been provided by the work of Cain (1969), whose magnitude results with these two alcohols, and n-butanol (C_4) and n-hexanol (C_6) as well, demonstrated an inverse relationship. The purpose of the present investigation was to test this assumption further by determining the slopes of scales constructed from magnitude estimates for a still larger number of alcohols in the series.

OBSERVERS

Ninety undergraduates, including 38 women, volunteered to serve without pay as Os; none had participated in an olfactory experiment before. They were divided into nine random groups of 10, and each group was assigned at random to a different odorant.

ODORANTS AND APPARATUS

These consisted of nine n-aliphatic homologous alcohols, from ethanol (C_2) to decanol (C_{10}), diluted in odorless, chromatographic-grade diethyl phthalate. Seven of the nine were of extremely high purity (viz, chromatographic or Baker-analyzed reagent grades or better), and the other two were only slightly less pure. Redistillation was not performed, since the larger distillation columns of the source companies produce an alcohol with a higher level of purity than do the smaller columns of the laboratory.

There were seven different solutions for each diluted alcohol, consisting of the following geometric dilutions prepared by means of a pipette: 1.5625%, 3.125%, 6.25%, 12.5%, 25%, 50%, and 100%.

PROCEDURE

The experiment was conducted in a ventilated and air-conditioned room where the temperature was maintained at 25°C. The O sniffed Q-tipped cotton saturated with a solution of odorant, 1.5 cc of which were kept in its 10 x 75 mm Pyrex test tube stopped with an aluminum-foil-wrapped cork. The cotton was positioned just above the surface of the odorant when not in use. The E presented to each O on a plastic holder, singly, the test tubes containing the seven concentrations of the assigned alcohol. Duplicate sets of comparison stimuli were used to reduce the possibility of recognition of previously presented stimuli from accidental markings on corks or test tubes.

The O was exposed to his alcohol in a single ½-h session. Each concentration was presented twice, and different irregular orders were used for each O. He was asked to judge the intensity of the odorant and to ignore all other attributes, to consider each comparison stimulus independently of the others, and to place the cotton at the same distance from his nose.

The O's judgments were based on magnitude estimates. He was instructed to let 10 represent the intensity of a standard, which was one of the seven concentrations and with which he was asked to become familiar. His task was to judge the intensity of each comparison stimulus, including the standard, by assigning a number to it proportionate on a ratio scale to the 10 of the standard. He could refer to the standard as often as desired, provided that there was at least a pause of 1 min between sniffs, which was the minimal time interval between any two sniffs in the experiment.

Since the method of magnitude estimation does not require a designated standard (Stevens, 1956; Engen, 1965), the first concentration presented was varied from one O to another, letting it become his standard. The appropriateness of the