EFFECTS OF PRIOR INTERACTION, STRATEGY, AND THE EXPECTATION OF MEETING AFTER ON GAME BEHAVIOR AND SENTIMENT

Thesis for the Degree of M. A.
MICHIGAN STATE UNIVERSITY
RONALD L. MICHELINI
1970

ABSTRACT

EFFECTS OF PRIOR INTERACTION, STRATEGY, AND THE EXPECTATION OF MEETING AFTER ON GAME BEHAVIOR AND SENTIMENT

By

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The present research examined the effects of social interaction prior to, during, and after the Prisoner's Dilemma game (PD). The dependent measures were cooperative behavior in the game and sentiment.

Prior interaction consisted of a pre-game discussion on a given topic. A confederate, posing as another subject, either agreed and cooperated with the subject on the latter's opinions or disagreed and was uncooperative. Therefore, there were two types of prior interaction: positive and negative. Interaction during the game consisted of the confederate's strategy: for the first two trials, the confederate was either unconditionally cooperative or unconditionally noncooperative. Thereafter, the confederate's strategy was conditional cooperation (matching the other's strategy

but with a one-trial lag). For social interaction after the game, half of the subjects expected to meet the confederate after the game while the other half did not.

In a separate design the effects of loss of anonymity (prior contact) on game behavior and sentiment were investigated. This design also included the variables of the confederate's initial strategy and the expectation of meeting after. Therefore, the second design differed from the first only in the independent variables of prior interaction and contact.

The results indicated that, for both designs, game behavior and sentiment were primarily affected by the type of social interaction (either prior to or within the PD) that the subject first encountered. For the prior interaction conditions, positive prior interaction resulted in more cooperation and more attraction to the confederate than did negative. For these conditions, neither the confederate's initial strategy nor the expectation of meeting after systematically affected game behavior. For the contact conditions, both game behavior and sentiment were primarily affected by the confederate's initial strategy. Unconditional cooperation on the first two trials led to more cooperation and more attraction to the confederate than did an initially unconditional noncooperative strategy.

Both contact and the expectation of meeting after affected game behavior (mostly on the first trial). Contact also affected sentiment. However, the effects of contact on game behavior and sentiment appear to have depended on the physical appearance of the confederate. Also, the effects of meeting after were inconsistent, sometimes increasing and sometimes decreasing cooperation.

Approved Lawrence A. Messé
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Date 21 July 1970

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

Department of Psychology

1970

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ACKNOWLEDGMENTS

A completed thesis is seldom the work of one person. Therefore, there are many individuals whom I wish to thank for their continuous and thoughtful assistance.

I would like to especially thank Dr. Lawrence Messé. His understanding and careful direction has helped me considerably from my senior year in undergraduate school throughout my present graduate education. His assistance on my thesis was immeasurable.

I would also like to express my gratitude to the other members of my committee, Dr. James Phillips and Dr. Jean Gullahorn. Both proferred constructive comments on the design and the writing of my thesis.

Special thanks is owed to Charlene Callahan, who served as the confederate, for her able performances and for making the data collection a pleasure.

Also, I would like to extend my appreciation to my parents. Their constant encouragement has always been an asset to myself and my education.

Finally, I would like to thank the Baker Hall crew. By showing me the way to Paul Revere's, their assistance in the completion of this thesis, while dubious, was enjoyable.

This thesis was partially supported through the Cooperation/Conflict Research Group, Grant (F44620-69-C-0114) from the USAF Office of Scientific Research.

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CHAPTER I

INTRODUCTION

Within an experimental game design social interaction can occur at three different periods: prior to, during, and after the actual participation in the game. While past research has investigated the effects of social interaction at one of the stages, no study has explored the effects of social interaction when it occurs at all stages. Therefore, the purpose of the present research was to manipulate social interaction at each stage and measure the effects on game behavior and sentiment.

Effects of social interaction on game behavior. --Two methods have been employed in the investigation of social interaction prior to the game (prior interaction). One method has been to manipulate the type of prior interaction through a pre-game using subjects who had not previously known each other. This approach was employed by McClintock and McNeel (1967). A game in which the participants had the option of adding or subtracting points from each other's score served as the pre-game. For positive prior

interaction, subjects were led to believe that points were being consistently added to their score by the other player. For negative prior interaction, subjects were informed of the opposite. A third group had no prior interaction (no pre-game). The experimental game played by all of the subjects was the Maximizing Difference Game. In this game it is possible to differentiate the competitive motive (maximizing the difference between own and other's gain) from such motives as cooperation (maximizing joint gain) and self-interest (maximizing self gain). Consequently, the dependent measure was the extent of competitiveness. Results indicated that subjects with positive prior interaction were least competitive while subjects with no prior interaction were most.

A second method of studying prior interaction is to employ the existing sentiment between the participants. That is, a subject is assigned to a dyad (and experimental group) according to the direction and, sometimes, degree of affect towards the other player. This approach was used by Oskamp and Perlman (1966) and by Swingle and Gillis (1968). Oskamp and Perlman carried out their study at two colleges. At one college they found significant differences among four friendship groups and a positive relationship between the degree of friendship and cooperative behavior in the Prisoner's Dilemma (PD). However, at the other school no

significant differences or relationships were found. The authors attributed the latter findings to situational influences (the second college was a business school).

Also using the PD, Swingle and Gillis (cited above) found that subjects cooperated more when they believed the other player was someone they liked rather than disliked or did not know.

In the present study, prior interaction was studied through a method similar to that of McClintock and McNeel. However, instead of a pre-game which can prohibit face-to-face interaction, a situation was employed in which the subjects discussed a given topic with a confederate. With the PD serving as the experimental game, it was hypothesized that positive prior interaction would result in more cooperation than negative.

Since prior interaction involves at least two components — contact with the other individual prior to the game (prior contact) and the rewards and costs derived from that contact — the present study also manipulated the former. The effects of prior contact were investigated by Oskamp and Perlman (1965) through loss of anonymity. However, their results were inconsistent. At a large university there was no difference between the anonymity and loss of anonymity groups. At a small college loss of anonymity as compared to anonymity resulted in more cooperation only if subjects

were recruited from psychology courses. For subjects recruited from nonpsychology courses, there was less cooperative behavior if there was the loss of anonymity than if not. In the present study, prior contact also consisted of loss of anonymity prior to the PD. But, because of the mixed results in the above study, no hypothesis concerning the main effects of prior contact was formulated.

Social interaction during the experimental game has been studied through communication and through the strategy of the other player. The effects of communication during the game is beyond the scope of this paper and is not considered here.[1]

Game research has generally indicated that noncontingent strategies do not affect the subject's game behavior. A noncontingent strategy is not dependent on the behavior of the other person and usually consists of a given percentage of cooperation randomly distributed throughout the trials. McClintock, Harrison, Strand, and Gallo (1963) systematically varied the level of cooperation by the other player (85, 50, 15 percent cooperation) but found no differences. Another example of the usual ineffectiveness of noncontingent strategies is a study by McKeown, Gahagan, and Tedeschi (1967). Simulated strategies of 10, 50, and 90 percent cooperation had no

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[1] See Vinacke (1969) for a review of the effects of communication (and feedback) on game behavior.

significant effects on game behavior. In contrast, contingent strategies (i.e., behavior that is conditional on the behavior of the other person) appear to affect game behavior. The contingent strategies usually employed are real (subjects actually play each other) and conditional cooperation (matching the subject's choices with a one-trial lag). Gallo (1969) employed three strategies: conditional cooperation, real, and noncontingent. The Maximizing Difference Game served as the experimental game. The results showed a lower level of competition for the conditional cooperation group than for the noncontingent. The real strategy did not differ significantly from either one. Similarly, Solomon (1960) reported that conditional cooperation resulted in more cooperative behavior than either unconditional cooperation or unconditional noncooperation. Finally, Rapoport and Chammah (1965) have found that conditional cooperation usually results in more cooperative behavior than do noncontingent strategies.

The present study employed contingent strategies that differed only on the first two trials. That is, on the first two trials the confederate was either unconditionally cooperative or unconditionally noncooperative. Thereafter, the strategy was conditional cooperation. Terhune (1968), Sermat (1967), and Tedeschi, Heister, Lesnick, and Gahagan (1968) have reported that if the other player

cooperated on the first trial a higher level of cooperation was found than if he did not cooperate. Further, all three studies employed contingent strategies (either real or conditional cooperation). Therefore, for the prior contact and no prior contact conditions, it was hypothesized that an initially cooperative confederate results in a higher level of cooperation than does an initially noncooperative confederate.

A second hypothesis concerning the interaction effects of strategy and prior interaction on cooperative behavior was derived from Swingle and Gillis (cited above). They proposed that, when a positive relationship exists between the two participants, noncooperative behavior by one member of the dyad will be reciprocated by the other. The purpose of reciprocation is the maintenance of the integrity of the relationship. However, if the affective relationship is negative, the individual will not respond to the other's strategy in order to maintain psychological distance. Their results supported their position. In the friendship conditions subjects matched the strategy (noncontingent) of the other player. (This is one instance where a noncontingent strategy did affect the subject's game behavior.) When the subjects either disliked or did not know the other player, they were consistently noncooperative regardless of the other's strategy. In the present study for the positive prior interaction

conditions, it was hypothesized that more cooperation would be found if the strategy of the confederate was initially cooperative than if not. However, for the negative prior interaction conditions the confederate's initial strategy would have no systematic effect.

The expectation of social interaction after the game was investigated by Marlowe, Gergen, and Doob (1967). Half of the subjects were told that they would discuss their game behavior with the other player after the game. Results indicated a higher level of cooperation when there was the expectation of a discussion (or confrontation) than when not. In a follow-up study the perceived personality of the other player was also manipulated. If the other player appeared egotistical, subjects cooperated less when a post-game discussion was expected than when not. The reverse was found when the other player appeared to be humble. In the present study confrontation was only implied. That is, subjects expected to leave the experiment either alone or with the other player. There was no expectation of explicit post-game discussion. For the contact conditions it was predicted that the expectation of meeting after should result in more cooperation than if there is no expectation. An interaction similar to that of perceived personality of the other player and confrontation was hypothesized for the prior interaction conditions. More specifically, for positive prior interaction, subjects

were predicted to cooperate more if there was the expectation of meeting after than if not; the reverse was predicted for subjects exposed to negative prior interaction. This hypothesis, then, equates behaviorally positive prior interaction with the humble opponent condition and negative prior interaction with the egotistical opponent condition.

Effects of social interaction on sentiment. --The literature on the effects of social interaction on sentiment is quite extensive, ranging from simple, self-report questionnaire studies (e.g., Taguiri, Blake, and Bruner, 1953) to highly complex, naturalistic observations (e.g., Newcomb, 1961). However, of most relevance to the present research are those studies that have examined sentiment within the framework of experimental games. Therefore, the following discussion is restricted to these latter studies.

McClintock and McNeel (1967) found that the type of prior interaction significantly affected the attraction towards the other player. Subjects with positive prior interaction were more attracted to the other player than were subjects with negative prior interaction. Therefore, in the present study it was predicted that positive prior interaction would result in more attraction to the confederate than would negative.

Strategy has also been found to affect attraction towards the other player. Gallo (1969) found that subjects playing against conditional cooperation liked the other player more than subjects playing against either a real or noncontingent strategy. Swingle and Coady (1967) reported that initially cooperative partners (in the first fifty trials) were more favorably evaluated (e.g., pleasant, kind) than were initially noncooperative partners. In the previously cited study by Marlowe et al., the noncontingent strategy of the other player was predominantly cooperative (80 percent). Results indicated that after the game subjects perceived the egotistical opponent to be less egotistical, less independent, and more likeable than prior to the game. The evaluation of the humble person did not change. Finally, Wilson and Insko (1968) reported that whether a confederate played either cooperatively or noncooperatively affected the subjects' impressions of him on such traits as generosity and fairness. Cooperative behavior led to the more favorable impressions.

In accordance with the above studies, it was hypothesized that for the contact conditions an initially cooperative strategy would result in more attraction toward the confederate than would an initially noncooperative strategy. Similarly, for the positive prior interaction conditions, subjects should be more attracted to an initially cooperative confederate than to an initially noncooperative

confederate. However, when negative prior interaction occurred, the confederate's initial strategy was not expected to affect the subject's attraction to the confederate. A previous hypothesis stated that the game behavior of subjects with negative prior interaction will not be affected by the confederate's initial strategy. Also, a relatively low level of cooperation is expected for the negative prior interaction conditions. Therefore, regardless of the confederate's initial strategy, after the first two trials all subjects with negative prior interaction should be playing against a predominantly noncooperative confederate. Thus, there is no inconsistency between the above results of Marlowe et al. on attraction to an egotistical opponent and the present hypothesis for the negative prior interaction conditions.

Finally, Marlowe et al. reported that the expectation of confrontation had no effect on attraction to the other player. Therefore, in the present study, the anticipation of meeting after was not expected to affect sentiment for any of the experimental conditions.

Review of hypotheses. --

1. Positive interaction should result in more cooperative behavior than does negative.
2. For the prior contact and no prior contact conditions, there should be a higher level of cooperation if the confederate's

strategy is initially cooperative than if it is initially noncoopera-tive.

3. For the positive prior interaction conditions more cooperation should result if the confederate is initially cooperative than if not. For the negative prior interaction conditions, the confederate's initial strategy should have no systematic effect on subject's game behavior.

4. For the positive prior interaction conditions, subjects should cooperate more if there is the expectation of meeting after than if not. For the negative prior interaction conditions, subjects should cooperate less if there is the expectation of meeting after than if not.

5. For the contact conditions, the expectation of meeting after should result in more cooperative behavior than if meeting after is not expected.

6. Positive prior interaction should result in more attraction to the confederate than should negative.

7. For the positive prior interaction conditions subjects should be more attracted to an initially cooperative confederate than to an initially noncooperative confederate. When negative prior interaction occurs, the confederate's initial strategy should not affect the subject's attraction to the confederate.

8. For the contact conditions, an initially cooperative strategy should result in more attraction to the confederate than should an initially noncooperative strategy.

9. The expectation of meeting after should have no effect on attraction towards the confederate for any of the experimental conditions.

CHAPTER II

METHOD

Subjects. --Eighty college females from an undergraduate introductory psychology course served as subjects and were randomly assigned to one of the experimental groups. All subjects received extra credit for participating in addition to the money won in the game.

Materials. --Two questionnaires were used. The primary purpose of one was to determine the validity of the manipulation of positive and negative prior interaction and, therefore, was administered only to subjects receiving those treatments. This questionnaire was administered prior to the PD. The second questionnaire, administered after the game, primarily measured the effects of all the treatments on sentiment. On this questionnaire, subjects were asked to indicate the extent to which they would become friends with the other person if their acquaintance were to continue. They answered on a seven-point scale. (See Appendix for both questionnaires.)

Design. --Two 2 × 2 × 2 designs were used. One design consisted of two levels of prior interaction, two levels of the confederate's initial strategy, and the expectation or not of meeting after the PD. The second consisted of two levels of the contact conditions, two levels of the confederate's initial strategy, and the expectation or not of meeting after the PD. Therefore, both designs differed only in the independent variables of prior interaction and contact.

Procedure. --Positive and negative prior interaction was manipulated by having the subject discuss a topic with a confederate before participating in the PD. The confederate, who was a female undergraduate, was presented as another subject. The experiment was explained as studying decision-making behavior in unstructured and structured situations, the former being the discussion and the latter the PD. The topic was, "Does a married college-educated woman owe it to her family to stay at home or to herself to pursue her career aspiration?" It was thought that this topic would be highly relevant to the subjects and, therefore, aid in the success of the manipulation.[2] Both were told to discuss the topic for five

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[2]On a five-point scale, the means were 3.75 for positive prior interaction and 4.05 for negative ($F < 1$). The means indicate that interest in the topic was high for subjects in both prior interaction conditions.

minutes and to attempt to come to a consensus. After both indicated that they were ready to begin, the subject was asked to start the discussion. Subsequently the subject found the confederate either similar in opinion and cooperative (i.e., willing to come to a consensus), or the inverse. For positive prior interaction, the confederate was polite, smiled, and generally agreed with what the subject said. For negative prior interaction, she was rude (interrupted, tapped on the desk as the subject talked, etc.), never smiled, always disagreed, and labeled the subject's opinions as archaic, irresponsible, etc.[3] After the discussion both were asked to complete a questionnaire.

Prior contact consisted of the subject and confederate only seeing each other before the game. This was accomplished by having the confederate visibly seated and looking up at the subject when she arrived. For no prior contact, the confederate was already seated behind a partitioned table (and, therefore, not in view) when the subject arrived.

The expectation of meeting after was manipulated through that part of the instructions for the PD that covered the method of payment. The expectation of meeting after was established by

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[3]To insure that the confederate was consistent and effective, she was given considerable previous training with naive subjects.

informing the subject and confederate that at the end of the session they would both go over to a table with the experimenter and then be paid together. For no expectation of meeting afterwards they were told that they would remain seated while they received their earnings and that they would leave separately.

The confederate's initial strategy consisted of either unconditional cooperation or unconditional noncooperation on the first two trials. This was followed by conditional cooperation with a one-trial lag for the remaining trials.

A questionnaire was administered to all the subjects after the game.

All instructions for the PD were taped and differed only when required by the independent variables of prior interaction, contact, and expectation of meeting afterwards. Each subject saw the game matrix which indicated the individual payoffs to the participants as determined by their combined choices. Also, to allow the subjects greater insight into the PD, the instructions included a section listing the various goals (e.g., to gain as much as one can) that the participants might play for. Further, strategies that might attain these goals were also given. (Refer to Appendix for instructions used.) When playing the game, the subject and confederate were separated by a partitioned table. The game was

played for ten trials and payoffs per trial were as presented in Table 1.

Table 1

Payoff Matrix for Prisoner's Dilemma

		Confederate's Payoffs	
		A	B
Subject's Payoffs	A	3, 3	0, 5
	B	5, 0	1, 1

CHAPTER III

RESULTS

On an *a priori* basis analyses were performed separately for those treatments involving positive and negative prior interaction and for those involving prior and no prior contact. This was done since results of interest to the study fell within this framework. Also, the similarities and dissimilarities in procedure indicated that separate analyses were desirable. For example, two questionnaires were administered to the subjects with positive or negative prior interaction while only one was given to the subjects in the contact groups.

Since the confederate's initial strategy cannot affect game behavior until after the first trial, analyses were performed separately for cooperative behavior on trial 1 and on trials 2-10. The responses to the question on sentiment constituted a third dependent measure. An analysis of variance was performed on each set of data.

Trial 1. -- Tables 2 and 3 summarize the results of the analyses of variance for subjects' game responses on trial 1. As Table 2 indicates, the positive and negative prior interaction groups differed significantly. Ninety percent of the subjects who were exposed to positive prior interaction cooperated on the first trial, while only sixty percent in the negative prior interaction group did so. For either group, the expectation of meeting afterwards had no effect.

Table 2

Analysis of Variance of Cooperative Response on Trial 1: Prior Interaction × Expectation of Meeting After

Source	df	MS	F
Prior Interaction (P)	1	.90	5.06*
Expectation of Meeting (M)	1	.10	
P × M	1	.30	1.68
Error	36	.18	

*$p < .05$

For treatments involving prior contact and no prior contact, Table 3 indicates a significant interaction between the expectation of meeting afterwards and the condition of contact.

Table 3

Analysis of Variance of Cooperative Response on Trial 1: Contact × Expectation of Meeting After

Source	df	MS	F
Contact (C)	1	0.00	
Expectation of Meeting (M)	1	0.00	
C × M	1	2.50	17.99*
Error	36	.14	

*$p < .001$

The relevant means are presented in Table 4.

Table 4

Percent of Subjects Cooperating on Trial 1 Classified by Prior Contact and No Prior Contact and by Expectation of Meeting After

		Expectation of Meeting	
		Expected	Not Expected
Contact	Prior Contact	50%	100%
	No Prior Contact	100%	50%

Tests of simple effects (Winer, 1962) confirmed that subjects in the prior contact condition were more likely to cooperate if there was no expectation of meeting afterwards ($F = 8.93$; $df = 1, 36$; $p < .05$), while subjects in the no prior contact condition cooperated more if they expected to meet the other later ($F = 8.93$; $df = 1, 36$; $p < .05$).

Trials 2-10. --Tables 5 and 6 present summaries of analysis of variance performed on the choices of subjects in the interaction conditions and the contact conditions on trials 2-10.

Table 5

Analysis of Variance of Cooperative Responses for Trials 2-10: Prior Interaction × Confederate's Initial Strategy × Expectation of Meeting After

Source	df	MS	F
Prior Interaction (P)	1	8.53	4.67*
Initial Strategy (S)	1	.53	
Expectation of Meeting (M)	1	.03	
P × S	1	.53	
P × M	1	1.03	
S × M	1	.03	
P × S × M	1	1.63	
Error	32	1.83	

*$p < .05$

Table 5 indicates that positive prior interaction again differed from negative in the predicted direction. The level of cooperation for positive prior interaction was 57.8 percent, while for negative it was 40.0 percent. Neither the confederate's initial strategy nor the expectation of meeting afterwards systematically affected choices.

Table 6

Analysis of Variance of Cooperative Responses for Trials 2-10: Contact × Confederate's Initial Strategy × Expectation of Meeting After

Source	df	MS	F
Contact (C)	1	.13	
Initial Strategy (S)	1	9.63	5.67**
Expectation of Meeting (M)	1	.53	
C × S	1	.53	
C × M	1	1.63	
S × M	1	2.13	1.25
C × S × M	1	7.50	4.41*
Error	32	1.70	

*$p < .05$

**$p < .025$

Table 6 indicates that there was a significant main effect in the hypothesized direction for the confederate's initial strategy in the contact conditions. If the confederate unconditionally cooperated

on the first two trials, the level of cooperation was 62.2 percent; for unconditional noncooperation on the first two trials it was 43.3 percent. As indicated, the second order interaction was also significant. All relevant means are presented in Table 7.

Table 7

Mean Percent of Cooperative Responses for Trials 2-10 Classified by Contact, Expectation of Meeting After, and Confederate's Initial Strategy

Contact	Meeting after PD	Confederate's Initial Strategy	
		Cooperation	Noncooperation
Prior Contact	Expected	66.7%	44.4%
	Not Expected	55.6%	48.9%
No Prior Contact	Expected	44.4%	46.7%
	Not Expected	82.2%	33.3%

Tests of simple effects indicated two significant comparisons, both involving no prior contact. Subjects who had not previously seen the confederate, and did not expect to, were more cooperative if the confederate was initially cooperative than if she conflicted on the first two trials ($F = 9.49$; $df = 1, 32$; $p < .005$). If the initial

strategy was unconditional cooperation and there was no prior contact, subjects cooperated more if they did not expect to meet the confederate afterwards than if they did ($F = 5.66$; $df = 1, 32$; $p < .025$).

Sentiment. -- Tables 8 and 9 present summaries of analyses of variance performed on the subjects' responses to the question on sentiment.

Table 8

Analysis of Variance of Responses to Question on Sentiment: Prior Interaction × Confederate's Initial Strategy × Expectation of Meeting After

Source	df	MS	F
Prior Interaction (P)	1	22.50	11.25**
Initial Strategy (S)	1	1.60	
Expectation of Meeting (M)	1	.10	
P × S	1	4.90	2.45
P × M	1	6.40	3.20*
S × M	1	.90	
P × S × M	1	3.60	1.80
Error	32	2.00	

*$p < .10$

**$p < .005$

Table 8 indicates the positive and negative prior interaction conditions differed significantly. On a seven-point scale, the means for positive and negative prior interaction were 3.75 and 2.25, respectively. For the same conditions, a first order interaction between prior interaction and the expectation of meeting after was marginally significant. Tests of simple effects indicated one significant comparison. Positive and negative prior interaction groups differed only when there was the expectation of meeting after (F = 13.22; df = 1, 32; p < .001).

Table 9

Analysis of Variance of Responses to Question on Sentiment: Contact × Confederate's Initial Strategy × Expectation of Meeting After

Source	df	MS	F
Contact (C)	1	2.50	
Initial Strategy (S)	1	12.10	5.00**
Expectation of Meeting (M)	1	1.60	
C × S	1	8.10	3.34*
C × M	1	3.60	1.49
S × M	1	0.00	
C × S × M	1	3.60	1.49
Error	32	2.42	

*p < .10

**p < .05

Table 9 shows a significant main effect for the confederate's initial strategy under the treatments involving contact. For subjects in the treatment where the confederate cooperated on the first two trials, the mean was 3.40, while for those in the initial noncooperation treatment it was only 2.30. As indicated, a first order interaction between contact and the confederate's initial strategy approached significance. Tests of simple effects indicated that two comparisons were significant. The difference in sentiment for the initial strategy was significant for prior contact ($F = 7.75$; $df = 1, 32$; $p < .01$). Further, when the initial strategy was noncooperation, the measure of sentiment for the prior contact condition was significantly lower than for the no prior contact condition ($F = 4.04$; $df = 1, 32$; $p < .06$).

Correlations between cooperative behavior and sentiment. -- The correlation between sentiment and the degree of cooperation was not significant ($r = .216$) for the positive and negative prior interaction conditions. For the prior and no prior contact treatments the level of cooperation was found to correlate significantly with sentiment ($r = .425$; $p < .01$).

Validity of prior interaction. -- The success of the manipulation for positive and negative prior interaction was determined by

the responses to items on both the pre- and post-game questionnaires. For perceived similarity of opinion on the topic, the two treatments differed markedly ($F = 66.57$; $df = 1,38$; $p < .001$). Another question on the reasonableness of the confederate's opinions also showed a significant difference ($F = 22.34$; $df = 1,38$; $p < .001$). Finally, as noted above, the two treatments differed with respect to sentiment ($p < .005$). Therefore, it appeared that the manipulation was successful.

CHAPTER IV

DISCUSSION

It is evident from the results that both game behavior over trials and sentiment were most consistently affected by the first social interaction (either prior to or within the PD).

For the prior interaction treatments, choices on trial 1 and on trials 2 - 10 were systematically affected only by the type of prior interaction. As predicted, positive prior interaction produced a higher level of cooperation than did negative. Similarly, subjects with positive prior interaction were more attracted to the confederate than were those exposed to negative prior interaction.

For the contact conditions, after the first trial—which is really the first opportunity that subjects in these treatments had for interaction of any kind—cooperation and attraction were primarily determined by the confederate's initial strategy. For these conditions an initially cooperative strategy led to more cooperative behavior and more attraction towards the confederate than did an initially noncooperative strategy. In conjunction with these results

there was a significant positive correlation between game behavior and sentiment, suggesting that sentiment for the contact conditions was a result of the rewards and costs incurred in the game.

Since the confederate's initial strategy did not systematically affect the game behavior of subjects under the condition of positive prior interaction, the results appear contrary to those found by Swingle and Gillis (1968). They found that, when an individual liked the other player, he reacted to the other player's strategy. However, unlike the present study, they were interested in the subject's reaction to predominantly cooperative or predominantly noncooperative strategies and abrupt shifts in strategy (changing from 95 percent cooperation to 5 percent and vice-versa). That is, subjects in their friendship conditions matched the other player's strategy when it was either predominantly cooperative or predominantly noncooperative and, further, matched any change from one of these strategies to the other.

Therefore, the present results might indicate that individuals in a positive sentiment relationship are willing to tolerate or accept moderate discrepancies in desired or appropriate behavior by the other person. However, the correlation between sentiment and game behavior was not significant, suggesting that sentiment, by itself, was not influencing game behavior. Unlike the contact

conditions where sentiment was expected to result primarily from game interaction, attraction to the confederate was expected to be established by the type of prior interaction. Therefore, sentiment should have existed prior to the PD and, according to Swingle and Gillis, affected game behavior. The lack of a significant correlation does not support their position.

An alternative explanation is that the type of prior interaction affected the perceived trustworthiness (Deutsch, 1962) of the confederate. More specifically, for the positive prior interaction-noncooperative initial strategy treatment, subjects might have estimated that the probability of the confederate changing to cooperative choices was high; on the other hand, subjects in the negative prior interaction-cooperative initial strategy treatments might have considered the probability low that the confederate would continue to cooperate.

Also, contrary to prediction, the expectation of meeting after had no effect on game behavior for subjects in the prior interaction conditions. In Marlowe et al. (where the expectation of confrontation led to more cooperation than if there was no expectation), having the subjects defend their game behavior was an important factor in predicting results (e.g., embarrassment). Therefore, game behavior was emphasized. In the present study, subjects only

expected to leave alone or with the confederate. Therefore, for the prior interaction conditions, it is possible that subjects either did not see any relationship between meeting the confederate after and their own game behavior or did not expect to defend their game behavior to the confederate after the game.

Again contrary to prediction, the results indicated that the expectation of meeting after did affect sentiment when prior interaction occurred. For positive prior interaction, subjects tended to be more attracted to the confederate when they expected to meet her after than when not. Conversely, for negative prior interaction, subjects were less attracted to the confederate if they expected to meet her after than if not. Consequently, the negative and positive interaction groups only differed significantly for sentiment when there was the expectation of meeting the confederate after the PD. In Marlowe et al., the expectation of confrontation had no effect on sentiment. A possible explanation could be that in the present study, when continued social interaction with the confederate was expected, the subjects might have felt compelled to decide more clearly how they felt towards her. That is, being definite about how one feels towards another might make it easier to decide how one is going to behave when interacting with the other person. When subjects did not expect to meet the confederate again, there might have been no

reason to be definite with respect to their feelings towards her. This may not have occurred in the Marlowe et al. study because the post-game discussion clearly structured the expected social interaction.

Since social interaction—once it occurred either prior to or through the game—primarily determined subsequent behavior, the effects of prior contact and the expectation of meeting after on cooperation are most clearly indicated on trial 1 for the contact conditions. As predicted from Marlowe et al., subjects in the no prior contact condition cooperated more when there was the expectation of meeting after than when not. However, the results for the prior contact condition (i.e., cooperating less when there was the expectation of meeting after than when not) were contrary to prediction.

A possible explanation may be found in the interaction which Marlowe et al. reported between confrontation and the perceived personality of the opponent. With an egotistical opponent, confrontation resulted in less cooperation than did no confrontation. For an opponent who appeared self-effacing, the reverse was found. Therefore, it could be that the appearance of the confederate, who was a physically attractive person, led subjects in the prior contact conditions to believe she might be egotistical. This belief, if present,

might have affected cooperative behavior on the first trial. This explanation implies that prior contact might not have affected game behavior if there was a different confederate. This position is supported in a recent study by McClintock, Nuttin, and McNeel (1970). They manipulated the visual presence of the other player during the game. That is, throughout the game each individual could see the other subject from the shoulders up. This condition did not systematically differ from a second condition in which there was no visual presence. These results could indicate that if the appearance of the other person is a random factor, as was the case in the above study, contact would have no systematic effect on game behavior.

The results from the present study also indicated that the confederate's initial strategy only affected sentiment significantly when both the subject had seen her prior to the game and her initial strategy was noncooperation. Again, the data suggest that the appearance of the confederate affected the subjects as contended above, with the confederate's noncooperative initial choices possibly reinforcing the subject's belief that the confederate was egotistical.

Results also indicated that the confederate's initial strategy was most influential when the subjects did not see the other player. That is, manipulating the confederate's initial strategy, both the highest and lowest level of cooperation were found when the

subjects never saw the confederate (see Table 7). Therefore, it appears that for trials 2 - 10, contact and the expectation of meeting afterwards inhibited the degree, but did not necessarily change the direction, of the effects of the confederate's initial strategy. However, for the no prior contact-cooperative initial strategy conditions, subjects cooperated more when they did not expect to meet the confederate after than when they did. This is contrary to the findings of Marlowe et al., and the explanation of these results is not readily apparent.

However, it should be noted that when there was both the expectation of meeting after and no prior contact, a low level of cooperation (under 50 percent) was found regardless of the confederate's initial strategy. If, in the relevant cell (see Table 7), the initial strategy of unconditional cooperation would have affected game behavior the way it did when present in three other cells, this contradictory result would not have occurred. Finally, the general overall effects of the expectation of meeting after do not appear powerful enough to nullify the influence of the confederate's initial strategy of unconditional cooperation for this group. However, a more concise explanation must await further research.

Implications for future research. --The present results suggest several studies. Perhaps of most importance is a further

investigation of the effects of prior social interaction on game behavior and, especially, on attitudes. Consistency theory (in particular, Balance theory--e.g., Heider, 1958) would predict that the sentiment relation between the participants would mediate game behavior. More clearly, there should be a positive correlation between sentiment and the extent of cooperation. For the prior interaction conditions no significant positive correlation was found. Therefore, some other factors such as the confederate's perceived trustworthiness or perceived desire to cooperate may be the more important variables. Such factors should be amenable to investigation through questionnaires administered prior to and after the game situation (plus control groups given the same questionnaire but only after the game).

The effects of meeting after and confrontation on both game behavior and sentiment also need to be studied further. For the prior interaction conditions, the above explanations of the effects of meeting after and confrontation on both sentiment and game behavior can be investigated by adding the three conditions of no expectation of meeting after, expectation of meeting after, and the expectation of confrontation to the study proposed above.

Also, if the effects of contact were really the result of the particular confederate employed, then this can be explored by using

more than one confederate plus varying a range of physical appearances. Again, with this method, contact would consist of loss of anonymity before the game situation.

Finally, different types of positive and negative prior interaction are amenable to investigation by the present methodology. For instance, the effects of intimidation on cooperative behavior can be studied by having an assertive, antagonistic, overgrown male as a confederate. Of course, males would be used as subjects. The sex of both the confederate and subject can also be manipulated. For instance, how would a male react to a pretty but antagonistic female? Therefore, it is clear that the present methodology is a promising technique for studying social interaction with game behavior as a dependent measure.

In summary, results indicate that the dominant influence for both game behavior and sentiment was the type of the first social interaction. When prior interaction occurred, positive prior interaction led to more cooperative behavior and attraction than did negative. Similarly, for the contact conditions, an initially cooperative strategy by the confederate resulted in more cooperation and attraction than did an initially noncooperative strategy. Just seeing the other before playing the PD and the expectation of meeting afterwards also influenced game behavior (mostly on the first trial) and sentiment, but less so and, often, inconsistently.

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APPENDICES

APPENDIX A

QUESTIONNAIRES

Questionnaire I

(administered only to prior interaction subjects)

Answer the following questions by putting a check within a space on the appropriate scale.

1. Do you feel that the other person's opinions were reasonable or valid in regard to the discussion? Check scale below.

/_____/_____/_____/_____/_____/
unreasonable reasonable

2. How relevant or important was the topic to you?

/_____/_____/_____/_____/_____/
very relevant very unrelevant

3. How easily do you think the other makes friends?

/_____/_____/_____/_____/_____/
difficult easy

4. Compared to yourself, how easily do you think she makes friends?

/_____/_____/_____/_____/_____/
more easily less easily

5. To what extent do you perceive the other participant's position in regard to the topic as being similar to your own?

/_____/_____/_____/_____/_____/
very dissimilar very similar

6. Did you find the discussion interesting?

/_____/_____/_____/_____/_____/
very interesting very uninteresting

7. Name the other's most pleasing behavior, if any.

8. Name the other's most annoying behavior, if any.

Questionnaire II

(administered to all subjects)

This study is partially interested in possible changes, if any, in one's feelings and impressions as a consequence of the structured situation in which you just participated. Most of the following questions pertain to this purpose. When appropriate, answer by putting a check within a space on the scale.

1. How easily do you think the other makes friends?

/_____/_____/_____/_____/_____/
difficult easy

2. Compared to yourself, how easily do you think she makes friends?

/_____/_____/_____/_____/_____/
more easily less easily

3. Indicate what your goal or goals were in the structured situation.

_____ to gain as much as you could

_____ to make sure you at least gained something

_____ to gain as much as you mutually could

_____ to gain more than the other

_____ other (specify)

4. Indicate the extent to which you think the other participant affected your choices.

/_____/_____/_____/_____/_____/
none very much

4a. If she did, in what way?

5. What did you think her first choice was going to be?

6. Did you find participating in this structured situation interesting?

/ / / / / /
interesting uninteresting

7. If your acquaintance with the other person were to continue, to what extent do you think you would become friends (don't answer this question in regard to your ability to make friends or be one but in regard to your impressions of the other's personality, compatibility with you, etc.)?

/ / / / / /
remain acquaintances become friends

8. Do you think your impressions of the other affected your behavior or choices in the structured part? Explain.

9. Why do you think this research was done? What do you think it wanted to know? Use back.

10. The instructions indicated whether you would leave with the other person or separately. Circle one.

    1. Together

    2. Separately

11. Optional--If you desire further information about this study, write your name and campus address.

APPENDIX B

INSTRUCTIONS

Instructions for Discussion

(given only to prior interaction subjects)

The present study is concerned with decision-making behavior in unstructured and structured situations. Therefore, there are two parts in which both of you will participate.

In the first part, which is the unstructured situation, both of you will give your thoughts or opinions vocally on the following topic:

> Does a married, college-educated woman owe it to her family to stay home or does she owe it to herself to have her freedom by pursuing her career aspirations?

It will probably be of some help to both of you to first put your thoughts on paper. Therefore, feel free to take a few minutes to collect your thoughts and then write them down.

Stating your opinions about the designated topic will provide us with some of the various reasons by which an individual decides

his or her position on any given subject. If possible, please come to a consensus, i.e., a mutual agreement. Once the discussion begins you will have approximately five minutes to present your opinions. Try to discuss the topic for the whole five minutes.

The discussion will be recorded.

The second part will be explained to both of you at the appropriate time.

Example of Instructions to Prisoner's Dilemma

(given to subjects in prior interaction conditions)

We are now about to begin the second phase of the study. This phase is concerned with decision-making behavior in a structured situation. The purpose is to look at what kinds of decisions are made when each of you has to make choices which affect the amount of money paid to the other person as well as to yourself. Both of you will be making a series of these choices, more or less, at the same time, without knowing how the other--at the moment--is choosing. Each pair of choices will be called a trial.

Look at the figure. This shows all the possible outcomes for a given trial. There are four possible payments for each person. The payments for each of you are determined by the combined choices of both of you. If you choose A, you will get three cents or no cents depending on what the other person does; if you choose B, you will get five cents or one cent depending on what the other person does. If both of you choose A, you will each receive three cents. If you both choose B, you will each get one cent. If one chooses A while the other chooses B, the one who chooses B will get five cents and the one who chooses A will get no cents.

When you have made your decision for a given trial, check A or B on a sheet from the stack of paper before you. After

both of you have made your decisions, I will pick up the sheets. I will then give each of you a slip indicating the number of cents that you have earned on that trial. Of course, this will be done after each trial. After the last trial, there will be another questionnaire for you to fill out concerning this part of the study. After both of you have finished the questionnaire you will remain seated while I give each of you the appropriate amount of money. After this each of you will leave separately.

Also, it has been found that subjects usually perceive the purpose of this situation as entailing one or more of the following:

1. To gain as much as you can. This can be done by both of you choosing A or by choosing B under the pretext that the other will choose A.
2. To make sure you at least gain something. This is accomplished by always choosing B regardless of what the other does.
3. To gain as much as you mutually can. This is accomplished by both of you consistently choosing A.
4. To gain more than the other. This is possible by choosing B when you think the other is choosing A more times than the reverse.

Let me assure you that this situation was not necessarily designed with any one or more of the above in mind. In fact, the situation is such that it is left up to each of you to decide what the goal should be.

Finally, it is important that you do not communicate by sighing, laughing, or in any other way which might indicate how you feel about any given outcome or how you would like the other participant to behave.

Example of Instructions to Prisoner's Dilemma

(given to subjects in contact conditions)

Both of you are here to participate in a study of decision-making behavior. The purpose of this study is to look at what kinds of decisions are made when each of you has to make choices which affect the amount of money paid to the other person as well as to yourself. Both of you will be making a series of these choices, more or less, at the same time, without knowing how the other--at the moment--is choosing. Each pair of choices will be called a trial.

Look at the figure. This shows all the possible outcomes for a given trial. There are four possible payments for each person. The payments for each of you are determined by the combined choices of both of you. If you choose A, you will get three cents or no cents depending on what the other person does; if you choose B, you will get five cents or one cent depending on what the other person does. If both of you choose A, you will each receive three cents. If you both choose B, you will each get one cent. If one chooses A while the other chooses B, the one who chooses B will get five cents and the one who chooses A will get no cents.

When you have made your decision for a given trial, check A or B on a sheet from the stack of paper before you. After

both of you have made your decisions, I will pick up the sheets. I will then give each of you a slip indicating the number of cents that you have earned on that trial. Of course, this will be done after each trial. After the last trial, there will be a questionnaire for you to fill out. After both of you have finished the questionnaire, the three of us will go over to the table and I will give each of you the appropriate amount of money.

Also, it has been found that subjects usually perceive the purpose of this situation as entailing one or more of the following:

1. To gain as much as you can. This can be done by both of you choosing A or by choosing B under the pretext that the other will choose A.
2. To make sure you at least gain something. This is accomplished by always choosing B regardless of what the other does.
3. To gain as much as you mutually can. This is accomplished by both of you consistently choosing A.
4. To gain more than the other. This is possible by choosing B when you think the other is choosing A more times than the reverse.

Let me assure you that this situation was not necessarily designed with any one or more of the above in mind. In fact, the

situation is such that it is left up to each of you to decide what the goal should be.

Finally, it is important that you do not communicate by sighing, laughing, or in any other way which might indicate how you feel about any given outcome or how you would like the other participant to behave.