

## BRIEF ARTICLES

### PERSONALITY AND ATTITUDINAL CORRELATES OF TRUSTING AND TRUSTWORTHY BEHAVIORS IN A TWO-PERSON GAME

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2 experiments were completed, with the purposes of determining (a) if personality and attitudinal variables might be related to extent of trusting and trustworthy behaviors in a 2-person non-zero-sum game, and (b) if playing for moderate sums of real money would produce the same behaviors as playing for imaginary money. Scores on the Philosophies of Human Nature Scale were related to trusting behavior; persons who believe human nature to be altruistic, trustworthy, and independent behaved in the game situation in more trusting ways than did Ss with unfavorable attitudes about human nature. No attitude or personality variable was found to be related to trustworthy behavior in the game. In each experiment, playing for real vs. imaginary payoffs had little influence on S's game behavior.

A recent review by Gallo and McClintock (1965) draws several conclusions about the present state of research on cooperative and competitive behaviors in a non-zero-sum game. One conclusion is that the number of personality and attitudinal variables which have been shown to be related to cooperative (or trusting) behavior in the game is limited. Second, the review finds no studies which used large, actual monetary rewards as incentives to the players.

The present study attempts to fill these gaps. Its purposes are twofold: to detect some of the attitudinal and personality correlates of trusting and trustworthy behaviors in an interpersonal situation, and to determine whether the expectation of winning real money (versus playing for imaginary money) influences the frequency of trusting and trustworthy behaviors in a two-person non-zero-sum game.

In relating attitudes to game behavior, Deutsch (1960) found that authoritarianism was negatively related to extent of trusting and trustworthy behaviors in a two-person game, and Lutzker (1960) found that attitudes favoring internationalism rather than isolationism were related to cooperative or trusting behaviors. Marlowe (1963) related scores on an adjective check list to Prisoner's Dilemma game behavior and found that cooperative subjects scored higher on need Abasement ( $p = .07$ ) and Deference ( $p = .02$ ), while noncooperative subjects scored

higher on need Aggression ( $p = .06$ ) and Autonomy ( $p = .03$ ).

These findings, meager as they are, have been based on game situations where the monetary rewards were either imaginary or very small. For example, the payoff matrix in Marlowe's 30-trial study (which used impecunious first-year medical students) ranged from 0 to \$.04 per trial. Deutsch used larger numbers, but the payoffs were imaginary.

Apparently only two studies have varied the value of rewards. One of these did not use the traditional Prisoner's Dilemma game, but rather a conceptually similar procedure, the simulated trucker's game, developed by Deutsch and Krauss (1962). Subjects playing for imaginary money lost an average of \$38.80 per dyad over 20 trials, while subjects playing for large amounts of real money won an average of \$9.92 per dyad. Thus game behavior was much different, and much more cooperative, when real money was involved.

Evans (1964) assessed the value of the matrix entries in the Prisoner's Dilemma game by using imaginary money in one condition and points to be added to the subject's examination score in the other condition. Over the six trials, no significant differences in number of cooperative responses between conditions were found. Evans concludes that "tentatively, it is safe to generalize from game situations in which the rewards are small or imaginary to situations where the payoff of an outcome is of a moderate value, at least [p. 590]." This conclusion is quite opposite to that of Gallo (1963).

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## METHOD

Two experiments were completed, each using undergraduates at George Peabody College as subjects. Subjects participated as part of their course requirements in general psychology. When each arrived, he was told that he was to participate in a study of choice behavior and had "the opportunity to win some money," in addition to receiving experimental credit. In both experiments, subjects worked as pairs, although unseen to one another. Each subject participated in a two-person, non-zero-sum game in which the amount of gains for each person was determined by his choice and that of the other subject. The procedure is similar to that used by Deutsch (1960), except that different amounts of money were used.

Three conditions were employed in the game situation, with 28 subjects participating in each condition. In the real-money condition subjects were told that they could keep whatever they won. (Postexperimental questioning indicated that 90% of the subjects believed this.) Subjects in this condition could then receive as much as \$12 for 30 minutes' participation. In the imaginary-money condition subjects were told that they were playing "for fun" and that no money would be paid. In the no-information condition, they were not told whether they would be allowed to keep their winnings or not. (On postexperimental questioning, 75% of the subjects in this condition expected that they would not be allowed to keep their winnings.)

In Experiment I, subjects participated in two trials. On the first, they were presented the data in Figure 1. Each subject chose first (i.e., either X or Y), knowing that the other subject would know his choice before choosing. On the second trial, each subject was told the first choice of the other person, and then chose second. If the other subject did not appear for the experiment, the subject was told that the other subject had chosen X. (This happened in 15 cases.) Thus each person had an opportunity on the first trial to show, in Deutsch's terms, his trusting or suspicious behavior. The second trial gave a test of the person's trustworthiness in the case when the first person had chosen X. After each choice, the subject was asked why he had chosen as he did and what he expected the other person would choose or why the other person had chosen as he did.

One month prior to participating in the above, subjects in Experiment I were administered the following instruments which measure variables possibly related to game behavior: Verbal Hostility

	A	B
X (\$3, \$3)		(\$0, \$6)
Y (\$6, \$0)		(\$1, \$1)

FIG. 1. Two-person non-zero-sum game. (Person 1 chooses between Rows X and Y, Person 2 between Columns A and B. Person 1's payoffs are the first numbers in the parentheses, Person 2's are the second numbers. Adapted from Deutsch, 1960.)

subscale of the Buss-Durkee Hostility Inventory (Buss, 1962); Rehfish (1958) Rigidity Scale; revised Social Responsibility Scale (Berkowitz & Daniels, 1964); Personal Optimism and Anti-Police Attitudes scales (Chein,<sup>2</sup>); the California F Scale (Adorno, Frenkel-Brunswick, Levinson, & Sanford, 1950); the Political Cynicism Scale (Agger, Goldstein, & Pearl, 1961); and the Philosophies of Human Nature Scale (Wrightsmann, 1964).

In Experiment II, the same procedure was used, with the exception of the following three modifications:

1. All 56 subjects were female. (In Experiment I, 15 males and 69 females were used.)

2. Several additional attitude and personality measures were used in Experiment II, as follows: Machiavellianism Scale (Christie & Merton, 1958) and the social desirability scales developed by Crowne and Marlowe (1960) and by Edwards (1957). Also given were some of those measures used in the first experiment (Personal Optimism Scale, Anti-Police Attitudes Scale, F Scale, and Philosophies of Human Nature Scale).

3. In Experiment II, each subject chose first (i.e., between X and Y) two times. On one of these he was told that he would keep whatever he won; on the other he was told he would not be allowed to keep whatever he had won. Before making his second choice, he was not told what the other subject had chosen. Order of conditions was randomized across the 56 subjects.

In both experiments, subjects were classified as trusting or distrusting on the basis of their choice on the first trial (X or Y), their expectation of the other's choice (A or B), and the reasons they gave for their choice and their expectation of the other's choice. The criterion of trusting behavior was met when the subject chose X, expected the other person to choose A (i.e., to cooperate), and gave as his reasons for this a concept of trust, fairness, or cooperation. Any choice of Y, or the choice of X with the expectation that the other would pick B, was classified as distrusting, when the person gave as his reason distrust or fear of the other's response. If he chose Y and gave as his reason "equality," "planning," or "safety," he was classified as neither trusting nor distrusting.

Trustworthy behavior was considered as present when the subject chose A after the other subject had chosen X. Untrustworthy behavior was defined as choosing B after the other had chosen X. If the first person had chosen Y, it was felt that the second person's response could not be used to gauge trustworthiness or lack of it. Hence the number of subjects for the analysis of trustworthiness in Experiment I is reduced to 42. (In the case where the first person had chosen Y, all but 5 of the remaining 42 chose B.)

## RESULTS

In both experiments, the frequency of trusting behavior was not greatly influenced by playing

<sup>2</sup> I. Chein, personal communication, March 1, 1961.

TABLE 1

MEAN DIFFERENCES ON ATTITUDE AND PERSONALITY MEASURES BETWEEN TRUSTING,  
DISTRUSTING, AND OTHER SUBJECTS IN EXPERIMENT I

Measures	Means				<i>t</i>
	All subjects ( <i>N</i> = 84)	Trusting subjects ( <i>N</i> = 27)	Distrusting subjects ( <i>N</i> = 19)	Other subjects ( <i>N</i> = 38)	
Buss-Durkee Verbal Hostility	5.94	6.07	6.26	5.68	0.31
Rehfish Ridity	11.77	11.28	11.63	12.18	0.55
Berkowitz Social Responsibility	18.54	18.72	19.21	18.05	1.21
Chein's Personal Optimism	2.23	2.15	2.47	2.16	0.58
Chein's Anti-Police Attitudes	1.67	1.70	1.73	1.60	0.10
California F Scale	-12.46	-17.01	-11.79	- 9.60	0.83
Agger's Political Cynicism	+ 2.90	+ 1.93	+ 3.26	+ 3.34	0.31
Philosophies of Human Nature					
General Favorability (Positiveness)	+22.68	+49.87	+ 2.92	+15.22	3.77*
Trustworthiness	+ 6.34	+13.25	- 1.67	+ 5.68	3.30*
Strength of Will	+13.48	+17.50	+15.01	+ 9.63	2.12
Altruism	+ 1.74	+10.00	- 6.92	+ 0.45	4.05*
Independence	+ 1.64	+ 9.12	- 3.50	- 0.54	3.37*

\*  $p = .05$ .

for real versus imaginary money. In Experiment I, the number of trusting subjects (among 28 per condition) was 9 in the real-money condition, 10 in the no-information condition, and 8 in the imaginary-money condition. In Experiment II, where each subject played under both conditions, 6 of 56 subjects (11%) chose differently under real versus imaginary payoffs. In 4 of these 6, the subject was not willing to trust under real-money conditions but was willing when no real payoff was involved. Likewise, frequency of trustworthy behavior in Experiment I did not significantly vary across conditions. Many subjects in the imaginary-money condition in

Experiment I commented that they would have behaved the same way if real payoffs had been involved.

Table 1 presents mean differences on attitude and personality measures among trusting ( $N = 27$ ), distrusting ( $N = 19$ ), and other subjects ( $N = 38$ ) in Experiment I. On the Philosophies of Human Nature Scale, trusting subjects had more generally positive attitudes toward human nature ( $p < .05$ ) and saw people as more trustworthy ( $p < .05$ ), more altruistic ( $p < .05$ ), and more independent ( $p < .05$ ) than did distrusting subjects and other subjects. These findings confirmed expectations. In each of these

TABLE 2

MEAN DIFFERENCES ON ATTITUDE AND PERSONALITY MEASURES BETWEEN TRUSTWORTHY  
AND UNTRUSTWORTHY SUBJECTS IN EXPERIMENT I

Measures	All subjects ( <i>N</i> = 42)	Trustworthy subjects ( <i>N</i> = 27)	Untrustworthy subjects ( <i>N</i> = 15)	<i>t</i>
Buss-Durkee Verbal Hostility	5.74	5.64	5.93	+0.30
Rehfish Ridity	12.12	12.21	11.93	-0.25
Berkowitz Social Responsibility	18.57	18.64	18.43	+0.22
Chein's Personal Optimism	2.36	2.18	2.71	-1.44
Chein's Anti-Police Attitudes	1.62	1.71	1.43	-0.73
California F Scale	-11.19	-11.82	- 9.92	+0.91
Agger's Political Cynicism	+ 2.48	+ 2.64	+ 2.14	-0.93
Philosophies of Human Nature				
General Favorability (Positiveness)	+20.85	+26.47	+ 9.00	+0.91
Trustworthiness	+ 4.00	+ 7.73	+ 2.33	+0.79
Strength of Will	+10.50	+11.68	+ 8.22	+1.08
Altruism	+ 2.39	+ 2.95	+ 0.78	+0.56
Independence	+ 2.32	+ 4.21	- 1.07	+1.05

Note.—All *t* tests are 2-tailed tests.

comparisons, the order was as follows: trusting subjects most favorable toward human nature, unclassified subjects as next most favorable, and distrusting subjects as least favorable. No other attitude or personality measures were significantly related to trusting behavior in Experiment I.

Using the criterion described in the Method section, 27 subjects in Experiment I were classified as trustworthy and 15 were classified as untrustworthy. As predictors of trustworthy or untrustworthy behavior in the same situation, none of the attitude or personality measures was successful. As Table 2 indicates, mean scores for the trustworthy and untrustworthy subjects in Experiment I were not significantly different on any of the measures. Differences on the five measures of Philosophies of Human Nature were all in the expected direction, but none came close to statistical significance. Of the 27 trustworthy subjects, on the first trial 8 had been trusting, 5 distrusting, and 14 neither; of the 15 untrustworthy subjects, none had been trusting, 4 had been distrusting, and 11 had been neither. Thus every trusting subject whose trustworthiness was tested responded in that way whereas only half of the other subjects responded in a trustworthy way. The small number of trusting subjects in this group prevents further analysis.

In Experiment II, few of the attitude and personality variables were significantly related to trusting or distrusting behavior in the game. Table 3 summarizes the findings. In general, the

"other" subjects (neither trusting nor distrusting) had more and greater political cynicism and less positive attitudes. Trusting subjects had, as in Experiment I, more favorable views of human nature, but the levels of significance were lower ( $p < .05$  for general positiveness, and for trustworthiness, and nonsignificant differences on the other three dimensions), and the order of the three groups was not consistent with that of Experiment I. In Experiment II, trusting and distrusting subjects' means were similar, with the trusting subjects being nonsignificantly more favorable. The "other" subjects were significantly less favorable and less trusting in their attitudes toward human nature than were the subjects who were either trusting or distrusting in the game.

### DISCUSSION

The findings of these two experiments seem to confirm Evans' (1964) conclusion that the size of reward has little effect on the subject's game behavior. The great limitation in the experiments described here is that they did not extend beyond two trials. Whether such similarities in game behavior between conditions of real versus imaginary payoffs exist in further trials needs to be studied, as Gallo (1963) found differences, between conditions, as extent of cooperation in the trucker's game increased in the later trials.

The number of attitude and personality variables which significantly relate to game behavior seems to be limited to those which are conceptually quite similar to game behavior, that is,

TABLE 3  
MEAN DIFFERENCES ON ATTITUDE AND PERSONALITY MEASURES BETWEEN TRUSTING,  
DISTRUSTING, AND OTHER SUBJECTS IN EXPERIMENT II

Measures	Means				<i>F</i>
	All subjects ( <i>N</i> = 56)	Trusting subjects ( <i>N</i> = 22)	Distrusting subjects ( <i>N</i> = 14)	Other subjects ( <i>N</i> = 30)	
Personal Optimism	2.32	2.41	2.42	2.15	0.27
Anti-Police Attitudes	1.39	1.41	1.57	1.25	0.28
California F Scale	- 3.86	- 1.73	- 8.78	- 2.75	0.71
Political Cynicism	+ 1.40	+ 0.45	- 1.64	+ 4.55	2.88
Philosophies of Human Nature					
General Favorability (Positiveness)	+13.72	+27.71	+24.00	- 8.45	3.40*
Trustworthiness	+ 4.61	+ 9.04	+ 7.35	- 2.20	3.37*
Strength of Will	+10.89	+12.59	+14.71	+ 6.05	2.48
Altruism	- 0.75	+ 2.82	+ 0.86	- 5.80	1.46
Independence	- 1.16	+ 3.27	- 0.14	- 6.75	2.84
Christie's Machiavellianism	-21.21	-21.41	-24.28	-18.80	0.56
Marlowe-Crowne Social Desirability	16.78	16.00	18.50	16.45	0.82
Edwards Social Desirability	20.63	20.54	21.21	20.30	0.21

Note.—When the subject's two choices were not the same, she was classified as trusting, distrusting, or other on the basis of her choice in her first condition.

\*  $p = .05$ .

philosophies of human nature, and to some extent, political cynicism. Despite its apparent simplicity, the game situation evokes a variety of orientations and reactions in different subjects. Some see the game as a competition and thus interpret the purpose of it to win as much as they can, while others focus on the partnership aspect and feel constrained to share. These varying orientations brought to the situation may cause the lack of relationship between such characteristics as social responsibility or personal optimism and trusting behavior in the game. However, the relationships with attitudes toward human nature do indicate that the particular orientation one "happens upon" is somewhat related to his basic beliefs about people in general.

The relationships between attitudes and game behavior were only partly consistent between Experiment I and Experiment II. In both cases, trusting subjects had more favorable attitudes, but the relative position of distrusting and other subjects shifted. The findings for Experiment I are consistent with expectations. Why, in Experiment II, do subjects who distrust in the game have attitudes more like the trusting subjects than the other subjects? The extent of trusting behavior in Experiment I (32%) was similar to that on the first trial in Experiment II (39%). Mean scores for subjects in the two experiments (see Tables 1 and 2) were similar. Instructions to the subjects on the first trials of the two experiments were the same. Most of the subjects in Experiment I, and all in Experiment II, were females. Several subjects in Experiment II reported hearing that they "would have a chance to win \$3" prior to their coming to the game session, and this may have led to the increased choice of X and some reduction of the relationships between behavior and attitudes. It appears that further study needs to be given to the reasons for choices of X or Y in two-person games.

Although this study failed to confirm Deutsch's (1960) finding that authoritarianism was related to trusting and trustworthy behavior, results were generally in the direction of agreement with his findings. The discrepancy may lie in the method of classification. If, in Experiment I, one classifies all those choosing X and expecting the other person to choose A as trusting ( $N = 27$ ) and compares this mean with the mean of all the other 57 subjects (those choosing Y or those with X and an expectation of B), the two means are significantly different ( $t = 1.99$ ,  $p < .05$ ) and

in the expected direction. This is, in essence, what was done in Deutsch's study. The refinement derived from a three-way classification removes the significance.

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