The effects of conflict intensity and promisor credibility on a target's behavior[1,2]

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Noncontingent promises of varying credibility were made to Ss in conditions of high and low conflict intensity established by manipulating the payoff values in the Prisoner's Dilemma Game (PDG) payoff matrix. Highly credible promises produced more cooperation on the message trials than did low credibility promises. Ss concealed their choice intentions more when credibility was low. Greater overall cooperation, trust, and repentence were displayed when the conflict intensity was low. Conflict intensity interacted with credibility on the proportion of forgiveness shown. Females were more repentent than males when promise conditions were compared to controls.

In the Prisoner's Dilemma Game (PDG) each of two players is given the choice to either cooperate (C) or to compete (D) (see Rapoport, 1966, for the rules). A PDG trial consists of a simultaneous choice by Player B (Cb or Db) and by Player A (Ca or Da); no communication between the players is permitted. The extent of cooperative behavior in the PDG has been demonstrated to be related to the environmental intensity of the conflict which can be varied by manipulating the numerical values of the four payoffs (Axelrod, 1967; Rapoport & Chammah, 1965; Steele & Tedeschi, 1967; Jones et al, 1968).

Gahagan & Tedeschi (1968) studied the content credibility of noncontingent promises in a PDG modified so that a confederate source (E) communicated a promise to cooperate to target (S) on every 10th trial. They found that 90% credible promises led to more cooperative play on the trial following message exchanges than did either 30% or 60% credible promises.

The purpose of the present study was to examine the effects of promises under varying degrees of conflict intensity. Promises should be more effective in eliciting cooperation under low rather than high conflict intensity. Two levels (high and low) of conflict intensity, obtained by manipulating the index, log (R-P)/(T-S) (Jones et al, 1968), three levels of promise credibility (10%, 50%, and 90%) with a nonmessage control group, and sex of Ss were the dimensions in the 2 by 4 by 2 factorial design.

METHOD

Sixty Ss, 29 females and 31 males, partially fulfilled requirements for an introductory psychology course by appearing in like-sex pairs for the experiment. Each S was placed in a separate room, read instructions, and actually played a programmed "dummy."

The game apparatus consisted of cumulative point counters, a series of messages "sent" by pushing buttons, and a PDG matrix under which was located two switches corresponding to C and D strategy selections. A complete description of the apparatus can be found elsewhere (Horai & Tedeschi, 1968). The low-intensity conflict matrix had the values R = 4, T = 5, S = −5, and P = −4, while the high-intensity conflict matrix had the values R = 1, T = 10, S = −10, and P = −1.

The "dummy" followed a preplanned, unpatterned set of strategies which yielded a total trials (110) proportion of 50% cooperative strategy selections. After the 10th trial, and after each subsequent 10 trials until 10 noncontingent promises had been communicated, E sent the only incoming message displayed on the S's game board: "I intend to make Choice 1 on the next trial." (Choice 1 corresponded to the C strategy selection.) The S was instructed that the "other" had the option of sending a message after every 10th trial but that he could only send the one displayed. This instruction was intended to establish the believability of a repeated message since, if the "other" had a choice among messages, the S might question why he kept sending the same one.

The S was told that whenever the "other" sent a message he must reply. S had a choice from three messages of intent: (M1) I will make Choice 1 on the next trial; (M2) I will make Choice 2 on the next trial; and (M3) I do not wish to disclose my intentions. After each message exchange, the regular PDG play was continued. The credibility conditions were obtained by causing the "dummy" to cooperate after: (1) the fifth promise only in the 10% credibility condition; (2) the even-numbered promises in the 50% condition; or (3) every promise except the fifth in the 90% credibility condition. Control Ss did not receive any message instructions.

RESULTS

The proportion of cooperation strategy selections on the 10 message trials (CPM) was the major measure of the efficiency of promises. Control Ss were dropped from this analysis since they received no promises. Although analysis revealed that none of the factors reached the standard levels of statistical significance, on the basis of the Gahagan and Tedeschi findings the risk of making a Type I error on the main effect of credibility ($F = 2.430$, $df = 2/48$, $p < .099$) appeared to be reduced. Duncan Multiple Range tests indicated that there was significantly more CPM in the 90% ($\bar{X} = .550$) than in the 10% ($\bar{X} = .365$) credibility condition ($R_3 = .179$, $p < .05$) while the intermediate 50% level ($\bar{X} = .445$) did not differ significantly from either 90% or 10%.

The proportion of cooperative choices made by Ss over all trials (CP) was significantly ($F = 7.663$, $df = 1/64$, $p < .007$) greater under low intensity ($\bar{X} = .365$) than high intensity ($\bar{X} = .206$) conflict. There were no other source effects on CP.

State-conditioned propensities have been defined in terms of Ss' choices on Trial n + 1 following the dyadic outcome on Trial n (Rapoport, 1964). Low-intensity conflict ($\bar{X} = .387$) elicited significantly more T ($F = 11.182$, $df = 1/64$, $p < .001$) behavior, defined as the proportion of Ca choices following DaDb outcomes, than high intensity conflict ($\bar{X} = .225$). Ss in the low-intensity conflict condition ($\bar{X} = .320$) were more R (Ca following DaDb outcomes) than Ss in the high-intensity condition ($\bar{X} = .239$). There was also a significant Credibility by Sex interaction ($F = 2.875$, $df = 3/64$, $p < .043$) on R. As indicated in Fig. 1, males displayed more R than females in the no-message control condition, whereas females displayed more R than males in the message conditions. Finally, a Conflict Intensity by Credibility interaction showed a significant ($F = 2.867$,

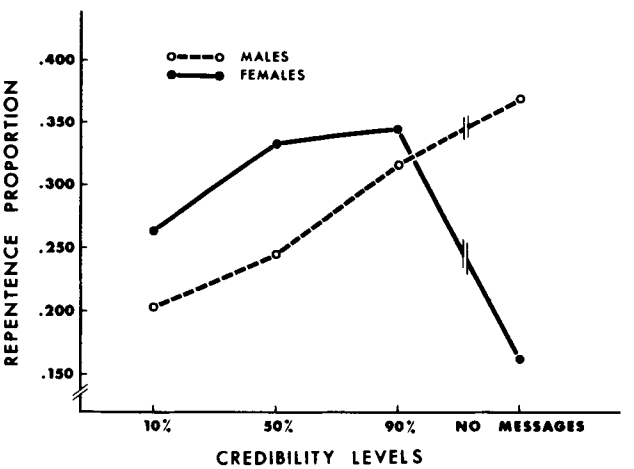

Fig. 1. The Sex by Credibility interaction on repentance.

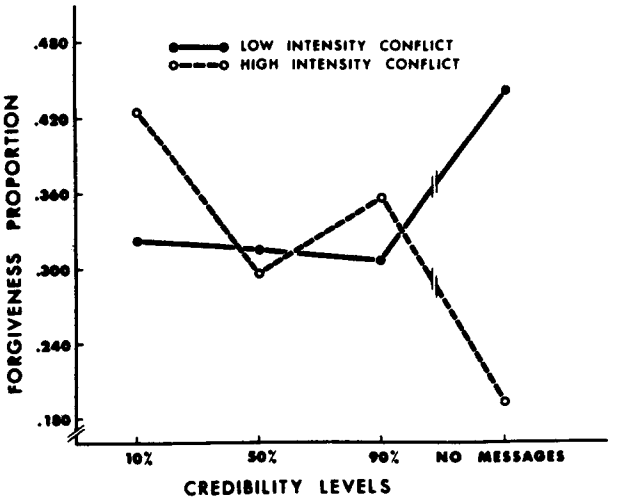

Fig. 2. The Conflict Intensity by Credibility interaction on forgiveness.

df = 3/54, $p < .045$) effect on F (Ca following CaDb). Figure 2 shows that much greater forgiveness was shown when conflict intensity was low if no messages were exchanged and, also, when the promise was only 10% credible if conflict intensity was high. No other main or interaction effects were found on these variables, nor were there any source effects on TW behavior (Ca following CaCb).

There were no significant effects on the frequency of use of M1 or M2 by Ss, on the proportion of times Ss used M3 to "cover" a C or D selection, nor on the proportion of times Ss lied when sending messages of intent. However, there was a significant main effect of credibility ($F = 3.802$, df = 2/48, $p < .029$) on the frequency of the use of M3. Duncan range tests showed that 10% credibility Ss ($\bar{X} = 4.000$) sent M3 more frequently ($R_3 = 1.774$, $p < .05$) than 90% credibility Ss ($\bar{X} = 1.700$), while the 50% credibility condition ($\bar{X} = 2.850$) did not differ from either of the others.

DISCUSSION

Credibility

The obtained greater proportion of cooperative responses on message trials to the 90% credible promises is consistent with the findings of the Gahagan & Tedeschi (1968) study. That study, however, found that 90% credibility differed from two intermediate levels (30% and 60%) which did not differ from each other. In this study, 90% credibility differed only from low, 10% credibility. Gahagan and Tedeschi used matrix values of R = 85, T = 100, S = 35, and P = 40; these values, and their Steele-Tedeschi index, differ from the values and the indices of the two matrices used in this study. These index differences and, hence, the variability in conflict intensity may account for the failure of intermediate credibility to differ from high credibility in the present study. However, the obtained means of CPM over all levels of credibility did vary evenly from low to high and are, therefore, quite satisfying theoretically. A clearly higher proportion of cooperative responses was obtained on high-credibility message trials than on the no-message trials. This result gives support to Osgood's (1962) notion of GRIT; the target did return a small concession in reciprocation of an announced, but noncontingent, concession.

A linear trend was also found on the use of the reply message that S did not wish to disclose his intentions. Once again, only the comparison of high with low credibility produced a statistically significant difference. Subjects more often declined to make a statement of intentions to a promiser who almost never made good on his promise. This, however, was merely a form of verbal defiance because, behaviorally, there was no difference between conditions on the proportion of times the not-reveal-intentions message was followed by a defection.

Conflict Intensity

As hypothesized, Ss did cooperate more when the conflict intensity was low. In the high-intensity condition, only 21% of their strategy choices were cooperative, indicating that the potential gain of 10 points from an attempted exploitation far overshadowed the double-cooperative gain or double-defection loss of one point. When conflict intensity was low, the defection choice resulted in a loss of four or a gain of five points and so achievement of a double-cooperation outcome of four points was comparatively more advantageous.

Greater trust and greater repentence under low conflict intensity accompanied the CP result. The relatively greater attractiveness of conflict resolution when intensity was low was evidently most vividly indicated after a double-defection outcome or after S succeeded in exploiting the simulated player. Both trust and repentence could be interpreted as overtures to join in a cooperative bond after the opponent had suffered losses and could be assumed then to be most interested in seeking a resolution.

As would be predicted from the general greater cooperativeness, there was much more forgiveness when conflict intensity was low if there was no exchange of messages. Most forgiveness of a promiser occurred when he was only 10% credible—but only under high conflict intensity. This somewhat curious result may indicate an effort to reform a noncredible source who, because of the high-intensity conflict matrix of outcomes, had been very damaging to S. Perhaps a sort of desperation under high conflict intensity caused these Ss to depart a bit more from the rational choice of defection in favor of a "hopeful forgiveness." Of course, the simulated player did play a 50% cooperative strategy. There is the possibility that S was willing to cooperate after being exploited because he thought he could, thereby, encourage the simulated player to cooperate for several trials and, thus, render the latter vulnerable for later exploitation.

Sex of Subjects

The interaction of sex with credibility on repentence stems from the comparison of all message conditions with the no-message condition. As proposed by Tedeschi, Horai, Lindskold, & Gahagan (1968) and elaborated by Lindskold and Tedeschi (unpublished), females are more conforming in responding to the cue of a message with content relating to the cooperative response. More than males, they accept the cooperative response as appropriate. The effect was more pronounced in the referenced studies than in this one because in them the message asked the target S to make the cooperative response, while in this study only the choice of the simulated "other" was mentioned. However, because repentence involves the prior act of exploitation by S, it is perhaps the most sensitive state-conditioned propensity if expectations regarding the propriety of one's own conduct are raised and are conformed to.

REFERENCES

AXELROD, R. Conflict of interest: An axiomatic approach. Journal of Conflict Resolution, 1967, 11, 87-99.

GAHAGAN, J. P., & TEDESCHI, J. T. Strategy and the credibility of promises in the Prisoner's Dilemma game. Journal of Conflict Resolution, 1968, 12, 224-234.

JONES, B., STEELE, M. W., GAHAGAN, J. P., & TEDESCHI, J. T. Matrix values and cooperative behavior in the Prisoner's Dilemma game. Journal of Personality & Social Psychology, 1968, 8, 148-153.

OSGOOD, C. E. *An alternative to war or surrender.* Urbana: University of Illinois, 1962.

RAPOPORT, A. *Two-person games.* Ann Arbor: University of Michigan, 1966.

RAPOPORT, A. *Strategy and conscience.* New York: Harper and Row, 1964.

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Table 1
Time per Trial, Trials per Problem, and Errors per Problem for 10 Concept Types under One and Two Irrelevant Dimensions

Type of Concept	Time per Trial (min)				Trials per Problem				Errors per Problem			
	1 IR	2 IR	Mean	Difference	1 IR	2 IR	Mean	Difference	1 IR	2 IR	Mean	Difference
Affirmation	.27	.29	.28	.02	5.40	5.71	5.55	.31	1.11	1.16	1.13	.05
Negation	.30	.36	.33	.06	5.38	7.99	6.68	2.61	1.04	1.79	1.41	.75
Conjunction	.32	.44	.38	.12	5.39	7.39	6.39	2.00	1.50	2.76	2.13	1.26
Alternate Denial	.49	.71	.60	.22	7.03	11.62	9.32	4.59	1.46	3.43	2.34	1.97
Inclusive Disjunction	.37	.44	.40	.07	8.02	9.66	9.34	1.64	1.70	2.64	2.17	.94
Joint Denial	.38	.49	.43	.11	6.00	9.23	7.61	3.23	1.85	3.25	2.55	1.40
Conditional	.52	.87	.69	.35	11.31	13.64	12.47	2.33	2.59	3.16	2.87	.57
Exlusion	.47	.52	.49	.05	6.04	10.60	8.32	4.56	2.01	4.10[a]	3.05	2.09
Biconditional	.36	.50	.43	.14	9.13	7.70	8.81	-1.43	1.52	1.68	1.60	.16
Exlusive Disjunction	.64	.94	.79	.30	7.35	9.54	8.45	2.19	1.58	2.27	1.92	.69

[a]*Due to one S who had 13 errors per problem, mean without him was 3.24 errors.*

nonexemplars for the conditional concept support the hypothesis of a task-based difference as the probable cause of the reversal of the relative difficulty of the conditional and biconditional concepts in this study. Thus the added rule-learning aspect of the complete learning task increased the difficulty of the biconditional concept much more than for the conditional concept. The Type Concept by Type Start Card interaction was significant, $p < .01$, for the measures of trials per problem, $F(9,160) = 4.72$, and errors per problem, $F(9,160) = 4.46$, and was due to an increase for nonexemplar start cards with conjunctive type concepts and an increase for exemplar start cards with disjunctive type concepts. This would be expected since nonexemplar start cards provide less information for S than exemplars when conjunctive type concepts are to be identified while the converse is true when disjunctive type concepts are to be identified. Number IR interacted with this interaction, $F(9,160) = 2.71$, $p < .01$, for the trial per problem measure; the pattern of increase for two IR was difference for exemplar and nonexemplar start cards. No explanation was possible for either pattern or their difference.

Of major interest in this study were the significant interactions of IR with Type Start Card and Type Concept. The IR by Type Start Card interaction was significant only for time per trial, $F(1,160) = 5.63$, $p < .05$. This interaction was due primarily to quick times per trial with exemplar start cards under one IR and essentially the same times per trial for two IR regardless of start card. Thus the type of start card only effects performance in the easier task of one IR. The IR by Type Concept interaction significantly effected time per trial, $F(9,160) = 2.43$, $p < .05$, and trials per problem, $F(9,160) = 3.85$, $p < .01$. Table 1 portrays this interaction. A correlation of .80 ($p < .01$, $N = 10$) was calculated across the 10 concepts between the mean time per trial for one IR and the difference in the group mean time per trial as IR increased from one to two. (The correlation for the trials per problem was $-.26$ and for errors per problem was .23, $p > .05$, $N = 10$.) Thus a significant proportional relationship existed between the difficulty of conceptual type and the degree of decremental effect produced by increased IR only for the time per trial dependent measure. Hence, for the measure time per trial (and to a lesser degree for the measure errors per problem) Haygood and Stevenson's findings were extended to 10 conceptual types and to the selection mode showing that the IR by Type Concept interaction does not break down under the reduced memory and active information solicition characteristics of the selection mode.

REFERENCES

BRUNER, J. S., GOODNOW, J. J., & AUSTIN, G. A. *A study of thinking.* New York: Wiley, 1956.

GIAMBRA, L. M. Concept identification behavior and selection strategies as a function of sex, type start card, type concept, and number irrelevant dimensions. Ann Arbor, Mich., University Microfilm, 1968, No. (unassigned).

HAYGOOD, R. C., & BOURNE, L. E., Jr. Attribute- and rule-learning aspects of conceptual behavior. Psychological Review, 1965, 72, 175-195.

HAYGOOD, R. C., & STEVENSON, M. Effects of number of irrelevant dimensions in nonconjunctive concept learning. Journal of Experimental Psychology, 1967, 74, 302-304.

KEPROS, P. G., & BOURNE, L. E., JR. Identification of biconditional concepts: Effects of number of relevant dimensions. Canadian Journal of Psychology, 1966, 20, 198-207.

LAUGHLIN, P. R. Focusing strategy for eight concept rules. Journal of Experimental Psychology, 1968, 77, 661-669.

LAUGHLIN, P. R., & JORDAN, R. M. Selection strategies in conjunctive, disjunctive, and biconditional concept attainment. Journal of Experimental Psychology, 1967, 188-193.

NEISSER, U., & WEENE, P. Hierarchies in concept attainment. Journal of Experimental Psychology, 1962, 64, 282-290.

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RAPOPORT, A., & CHAMMAH, A. M. *Prisoner's dilemma.* Ann Arbor: University of Michigan Press, 1965.

STEELE, M. W., & TEDESCHI, J. T. Matrix indices and mixed-motive games. Journal of Conflict Resolution, 1967, 11, 198-205.

TEDESCHI, J. T., HORAI, J., LINDSKOLD, S., & GAHAGAN, J. The effects of threat and conflict intensity on compliance and communication. Proceedings of the 76th Annual Convention of the APA, 1968, 399-400.

NOTES

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