

THE EFFECTS OF DIFFERENTIAL UTILITY VALUE KNOWLEDGE ON BOTH JOINT
PAYOFF AND DIFFERENTIAL PAYOFF IN BILATERAL BARGAINING

by

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For the Department

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CHAPTER I

STATEMENT OF PROBLEM

Many human interactions are characterized by efforts to interact with someone for a specific goal. Those interactions which involve a highly conscious goal have been termed goal-oriented relationships.¹ Goal-oriented social relationships are necessary when each of us cannot achieve our desired goals alone.

Cooperative, Competitive, and Mixed-motive Goal Relationships

Goal-oriented relationships vary in the degree of cooperation and competition inherent in the particular relationship. Cooperative relationships, competitive relationships, and mixed-motive relationships are three classifications of goal-oriented social relationships.² These classifications are based on the amount of cooperation associated with the relationship.

A cooperative relationship occurs when all participants derive maximum benefits from the same outcome or the same decision. Since each participant derives his maximum benefit from the same outcome, each participant decides on and helps to bring about that outcome. An example might be two people working together to write a book. They both would probably want the outcome of a scholarly, informative, and widely read book. They both would probably work toward this outcome.

A competitive relationship occurs when outcomes favorable to one participant are distinctly unfavorable to the other participant(s). This condition would describe a win or lose situation. An example might be two book salesmen competitively trying to "win a book adoption for a basic course at a university." Here if one salesman achieves his goal the other salesman cannot achieve his.

A mixed-motive relationship includes motives to cooperate and motives to compete. Mixed-motive situations are cooperative in the sense that if a decision can be negotiated, the resulting outcome is rewarding to some degree to all participants. However, such interactions are also competitive since the particular decision and outcome most rewarding to one party is not the most rewarding to the other party. Mixed-motive situations offer a set of mutually beneficial alternatives, however some decisions are more beneficial to one participant at the expense of the other participant(s). An example of a mixed-motive situation might be the negotiation between a publishing company and a writer about the financial and other benefits to be given the writer for his book.

Most goal-oriented social relationships are mixed-motive. Exchanges of resources are mixed-motive. All economic bargaining is mixed-motive. The buyer and seller must agree on a sale if either is to benefit. (This represents the motive for cooperation.) Yet, the decision on price and quantity parameters is competitive. The more the seller benefits from a specific agreement on price and quantity, the less the buyer benefits from the transaction.

Bilateral Monopoly Bargaining

This study examines a specific type of mixed-motive goal relationships--economic bargaining. Even more specifically it examines that type of economic bargaining known as bilateral monopoly bargaining. Bilateral monopolies describe those instances of economic bargaining where there is only one buyer and one seller presently engaged in the negotiation of price and quantity parameters.

It has been pointed out by Siegel and Fouraker that many social conflict situations show the same basic characteristics of the bilateral monopoly situation. "There has been a recent revival of interest in bilateral monopoly, because the bare structure of the situation has the essential characteristics of many social conflict situations."³ Siegel and Fouraker believe, and this writer concurs, that knowledge about bilateral monopoly negotiation can be a basis for understanding the bare structure of many mixed-motive goal relationships.

Certainly many variables affect mixed-motive relationships. The personalities of the people involved in the mixed-motive situation, their self-concepts, their perceptions of each other, their compatibility or incompatibility, their attitudes toward bargaining, and their styles of communication may well be important in understanding mixed-motive situations. However, these variables are not as basic to the mixed-motive situation as the fundamental aspect of mixed-motive situations. The fundamental question of mixed-motive situations is "How can cooperative interests and competitive interests be merged in the form of an agreement?" This is the general structure to which the specific individual variations of personality differences,

communication style differences, and the other less fundamental variable differences must be added.

Bilateral bargaining highlights this basic structure of both competitive and cooperative motives. If the essential characteristic of mixed-motive situations is the existence of both cooperative and competitive motives, and if bilateral bargaining highlights this basic structure rather than other aspects of mixed-motive situations, then bilateral bargaining is a basic starting point towards examining mixed-motive situations

As we have stated, all economic bargaining is mixed-motive. In bilateral monopoly negotiation the cooperative motives are expressed when both the buyer and the seller strive to maximize their joint payoff. Within the set of possible agreements on price and quantity, each price and quantity agreement has payoffs for the buyer and payoffs for the seller. The joint payoff is the sum of the buyer's payoff and the seller's payoff for a particular price and quantity agreement

Differential payoff is the division of the joint payoff between the seller and the buyer. The competitive aspect of bilateral bargaining situations is reflected in these individual payoffs

Utility Value Knowledge Effects

The main question of this study is developed from the context of bilateral bargaining studies. The central question is "What effect does knowledge or lack of knowledge of one's bargaining partner's possible payoffs have both on one's own payoffs and on joint payoff maximization?" The question implies that knowing or not knowing one's fellow negotiator's utility values affects both differential and

joint payoff.

Utility Value Knowledge and Joint Payoff

The evidence suggests that joint payoff is more easily maximized when utility value knowledge is complete. Siegel and Fouraker used three levels of completeness or payoff knowledge one where both bargainers had complete payoff information, one where neither bargainer had complete payoff information, and one where one bargainer had complete payoff information and the other bargainer had incomplete payoff information.⁴ Bargaining pairs where one bargainer had complete payoff information achieved a significantly higher mean joint payoff than bargaining pairs where neither bargainer had complete payoff information. Also, bargaining pairs where both bargainers had complete payoff information achieved a significantly higher mean joint payoff than either of the other two conditions where at least one bargainer had incomplete payoff information

Kahn and Kohls (1972) studied bargaining pairs where either both bargainers had either incomplete information or both bargainers had complete information. The complete information pairs tended to achieve a higher joint payoff, however, the difference in means was not statistically significant. In the research of Harnett et al (1968) mean joint payoff was also not significantly different. Trios where all bargainers had complete information achieved a nearly equal mean payoff to that of trios where two or all three of the bargainers had incomplete information.

There is limited research on the effect of completeness of information on joint payoff. However, from the statistically nonsignificant

results of Siegel and Fouraker, it appears that as both bargainers approach complete payoff information, a higher joint payoff is achieved.

The central question of the study is important in terms of differential payoff effects because knowing one's opponent's utility values for alternative agreements should theoretically have two important effects. First, knowledge of one's opponent's utility values affects one's expected payoff. Secondly, complete information of utility functions affects what Fellner calls "one's bargaining strength"⁵

Payoff Expectations

Siegel and Fouraker have demonstrated that in bilateral bargaining where both bargainers have complete information (knowledge of the joint payoffs and the division of payoffs associated with any proposed contract) the expectations of payoffs seem to be realistic.⁶ This assumption was supported by the observation that bargainers who both had complete information made more modest (that is more compromising) initial offers than incomplete information bargainers. Although expectations of payoffs were not actually measured by Siegel and Fouraker, they were assumed to be the reason for the high incidence of fifty-fifty splits of the joint payoff when bargainers had complete information about each other's payoffs. This tendency toward fifty-fifty splits was not found as frequently when one bargainer or both bargainers lacked knowledge of both bargainer's utility functions. Thus, Siegel and Fouraker demonstrated that complete payoff knowledge seems to result in realistic payoff expectations which lead to more fifty-fifty splits rather than widely variant differential payoffs.

The implication of this Siegel and Fouraker finding is that if

neither bargainer or only one bargainer has complete payoff knowledge, there will be a tendency toward differential payoff inequalities. This is supported by the research of Harnett, Cummings, and Hughes (1968) who investigated the effects of risk-taking propensity under varying information conditions on bargaining behavior. In their study bargainers bargained with two other persons since the bargaining was between manufacturers, wholesalers, and retailers. The mean payoffs of these bargainers allow some comparisons between bargainers negotiating from different information conditions. When all three bargainers of a bargaining trio were completely informed about potential payoffs, the differential payoff tended to be more equal than in trios where some members of the trio were incompletely informed. Differential payoff inequalities seemed to be reduced when all of the bargainers in a particular trio were completely informed. In pairs where one bargainer has complete information and the other has incomplete information tend to achieve "non-fifty/fifty" splits in differential payoffs, the question then becomes who will tend to receive the more generous portion of the payoff. This question is presently unresolved, but hypotheses concerning "bargaining strength" propose some answers.

Bargaining strength has been conceptualized in various ways. It has been conceptualized as having more 1) physical strength, 2) intelligence, 3) skill in debate, 4) financial resources, 5) ability to sustain financial losses, 6) ability to endure stalemates, and 7) military power. "Bargaining power has also been described as the power to fool and bluff, 'the ability to set the best price for your-

self and fool the other man into thinking this was your best offer."7

Fellner suggested that bargaining strength is the ability to take and inflict losses during a stalemate, and is "toughness." His conception of toughness was "...a bargainer's toughness is his unwillingness to yield in a range in which one party is expected to yield if the other party fails to do so."8

Kahn and Kohls (1972) have collected evidence that the amount of utility value information bargainers have influences their "bargaining toughness." Incomplete information bargainers in their study were tougher than complete information bargainers according to several measures of bargaining toughness. Incomplete information bargainers tended to have higher initial goals, make higher initial bids, make more bids, attempt more deceptions, and take more total time in the negotiation

The main hypothesis of Kahn and Kohl's study was that information affects bargaining toughness. The study did not hypothesize about information affecting payoffs. Bartos (1970) found bargaining toughness positively correlated with payoff. Thus, one could reason that incomplete payoff information increases bargaining toughness, and increased bargaining toughness increases payoffs. By omitting the intervening variable of toughness, one would conclude incomplete information increases payoffs. However, Kahn and Kohl's research empirically supports the conclusion that incomplete information increases toughness, yet simultaneously does not support the conclusion that incomplete information increases payoffs. In Kahn and Kohl's study the mean payoff for high information bargainers was not significantly higher

than the mean payoff for low information bargainers.

In these comparisons by Kahn and Kohls between low information bargainers with high information bargainers, it must be noted that in their study the members of a bargaining pair were always in the same experimental condition. Consequently, the results concerning low information bargainers bidding with more toughness than high information bargainers demonstrates little about any bargaining toughness advantage when an incompletely informed bargainer meets a completely informed bargainer. The Kahn and Kohls results concern contrasts between pairs of incompletely informed bargainers and pairs of completely informed bargainers.

The Schelling Hypothesis

"Weakness is often strength," is Schelling's (1960) paradoxical guiding principle when considering bargaining strength.⁹ According to Schelling it may be advantageous to a bargainer to destroy the viability of the agreements he might be expected to make except for those that are extremely desirable to him. This places the burden of concession-making on his opponent. Since, in both appearance (and as stressed by Schelling) and in reality he cannot make any concessions, his opponent must concede if they are to achieve any joint payoff at all. Schelling wrote

The essence of these tactics is some voluntary but irreversible sacrifice of freedom of choice. They rest on the paradox that the power to constrain an adversary may depend on the power to bind oneself, that, in bargaining, weakness is often strength, freedom may be freedom to capitulate, and to burn bridges behind one may suffice to undo an opponent.¹⁰

These conceptions of bargaining strength have a bearing on the relationship between utility value knowledge and differential payoff because utility value knowledge can affect bargaining strength. Although Fellner does hypothesize that differential payoff is determined by the relative bargaining strengths of the buyer and seller,¹¹ he makes no hypothesis relating utility value knowledge to joint or differential payoff. Siegel and Fouraker have made such a hypothesis. Using Schelling's "weakness is strength" principle, they hypothesized one possible relationship between utility value knowledge and differential payoff.

One way in which utility value information can be used as bargaining strength is that if one knows he is in a position of strength, he will demand the "lion's share" of the joint payoff. However, if one is guided by Schelling's "weakness is strength" hypothesis, then one would predict this may not happen. Using Schelling's hypothesis it can be argued that incomplete information of opponent's utility values may be advantageous. A bargainer with incomplete information may obtain the larger share of the joint payoff when bargaining with a partner who does have complete information. This would be possible because the bargainer with complete information realizes that it will be difficult for his opponent, who lacks complete information on payoffs, to see the merits of the optimal contract. Thus the completely informed bargainer may feel obliged to make large concessions in order to avoid a stalemate. In such a situation the bargainer with incomplete utility function knowledge would win the lion's share of any joint profit.

Beisecker (in an unpublished study) has some evidence that bargainers with complete information of both bargainer's payoff values receive higher differential payoff than their incomplete information partners. This finding contradicts the Schelling "weakness is strength" approach. This finding also contradicts the nonsignificant, but slightly indicative results of Siegel and Fouraker on the effects of information on differential payoffs. Siegel and Fouraker wrote

To test the Schelling hypothesis that bargainers with less information will receive the larger share of the joint payoff, the data from the complete-incomplete condition were examined...Although the differences are in the direction predicted by Schelling, they are not significant.¹²

Thus, the Schelling hypothesis has not been supported by experimental evidence, however, neither has it been disproved.

One necessary condition for the Schelling hypothesis to operate in this case is awareness by the bargainer with complete information that his partner has incomplete payoff information. According to the Schelling conception it is the fear that this opponent, who does not have the complete knowledge of payoffs for both and will consequently not see the need for both to make concessions, that causes the complete information bargainer to make so many generous concessions.

What would we expect if we contrasted bargainers with knowledge of their opponent's utility functions and with awareness that their opponent had incomplete knowledge, to bargainers with knowledge of their opponent's utility functions who also believed that their opponent had such complete payoff information? We are adding a dimension to the completeness of information question. This dimension

is the awareness of one's opponent's incompleteness of payoff information.

If Schelling's general bargaining principle is true in this case, then bargainers with complete utility value knowledge who are aware of their opponent's incompleteness of utility value information should receive less payoff than bargainers who have complete payoff information and think their opponents do also.

Complete Information As A Bargaining Advantage

Completeness of payoff information might be advantageous, however. This might prove true in several ways. Utility value knowledge might cause a bargainer to realize an existing bargaining weakness in an opponent. Here bargaining strength would be operationally defined as a situation where most of the possible agreements have payoffs strongly favoring one bargainer. Thus, the bargainer with complete utility value information would be expected to receive a larger share of the differential payoff as a result of knowing that the possible payoffs favor this likely outcome.

Another possible way the bargainer with utility value information might collect an advantageous portion of the joint payoff is that the knowledge of both payoffs could lead to confidence and competence in making strategic offers. This confidence and competence could then result in an advantage in differential payoff

The concessions made by one's opponent are an indirect indication of whether he "still has room" to make a profit. An incompletely informed bargainer might make inferences from his opponent's concessions

about his opponent's potential payoffs. Since, in this study and in the studies reviewed here, little communication other than the actual offers was allowed, messages about what is an equitable profit for both or messages about lack of profit if one is pressed for further concessions cannot counter any such guesses. A completely informed bargainer need not make such guesses, and he therefore may have a different framework for judging the competitiveness or cooperativeness of his opponent's concessions.

Many of the studies on bilateral negotiation have sought to clarify contradictory evidence concerning effective concession making strategies. Two hypotheses offer distinctly opposite strategies: the level of aspiration hypothesis and the reciprocity hypothesis.

Siegel and Fouraker's level of aspiration hypothesis suggests that bargaining toughness increases payoffs because overly generous concessions cause one's opponent to raise his expectations about his probable payoff. Along with Siegel and Fouraker's 1960 study, Bartos (1965), Bartos (1966), Kelley (1966), Kelley, Beckman, & Fishcher (1967), Liebert, Smith, Keiffer, & Hill (1968), Komorita & Brenner (1968), and Rubin & DiMatteo (1972) are cited as providing empirical support for the level of aspiration hypothesis.

The research of Pruitt & Johnson (1970), Komorita & Barnes (1969), Benton et al. (1972) shows support for the reciprocity hypothesis. The reciprocity hypothesis states bargainers will concede in accordance with the size of their opponent's concession. Generous concessions will be generously reciprocated, and small concessions will be minimally reciprocated.

Such studies that are focused on concession making interactions during bargaining are relevant to the question of utility information effects on payoff because some of them consider bilateral bargaining pairs where both bargainers have incomplete information (Pruitt & Drews, 1969, Hinton, Hammer, & Pohlen, 1974, and Rubin & DiMatteo, 1972) Others studied pairs where both bargainers have complete information (Druckman et al., 1972, Druckman & Bonoma, 1976, and Michener et al., 1975). The information state of a bargainer could certainly be an important part of the context in which a concession is judged to be generous or minimal.

Summary of Previous Research Applied to this Study

It is clear from the previous studies discussed above that completeness or incompleteness of payoff information affects bilateral bargaining. Three major principles of such effects are applied to the generation of this study's hypotheses

First, when both bargainers have complete payoff information they tend to achieve a higher joint payoff than incompletely informed bargainers. Second, when both bargainers have complete information neither tends to get an advantageous share of the payoff. Third, in bargaining pairs where one bargainer has complete information and another bargainer has incomplete information, it is presently unknown who tends to receive the advantageous share of the payoff. These three conclusions lead to the following hypotheses.

Hypotheses

This study will be concerned with five hypotheses. The first

hypothesis deals with the following question. Who tends to achieve a higher maximization of joint payoff--bargaining pairs where only one of the bargainers is completely informed or bargaining pairs where both bargainers are completely informed? The first hypothesis is

Complete payoff information/complete payoff information bargaining pairs will achieve higher joint payoffs than will complete payoff information/incomplete payoff information bargaining pairs.

This effect of both bargainers having complete payoff information on joint payoff maximization has been supported by Siegel and Fouraker.¹³

The second hypothesis deals with the question of what type of bargaining pairs tend to split the possible payoff unequally--bargaining pairs where only one of the bargainers is completely informed or bargaining pairs where both bargainers are completely informed? The second hypothesis is

Complete payoff information/incomplete payoff information bargaining pairs will arrive at bargains with greater variability in differential payoffs than complete payoff information/complete payoff information pairs

Siegel and Fouraker's 1960 studies also support this hypothesis¹⁴

The third hypothesis is that the "Schelling hypothesis" might explain who tends to obtain the advantageous share in the differential payoff that is more common in complete payoff information/incomplete payoff information pairs.

In complete payoff information/incomplete payoff information pairs, the bargainers with incomplete information will achieve higher payoffs than their complete information opponents.

Siegel and Fouraker found slightly indicative but nonsignificant signs of this.¹⁵ Beisecker has indications that the opposite is more likely.¹⁶

The fourth hypothesis is

In complete information/incomplete information pairs, complete information bargainers who bargain with awareness of the incompleteness of their opponent's payoff information will receive lower payoffs than complete information bargainers with no awareness of the incompleteness of their opponent's payoff information

Siegel and Fouraker's studies did not include a manipulation of "awareness of the other's payoff knowledge." This clearer test of the Schelling hypothesis has not been done.

The fifth hypothesis compares two conditions of incomplete payoff information. Both of these conditions involved incomplete information bargainers who bargain with complete information bargainers. In both conditions the complete information bargainers of these pairs are unaware of the completeness or incompleteness of their partner's payoff information. The incomplete information bargainers represent two conditions of awareness of the completeness or incompleteness of their partner's payoff information. The payoffs of incomplete information bargainers who are aware of their partner's complete payoff information will probably be more than the payoffs of incomplete information bargainers who are unaware of their partner's complete payoff information.

The fifth hypothesis is a test of whether or not the bargainer with incomplete payoff information who is aware of his partner's complete payoff information will interpret his partner's concessions as being a sign of bargaining weakness, and will consequently yield less. Siegel and Fouraker described an instance of a bargainer offering an unexpectedly generous bid.¹⁷ The opponent's response was not to make a reciprocally generous concession, but rather to make even smaller

concessions than he had been making before the unexpected yielding of the other. Siegel and Fouraker speculated that his expectations for an advantageous bargain had been increased, and resulted in his smaller concession making. The fifth hypothesis is

Incomplete information bargainers who are aware of their partner's complete information will receive higher payoffs than incomplete information bargainers who are less aware of their partner's complete payoff information.

Summary

Thus this research posed five major questions regarding the effect of payoff information on both joint and differential payoffs:

- 1) What information conditions maximize joint payoff?
- 2) What information conditions lead to inequality in differential payoff?
- 3) Do incomplete bargainers or complete bargainers (in incomplete/complete pairs) tend to get the advantageous share of differential payoff?
- 4) Is awareness of one's bargaining partner's incomplete information an advantage or disadvantage to a completely informed bargainer?
- 5) Is awareness of one's bargaining partner's complete information an advantage or disadvantage to an incompletely informed bargainer?

The procedures used to investigate these research questions are described in Chapter II, the results are reported in Chapter III, and a discussion of the results and implications for future research are found in Chapter IV.

CHAPTER II

METHODOLOGY

This study used students at the University of Kansas as bargainers. The bargainers were randomly assigned to either act as the buyer of a hypothetical product X or as the seller of X. Buyers and sellers were randomly paired. Each bargaining pair was asked to bargain until an agreement as to what quantity of X and at what price X should be bought was agreed upon. In order to manipulate bargainers' states of utility value information, bargainers were randomly assigned to one of five conditions of different information, and received different payoff information accordingly. The bargaining was carried out by having the experimenter carry the written price and quantity offers back and forth between the buyer and the seller. After each bargaining pair reached an agreement, the bargainers individually responded to a questionnaire constructed to check the manipulation of utility value information as well as the bargainers' conceptions of the situation.

Subjects

The subjects were 120 students who were enrolled in the basic interpersonal communication course at the University of Kansas. Fifty-nine were female and sixty-one were male. Almost all 120 were either freshmen or sophomores.

Subjects participated in order to fulfill a course requirement to either take part in one speech-communication research project or to review a speech-communication research report. Subjects were solicited by a bulletin board sign-up sheet. This sheet stated to subjects that they would be taking part in a study of "bargaining communication." In terms of assignment to conditions, all such assignment was random.

Design

Five conditions of varying utility value knowledge were used. Each condition was represented by twelve bargaining pairs. A bargaining pair consisted of the buyer and the seller who bargained together. Sixty bargaining pairs or 120 subjects participated.

Two variables were used to classify the bargaining pairs into five different conditions. The first was whether both bargainers or only one bargainer had complete payoff information in each bargaining pair. Incomplete payoff information bargainers received only a table of their own potential profits at various specifications of price and quantity. These tables indicated the various potential profits associated with different price and quantity agreements (see Appendices B and C). Complete payoff information bargainers received not only a table of their own potential profits, but also a table of their bargaining opponent's possible profits at various intersections of price and quantity.

The second variable used to classify the bargaining pairs was whether both bargainers, one bargainer, or neither bargainer in a pair knew whether his partner had complete or incomplete payoff information. This variable was called the awareness of the information state of one's bargaining partner.

If both bargainers of a bargaining pair had complete payoff information and both were aware that the other had complete payoff information, then the bargaining pair was said to represent condition one. Such bargaining pairs will hereafter be referred to as "complete information/complete information" bargaining pairs. Only this condition had both bargainers using complete payoff information. In conditions two, three, four, and five each bargaining pair consisted of one bargainer with complete payoff information and another bargainer with incomplete payoff information.

If one bargainer had complete payoff information and was aware of the information condition of the other bargainer, and if this other bargainer had incomplete payoff information and was aware of the information state of the first, then these two bargainers constituted a bargaining pair which represents condition two. Such bargaining pairs will hereafter be referred to as "complete and aware/incomplete and aware" bargaining pairs.

If one bargainer had complete payoff information and was made aware of the information state of the other, and if this other bargainer had incomplete information and was not made aware of the information state of the first, then this bargaining pair represented the third condition. Hereafter such pairs will be referred to as "complete and aware/incomplete and unaware".

If one bargainer had complete payoff information and was not made aware of the information state of the other, and if this other bargainer had incomplete information and was made aware of the information state of the first, then these bargainers were a pair which represents

condition four Such pairs will be called "complete and unaware/incomplete and aware" bargaining pairs.

If one bargainer had complete payoff information and was not made aware of the information state of the other bargainer, and if this other bargainer had incomplete payoff information and was not made aware of the information state of the first, then these two bargainers constituted a condition five bargaining pair. Such bargaining pairs will hereafter be referred to as "complete and unaware/incomplete and unaware" bargaining pairs

Procedure

Each experimental session began with the subjects arriving at an assigned room. Two bargaining pairs participated in each session. The first subject to arrive was directed to a small, windowless, and private room. The other subjects on arrival were also directed to private rooms—one subject to each room. It was necessary for each subject to have a private room in order to minimize interpersonal communication between the bargainers.

A random schedule of which conditions were to be represented by these two bargaining pairs was followed. Inside each condition one half of the complete information bargainers acted as sellers and one half acted as buyers. Likewise, one half of the incomplete information bargainers acted as buyers and one half acted as sellers. In each pair of bargainers a random draw determined who was the buyer and who initiated the first offer.

Each subject received written instructions (see Appendix A). These instructions introduced the bilateral bargaining situation. After

a few minutes had been allowed for the subjects to read these instructions, payoff tables and statements or lack of statements about one's opponent's payoff tables were given according to the experimental condition represented by each subject (see Appendices B and C) Incomplete information was operationally defined as receiving only the seller's table if one was a seller or only the buyer's payoff table if one was a buyer. Complete information bargainers received both the buyer's and the seller's payoff tables

Awareness of one's opponent's information condition was assumed to be low. This was checked with an item on the questionnaire and with the interview which followed the bargaining session. To make a subject highly aware of the other's payoff knowledge the experimenter told what payoff table his opponent was going to be given. In conditions of unawareness of the other's payoff information the completeness or incompleteness of the other's payoff knowledge was not mentioned.

Once the subjects knew which of the two roles (buyer or seller) they were to play, and had received their payoff table and possibly some information about what type of payoff table their opponent had received, they were given additional written directions. These directions explained how to make offers, and what constitutes a bargain (see Appendix D).

Negotiations were conducted in silence. A subject recorded a bid on a sheet of paper provided to him for this purpose. The subject then signalled the experimenter who took this bid to that subject's opponent. The other bargainer then either accepted this offer or made a counter-offer. Both the original offer and all counter-offers were always passed along to the bargainers. This continued until the pair came to an agreement.

The agreed upon bid dictated various amounts of joint and differential payoff, and thus served as the major dependent variable in the various statistical analyses

Note that this procedure minimized interpersonal relations between subjects. The bargainers never saw each other prior to bargaining, and they bargained in total physical separation. The only communications were the offers and the counter-offers. This procedure minimized the influence of possible incompatibilities or differences in verbal style when communicating concessions, perceptions, etc. These variables may well be important, but they should be minimized when our present concern focused on the effects of differences in payoff knowledge.

After agreements were negotiated, subjects responded to a questionnaire concerning their perceptions of the agreement, the negotiations, their expectations of payoffs, their satisfaction with the agreement, their awareness of the condition of their opponent's information condition, etc. These questions allowed examination of the assumption that bargainers who are not told about their partner's information condition would not be highly aware of their partner's information condition.

After this written questionnaire was completed by the subjects, each subject was interviewed briefly. Subjects were asked not to discuss the study with anyone.

Statistical Procedures

The hypotheses were tested statistically in the following comparisons. The first hypothesis was tested with a one-tailed t-test between the mean joint payoff of "complete information/complete information"

pairs (condition one) against the mean joint payoff of all other pairs (conditions two, three, four and five) It was predicted that the mean joint payoff of complete/complete information pairs would be greater than the mean joint payoff of complete/incomplete pairs. The prediction was directional on the evidence of Siegel's and Fouraker's results ¹⁸

If a bargaining pair agreed on a price and quantity that gave one bargainer a profit of 500 and the other bargainer a profit of 200, then the difference in differential payoff would be 300. The second hypothesis was tested with a one-tailed t-test between the mean difference in differential payoff of condition one bargaining pairs and the mean of conditions two, three, four and five bargaining pairs. It was predicted that the mean difference in individual payoffs in condition one would be smaller than the mean difference in individual payoffs in the other conditions where one bargainer has complete information and the other bargainer has incomplete information. The prediction was directional on the basis of the data of Siegel and Fouraker.¹⁹

The third hypothesis was tested with a one-tailed t-test between the mean payoffs of complete information bargainers in every condition except condition one and the mean payoffs of incomplete information bargainers in all conditions. It was predicted that the mean payoff of complete information bargainers would be less than the mean payoff of incomplete information bargainers This prediction is directional on the basis of Siegel's and Fouraker's data ²⁰

The fourth hypothesis was tested with a one-tailed t-test between the mean payoffs of the complete information bargaining in condition

three (complete/incomplete pairs where only the complete information bargainers are made aware of their partner's state of payoff information) versus the mean payoff of the complete information bargainer in condition five (complete/incomplete pairs where neither is made aware of the condition of payoff information of the other) This test was directional on the basis of the speculation of Siegel and Fouraker and on the basis of Schelling's hypothesis ²¹

The fifth hypothesis was tested statistically with a one-tailed t-test between the mean payoff of incomplete bargainers in condition four (complete/incomplete pairs where only the incomplete information bargainer is made aware of the other's condition of information) and the mean payoff of incomplete bargainers in condition five (complete/incomplete information pairs where neither is made aware of the condition of information of the other) The test was directional based on the speculations of Siegel and Fouraker concerning overly generous concessions ²²

Summary

This chapter reported the methodological procedures employed in this research project. Specifically, five conditions of varying utility value knowledge were created in bilateral bargaining pairs After bargaining, subjects filled out a questionnaire constructed for this study to identify any processes related to utility value information which might have affected the bargaining Of main interest in the statistical analyses were the mean joint and differential payoff associated with the various conditions of utility value information. The results of the statistical operations which were used are reported in Chapter III.

CHAPTER III

RESULTS

This chapter reports the results of this experimental study. The data obtained as well as the statistical analyses are reported for each hypothesis. The .05 level of significance was used for all statistical tests

Hypothesis One

Complete payoff information/complete payoff information bargaining pairs will achieve a higher maximization of joint payoff than will complete payoff information/incomplete payoff information bargaining pairs.

Joint payoff was the sum of each individual bargainer's payoff for the agreed upon quantity and price of X, the hypothetical product. Joint payoff varied according to the price and quantity agreement of each bargaining pair. These variations were specified on the profit tables used by the bargainers. The range of possible joint payoff varied from 221 profit units to 2,941 profit units. The actual agreements of the sixty bargaining pairs of this study created a set of joint payoffs which ranged from 600 profit units to 1,080 profit units

The mean joint payoff of the bargaining pairs in condition one, where both had complete payoff information, was contrasted to the mean joint payoff of the bargaining pairs in conditions two, three, four, and five, where one bargainer had complete payoff information and the other bargainer had incomplete payoff information. A one-tailed t-test

was performed to determine the extent and significance of the mean difference between the two groups. Table 1 reports the means and t value of the analysis.

TABLE 1
COMPLETENESS OF INFORMATION AND JOINT PAYOFF

| | N | Mean Joint Payoff | t |
|---|----|-------------------|--------|
| Complete Information/ Complete Information Bargaining Pairs | 12 | 990.50 | -1.40* |
| Complete Information/ Incomplete Information Bargaining Pairs | 48 | 1037.26 | |

*Nonsignificant

It was hypothesized that the mean joint payoff of complete/complete information pairs would be higher than the mean joint payoff of complete/incomplete information pairs. However, the mean joint payoff of complete/complete information pairs was not significantly higher than the mean joint payoff of the complete/incomplete information pairs. Thus, the hypothesis could not be accepted.

Hypothesis Two

Complete payoff information/incomplete payoff information bargaining pairs will arrive at bargains with greater variability in differential payoff than complete payoff information/complete payoff information pairs.

Differential payoff was each individual's payoff for the particular agreement on price and quantity negotiated. The amount of payoff was specified by the profit tables. Since the possible range of individual

TABLE 2
JOINT PAYOFF

| | Complete Information/ Complete Information Bargaining Pairs | Complete and Aware/ Incomplete and Aware Bargaining Pairs | Complete and Aware/ Incomplete and Unaware Bargaining Pairs | Complete and Unaware/ Incomplete and Aware Bargaining Pairs | Completed Unaware/ Incompleted Unaware Bargaining Pairs |
|------------------|---|---|---|---|---|
| | 1080 | 1055 | 1030 | 1030 | 1023 |
| | 1080 | 1080 | 1080 | 865 | 1080 |
| | 1080 | 947 5 | 1080 | 1055 | 1030 |
| | 1023 | 1030 | 1080 | 1050 | 1080 |
| | 1023 | 1023 | 1030 | 1080 | 1080 |
| | 600* | 1080 | 1080 | 1080 | 1080 |
| | 1080 | 1080 | 1023 | 1030 | 1080 |
| | 1080 | 1030 | 1080 | 1080 | 865 |
| | 1080 | 1080 | 1030 | 1080 | 1030 |
| | 600* | 1023 | 1080 | 1080 | 940 |
| | 1080 | 732 5 | 1080 | 1080 | 865 |
| | 1080 | 1080 | 1080 | 1051.5 | 1080 |
| Mean | <u>990 50</u> | <u>1020 08</u> | <u>1062.79</u> | <u>1046.79</u> | <u>1019.42</u> |
| Joint Payoffs | | | | | |

*These two pairs achieved a 50%/50% split bargain--apparently without noticing that they could have achieved this same 50%/50% parity at another price and quantity which would have been 1080 rather than 600 joint payoff.

TABLE 3
NUMBER OF PAIRS THAT ACHIEVED THE MAXIMUM
JOINT PAYOFF OF 1,080 PROFIT UNITS

| | Complete/Complete Pairs | Complete/Incomplete Pairs |
|--|-------------------------|---------------------------|
| Achieved Maximum Joint Payoff | 8 | 25 |
| Did Not Achieve Maximum Joint Payoff | 4 | 23 |
| % Who Achieved Maximum Joint Payoff | 66.66% | 52.08% |

$\chi^2 = .825$ (nonsignificant)

TABLE 4

NUMBER OF PAIRS THAT ACHIEVED THE MAXIMUM
JOINT PAYOFF OF 1,080 PROFIT UNITS

| | | Incomplete | |
|----------|---------|--|---|
| | | Aware | Unaware |
| Complete | Aware | II 5 maximized 7 did not 41 67% | III 8 maximized 4 did not 66.67% |
| | Unaware | IV 6 maximized 6 did not 50 00% | V 6 maximized 6 did not 50.00% |

TABLE 5
AWARENESS AND JOINT PAYOFF

| Source | SS | df | MS | F | Significance |
|--|------------|----|-----------|------|--------------|
| Awareness in Completely Informed Bargainer | 829.16 | 1 | 829.16 | 0.16 | -- |
| Awareness in Incompletely Informed Bargainer | 701.50 | 1 | 701.50 | 0.13 | -- |
| Interaction | 14,717.42 | 1 | 14,717.42 | 2.80 | -- |
| Error | 231,117.50 | 44 | 5,252.67 | -- | -- |
| Total | 247,365.54 | 47 | -- | -- | -- |

payoff was 0 profit units to 2,941 profit units, the greatest disparity in individual payoff possible was 2,941. If both individuals in a pair achieved equal individual payoff the minimum difference in individual payoff of zero was achieved. The range that actually occurred with this study's sixty bargaining pairs was zero profit units to 1,050 profit units difference between the payoff of the two bargaining in each pair.

Hypothesis Two, being a directional hypothesis, was examined with a one-tailed t-test of the mean difference in individual payoff of pairs in condition one versus the mean difference of pairs in conditions two, three, four, and five. It was hypothesized that pairs in condition one (the only condition where both bargainers had complete information) would have less inequality in differential payoff than complete/incomplete information pairs. This hypothesis was accepted since the data indicated the mean difference in individual payoff of condition one pairs was significantly less than the mean difference in individual payoff of condition two, three, four and five pairs. Table 6 reports the means and the t value of this analysis.

TABLE 6
COMPLETENESS OF INFORMATION AND INEQUALITY IN
DIFFERENTIAL PAYOFF

| | N | Mean Difference in Individual Payoff | t |
|---|----|---|-------|
| Complete Information/ Complete Information Bargaining Pairs | 12 | 38 83 | |
| Complete Information/ Incomplete Information Bargaining Pairs | 48 | 235 41 | 2.90* |

*Significant

TABLE 7

THE SIZE OF NONPARITY OF INDIVIDUAL
PAYOFF WITHIN PAIRS
(THE SIZE IN PROFIT UNITS OF ANY INEQUALITY OF INDIVIDUAL PAYOFF)

| Complete Information/ Complete Information Bargaining Pairs | Complete and Aware/ Incomplete and Aware Bargaining Pairs | Complete and Aware/ Incomplete and Unaware Bargaining Pairs | Complete and Unaware/ Incomplete and Aware Bargaining Pairs | Complete and Unaware/ Incomplete and Un- aware Bargaining Pairs |
|---|---|---|---|---|
| 0 | 275 | 370 | 41 | 363 |
| 180 | 540 | 270 | 315 | 0 |
| 0 | 307.5 | 720 | 45 | 22 |
| 143 | 190 | 0 | 1050 | 180 |
| 143 | 77 | 610 | 180 | 0 |
| 0 | 0 | 135 | 180 | 360 |
| 0 | 0 | 77 | 510 | 0 |
| 0 | 750 | 180 | 0 | 35 |
| 0 | 270 | 370 | 360 | 230 |
| 0 | 143 | 360 | 360 | 120 |
| 0 | 47.5 | 0 | 180 | 65 |
| 0 | 180 | 0 | 471.5 | 360 |
| Means 38.84 | 231.67 | 257.67 | 307.71 | 144.58 |

TABLE 8

NUMBER OF PAIRS THAT ACHIEVED PARITY
IN INDIVIDUAL PAYOFF

| | Complete/Complete Pairs | Complete/Incomplete Pairs |
|------------------------|-------------------------|---------------------------|
| Achieved Parity | 9 | 9 |
| Did Not Achieve Parity | 3 | 39 |
| % Who Achieved Parity | 75.00% | 18.75% |

$\chi^2 = 14.46$ (significant)
1 d.f.

TABLE 9
NUMBER OF PAIRS THAT ACHIEVED PARITY
IN INDIVIDUAL PAYOFF

| | | Incomplete | |
|----------|---------|---|---|
| | | Aware | Unaware |
| Complete | Aware | II 2 achieved parity 10 did not 16.67% | III 3 achieved parity 9 did not 25.00% |
| | Unaware | IV 1 achieved parity 11 did not 8.34% | V 3 achieved parity 9 did not 25.00% |

TABLE 10

AWARENESS AND SIZE OF DIFFERENCES IN PAYOFFS
BETWEEN BARGAINERS OF A PAIR

| Source | SS | df | MS | F | Significance |
|---|--------------|----|------------|------|--------------|
| Awareness in Completely Informed Bargainers | 4,116.26 | 1 | 4,116.26 | 0.08 | -- |
| Awareness in Incompletely Informed Bargainers | 56,409.80 | 1 | 56,409.80 | 1.06 | -- |
| Interaction | 107,304.79 | 1 | 107,304.79 | 2.03 | -- |
| Error | 2,330,711.98 | 44 | 52,970.73 | -- | -- |
| Total | 2,498,542.83 | 47 | -- | -- | -- |

Hypothesis Two predicted that bargaining pairs where only one bargainer has complete payoff information would achieve unequal individual payoffs within each such pair. In such pairs one of the two bargainers is likely to achieve an advantageous portion of the payoffs. Hypothesis Three predicted that it would be the incompletely informed bargainer rather than the completely informed bargainer who would achieve this higher (relative to one's opponent) individual payoff.

In the analysis for Hypothesis Three the relative differences within each bargaining pair between the incompletely informed bargainer's payoff and the completely informed bargainer's payoff were used. That is, the completely informed bargainer's profit was subtracted from his incompletely informed opponent's profit. For example, a positive difference of 120 profit units would indicate that in that bargaining pair the incompletely informed bargainer achieved a payoff of 120 profit units more than the completely informed bargainer's profit.

The mean difference between incompletely informed bargainer's profits and completely informed bargainer's profits across all forty-eight pairs was 118.64 profit units.

Hypothesis Three

In complete payoff information/incomplete payoff information pairs, the bargainers with incomplete information will achieve higher payoffs than their complete information opponents.

The mean payoff of complete information bargainers was predicted to be less than the mean payoff of their incomplete information partners. Since this hypothesis was directional, a one-tailed t-test was performed. Table 11 reports the results of the data analysis. The hypothesis was accepted as being supported by the data.

TABLE 11

HYPOTHESIS THREE THE DIFFERENCE IN INDIVIDUAL PAYOFF
WITHIN COMPLETE/INCOMPLETE PAIRS

| | Means |
|--|---------------------|
| Mean Difference in Individual Payoff When the Complete Bargainer's Payoff Was Subtracted From the Incomplete Bargainer's Payoff | 118.64 profit units |
| | t = 2.66* |

*significant

TABLE 12

THE ADVANTAGE IN INDIVIDUAL PAYOFF OF THE INCOMPLETELY INFORMED
BARGAINER RELATIVE TO THEIR COMPLETELY INFORMED OPPONENTS

| Complete and Aware/ Incomplete and Aware Bargaining Pairs | | | Complete and Aware/ Incomplete and Unaware Bargaining Pairs | | | Complete and Unaware/ Incomplete and Aware Bargaining Pairs | | | Complete and Unaware/ Incomplete and Unaware Bargaining Pairs | | |
|---|---------------|-----------------|---|---------------|-----------------|---|---------------|-----------------|---|---------------|-----------------|
| A's Profit | B's Profit | Differ- ence | A's Profit | B's Profit | Differ- ence | A's Profit | B's Profit | Differ- ence | A's Profit | B's Profit | Differ- ence |
| 665 | 390 | 275 | 700 | 330 | 370 | 535.5 | 494.5 | 41 | 693 | 330 | 363 |
| 270 | 810 | -540 | 675 | 405 | 270 | 275 | 590 | -315 | 540 | 540 | 0 |
| 627.5 | 320 | 307.5 | 900 | 180 | 720 | 550 | 505 | 45 | 504 | 526 | - 22 |
| 420 | 610 | -190 | 540 | 540 | 0 | 1050 | 0 | 1050 | 630 | 450 | 180 |
| 550 | 473 | 77 | 210 | 820 | -610 | 450 | 630 | -180 | 540 | 540 | 0 |
| 540 | 540 | 0 | 607.5 | 472.5 | 135 | 630 | 450 | 180 | 720 | 360 | 360 |
| 540 | 540 | 0 | 550 | 473 | 77 | 770 | 260 | 510 | 540 | 540 | 0 |
| 890 | 140 | 750 | 630 | 450 | 180 | 540 | 540 | 0 | 415 | 450 | -35 |
| 675 | 405 | 270 | 700 | 330 | 370 | 720 | 360 | 360 | 630 | 400 | 230 |
| 440 | 583 | -143 | 360 | 720 | -360 | 720 | 360 | 360 | 530 | 410 | 120 |
| 342.5 | 390 | - 47.5 | 540 | 540 | 0 | 450 | 630 | -180 | 465 | 400 | 65 |
| 450 | 630 | -180 | 540 | 540 | 0 | 761.5 | 290 | 471.5 | 720 | 360 | 360 |
| 534.17 | 485.91 | 48.26 | 579.38 | 483.38 | 96.00 | 621.00 | 425.79 | 195.21 | 577.25 | 442.17 | 135.08 |

A is always the Incompletely Informed Bargainer

TABLE 13

WHO ACHIEVED THE LARGER PAYOFF IN BARGAINING PAIRS WHERE ONE BARGAINER
WAS COMPLETELY INFORMED AND THE OTHER WAS INCOMPLETELY INFORMED

| | No. of Cases | % of All 48 Cases | % of the 39 Nonparity Cases |
|---|--------------|-------------------|-----------------------------|
| <u>No advantage to either party (parity of individual payoff)</u> | 9 cases | 18.75% | ---- |
| <u>Incompletely informed bargainer achieved higher payoff than his completely informed opponent</u> | 27 cases | 56.25% | 69.23% |
| <u>Completely informed bargainer achieved higher payoff than his incompletely informed opponent</u> | 12 cases | 25.00% | 30.77% |
| | 48 cases | | |

$\chi^2 = 7.13^*$
d.f. = 2

*significant

TABLE 14

AWARENESS AND DIFFERENCE IN INDIVIDUAL PAYOFF

| Source | SS | df | MS | F | Significance |
|---|--------------|----|------------|------|--------------|
| Awareness in Completely Informed Bargainers | 103,834.51 | 1 | 103,834.51 | 1.05 | -- |
| Awareness in Incompletely Informed Bargainers | 459.42 | 1 | 459.42 | .005 | -- |
| Interaction | 34,911.04 | 1 | 34,911.04 | 35 | -- |
| Error | 4,343,741.40 | 44 | 98,721.39 | -- | -- |
| Total | 4,482,946.37 | 47 | -- | -- | -- |

Hypothesis Four

In complete information/incomplete information pairs, complete information bargainers who bargain with awareness of the incompleteness of their opponent's payoff information will receive lower payoffs than complete information bargainers with no awareness of the incompleteness of their partner's payoff information

This hypothesis was tested by a comparison of the mean individual payoff of complete information bargainers in condition three with the mean individual payoff of complete information bargainers in condition five. Results of the one-tailed t-test analysis are reported in Table 15. The data do not support the hypothesis

TABLE 15

"AWARENESS" AND "UNWARENESS" AND COMPLETE
INFORMATION BARGAINER'S PAYOFFS

| | N | Mean Payoff | t |
|---|----|-------------|-------|
| "Aware and Complete Information" Bargainers | 12 | 483.37 | |
| "Unaware and Complete Information" Bargainers | 12 | 442.17 | 0.76* |

*Nonsignificant

Hypothesis Five

Incomplete information bargainers who are aware of their partner's complete information will receive higher payoffs than incomplete information bargainers who are less aware of their partner's complete payoff information

This hypothesis predicted that incomplete information bargainers who are aware of their opponent's complete information will arrive at higher payoffs than incomplete information bargainers who are unaware of their opponents information state. This hypothesis was tested with

a one-tailed t-test between the mean payoff of incomplete information bargainers in condition four versus the mean payoff of incomplete information bargainers in condition five. This analysis of the data is reported in Table 16. The hypothesis was not accepted.

TABLE 16
"AWARENESS" AND "UNWARENESS" AND INCOMPLETE
INFORMATION BARGAINER'S PAYOFFS

| | N | Mean Payoff | t |
|---|----|-------------|-------|
| "Aware and Incomplete Information" Bargainers | 12 | 621.00 | 0.69* |
| "Unaware and Incomplete Information" Bargainers | 12 | 577.25 | |

*Nonsignificant

Summary

Hypothesis One dealt with the question of who tends to achieve a higher maximization of joint payoff--bargaining pairs where only one of the bargainers is completely informed or bargaining pairs where both bargainers are completely informed? The prediction that "complete/complete information" pairs would achieve higher joint payoff was not supported.

In regard to Hypothesis Two, the prediction made was supported. "Complete/incomplete information" pairs did make bargains with greater inequality of differential payoff than "complete/complete information" pairs.

The Schelling hypothesis, as applied in Hypothesis Three of this study, was also supported.

Awareness of the information condition of one's bargaining opponent did not create significant differences in either Hypothesis Four or Hypothesis Five. These two hypotheses dealing with the "awareness" manipulation could not be accepted.

Chapter IV will discuss the results and provide implications for future research.

CHAPTER IV

DISCUSSION

Summary of the Study

This study investigated the effects of utility value information on bilateral bargaining payoffs. One-hundred and twenty university students acted as either the buyers or sellers of a hypothetical product X. Each bargainer negotiated with either incomplete payoff information (which meant knowing only one's own different profit levels at various price and quantity intersections) or with complete payoff information (which meant knowing both one's own and one's opponent's possible profits). A second manipulation used to classify bargainers into different conditions was termed the "Awareness" manipulation. If a bargainer was informed as to the completeness or incompleteness of his opponent's payoff information, then that bargainer was classified as "Aware." Unaware bargainers were not informed about their opponent's payoff information. The five conditions of varying utility value knowledge in a pair of bargainers follows. Condition One--"complete and aware/complete and aware", Condition Two--"complete and aware/incomplete and aware", Condition Three--"complete and aware/incomplete and unaware", Condition Four--"complete and unaware/incomplete and aware", and Condition Five--"complete and unaware/incomplete and unaware".

These conditions were created for the purpose of examining some

hypotheses concerning the effects of utility value information on bargaining payoffs. These hypotheses will be discussed individually.

Hypothesis One

Hypothesis One posed the question of "What utility value information conditions maximize joint payoff?" Siegel and Fouraker had found that joint payoff is increasingly maximized in bargaining pairs as completeness of payoff information is increased. Bargaining pairs where at least one bargainer had complete payoff information usually achieved a higher joint payoff than pairs where neither bargainer had complete payoff information. The highest maximization of joint payoff was achieved by pairs where both bargainers had complete payoff information. Siegel and Fouraker concluded there was support for the hypothesis that completeness of payoff information results in higher joint payoff maximization.

Accordingly, this study's hypothesis concerning completeness of payoff information and joint payoff maximization was directional. Completeness of payoff information was predicted to result in higher joint payoff. The hypothesis was stated in the following manner

Complete payoff information/complete payoff information bargaining pairs will achieve a higher maximization of joint payoff than will complete payoff information/incomplete payoff information bargaining pairs

The mean joint payoff of condition one pairs was 990.50 profit units. Rather than being higher than the complete information/incomplete information pairs of conditions two, three, four, and five this was lower. Complete information/incomplete information pairs achieved a mean joint payoff of 1037.26 profit units (see Table 1 for

the t value). These means do not support the hypothesis.

The profit of twelve pairs contributed to the complete information/complete information mean joint payoff of 990.50 profit units. Two of these twelve pairs achieved the lowest joint payoff of any of the bargaining pairs in any conditions. The mean joint payoff of complete information/incomplete information pairs was 1,037 profit units. The mean joint payoff of all the complete information/complete information pairs except these two very low-scoring pairs was 1,069. The two low scoring pairs in extreme contrast both achieved a mean joint payoff of only 600. Accordingly, a closer look was taken at the bargaining tactics used by these two pairs.

In trying to understand the distinctly different payoff outcome of the two "600 profit units" pairs relative to the other ten pairs of the same condition, the initial offers of the bargainers were examined. In the case of the two "600" pairs, the initial offers were extreme--that is, one party demanded much more than a majority of the total potential profit. The initial offers in these two cases created great disparity in the differential payoff, the initial offer in one case proposed an eighty-eight percent/twelve percent profit split and the other case had a hundred percent/zero percent proposed initial payoff split

If the initial offers in the bargaining of the two "600 profit units" pairs were more extreme than the initial offers of the other ten pairs in the same condition, eventual compromise would be that much more difficult for the two pairs. So, they, in comparison to the other ten pairs, might be more easily satisfied with a fifty percent/fifty percent split of 600 profit units when further bargaining could have resulted in

a fifty percent/fifty percent split of 1,080 profit units. This explanation is unsatisfactory though because the proposed initial splits of profit of the other two pairs in the same condition were not less extreme than the two "600" pairs five cases of one-hundred percent/zero percent, two ninety-two percent/eight percent cases, one eighty-four percent/sixteen percent case, and two sixty-seven percent/thirty-three percent cases.

A satisfactory explanation appears to be a combination of two factors. As predicted in Hypothesis Two (which was supported by the data collected in this study) when both bargainers have complete payoff information unequal payoff splits occur less often than when one bargainer has incomplete payoff information. Thus, when both bargainers have complete payoff information as the two bargaining pairs being discussed did, one would expect them to achieve a bargain with equality of differential payoff. In the bargaining table used, three possible bargains specify such "50/50" splits Two of these possibilities split a joint payoff of 600 profit units equally. The third possible negotiation agreement splits a joint payoff of 1,080 profit units equally. Eight of the twelve pairs in condition one achieved the bargain specifying this "50/50 split--1,080 joint payoff" bargain The two low pairs both agreed on a "50/50 split--600 joint payoff" bargain.

Apparently the two low joint profit pairs never discovered the bargain that would have equality of differential payoff like the bargain they agreed on, but additionally would increase the amount they would split equally from 600 to 1,080. This explanation is supported by an observation. These two might not have discovered the 1,080 joint

payoff bargain because they spent less time than the other condition one bargaining pairs. They averaged 21.00 minutes of bargaining while the other ten condition one pairs bargained for a mean of 27.90 minutes. In summary, these two pairs significantly lowered the mean joint payoff at condition bargainers.

As originally hypothesized, condition one bargainers were expected to achieve a higher mean joint payoff, because both bargainers (having complete payoff information) would more easily perceive and consider the desirable consequence of those possible bargains which maximize joint payoff. Condition two, three, four and five bargainers (where one bargainer had incomplete payoff information) were expected to be slightly less able to perceive and consider the high payoffs of the joint maximizing offers. In this study, however, complete payoff information/complete payoff information bargaining pairs did not achieve a significantly higher mean joint payoff than complete payoff information/incomplete payoff information pairs.

Hypothesis Two

The question posed by Hypothesis Two is "What utility value information conditions tend to result in equality or approximate equality in differential payoff and what information conditions tend to result in higher inequality in differential payoff? Siegel and Fouraker had found that inequality in differential payoff is increased as completeness of payoff information is decreased. On the basis of their results this study's hypothesis concerning completeness of payoff information and inequality in differential payoff was directional. The hypothesis was

stated as follows.

Complete payoff information/incomplete payoff information bargaining pairs will arrive at bargains with greater variability in differential payoff than complete payoff information/complete payoff information pairs.

This hypothesis was well supported. The mean difference in differential payoffs in condition one (38.83 profit units) was significantly lower than the mean difference in differential payoffs in conditions two, three, four, and five (235.40 profit units) where one bargainer had incomplete payoff information (see Table 6 for the t value).

The theoretical explanation for this effect follows. If one of the bargainers has incomplete payoff information either the Schelling hypothesis or its opposite can take effect, giving one bargainer a larger share of the profit. If both bargainers have complete payoff information, then they both tend to perceive and demand those offers which split profit reasonably. When both bargainers have complete payoff information, expected payoff is more realistic. So, complete payoff information/complete payoff information bargaining pairs more easily perceive the middleground compromise areas of the range of possible negotiation agreements, tend to expect a payoff associated with the middleground range, and achieve a bargain that indeed splits payoff approximately more equal than complete payoff information/incomplete payoff information pairs.

This theoretical explanation would appear to be supported since Hypothesis Two was statistically supported by the data of this study.

Hypothesis Three

Hypothesis Two predicted that when one bargainer of a pair is incompletely informed then there is a greater tendency toward inequality in individual payoffs than in bargaining pairs where both bargainers are completely informed. That is, "large/small" payoff splits become more common than "fifty/fifty" splits. This hypothesis was strongly supported by this study, and has been supported by other studies as reviewed earlier.

Hypothesis Three is an extension of Hypothesis Two. Hypothesis Three asked the question of who tends to receive the larger share of the payoff--the bargainer with incomplete payoff information or the bargainer with complete payoff information.

Applying the Schelling hypothesis, it was hypothesized that complete payoff information would become bargaining weakness. The completely informed bargainer's perspective of what bargains constitute a reasonable split of potential profit meant the bargainer was provided with his opponent's potential profits for every potential bargain. In contrast incompletely informed bargainers must make concessions without realistically knowing how equitable the bargain is. Consequently it is easier for the incompletely informed bargainer to believe that he has made sufficient concessions and decide that he will give up no more of his profit. Such a decision would, of course, lead to payoff inequality in favor of the incomplete payoff information bargainer.

This hypothesis was supported (see Table 11 for the t value). The mean difference between incompletely informed bargainers' profits and their completely informed opponent's profits was 118.64 profit units

in favor of the incompletely informed bargainers. Hypothesis Four and Five further explore the relative advantages of complete versus incomplete utility value information.

Hypotheses Four and Five

Hypotheses Four and Five are concerned with the effects of awareness of one's opponent's condition of payoff information on differential payoff. Hypothesis Four predicted that to a completely informed bargainer the knowledge of one's opponent's incompleteness of payoff information would result in lower payoff for that bargainer. The hypothesis was stated in the following form.

In complete information/incomplete information pairs, complete information bargainers who bargain with awareness of the incompleteness of their opponent's payoff information will receive lower payoffs than complete information bargainers with less awareness of the incompleteness of their opponent's payoff information

As Table 15 shows, the analysis failed to achieve statistically significant support for the hypothesis. Theoretically, the effect was expected on the basis that to a completely informed bargainer, awareness of the incompleteness of one's opponent's payoff information should act as a heightening of the Schelling effect. That is even more of the burden of concession making should have theoretically been placed on the completely informed bargainer

To an incompletely informed bargainer, awareness was expected to have an advantageous effect. The reasoning follows. If an incompletely informed bargainer was aware that the offers of the completely informed bargainer were being made by the completely informed bargainer on the basis of both their profits, then he might wonder why this completely

informed bargainer is making concessions that give him profit. This might lead to the inference that the completely informed bargainer is bargaining from a position of weakness. That is, "aware" incompletely informed bargainers may interpret opponent's concessions as generous considering that those opponents know both bargainers possible profits, and yet are still offering concessions. Such an assumption that their opponents are just salvaging their own possible profits from a known weak bargaining position would cause the "aware and incompletely informed" bargainer to yield less.

The hypothesis was stated in the following form

Incomplete information bargainers who are aware of their partner's complete information will receive higher payoffs than incomplete information bargainers who are less aware of their partner's complete payoff information

As Table 16 shows, the support for the hypothesis was not statistically significant.

Implications

Two of the hypotheses were supported--Hypothesis Two and Hypothesis Three. The Hypothesis Two support agreed with other studies that when both bargainers have complete payoff information, differential payoff inequality is reduced. The support for Hypothesis Three is also important. Prior to this study the question of whether there is a profit advantage for complete information bargainers or for incomplete information bargainers was dealt with by few studies, the conclusions were conflicting. This study provided statistically significant support for the Schelling hypothesis.

In the current research on bilateral bargaining, two theoretical positions appear to be developing. One is guided by Siegel and Fouraker's Level of Aspiration hypothesis. This theoretical position suggests that concession making is governed by a bargainer's expectations of what a fair bargain will mean in terms of his share of the profit. Thus an opponent's concessions are primarily judged relative to a "pre-initial offer" aspiration level. The reciprocity position suggests that the size of an opponent's recent concession or concessions best predicts the bargainer's answering concession.

This study seems to fit into the Siegel and Fouraker position. In this study the completeness of one's utility value information is thought to play a major role in the setting of realistic (and, in consequence, lower) levels of aspiration. The implication for future studies is that this can be tested in future studies by attempts to measure initial expected payoff and perhaps even fluctuations in level of aspiration during the bargaining.

One of the obvious limitations to generalizing the results of this study to other conflict of interest situations is that the monetary incentives of the bargainers were purely hypothetical. They bargained with enthusiasm for only hypothetical profits.

The results of this study would certainly be expected to be different if one of the basic conditions of the study was altered--that of limited communication. In this study, the only communication between bargainers was the written exchange of economic offers. Bargainers could not comment to their opponents about offers, they could only make further offers.

The limited communication prevented bargainers from communicating

information to their opponents about how to interpret any particular concession. The bargainers could not say, "This is my last offer", or "I cannot concede any lower because then my profit is ridiculously 'small.'" Allowing such communication about how to interpret an offer would negate the Schelling effect. Completely informed bargainers would quickly inform those of their incompletely informed opponents with unrealistic payoff expectations about the inequity of their unrealistic offers.

Less restricted communication would have a direct bearing on the Schelling hypothesis. When one bargainer has only limited knowledge of the other's utility values, communication can be employed to make the completeness of payoff information more two-sided. Such communications, however, would raise another issue. Would such "information" be believed in the context of the partly competitive situation of bilateral bargaining? Beisecker has noted two principles of relevance here. 1) the potential impact of communication is greater in bargaining situations with less initial structure²³, and 2) communication can be used cooperatively or competitively.²⁴ In regard to these two principles, incompleteness of information would mean a less definite initial structure which would mean communication could have greater impact. However, would the completely informed bargainer's communications about his utility values to his less informed opponent be perceived as cooperative or competitive? In terms of a practical example how often would potential car buyers with incomplete payoff knowledge believe the car salesman when he says, "I just would not be making any commission at all if I went that low in price."

Along with the research issue of the credibility of communications designed to make an incompletely informed bargainer completely informed, there is the research area of how are such communications attempted. Studies focusing on the possible ways completely informed bargainers try to inform incompletely informed opponents are needed.

Bilateral bargaining research has not exhausted all potential questions. Hopefully, the variable of completeness of utility value information can be useful in helping to understand conflict of interest situations.

APPENDIX A

INSTRUCTIONS

This is a research project interested in the process of bargaining. We are interested in what kinds of offers and counteroffers lead to bargains advantageous to a buyer or advantageous to a seller. We are interested in whether you can achieve a bargain advantageous to you.

You will be randomly paired with another student in one of the other rooms. You will be selected to act as either the seller or the buyer or "X". Your bargaining opponent in the other room will act as the buyer of X if you are the seller, or will act as the seller of X if you are the buyer. A coin flip will determine who will be the buyer and who will be the seller.

You will be supplied with a table showing various profit levels you can attain, and the prices and quantities to be agreed upon in order to reach those levels of profit. The seller's table is derived from his costs and reflects the condition that his profits vary directly with price. The buyer's table is derived from what he can distribute profitably, and therefore varies inversely with price. To this extent your interests are opposed, that is, the seller wants to sell at a high price, and the buyer wants to buy at low prices. However, an agreement as to price and quantity must be reached if you are to realize any profit. We want to see how large a profit you can obtain.

APPENDIX B

QUANTITY

Price

| | 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 |
|-------------|-----|-----|-----|-----|-----|------|------|------|------|
| Your Profit | | | | | | | | | |
| 230 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 220 | 17 | 30 | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| 210 | 27 | 60 | 65 | 50 | 0 | 0 | 0 | 0 | 0 |
| 200 | 38 | 90 | 115 | 120 | 90 | 33 | 0 | 0 | 0 |
| 190 | 47 | 120 | 165 | 190 | 180 | 143 | 91 | 0 | 0 |
| 180 | 57 | 150 | 215 | 260 | 270 | 253 | 221 | 150 | 51 |
| 170 | 67 | 180 | 265 | 330 | 360 | 363 | 351 | 300 | 221 |
| 160 | 77 | 210 | 315 | 400 | 450 | 473 | 481 | 450 | 391 |
| 150 | 87 | 240 | 365 | 475 | 540 | 583 | 611 | 600 | 561 |
| 140 | 97 | 270 | 415 | 540 | 630 | 693 | 741 | 750 | 731 |
| 130 | 107 | 300 | 465 | 610 | 720 | 803 | 871 | 900 | 901 |
| 120 | 117 | 330 | 515 | 680 | 810 | 913 | 1001 | 1050 | 1071 |
| 110 | 127 | 360 | 565 | 750 | 900 | 1023 | 1131 | 1200 | 1241 |

(continued next page)

APPENDIX B (CONTINUED)

Price

| | 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 |
|-----|-----|-----|------|------|------|------|------|------|------|
| 100 | 137 | 390 | 615 | 820 | 990 | 1133 | 1261 | 1350 | 1411 |
| 90 | 147 | 420 | 665 | 890 | 1080 | 1243 | 1391 | 1500 | 1581 |
| 80 | 157 | 450 | 715 | 960 | 1170 | 1353 | 1521 | 1650 | 1751 |
| 70 | 167 | 480 | 765 | 1030 | 1260 | 1463 | 1651 | 1800 | 1921 |
| 60 | 177 | 510 | 815 | 1100 | 1350 | 1573 | 1781 | 1950 | 2091 |
| 50 | 187 | 540 | 865 | 1170 | 1440 | 1683 | 1911 | 2100 | 2261 |
| 40 | 197 | 570 | 915 | 1240 | 1530 | 1793 | 2041 | 2250 | 2431 |
| 30 | 207 | 600 | 965 | 1310 | 1620 | 1903 | 2171 | 2400 | 2601 |
| 20 | 217 | 630 | 1015 | 1380 | 1710 | 2013 | 2301 | 2550 | 2771 |
| 10 | 227 | 660 | 1065 | 1450 | 1800 | 2123 | 2431 | 2770 | 2941 |

APPENDIX C

QUANTITY

Price

| | 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 |
|-------------|-----|-----|-----|------|------|------|------|------|------|
| Your Profit | | | | | | | | | |
| 230 | 220 | 600 | 900 | 1120 | 1260 | 1320 | 1300 | 1200 | 1020 |
| 220 | 210 | 570 | 850 | 1050 | 1170 | 1210 | 1170 | 1050 | 850 |
| 210 | 200 | 540 | 800 | 980 | 1080 | 1100 | 1040 | 900 | 680 |
| 200 | 190 | 510 | 750 | 910 | 990 | 990 | 910 | 750 | 510 |
| 190 | 180 | 480 | 700 | 840 | 900 | 880 | 780 | 600 | 340 |
| 180 | 170 | 450 | 650 | 770 | 810 | 770 | 650 | 450 | 170 |
| 170 | 160 | 420 | 600 | 700 | 720 | 660 | 520 | 300 | 0 |
| 160 | 150 | 390 | 550 | 630 | 630 | 550 | 390 | 150 | 0 |
| 150 | 140 | 360 | 500 | 560 | 540 | 440 | 260 | 0 | 0 |
| 140 | 130 | 330 | 450 | 490 | 450 | 330 | 130 | 0 | 0 |
| 130 | 120 | 300 | 400 | 420 | 360 | 220 | 0 | 0 | 0 |
| 120 | 110 | 270 | 350 | 350 | 270 | 110 | 0 | 0 | 0 |
| 110 | 100 | 240 | 300 | 280 | 180 | 0 | 0 | 0 | 0 |

(continued next page)

APPENDIX C (CONTINUED)

Price

| | 1 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 |
|-----|----|-----|-----|-----|----|----|----|----|----|
| 100 | 90 | 210 | 250 | 210 | 90 | 0 | 0 | 0 | 0 |
| 90 | 80 | 180 | 200 | 140 | 0 | 0 | 0 | 0 | 0 |
| 80 | 70 | 150 | 150 | 70 | 0 | 0 | 0 | 0 | 0 |
| 70 | 60 | 120 | 100 | 0 | 0 | 0 | 0 | 0 | 0 |
| 60 | 50 | 90 | 50 | 0 | 0 | 0 | 0 | 0 | 0 |
| 50 | 40 | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 40 | 30 | 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

APPENDIX D

INSTRUCTIONS FOR BIDDING

You have before you a table of numbers. Across the top of the table are various quantities of X, along the left-hand side of the table are listed various prices of X. The numbers in the body of the table represent the profits associated with various combinations of price and quantity.

The following steps outline the procedure of the bargaining.

1. One of each pair of bargainers will be randomly selected (by coin flip) to start the bargaining.
2. Your respective bids should be in terms of both price and quantity.
3. You might want to start bargaining from a position which is quite favorable to you, since you may have to make concessions to reach an agreement.
4. You must either accept the offer of the other party, or make a counter-offer until an agreement is reached.
5. Bargaining is done in good faith (i.e., any bid offered by you at any time and turned down by your rival may be subsequently accepted by him).
6. Your offer is made by writing a price and quantity bid only on available slips of paper.
7. The profit table shows some possible prices and quantities, however, you are permitted to use values not given in the table. If you choose a price and/or quantity in between two values shown on the table, then then the profit will be between those profits shown

APPENDIX E

A QUESTIONNAIRE ABOUT YOUR BARGAINING

1. What price and quantity did you agree upon? _____

2. What was your profit? _____

3. To what extent did you determine the outcome?

| | | | | | | |
|--------------------------------------|---|---|---|---|---|----------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I had nothing to do with the outcome | | | | | | I totally determined the outcome |

4. To what extent did your bargaining opponent determine the outcome?

| | | | | | | |
|---------------------------------------|---|---|---|---|---|-----------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| He had nothing to do with the outcome | | | | | | He totally determined the outcome |

5. To what extent were you competitive?

| | | | | | | |
|-----------------------------|---|---|---|---|---|---------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I was extremely competitive | | | | | | I was extremely non-competitive |

6. To what extent was your partner competitive?

| | | | | | | |
|------------------------------|---|---|---|---|---|----------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| He was extremely competitive | | | | | | He was extremely non-competitive |

7. To what extent did you make reasonable bids?

| | | | | | | |
|----------------------------------|---|---|---|---|---|------------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| I made extremely reasonable bids | | | | | | I made extremely unreasonable bids |

8. To what extent did you partner make reasonable bids?

| | | | | | | |
|-----------------------------------|---|---|---|-------------------------------------|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | | | | | |
| He made extremely reasonable bids | | | | He made extremely unreasonable bids | | |

9. What payoff did you expect before you started bidding? _____

10. What payoff did your partner expect before you started bidding?

11. To what extent did you enjoy the bargaining?

| | | | | | | |
|---------------------------------------|---|---|---|---------------------------------------|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | | | | | |
| I enjoyed the bargaining a great deal | | | | I did not enjoy the bargaining at all | | |

12. To what extent are you satisfied with the agreement reached?

| | | | | | | |
|----------------------------------|---|---|---|-------------------------------------|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | | | | | |
| I am extremely satisfied with it | | | | I am extremely dissatisfied with it | | |

13. Briefly describe your understanding of the situation.

14. Briefly describe your own profit table.

15. Briefly describe your partner's profit table.

FOOTNOTES

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13. Ibid. p. 32.
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15. Ibid. pp. 57-58
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19. Ibid. p. 59.
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21. Ibid. p. 54.
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24. Ibid., p. 154.