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Strategic Bargaining as a Function
of Information Processing Complexity
and Threat Availability

by

Royce A. Watts

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IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE

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Abstract

Strategic Bargaining as a Function
of Information Processing Complexity
and Threat Availability

by
Royce A. Watts

A 20-trial iterated Deutsch-Krauss trucking game was played by 144 male college students. Half of the subjects were abstract information processors (AIPs), and half were concrete information processors (CIPs). Subject pairs were formed on the basis of level of information processing complexity (LIP) and assigned to one of three groups: AIP-AIP, AIP-CIP, and CIP-CIP. Allowing for free play of the game, subject pairs within each group played under conditions of No Threat, Unilateral Threat, and Bilateral Threat. The following results were obtained: (1) Joint profits were highest under No Threat, intermediate under Unilateral Threat, and lowest under Bilateral Threat; (2) considering all conditions the joint profits tended to increase over trials; and (3) the threat effect varied as a function of the composition of LIP pairs. It was concluded that the introduction of threat capacity into the bargaining situation added information that was processed differently by subjects differing in LIP, and these processing differences were manifested in differential payoffs and strategy development.
INTRODUCTION

Many of our day-to-day decisions involve bargaining in some form or another. Bargaining occurs at all levels of human endeavor; for example, between individuals, groups, organizations, and countries. As such, it is an important and pervasive social phenomenon deserving careful study.

As defined by Webster, a bargain is "an agreement between parties settling what each gives or receives in a transaction between them or what course of action or policy each pursues in respect to the other." Deutsch (1960, pg. 181) notes that bargaining may refer to either tacit or explicit processes in arriving at some type of agreement. He further outlines the properties of a bargaining situation:

1. Both parties perceive that there is the possibility of reaching an agreement in which each party would be better off, or no worse off, than if no agreement is reached;

2. Both parties perceive that there is more than one such agreement which could be reached; and

3. Each party perceives the other to have conflicting preferences or opposed interests with regard to the different agreements that might be reached.

Bargaining can be said to characterize such diverse situations as conflicting preferences between husband and wife, buyer-seller relationships when price is not fixed, labor-management negotiations, and even limited warfare (Schelling, 1960).

In recent years many articles and reviews have appeared con-
cerning various facets of interpersonal bargaining, and, from these several important suggestions for future theory and research have emerged. The most common recommendation has been for experimental bargaining research of greater theoretical relevance (Rapoport, 1968; Vinacke, 1969; Deutsch, 1969; Terhune, 1970; Nemeth, 1970; Deutsch, 1973; Apfelbaum, 1974; Hamner, 1974; Wrightsman, O'Connor & Baker, 1972; Rubin & Brown, 1975; Chertkoff & Esser, 1976; Pruitt & Kimmel, 1977). In particular, theories of greater specificity and precision would permit some integration of individual predisposition, task, and situational variables while providing some insight into the complex relationships existing among them. A second recommendation has focused upon the implementation of programmed strategies to allow for the concentrated study of individual patterns of response (Gallo & McClintock, 1965; Oskamp, 1969; Shure, Meeker & Hansford, 1965; Leff, 1968; Brown, 1968; Nydegger, 1974). It has also been recommended that multiple outcome criteria be used in the assessment of bargaining behavior (Shure, Meeker & Moore, 1963; Shure & Meeker, 1965; Kelley, 1965; Shure & Meeker, 1968). These outcome criteria should include objective measures as well as subjective intentions and perceptions of game behavior. Finally, it has been suggested that the generality of experimental results could be extended by selecting subjects from a wide cross-section of the population instead of adhering to the traditional employment of college age students in data collection (Rubin & Brown, 1975; Pruitt & Kimmel, 1977). This may involve the researcher's willingness to leave the confines of his laboratory and
take a look at "real world" conflicts.

The present study addresses itself to a subset of these recommendations. It is concerned with the application of an interactional theory of personality (Schroder, Driver & Streufert, 1967) to the prediction of interpersonal behavior within the context of a two-person, variable-sum bargaining game (Deutsch & Krauss, 1960). Although some writers maintain that much of the variance observed in experimental games is attributable to the personality and/or motivational characteristics of the players (Wrightsman, 1966; Terhune, 1968, 1970; Kelley & Stahelski, 1970; Kelley et al., 1970), this argument is questionable since these characteristics cannot be examined out of the context of the evoking situation. Numerous studies have reported that samplings of individual differences, situations, and response modes considered separately account for less variance than do their interaction (McGuire, 1968; Moos, 1968, 1969, 1973; Endler & Hunt, 1966, 1968, 1969; Argyle & Little, 1972; Endler, 1972; Bowers, 1972; Ekehammar, 1974; Magnusson & Endler, 1976; Endler & Magnusson, 1976).

As Rapoport and Chammah (1965) point out, in an iterative game the interactions are really more important than the individual personality dispositions. Since an iterative bargaining game may be said to constitute an array of information, it seems reasonable to assume that the information processing characteristics of the players interact with task and situational variables to shape the development of cooperation and conflict. For this reason, the
present study examines the relationship between the level of information processing complexity (LIP) of the players and certain types of information available in strategic bargaining interactions.

**Bargaining and Threat:**

Gaming research has provided the experimentalist with a useful paradigm with which to study bargaining and conflict: the variable-sum bargaining game. This type of game characteristically provides players with conflict situations in which the size and division of payoffs vary considerably. In fact, Schelling (1960) has pointed out that the flexibility afforded by such tasks extends to the point of arousing "mixed motives." That is, a player is confronted with unavoidable conflict with his opponent over the division of payoffs, but he may resort to cooperative behavior in order to maximize the size of the total payoff. The extent of such cooperation on the part of both players determines what Schelling calls "bargaining efficiency."

Several studies have attempted to examine the relationship between bargaining efficiency and various motivational and structural properties of variable-sum bargaining games. Deutsch and his colleagues (Deutsch, 1958; Deutsch & Krauss, 1960, 1962) were among the first researchers to examine systematically the antecedents of interpersonal bargaining within the confines of a laboratory. They formulated two basic propositions concerning the nature of bargaining agreements (1960, pg. 181). In general:

1. Bargainers are more likely to reach an agreement, the stronger are their cooperative interests in comparison
with their competitive interests.

2. Bargainers are most likely to reach an agreement, the more resources they have available for recognizing or inventing potential bargaining agreements and for communication to one another once a potential agreement has been recognized or invented.

As pointed out by Deutsch and Krauss, the balance of cooperative to competitive motivation inherent in the structure of the bargaining game is to a great degree determined by the nature of the strategic resources available to the bargainers. In the case where the strategic resources at the bargainer's disposal include threat, Deutsch and Krauss (1960) proposed: (a) in conflicts of interest where threat is available, it is likely to be used in an attempt to force the other person to yield in order to obtain higher outcomes for oneself; (b) if the threatened party considers himself to be of equal or superior status to the threatener, he will not allow himself to be intimidated, but will reciprocate threat with counterthreat; and (c) as a result, the threat-counterthreat spiral heightens the bargainers' competitive interests and decreases the likelihood that agreement will be reached. The underlying motivational component of the destructive threat-counterthreat cycle was presumed to have originated from the affront to self esteem or social face felt by the threatened party (Goffman, 1955, 1959). For Deutsch and Krauss, threat was defined as an intention to impose loss or damage to the other party.

In support of the above hypotheses, Deutsch and Krauss (1960,
1962) presented data from a series of experiments showing a reduction of mutual cooperation when threats were made available to one or both bargainers. In order to study the effects of threat on bargaining efficiency, they developed a two-person variable-sum experimental game, the Deutsch-Krauss trucking game. Players were asked to imagine that they were owners and operators of competing trucking companies, each hauling their merchandise to their respective destinations. Each player had a choice between two routes: a common short route only wide enough to accommodate one truck at a time, and a longer private route. In this game, profits or losses (imaginary money) were accumulated by charging each player a fixed sum per unit of time required to complete the trip. It was to both players' advantage to take the short route; however, since it was common to both, only one could traverse it at a time. The optimal solution in terms of profit maximization for each player was an alternation strategy with players taking turns using the common path. Experimental results using this task indicated that subjects did, in fact, prefer this optimal strategy: most dyads learned to alternate the use of the common path over trials.

Deutsch and Krauss then altered the structural context of the game by the introduction of threats in the form of gates which could be used to block the opponent attempting to use the common path. In the unilateral threat group, only one player possessed a gate, whereas in the bilateral threat group both players were provided with gates. As was expected, bargaining efficiency as measured
by the joint mean sum of the players profits over 20 trials was maximum in the no-threat condition (+$2.03) and progressively decreased in the unilateral threat (-$4.05) and bilateral threat (-$8.75) conditions.

Prior research had indicated that increased communication lead to increased cooperation in mixed-motive games (Deutsch, 1958; Loomis, 1959; Scodel, Minas, Ratoosh & Lipetz, 1959; Deutsch, 1960). Deutsch and Krauss (1962) reasoned that if players in the trucking game were allowed to communicate with one another, the spiral of competitive conflict would be blunted. Bargainers were assigned to conditions with or without bilateral threat and with or without verbal communication. It was found that the availability of communication channels failed to exert a significant effect across conditions. As to the significance of their findings, Deutsch and Krauss (1962, pg. 64) stated: "... the opportunity to communicate does not necessarily result in amelioration of conflict ... little communication occurred; most of our subjects did not use their opportunity to communicate ... the competitive orientation induced by the threat potential in our situation was sufficiently strong enough to overcome any possible ameliorating effects of communication."

Additional experiments (Deutsch & Krauss, 1962) were carried out using similar procedures to examine the effect of compulsory, permissive and no communication on interpersonal bargaining. Regardless of the communication options available to the subjects, bargaining was less efficient in the bilateral threat condition than in either
the unilateral or no threat conditions. Krauss and Deutsch (1966) reported similar data in a study concerning the effects of tutoring bargainers in effective communication procedures. This series of studies has consistently shown, according to Deutsch and Krauss, that threat availability heightens the competitive motivational orientation of those possessing it and tends to override any positive effect of communication on the bargaining process.

Critique of Deutsch and Krauss Experiments:

Since the early 1960's, the Deutsch and Krauss findings involving the effect of threats on the course of interpersonal conflict have been challenged on a number of empirical and theoretical grounds (for reviews, see Kelley, 1965; Tedeschi, 1970; Apfelbaum, 1974; Rubin and Brown, 1975; Shure et al., 1966). Borah (1960, 1963) has argued that the lower joint outcomes observed in Deutsch and Krauss bilateral threat condition did not necessarily connotate the players stronger competitive motivation in that condition. Borah reasoned that under competitive conditions the gates forced the players to take the longer alternate route, whereas in the absence of gates, they were more or less forced to negotiate over the use of the common path. Simply put, the poorer outcomes under conditions of threat were explainable by the increased use of the alternate path when the gates were used. Borah devised a measure of difficulty in reaching agreement termed "time lost in standoffs" to obviate time wasted on the alternate path, thereby enabling comparisons to be made between gate versus no gate conditions. He contended that this measure was a more valid indicator of attempts to beat, coerce, or resist
coercion from the other player. Using a gameboard with movable pawns in a near replication of Deutsch and Krauss 1960 experiment, Borah obtained mean joint payoffs very similar to those for the original study; however, there were no significant differences between the gate versus no-gate conditions in "time loss in standoffs." The absence of any differences between groups on this measure was taken to mean that threat availability did not enhance the competitive orientation of the players. Unfortunately, as Shure, Meeker and Moore (1963) noted, the criterion of "time loss in standoffs" is subject to ambiguous interpretation since it excludes other functional responses expressive of mutual stubbornness for subjects in the gate condition.

Shomer, Davis and Kelley (1966) conducted an experiment designed to test what the effects of the gates would be if there were no alternate paths. According to Deutsch and Krauss (1960), the mere presence of the gates served to heighten competitiveness and reduce bargaining efficiency. Subjects were assigned to one of four conditions: (a) gates, alternate path; (b) gates, no-alternate-path; (c) no gates, alternate path; and (d) no gates, no-alternate-path. They played a gameboard version of the trucking game similar to the one used by Borah. An inspection of the data revealed that in the two conditions with alternate paths, the pattern of joint profits showed detrimental effects of threat similar to those reported by Deutsch and Krauss (1960) in their no threat and bilateral threat conditions. For the two conditions without alternate paths, however, a different pattern of results was observed. Although the no-gate,
no-alternate-path condition started with higher profits than the
gates, no-alternate-path condition, the latter showed marked improve-
ment over trials. These results were interpreted to mean that
given the lack of an alternate route, bargainers learned to cooperate
despite threat availability. It should be noted that even without
the alternate route, bargainers with threat potential still experi-
cenced greater coordination problems in the early trials than did
those pairs without threat. Perhaps the removal of the alternate
routes enhanced the cooperative aspects of the interaction by making
the alternation strategy more salient to the bargainers.

In a rejoinder pertaining to the latter two studies, Deutsch
(1969) stated that the crucial issue was not the subjects' use of
the gates and alternate paths in withdrawing from the interaction
to avoid negotiation, but more importantly it was what motivated
the players to withdraw. He said "... the force to withdraw to the
alternate path reflects the competitive struggle which develops in
the two gate situation as the gates are employed. This struggle
makes cooperation in the use of the one lane path seem unlikely, and
consequently pushes the subject to take the alternate route expe-
ditiously: to make sure that they lose as little as they can, and
if possible, less than the other player" (pg. 45). Overall, the
issue of whether threat induces a spiral of competitiveness and
hostility which works to undermine cooperation and bargaining
efficiency remains unanswerable by the present data. Interpretations
of the underlying motivational bases of the players strategies in
the trucking game is difficult at best. It is the present writer's contention that behavior should be anchored to other aspects of personality and/or situational variables which have demonstrated empirical relationships to interpersonal bargaining.

In Kelley's (1965) extensive review of the effects of threats on bargaining, he alludes to the earlier criticisms advanced by Borah as well as to other difficulties in interpreting the Deutsch-Krauss results. One such difficulty involves the operationalization of gates as threats which function to exacerbate interpersonal conflicts (Tedeschi, 1970; Shomer et al., 1966). From this criticism two related issues emerged: (a) gate usage in the original trucking game seems to confound a warning message with actual imposition of cost, and (b) gates may be used to communicate messages other than intent to inflict harm on the other player. Let us now examine each issue in turn.

Tedeschi (1970), in his review of coercive power, has made an important distinction between contingent threat and noncontingent threat. Contingent threats take the form of clear if-then verbal communication specifying administration of punishment for non-compliance. Noncontingent (tacit) threats of the kind used in the trucking game paradigm are often ambiguous in nature, and create difficulties in interpretation not only for the source but for the target as well.

As Deutsch (1969, pg. 1086) has pointed out, the noncontingent threat employed in the original trucking game study was more or less
implicitly stated: "I will interfere with you unless you do what
I want." In this situation the threat or warning message is expressed
covely and is not clearly separable from the act of imposing cost
on the other player in the case of noncompliance. There have been
ttempts to separate the warning message from actual imposition of
cost, and with some interesting results. In Shomer, Davis and
Kelley's (1966) study, subjects played a variant of the trucking game
on a game board much like those described previously. The alternate
routes were eliminated and fines and threats of fines were used
instead of gates. Pressing a threat button served to signal the
other player of one's intention to deliver a fine. It was not
necessary for a player to precede the fine with a threat, nor to
follow a threat with a fine. The results confirmed the investigators'
expectations that threat intention, when considered apart from punish-
ment, did not result in significantly lower outcomes for bargaining
pairs. Others have reported similar findings (Hornstein, 1965;
Gumpert, 1967; Cheney, Harford & Solomon, 1972; Smith & Anderson,
1975).

Kelley (1965) contends that gate usage in the trucking game
may be used to convey a wide variety of messages. For instance, a
player might use his gate to trick his opponent into waiting by a
closed barrier, to gain revenge or punish him, or as a coordination
device to signal a particular alternation sequence on the short route.
Evidence supporting Kelley's hypothesis comes from several studies.
Shomer et al. (1966) found that threat warnings were employed as
signals for coordination and amelioration of conflict when subjects were prohibited from communicating. Nardin (1968) obtained similar results using an extended version of the PDG. Dyads given threat capability and no means of communication displayed more cooperativeness over trials, whereas those with threat and benevolent communication options showed reduced cooperation and escalation of conflict.

A more recent study by Smith and Anderson (1975) examined the interactive effects of threat availability and communication in the trucking game. Some subjects were allowed no communication, some were allowed to write messages to each other between trials, and others were allowed unlimited verbal communication opportunities. In each group, half the players had bilateral threat and fining capacity, while the other half did not. The gameboard was patterned after the one used by Shomer et al. (1966), hence it had no alternate routes or gates. Results revealed that communication served a two-fold function: as a context for interpreting threat and as a signal for cooperation. More specifically, players having full communication used threat in competitive ways, and those without communication employed threat as a coordination signal.

Further criticism of the Deutsch and Krauss results have revealed problems of interpretation due to the use of trivial incentives for participation (Kelley, 1965; Gallo, 1966; Gallo & McClintock, 1965). In general, these writers have suggested that playing for real amounts of money versus imaginary money could
alter the meaning and utility of threats. An experiment carried out by Gallo (1966) demonstrated the effect of increased incentives upon the use of threat in interpersonal bargaining. He had 32 dyads play for real or imaginary money of a considerable amount. Not only did real money dyads use their gates less frequently than did their counterparts, they engaged in five times as much cooperative interaction (alternation) as did the imaginary money dyads.

In a careful examination of Gallo's experimental procedure, Deutsch (1969) has criticized the study as having been affected by experimenter bias. In the real money condition the experimenters may have unwittingly given subjects the idea that acceptable performance meant earning a large amount of money, while in the imaginary money condition this was not the case. Other studies using the trucking game and the PDG and employing large monetary incentives have failed to support Gallo's results (Brown, 1968; Gumpert, 1969; Gumpert, Deutsch & Epstein, 1969).

In summary, it appears that the nature of the strategic resources available to bargainers greatly influences their interaction in an iterative game. Varying the basic structure of the trucking game by altering experimental setting or instructions, providing for communication and/or threat options, and using the alternative routes is to change the amount and type of information available to each player as well as the complexity of the decision making process. It seems reasonable to assume that strategic gameplay may well be influenced by the information processing character-
istics of the individual players.

**Information Processing Complexity:**

The concept of "cognitive complexity," or level of information processing complexity (LIP) as used in the present paper, was formulated by Bieri (1955). In a broad sense, it may be defined as the number of independent dimensions with which an individual uses in perceiving and attaching meaning to person-objects in his social environment. Basing his work for the most part on Kelly's (1955) "Theory of Personal Constructs," Bieri (1955) conceptualized the degree of differentiation of a construction system as reflective of cognitive complexity-simplicity. For Bieri, "A system of constructs which differentiates highly among persons is considered to be cognitively complex ..." while "... a construct system which provides poor differentiation among persons is considered to be cognitively simple in structure" (pg. 263). Through a modification of Kelly's Role Construct Repertory Test (Reptest), Bieri was able to measure the number of functionally different dimensions used in the prediction of behavior of others in common social situations. The results of his 1955 study revealed a significant positive relationship between the degree of cognitive complexity and the tendency to describe others as similar to oneself.

Following Bieri and relevant to the work to be done here, Schroder and his colleagues (Harvey, Hunt, & Schroder, 1961; Driver & Streufert, 1966; Schroder, Driver, & Streufert, 1967; Streufert
& Driver, 1967) have formulated a theory of human information processing in which environmental stimulation and behavioral output are mediated by a personality variable (conceptual complexity). The theory specifies that the above components can be ordered along a continuum of complexity; content is not particularly important. In this theory environmental complexity is mainly determined by three factors: information load, diversity of information, and the rate of change of information. It is further postulated that environmental input is related to differentiation and integration in behavior as represented by a family of inverted U-shaped curves. That is, perceptual and performance levels are characteristically found to be low where environmental complexity is either very high or very low. Perceptual and performance levels, however, increase under conditions of moderate (optimal) environmental complexity. At the same time, the conceptual system of the individual effects the shape of the function. According to Suedfield (1964), the mediating schemata are "... seen as cognitive linkages mediating between stimuli and responses, and can vary from the extremely simple ('concrete') to the highly complex ('abstract') (pg. 242). Complex subjects have been found to attain higher levels of differentiation and integration under optimal levels of environmental complexity. Specifically, then, the level of information processing complexity reflects the ways in which an individual receives, stores, processes, and transmits information. Although not related to intelligence above a basal level, these information processing
structures are related to creativity in certain content areas (Schroder et al., 1967).

For purpose of this study, one may conceive of individual differences in level of information processing complexity (LIP) as varying on a continuum with its end points representing Concrete Information Processors (CIPs) and Abstract Information Processors (AIPs). In general, CIPs are characterized by relatively simple information processing procedures. The processing of information has a determinate quality for CIPs; internal information contained in their own traits, attitudes, and motives as well as salient information in the environment (norms, rules, and roles) are regarded as unalterable facts which are interpreted and acted upon in an inflexible, rigid way. Moreover, the world is perceived "... completely in terms of their own schemata, ignoring subtle situational changes and the alternate interpretations of others" (Schroder et al., 1967, pg. 17). Reducing this formulation to specific behavioral characteristics (Schroder et al., 1967), we would expect CIPs to: (a) lack complex combinatorial rules for processing different types and amounts of information. Behavior is anchored in either internal or external stimulus conditions, but not in combinations of both. To this end, highly salient informational units tend to be processed and acted upon to the exclusion of other information; (b) be maximally controlled by external stimulus conditions (stimulus-bound) when these are explicit and unambiguous. As their categorization of a stimulus in an absolute sense results in a corresponding restriction of
internal integrative and synthetic processes, they fail to consider alternate interpretations of events; (c) operate according to internal predispositions (traits, attitudes, and motives) in the absence of environmental structure (e.g., rules and roles); and (d) minimize conflict and push for "fast closure" in choice situations. Unable to generate alternate ways of handling conflict, they respond rapidly and in stereotypic fashion to resolve these situations in terms of their most obvious solutions.

By contrast with the above CIP traits, those for AIPs are characterized by complex, integrative, and flexible information processing procedures. Individuals so classified have been found to be capable of making finer discriminations and of organizing, combining and using information in more complex ways than CIPs (Suedfield & Hagen, 1966). Operating from a "theoretical" vantage point, AIPs are able to "generate or apply general laws that systematize a large and differentiated body of information generated by simpler schemata in various ways" (Schroder et al., 1967, pg. 23). Consequently, their behavior tends to: (a) go beyond the immediate constraints of the situation and information contained in their own traits, attitudes, and motives and appear less determined than that of other people. In essence, their behavior becomes decreasingly predictable as a function of their past and personality; (b) be characterized by bargaining, compromise, and conciliatory response patterns rather than "fast closure" or exacerbation of conflict (Harvey et al., 1961; Schroder et al., 1967). They do not seek, as the CIP,
to avoid or minimize choice situations and view reality as comprised of multiple alternatives, whereby diversity is sought as a means of enhancing their validation of events (Schroder & Harvey, 1963).

It might be noted that there has been some discussion regarding the generality of cognitive complexity-simplicity as a personality disposition. Earlier research suggested this dimension to be a relatively enduring mode of cognitive schematization characterizing and individual's behavior across situations (Bieri & Blackman, 1956; Allard & Carlson, 1963). Owing to methodological deficiencies, this research has been brought into question by others who suggest that cognitive complexity is more situationally dependent than was originally thought (Scott, 1963; Vannoy, 1965; Gardner & Schoen, 1962; Mischel, 1968; Kuusinen & Nystedt, 1975). Nevertheless, within the limited context of experimental gaming research, measures of cognitive complexity do seem to relate fairly consistently to observed cooperative-conflict behavior. We will now turn to an examination of this research.

Phelan and Richardson (1969) found that AIPs tended to be more cooperative than CIPs in a 60-trial PDG played against a programmed stooge. The operational definition of cognitive complexity was derived from Bieri's Rep Test. There was a tendency for all subjects to make fewer competitive responses as the game progressed. Subjects high in cognitive complexity were discovered to favor an equitable distribution of payoffs against a cooperative opponent and a strategy that minimized their own losses if the opponent was un-
cooperative. Conversely, those low in cognitive complexity availed themselves of the opportunity to increase personal gain even at the other player's expense.

Leff (1968) had AIP and CIP subjects play a 60-trial PDG against a conditionally cooperative programmed opponent. Information contained in the payoff matrix was varied by giving subjects in the full matrix condition their own payoffs as well as those of their (programmed) opponent, while subjects in the partial matrix condition knew only their own payoffs. The full matrix condition was hypothesized to be a simple environment in terms of strategy development and outcome maximization, whereas the partial matrix was characterized as a more complex environment requiring subjects to abstract the cooperative solution from interaction with the programmed opponent. Concrete subjects were found to behave more cooperatively than abstract subjects when information concerning their opponent's choice behavior was provided on each trial. When no information was available, concrete subjects were more competitive than abstracts.

Related to the Leff (1968) results are the findings of a study by Nydegger (1974). Information availability was manipulated by having subjects play a 60-trial iterative PDG either in a face-to-face seating arrangement or in separate rooms. Half the subjects were classified as AIPs, and half as CIPs. Different combinations of subject pairs were formed on the basis of the level of information processing complexity of the pair members: AIP-AIP, AIP-CIP, and CIP-CIP. Allowing for free play of the game, it was found that AIP-
AIP pairs made more cooperative choices than CIP-CIP pairs. In terms of defections, or the choice of a higher payoff following two consecutive cooperative choices, AIP-AIP pair members defected more from mutual cooperation than did CIP-CIP pair members in the separated condition, while the trend was reversed in the face-to-face condition. AIP-CIP pair members were intermediate in both conditions.

In the absence of information about the other player, it was hypothesized that pairs composed of AIPs defected from mutual cooperation more frequently than those composed of CIPs in order to experiment with other strategies. In the face-to-face condition, however, AIP-AIP pairs defected much less than CIP-CIP pairs. For the AIPs, it was suggested that mutual cooperation was sustained through visual contact which appeared to enhance communication between pair members. CIP-CIP pairs, on the other hand, seemed unable to utilize the information provided through the availability of interpersonal cues in communicating with one another. Mutual exploitation appeared to characterize the CIPs style of play in this condition.

A later study by Nydegger (1978, in press) used similar procedures with the exception that subjects, under the illusion of playing against each other, were in reality competing against a simulation program. AIP and CIP subject strategies were found to differ in the characteristic ways each used types and amounts of information in the game setting. Generally, it was found that subjects defected more from mutual cooperation in separated rather
than face-to-face conditions; there was an increase in defections over trials; and AIP-AIP pairs defected more in the face-to-face condition, while CIP-CIP pairs evidenced more defections in the separated condition. In contrast to the 1974 (Nydegger) study, the AIPs pursued a strategy of defection under conditions of information availability, suggesting that interpersonal cues may be used in attempts to "outwit" the other player. CIP players appeared constrained by the cooperative pull of the face-to-face interaction, and in the absence of interpersonal cues, they tended to defect from mutual cooperation with increasing frequency. Piecing together the evidence for a relationship between information processing complexity on the one hand and bargaining behavior on the other, the studies reviewed suggest that AIP subjects are able to process and operate more fully upon the information contained in the game setting than CIP subjects. At least in the Prisoner's Dilemma Game, the AIP appears to utilize information from a wider variety of sources (e.g., matrix values, history of play, interpersonal cues) in developing his game strategies, whereas the choice behavior of the CIP seems more determined by the situational features of the experimental situation.

The present study is concerned primarily with how the information processing characteristics of the players influences the use of strategic resources in experimental gaming behavior. If a strategic resource such as threat capability can be viewed as a class of salient information available to the players, then the
characteristic ways they process and use this information should have a decided impact on game play. The vehicle used for examining these notions was a modified version of the Deutsch-Krauss trucking game in which subjects played an iterative 20-trial game. In final form, the experimental design consisted of dyads assigned to one of three groups: AIP-AIP, AIP-CIP, and CIP-CIP, which constituted the LIP variable. Within each group, subject pairs were randomly assigned to the No Threat, Unilateral Threat, and Bilateral Threat conditions. The result was a 3 x 3 factorial matrix with eight pair members per cell. The dependent variables were: (a) joint payoffs of subject pairs, (b) the frequency with which the alternate routes were used, and (c) the frequency with which the gates were used.

The following hypotheses were generated regarding interpersonal behavior in the Deutsch-Krauss trucking game.

1. Consistent with the Deutsch and Krauss (1960, 1962) findings that threat availability reduces joint profits, mean joint profits for bargaining pairs will be lowest under Bilateral Threat, higher under Unilateral Threat, and highest under No Threat conditions.

2. Based on the hypothesized characteristics of AIP and CIP players, bargaining efficiency will be lowest for the CIP-CIP pairs and highest for AIP-AIP pairs, with the AIP-CIP pairs at an intermediate level. Specifically, it was predicted that:

2a. The difference between No Threat and Unilateral Threat will be larger for the CIP-CIP than AIP-AIP pairs,
with the AIP-CIP pairs intermediate. AIP-AIP pairs should maximize joint profits more frequently, withdraw to the alternate route less frequently, and use their gates less frequently than CIP-CIP pairs.

2b. The difference between No Threat and Bilateral Threat will be larger for the CIP-CIP than AIP-AIP pairs, with the AIP-CIP pairs intermediate. AIP-AIP pairs should maximize joint profits more frequently, withdraw to the alternate route less frequently, and use their gates less frequently than CIP-CIP pairs.
METHOD

Subjects

Subjects were 144 male students selected on the basis of their LIP scores from a pool of about 300 pretested college age males and recruited with the understanding that they would be compensated by some amount of money to be determined during the course of a joint decision-making task. The data from two additional subject pairs were discarded because of their failure to understand the experimental instructions.

Test Materials

Test instruments administered to subjects included: (a) the Paragraph Completion Test (PCT), consisting of six sentence stems, which was used as the measure of information processing complexity and thereby as the means of classifying AIP's and CIP's (Schroder et al., 1967); (b) the Personality Attitude Scale (PAS) (Shure & Meeker, 1967), which was used to access personality and attitudinal differences in bargaining and negotiation situations. This six factor scale comprised 102 items developed from an original battery of 24 test scales chosen for their presumed or established relevance to gaming behavior. The individual factor scales were Aggressive Militarism, Conciliation versus Belligerence in Interpersonal Relations, Authoritarian Nationalism versus Equalitarian Internationalism, Risk Avoidance, External versus Internal Control, and Suspiciousness versus Trust; and (c) Postexperimental Ratings which required each subject to rate his opponent on several 7-point
bipolar scales. A rating of 1 was the least favorable, and 7 was the most favorable evaluation. For example, if the player was given the adjective pair **bad-good**, and marked it as follows:

bad: ___: ___: ___: ___: x: ___: ___: ___: good

it would indicate that he felt somewhat positive toward the other person.

**Apparatus and Procedure**

The experimental apparatus used in this study functionally duplicated the original electro-mechanical Deutsch and Krauss trucking game (1960). The present version of the game, which was patterned after one described by Leff, Nydegger & Buck (1970), was constructed with HO gauge railroad track and employed model trolleys. In correspondence with the original Deutsch and Krauss experimental game both alternate routes and gates were used, and subjects played for real money.

Pairs of subjects played the trolley game at a table which measured 137.16 cm x 198.12 cm. The game format is presented in Figure 1. As shown in the diagram, both players started at separate points and traveled to separate terminals. Their remuneration in the experiment was contingent upon the length of time taken to complete a series of trips. The shortest route to their respective destinations contained a portion of common track over which only one trolley could pass at a time. Basically, players were faced with the choice of either working out a cooperative agreement over the use of the one lane track or taking separate alternate routes to
Fig. 1. Schematic Diagram of the Experimental Trolley Game.
their terminals. Subjects were instructed that they would lose a minimum of five cents each time they traveled the alternate route. Deutsch, Canavan & Rubin (1971) found that increasing the length of the common track intensified conflict between bargaining pairs. In the present study the length of the common track was approximately 50 percent of the short route. It was thought that a medium conflict size, as defined by Deutsch et al. (1971), would allow the personality variable (LIP) some latitude in which to influence bargaining efficiency.

The structure of the bargaining game was relatively simple. Subjects essentially had a choice between three alternatives on any one trial: (a) withdraw from the interaction by taking the long route; (b) go down or stay on the short, one-lane route; or (c) attempt to achieve some cooperative solution with regard to the short route thereby maximizing profits over the long haul. Those pairs of subjects possessing threat potential in the form of gate(s) were faced with the above alternatives plus the additional option of whether or not to use their gate(s).

In pre-experimental testing sessions, approximately 300 male undergraduates were given the Paragraph Completion Test (PCT) of cognitive complexity (Schroder et al., 1967). On each of the test's six items, responses were scored from 1 to 7. Uninterpretable responses received scores of 0. PCT scores were computed for each subject using the sum of the top two scores obtained on the six item test. Two scorers independently rated a random sample (N=30) of
PCT protocols and achieved satisfactory inter-rater reliability
\((r = .86)\) (Schroder et al., 1967). From the original 300 PCT scores
the highest 72 (\(\bar{X} = 6.69, \text{S.D.} = 1.08\)) were designated AIPs and the
lowest 72 (\(\bar{X} = 3.78, \text{S.D.} = .59\)) were designated CIPs. The
differences between the AIPs and CIPs on the SAT verbal and quantita-
tive measures were small and nonsignificant. These subjects were
assigned to groups in randomized blocks: 24 pair members were
assigned to each group composed of two AIPs, one AIP and one CIP,
and two CIPs. Within each of these three LIP groups, eight pair
members were randomly assigned to the No Threat, Unilateral Threat
and Bilateral Threat conditions, respectively. For half the bargain-
ing pairs in the AIP-CIP Unilateral Threat cell the AIP pair member
was given the threat capacity, while in the remaining half the CIP
pair member possessed threat.

Prior to their instruction concerning the nature of the
bargaining game, the subjects were taken to separate cubicles and
asked to complete a battery of personality and attitude measures
(PAS). Upon completion of this task, they were individually seated
at the gaming table. At the outset of the instructional period, the
experimenter informed the subject pairs that verbal communication
was expressly forbidden. Each subject was then given $1.00 for
participation and told that he could either win more money or lose
some of his initial stake depending upon his performance in the task.

An overview of the experimental instructions follows: Players
were asked to imagine that they were operating a trolley company
carrying passengers to a specified destination that could be reached
via a short route or a longer alternate route. Whereas taking the short route meant earning a profit, traveling over the long route always incurred a loss. They received 35 cents, minus operating expenses of one cent per second, for each trial. Through efficient use of the short route, the first pair member reaching his destination could make a profit of 19 cents, while the second person through would earn 9 cents. On the other hand, use of the longer route would always entail a minimum loss of 5 cents on that particular trial. It was emphasized that "time was money" in the game, hence standoffs on the short, one-lane track, attempts to trick the other player with the use of one's gate, and similar strategies were to each player's disadvantage. In the event that their total losses exceeded their initial stake, players were told that they would have to make up the difference out of their own pockets. The latter rule was not enforced, but they did receive their profits. A transcript of the tape-recorded instructions is included in Appendix A.

Following the instructions, players were guided through a series of practice trials. On the first trial run, they met head-on in the middle of the common track. Crosstown was told to back up while Broadway proceeded forward to his destination. Crosstown then followed suit. The process was then reversed. In the next practice trial, Crosstown was told to wait prior to entering the common path, while Broadway went through. Crosstown was then allowed to proceed. The process was again reversed. Finally, in the threat conditions gate usage was introduced by having the players enter the common track, close their gate(s), and then reverse direction taking the
alternate route. Subjects were instructed that they could close their gate(s) only while traveling on the short route; however, they were permitted to open them at any time. Instructions for gate usage were consistent with those of the original trucking game paradigm.

The experimenter requested that questions concerning the task be communicated by means of written notes. After the experimenter had answered all questions, game play began. The experimenter signaled the start of each trial, operated the digital timers, kept a record of game data, and announced profits and/or losses at the termination of each trial. Upon the completion of the 20 trial game, subjects were asked to fill out a series of personality ratings on their partners and a post-experimental questionnaire. They were thanked, paid, debriefed, and requested (Rice Honor Code) not to reveal anything about the study for one month.
RESULTS

In the present study the following gaming indices were recorded: (a) joint profits, (b) the number of times the alternate routes were used, and (c) the number of times the gates were used. Consistent with previous research, the basic measure of bargaining efficiency was the joint profits of subject pairs. Maximum coordination in the game resulted in a total joint profit of $5.60 for a subject pair. As an index of cooperation, the joint profit measure was affected by the behavioral options available to players in the trucking game. The option was open to all players to withdraw from the interaction by taking the alternate route to their respective destinations. In exercising the withdrawal strategy, each player incurred a minimum five cent loss on any given trial. Other players had the advantage of strategic resources in the capacity of unilateral or bilateral threat. The employment of these resources depended upon the individual decision of each player during the course of the bargaining game. Each of the above dependent measures will be considered for both between and within-pair comparisons. While between-pair comparisons are concerned primarily with differences in performance among LIP groups, the within-pair comparisons examine individual performance within groups. The latter analyses give particular attention to the Unilateral Threat condition. The analysis of variance and combined tables of means for the joint profit measure are included in Appendix B.

Between-Pair Comparisons

Joint Profits. The data for joint profits summed over trials
are reported in Table 1. An LIP (3) X Threat (3) X Trials (4) mixed design analysis of variance was applied to the joining profit measure. The trials dimension was represented by four blocks of five trials each. The analysis revealed significant effects of LIP, $F(2,63) = 9.19$, $p = .0003$; threat, $F(2,63) = 4.85$, $p = .0110$; and trial blocks, $F(3,189) = 9.77$, $p = .0000$; as well as the predicted LIP X Threat interaction, $F(4,63) = 6.40$, $p = .0002$.

Table 1
Means and Standard Deviations
For Money Won in Cents by Pairs
Of Ss in Each Cell With Design
Collapsed Over Trial Blocks

<table>
<thead>
<tr>
<th>Threat Availability</th>
<th>LIP for Pairs of Ss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AIP-AIP</td>
</tr>
<tr>
<td>No Threat</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>403.75</td>
</tr>
<tr>
<td>SD</td>
<td>178.17</td>
</tr>
<tr>
<td>Unilateral Threat</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>395.00</td>
</tr>
<tr>
<td>SD</td>
<td>165.59</td>
</tr>
<tr>
<td>Bilateral Threat</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>394.75</td>
</tr>
<tr>
<td>SD</td>
<td>205.83</td>
</tr>
</tbody>
</table>
Hypothesis 1 predicted that mean joint profits would be lowest in the Bilateral Threat condition and highest in the No Threat condition, with the Unilateral Threat condition intermediate. The overall ordering of mean joint profits in the threat conditions was consistent with the above hypothesis. The obtained marginal means for each condition were 330.87, 85.25, and 33.08 for the No Threat, Unilateral Threat and Bilateral Threat conditions, respectively. The interpretation of these overall data, however, must be qualified by the sizable variability around the means and the significant interaction that resulted.

Using the Bonferroni procedure as described by Kirk (1968), four nonorthogonal components of the LIP X Threat interaction were tested. For each linear comparison the alpha level required for significance was \( p = .0125 \). Hypothesis 2a predicted that the average difference in joint profits between No Threat and Unilateral Threat would be greater for the CIP-CIP than AIP-AIP pairs, with the AIP-CIP pairs intermediate. The average difference in joint profits for the CIP-CIP pairs (\( \bar{X}_{\text{diff}} = 117.63 \)) was small and did not differ significantly from the AIP-AIP pairs (\( \bar{X}_{\text{diff}} = 8.75 \)), \( F(1,63) = 0.76, p = .3886 \). Unexpectedly, the average difference in joint profits between No Threat and Unilateral Threat was 606.49 for the AIP-CIP pairs and 63.19 for the average of the AIP-AIP and CIP-CIP pairs, \( F(1,63) = 25.62, p = .0000 \). Post hoc comparisons (Scheffe) revealed that the average difference in joint profits for the AIP-CIP pairs differed significantly from the AIP-AIP pairs (\( \bar{X}_{\text{diff}} = 8.75 \)).
\[ F(1,63) = 11.61, p = .0011, \text{ and CIP-CIP pairs } (\bar{x}_{\text{diff}} = 117.63), \]
\[ F(1,63) = 7.80, p = .0069. \]

Hypothesis 2b predicted that the average difference in joint profits between No Threat and Bilateral Threat would be larger for the CIP-CIP than AIP-AIP pairs, with the AIP-CIP pairs intermediate. Linear comparisons indicated that joint profits for CIP-CIP pairs when both members possessed threat were considerably lower than when neither member possessed threat (\( \bar{x}_{\text{diff}} = 767.63 \)), whereas increased threat potential had little impact on AIP-AIP joint profits (\( \bar{x}_{\text{diff}} = 9.00 \), \( F(1,63) = 36.76, p = .0000 \)). As predicted, the difference between No Threat and Bilateral Threat was intermediate for the AIP-CIP pairs (\( \bar{x}_{\text{diff}} = 117.00 \)) and differed significantly from the average of the AIP-AIP and CIP-CIP pairs (\( \bar{x}_{\text{diff}} = 388.185 \), \( F(1,63) = 6.27, p = .0142 \)).

Joint profits generally increased over trials as reflected by the main effect for trial blocks. The means for trial blocks 1-4, collapsed over conditions were -8.86, 38.05, 51.76 and 68.67, respectively. Using a computer program developed by Wright and Lane (1978), trend analyses revealed a significant linear component for the trials effect, \( F(1,63) = 15.80, p = .0002 \). Interactions of LIP, Threat and LIP X Threat with the linear component of trials were nonsignificant. Although Deutsch and Krauss (1960) reported that subject pairs possessing Bilateral Threat evidenced no improvement over trials, the results of the trend analyses in the present study is consistent with other trucking game studies (Shomer et al., 1966; Smith and Anderson, 1975) that showed such an increase over trials.

Withdrawal Responses. Withdrawal responses were analyzed in an
LIP (3) X Threat (3) analysis of variance. The effects of LIP, $F(2,63) = 7.69, p = .0010$; threat, $F(2,63) = 10.42, p = .0001$; and LIP X Threat $F(4,63) = 5.37, p = .0009$, were significant. Mean data for all cells are presented in Table 2.

Table 2
Mean Number of Withdrawal
Responses in Each Cell

<table>
<thead>
<tr>
<th>Threat Condition</th>
<th>LIP for Pairs of Ss</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AIP-AIP</td>
<td>AIP-CIP</td>
<td>CIP-CIP</td>
</tr>
<tr>
<td>No Threat</td>
<td>0.25</td>
<td>2.75</td>
<td>0.00</td>
</tr>
<tr>
<td>Unilateral Threat</td>
<td>2.87</td>
<td>12.37</td>
<td>8.87</td>
</tr>
<tr>
<td>Bilateral Threat</td>
<td>2.63</td>
<td>7.62</td>
<td>23.87</td>
</tr>
</tbody>
</table>

As can be seen in Table 2, the resulting cell means parallel the joint profit data. Under conditions of No Threat, negligible differences were expected in the frequency of withdrawal responses among LIP groups. As noted by Kelley (1965), withdrawal to the alternate route is not a functional response in the absence of threat since the player choosing this option will always make less money than his opponent. The data in Table 2 supports this contention.

Hypothesis 2a predicted that the average difference in withdrawals between No Threat and Unilateral Threat would be greater for
the CIP-CIP than AIP-AIP pairs, with the AIP-CIP pairs intermediate. Linear comparisons (Bonferroni) revealed no significant differences in withdrawals between conditions of No Threat and Unilateral Threat for CIP-CIP pairs ($\bar{X}_{\text{diff}} = -8.87$) as compared to the AIP-AIP pairs ($\bar{X}_{\text{diff}} = -2.62$), $F(1,63) = 1.21, p = .2754$. Congruent with the profit data, the average difference in withdrawals for pairs with and without threat capacity was -9.62 for the AIP-CIP pairs and 5.74 for the average of the AIP-AIP and CIP-CIP pairs. This component of the interaction was not significant, $F(1,63) = 0.62, p = .4339$.

As predicted by Hypothesis 2b, the average difference in withdrawals between No Threat and Bilateral Threat was considerably larger for CIP-CIP pairs ($\bar{X}_{\text{diff}} = 23.87$) than for AIP-AIP pairs ($\bar{X}_{\text{diff}} = -2.38$), $F(1,63) = 14.30, p = .0003$. The average difference in withdrawals between the conditions of No Threat and Bilateral Threat was -4.87 for the AIP-CIP pairs and -13.12 for the average of the other two groups, $F(1,63) = 2.81, p = .0985$.

**Gate Usage.** Separate univariate analyses of variance were performed on gate usage inasmuch as players possessing Bilateral Threat capacity had twice the opportunities to use their gates as did players possessing Unilateral Threat capacity. The mean summaries of each analysis are presented in Table 3.

Hypotheses 2a and 2b predicted that gate usage in both the Unilateral and Bilateral Threat conditions would be greatest for CIP-CIP pairs, intermediate for AIP-CIP pairs and lowest for AIP-AIP pairs. The results of a one-way analysis of variance on gate usage in the Unilateral Threat condition failed to reach significance,
$F(2,21) = 2.66, p = .0950$. In any case, the predicted mean ordering suggested by Hypothesis 2a failed to hold. Gate usage in the AIP-CIP condition was somewhat higher than either the AIP-AIP or CIP-CIP conditions.

Table 3
Mean Data for Frequency of Gate Usage

<table>
<thead>
<tr>
<th>Threat</th>
<th>LIP for Pairs of Ss</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AIP-AIP</td>
<td>AIP-CIP</td>
<td>CIP-CIP</td>
</tr>
<tr>
<td>Unilateral Threat</td>
<td>5.50</td>
<td>11.87</td>
<td>6.12</td>
</tr>
<tr>
<td>Bilateral Threat</td>
<td>2.87</td>
<td>9.50</td>
<td>23.12</td>
</tr>
</tbody>
</table>

A one-way analysis of variance conducted on gate usage in the Bilateral Threat condition revealed significant differences between LIP groups, $F(2,45) = 11.34, p = .0010$. An inspection of Table 3 indicates that the predicted mean ordering suggested by Hypothesis 2b holds for Bilateral Threat. Individual comparisons by the Duncan multiple range test revealed that gate usage in the CIP-CIP condition differed reliably from both the AIP-AIP and AIP-CIP conditions at the .05 level in both cases.

Deutsch and Krauss (1960) hypothesized that the use of gates in the Bilateral Threat condition would elicit a threat-counter-
threat spiral among pair members. This notion was tested in the present study by correlating the use of threat by one member of the bargaining pair with the use of threat by the other member. A significant correlation was found only for the CIP-CIP pairs (r = .79, p < .02); no evidence for such a competitive spiral was found for either the AIP-AIP or AIP-CIP pairs.

Ratings of Other Player and Personality Measures.

Postgame ratings were categorized according to motive traits (competitive-cooperative, dishonest-honest, hostile-friendly, unsociable-sociable, suspicious-trusting, selfish-altruistic), ability traits (stupid-intelligent, slow-quick, wasteful-thrifty), and evaluative traits (dangerous-safe, small-large, sad-happy, weak-strong, tough-tender, excitable-calm, childish-mature, hard-soft). On each bipolar adjective scale, a rating of 1 was the least favorable, while 7 represented the most favorable rating. Each category above was analyzed by an LIP (3) X Threat (3) analysis of variance. While there were no significant findings for the ability or evaluative dimensions, the motive dimension approached significance for the main effect of threat, $F(2, 135) = 3.00, p = .0531$. Mean data for the postgame ratings (motive scale) are presented in Table 4. The results show that the players in the Unilateral Threat condition rated each other less favorably ($\bar{X} = 27.43$) than did players in either the No Threat ($\bar{X} = 31.64$) or Bilateral Threat ($\bar{X} = 29.99$) conditions. Further analyses were carried out on the data for the Unilateral Threat condition in order to determine the relative evaluations of subjects with and without threat capacity.
Table 4
Mean Data for Postgame Ratings
(Motive Traits) of Other Player

<table>
<thead>
<tr>
<th>Threat Availability</th>
<th>LIP for Pairs of Ss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AIP-AIP</td>
</tr>
<tr>
<td>No Threat</td>
<td>31.12</td>
</tr>
<tr>
<td>Unilateral Threat</td>
<td>26.87</td>
</tr>
<tr>
<td>Bilateral Threat</td>
<td>31.75</td>
</tr>
</tbody>
</table>

Within the Unilateral Threat condition, an LIP (2) X Threat (2) mixed design analysis of variance was performed on the postgame ratings (motive traits) of the AIP-AIP and CIP-CIP pairs. Threat was considered to be a within-subjects variable. The effect of threat was found to be statistically significant, \( F(1,14) = 5.12, \ p = .0400 \). As would be expected, the pair members possessing threat were rated less favorably (\( \bar{x} = 26.68 \)) than the pair members without threat (\( \bar{x} = 30.93 \)). An LIP (2) X Threat (2) mixed design analysis of variance applied to the data of the AIP-CIP pairs revealed no statistically reliable differences in terms of the postgame ratings (motive traits).

Personality differences were examined by comparing AIP and CIP scores on each of the six subscales of the PAS. As can be seen in Table 5, CIPs were found to be more authoritarian and less trusting...
Table 5
Results of T-Tests Comparing the Scores on the PAS for AIPs With Those of CIPs

<table>
<thead>
<tr>
<th>Measures</th>
<th>AIPs M</th>
<th>AIPs SD</th>
<th>CIPs M</th>
<th>CIPs SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 72)</td>
<td></td>
<td>(n = 72)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggressive Militarism</td>
<td>-41.54</td>
<td>12.00</td>
<td>-40.35</td>
<td>12.86</td>
<td>-.55</td>
<td>.581</td>
</tr>
<tr>
<td>Conciliation vs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belligerence</td>
<td>54.80</td>
<td>11.81</td>
<td>52.30</td>
<td>12.67</td>
<td>1.21</td>
<td>.227</td>
</tr>
<tr>
<td>Authoritarian vs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nationalism</td>
<td>71.40</td>
<td>13.91</td>
<td>82.57</td>
<td>20.90</td>
<td>-3.75</td>
<td>.000</td>
</tr>
<tr>
<td>Risk Avoidance</td>
<td>77.05</td>
<td>12.58</td>
<td>76.22</td>
<td>12.88</td>
<td>.39</td>
<td>.698</td>
</tr>
<tr>
<td>External vs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal Control</td>
<td>1.67</td>
<td>1.19</td>
<td>2.07</td>
<td>1.57</td>
<td>-1.69</td>
<td>.094</td>
</tr>
<tr>
<td>Suspiciousness vs.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td>37.46</td>
<td>10.45</td>
<td>43.33</td>
<td>12.15</td>
<td>-3.09</td>
<td>.002</td>
</tr>
</tbody>
</table>

than AIPs. Numerous studies (cf. Schroder et al., 1967) have reported relationships between high F scores (Adorno et al., 1950) and proneness to concrete thinking, with correlations ranging from -.25 to -.55. Rubin and Brown (1975) cite extensive evidence showing systematic relationships between bargaining behavior and generalized trust. In particular, bargainers predisposed to trust others tend to cooperate at a higher level in mixed-motive games. In the present study,
bargainers characterized by concrete information processing structures generally displayed noncooperative behavior.

**Within-Pair Comparisons**

**Joint Profits.** To clarify the effects of Unilateral Threat capacity, further analyses were performed on the data of the AIP-AIP and CIP-CIP pairs. Separate analyses were carried out on the data of the AIP-CIP pairs and will be discussed in following paragraphs. An LIP (2) X Threat (2) X Trials (4) mixed design analysis of variance with repeated measures on the latter two factors was conducted on the profit data. Threat was analyzed as a within-subjects factor since pair outcomes could not be assumed to be independent. Moreover, the threat factor referred to the distribution of strategic resources: pair members with and without threat. The results showed significant effects of threat, $F(1,14) = 13.76, p = .0023$, and trial blocks, $F(3,42) = 5.52, p = .0027$. Those pair members possessing Unilateral Threat earned significantly more money ($\bar{x} = .58$) than pair members without it ($\bar{x} = .11$). Pair outcomes showed a significant increase over trials. The means for trial blocks 1-4 were .15, .37, .33, and .53, respectively.

**Withdrawal Responses.** Similarly, an LIP (2) X Threat (2) Trials (4) mixed design analysis of variance with repeated measures on the latter two factors was applied to the withdrawal data. The results revealed a significant effect of threat, $F(1,14) = 5.13, p = .0399$. As expected, pair members possessing threat potential withdrew significantly less frequently ($\bar{x} = .34$) than those without it.
(\bar{X} = 1.20).

**Gate Usage.** In terms of gate usage, an LIP (2) X Trials (4) analysis of variance failed to show any reliable effects. Although not statistically significant, the frequency of gate usage decreased as a function of trials, \( F(3,42) = 1.79, p = .1639 \). For trial blocks 1-4, the means were 2.00, 1.68, 1.62 and 1.00, respectively.

**AIP-CIP Analyses**

Since strategic threat capacity was assigned a priori to bargainers in the AIP-CIP Unilateral Threat cell, subsidiary analyses were performed on these data. In half of the bargaining pairs, AIPs (N = 4) were given the threat response, while in the remaining half CIPs (N = 4) possessed threat. It was hypothesized that AIP-Threatener pairs would (a) maximize profits more frequently, (b) use the alternate routes less frequently, and (c) use their gates less frequently than CIP-Threatener pairs.

**Joint Profits.** Profits were analyzed by an LIP-Threat (2) X LIP (2) X Trials (4) mixed design analysis of variance with repeated measures on the latter two factors. The LIP-Threat factor

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1AIP-CIP pair outcome data (profits, withdrawals) for the No Threat and Bilateral Threat condition were analyzed by a Threat (2) X LIP (2) X Trials (4) mixed design analysis of variance. There was a reliable trials effect for the profit measure, \( F(3,42) = 5.93, p = .0018 \). Profits tended to increase over trials: the means for trial blocks 1-4 were .07, .33, .34 and .49, respectively. An LIP (2) X Trials (4) within-subjects analysis of variance applied to gate usage did not show any reliable effects.
referred to the pair member possessing threat capacity: AIP or CIP. The LIP factor was analyzed as a within-subjects variable since pair outcomes could not be assumed to be independent. The analysis revealed a significant LIP-Threat X LIP interaction, \( F(1,6) = 7.03, p = .0379 \); and LIP-Threat X Trials interaction, \( F(3,18) = 5.14, p = .0132 \).

The results of the analysis failed to support the profit maximization hypothesis (a). Although the direction of the difference was suggestive, no reliable differences were found between the joint profits of the AIP-threatener (\( \bar{X} = -.06 \)) or CIP-threatener (\( \bar{X} = -.68 \)) pairs, \( F(1,6) = 2.37, p = .1700 \). The significant LIP-Threat X LIP interaction indicated that within AIP-threatener pairs, individual profits were greater for the AIP (\( \bar{X} = .22 \)) than for his CIP partner (\( \bar{X} = -.36 \)); whereas, within CIP-threatener pairs, individual profits were greater for the CIP (\( \bar{X} = -.32 \)) than for his AIP partner (\( \bar{X} = -1.04 \)).

An examination of the LIP-Threat X Trials interaction revealed that AIP-Threatener pairs started with higher joint profits but tended to do worse during the course of the game, while CIP-threatener pairs started with relatively lower joint profits but tended to improve during the course of the game.

**Withdrawal Responses.** Withdrawals were analyzed by an LIP-Threat (2) X LIP (2) X Trials (4) mixed design analysis of variance with repeated measures on the latter two factors. The analysis revealed significant effects of LIP-Threat, \( F(1,6) = 7.33, p = .0350 \), and LIP-Threat X Trials interaction, \( F(3,18) = 4.39, p = .0170 \).
Hypothesis (b) predicted that AIP-threatener pairs would use the alternate route less frequently than CIP-threatener pairs. As predicted, AIP-threatener pairs withdrew significantly less frequently ($\bar{x} = .84$) than did CIP-threatener pairs ($\bar{x} = 2.31$). Within AIP-threatener pairs, the AIP pair member withdrew less frequently ($\bar{x} = .56$) than his CIP partner ($\bar{x} = 1.12$); whereas, within CIP-threatener pairs the CIP pair member withdrew less frequently ($\bar{x} = 2.18$) than his AIP partner ($\bar{x} = 2.43$). Paralleling the joint profit data, the LIP-Threat x Trials interaction revealed that AIP-threatener pairs withdrew to the alternate route less frequently than did CIP-threatener pairs during the initial trials of the game, however, the trend was reversed as the game progressed.

**Gate Usage.** Gate usage was analyzed by an LIP-Threat (2) x Trials (4) mixed design analysis of variance. The results of the analysis failed to support hypothesis (c), which stated that AIP-threateners would use their gates less frequently than CIP-threateners. No reliable differences in gate usage were found between AIP and CIP threateners.
DISCUSSION

In direct contradiction to Terhune's (1970) summary statement that threat minimizes the differential effects of personality in experimental games, the results of the present study provide strong evidence for the influence of a personality variable (LIP) on strategy development and gaming responses within a mixed-motive setting. Information processing complexity interacted with threat availability and trials in the development of the players' game strategy. This was manifested in joint profits, withdrawals, and gate usage in the Deutsch-Krauss trucking game.

A number of studies employing the Deutsch-Krauss trucking game have demonstrated that threat availability has a detrimental effect on bargaining efficiency (Deutsch & Krauss, 1960, 1962; Borah, 1963; Rice, 1964; Krauss & Deutsch, 1966; Cheney, Harford & Soloman, 1972; Deutsch, Canavan, & Rubin, 1972; Smith & Anderson, 1975). While the present data offer support for this generalization, they suggest that it requires some qualification. The remainder of the discussion is directed toward these qualifications.

It was interesting that bargaining efficiency was hampered even when bargaining pairs did not possess threat capacity. Whereas the AIP-AIP pairs seized upon the optimal and cooperative alternation strategy almost immediately and thereby maximized mutual gain, the AIP-CIP and CIP-CIP pairs arrived at this strategy only after some difficulty. The most important finding of the study was that the introduction of threat into the bargaining setting affected game play
dramatically. Specifically, threat capacity was found to be a type of information that was used differently by players of different information processing capacities. These differences were translated into strategy differences by the differing LIP groups. As hypothesized, the AIP-AIP pairs bargained most efficiently under conditions of Unilateral Threat, however, it was the AIP-CIP pairs rather than the CIP-CIP pairs who bargained least efficiently. Regarding joint profits, there was a moderate decrease from the AIP-AIP group to the CIP-CIP group, with the AIP-CIP group incurring substantial losses. An examination of the gaming responses reveals that the AIP-CIP group withdrew from the interaction more frequently and used their gates more frequently than did AIP-AIP or CIP-CIP pairs. However, these differences were not large enough to reach statistical significance. Within-pairs analyses afforded further insight into the strategies employed by each LIP group.

For the AIP-AIP and CIP-CIP pairs, within-pairs comparisons revealed a significant main effect of threat. Pair members possessing threat capacity earned more money than those without threat. As would be expected, threateners withdrew to the alternate route less frequently than those without threat. These findings are entirely consistent with the Deutsch-Krauss (1960) experiment: if threat is available to one member of a bargaining pair, it is to one's advantage to possess it. Moreover, bargainers tended to earn greater profits as the game progressed. Upon closer examination of the data, some interesting questions arise. Consistent strategies appear to
characterize the style of play of each the above LIP groups. There was a marked tendency for both AIP-threateners and CIP-threateners to exploit their respective partners. Interestingly, the AIP-threateners earned roughly three times as much as their partners, while CIP-threateners outearned their partners by a margin of four to one. What then, accounts for the difference in joint profits between AIP-AIP and CIP-CIP groups? The AIP-threatener appeared to use his gate as a signal in asserting his right to the common path during the early trials of the game. Wanting to minimize losses, the AIP pair member without threat would then wait for the threatener to go first on each trial and subsequently proceed to his destination. By the use of this strategy, these pairs attained fairly high profits. On the other hand, the CIP-threatener appeared to use his gate as a means of maximizing relative gain, whereby the pair member without threat was in many instances forced to take the unprofitable, long route to his destination.

For the AIP-CIP pairs, the hypotheses that the AIP-threatener pairs would maximize profits more, withdraw to the alternate route less frequently, and use their gates less frequently than CIP-threatener pairs were only partially supported. These data, however, provided some interesting results that are consistent with the major hypotheses of the study. Although the profit maximization hypothesis did not receive statistical support, there was a trend for AIP-threatener pairs to maximize profits to a greater extent than CIP-threatener pairs. In fact, 3 of 4 AIP-threatener pairs made
a profit, while all four CIP-threatener pairs incurred a loss. Considering AIP-threatener pairs, withdrawal appeared to be the dominant strategy of the CIP pair member during the early trials of the game. Since these pairs profits progressively declined during the course of the game, it can only be assumed that the CIP pair member finally realized that the only way to make a profit was to take the common path. Subsequently, the CIP began to block the right of way in asserting his priority over sharing the common path and became locked into a competitive strategy. In the CIP-threatener pairs, the AIP pair member did not "leave the field" immediately and appeared to exert his blocking power to obtain a fair share of the profits. Unable to bargain with the CIP-threatener, the AIP pair member began to withdraw in order to minimize his losses. The results obtained in the AIP-CIP analysis should be interpreted with extreme caution due to the small sample size; nevertheless, they provide speculation for further research.

The most dramatic effect in the significant LIP X Threat interaction was the impact of Bilateral Threat capacity on the differing LIP groups. The hypothesis that Bilateral Threat would be more deleterious for CIP-CIP than AIP-AIP pairs was strongly supported. CIP-CIP pairs earned significantly less money, withdrew to the alternate route significantly more frequently, and used their gates significantly more frequently than did AIP-AIP pairs. The AIP-CIP pairs fell intermediate on each of the above trucking game indices. When both pair members possessed threat, AIP-AIP pairs
seemed much more disposed towards bargaining and conciliation than did DIP-CIP pairs. Realizing the advantage in joint maximization, AIP-AIP pairs quickly established an alternation strategy in co-operating over the use of the alternate path. These pairs rarely used their gates except perhaps as a signal for turn taking.

CIP-CIP pairs, on the other hand, were more prone towards maximizing relative gain. They failed to consider the alternation strategy as a means of enhancing joint profits; instead, they seemed to view the task in terms of win-lose or victory-surrender. Since threat was a highly salient stimulus cue in the bargaining game, it is suggested that the gates exerted "cue control" over the more stimulus-bound CIP subjects. Past research (Schroder et al., 1967) has indicated that CIPs tend to anchor behavior in external stimuli when these are clear and unambiguous. Supporting such a conclusion is the tendency for CIP-CIP pairs to become locked into a threat-counterthreat spiral whereby threats by one pair member tend to be matched by threats from the other. Since the use of the gates forces the players to take the long route, the primary strategy becomes that of beating one's opponent rather than maximizing mutual gain.

In terms of players' postgame ratings, it was found that the Unilateral Threat condition was rated less favorably than either the No Threat or Bilateral Threat conditions on the motive scale (e.g., competitive-cooperative, hostile-friendly). It is suggested that the player who uses threat in gaining an advantage over an unarmed opponent violates the commonly held norm of equity (Adams, 1965) or
distributive justice (Homans, 1961). Apparently, the pair member without threat did not perceive that the threatener had a rightful claim to more than a fair share of the profits in the game. As would be expected, pair members possessing threat were rated less favorably on postgame motive traits than those without it. Interestingly, the AIP-AIP pairs rated each other less favorably than did the CIP-CIP pairs, suggesting that the former may well extract more motivational information from the interaction than the latter. While there was little variability in the postgame motive ratings for the AIP-CIP pairs, this could have been due to the limited sample size involved in the analysis. It should be kept in mind that these personality ratings are rather gross measures, therefore limiting any generalizations from the present study.

Given these findings the following conclusions appear justifiable. First, the availability of threat has a detrimental effect on players' bargaining efficiency in a mixed-motive game. Second, AIP and CIP players are affected differently by the type and amount of threat at their disposal. Considering the situation of Unilateral Threat, if threat is available to one member of a bargaining pair, it tends to be used in gaining an advantage over one's opponent. There appears to be a trend for both AIP-threateners and CIP-threateneners to exploit their respective partners. While the AIP-threatener's strategy appears to center around using threat as a signal in asserting his priority to the common path, the CIP-threatener's strategy is one of using threat to punish and force
his opponent to take the long, alternate route in order to maximize relative gain. As for Bilateral Threat, AIP-AIP pairs display an ability to go beyond the immediate situation and consider the multi-facted aspects of the complex setting of the trucking game. For these pairs, then, bargaining and compromise are the rule rather than the exception. CIP-CIP pairs appear to tap into the competitive aspects of the situation. Since the threat response constitutes a highly salient stimulus in the experimental setting, it is suggested that the more stimulus-bound CIPs readily employed it as a means of resolving conflict or perhaps as a way of escaping the complex interdependency inherent in the task itself.
REFERENCES


Endler, N. S. and Hunt, J. McV. S-R inventories of hostility and comparisons of the proportions of variance from persons, responses, and situations for hostility and anxiousness.


Hamner, W. C. The influence of structural, individual and strategic
differences on bargaining outcomes: A review. In D. L. Harnett
and L. L. Cummings (Eds.), Bargaining behavior and personality:
Harvey, O. J., Hunt, D. E., & Schroder, H. M. Conceptual systems and
Homans, G. C. Social behavior: Its elementary forms. New York:
Harcourt, Brace, 1961.
Hornstein, H. A. The effects of different magnitudes of threat upon
interpersonal bargaining. Journal of Experimental Social
Psychology, 1965, 1, 282-293.
Kelly, G. A. The psychology of personal constructs. Vol. I. A
Kelley, H. H. Experimental studies of threats in interpersonal
Kelley, H. H., and Stahelski, A. J. Social interaction basis of
cooperators' and competitors' beliefs about others. Journal of
Kelley, H. H., Deutsch, M., Lanzetta, J. T., Nutten, J. M., Shure,
G. H., Faucheux, C., Moscovici, S., Rabbie, J. M., and Thibaut,
Kirk, R. E. Experimental design: Procedures for the behavioral


Loomis, J. L. Communication, the development of trust, and cooperative behavior. *Human Relations*, 1959, 12, 305-315.


Moos, R. H. Sources of variance in responses to questionnaires and in behavior. *Journal of Abnormal Psychology*, 1969, 74, 405-412.


Siegal, S. and Fouraker, L. E. Bargaining and group decision


1975, 12, 76-82.


Wrightsman, L. S. Personality and attitudinal correlates of trusting and trustworthy behaviors in a two-person game. *Journal of*
Wrightsman, L. S., O'Connor, J., and Baker, N. J. (Eds.).

Cooperation and competition: Readings on mixed motive games.
Appendix A

Experimental Instructions
EXPERIMENTAL INSTRUCTIONS

The subjects were given the following tape-recorded instructions in the order presented. Parts of the instructions are applicable only to particular experimental conditions and are so labeled.

All Conditions:

Hello. I am your experimenter, Mr. Watts. You were both instructed by telephone to report to separate experimental cubicles at differing times to avoid communication with one another. It is absolutely necessary for you to refrain from any type of verbal communication between yourselves or directed to me at this time or during the course of your task. I will let you know when the task is finished.

You have completed the paper-and-pencil tests and are ready for the second part of a decision making experiment. I will read the instructions for the task. If you have any questions pertaining to the clarification of the instructions, please write them down on the paper provided, and I will read and answer your questions following the instructions and practice trials.

I would like for you both to pretend that you are owners and operators of a trolley company. The person on my right (pointing) will be designated Broadway Trolley Company, while the person on my left (pointing) will be designated Crostown Street Trolley Company. Your task is as follows: Each trolley company must carry its passengers from its respective start position (red square) to the terminal at the opposite end of the track in the shortest time possible. There are two routes which may be used to reach your terminal. The most direct route is designated Sunset Avenue and runs from your starting position to your terminal. As you can see it contains a section of common track over which you both cannot pass at the same time. Each of you also has access to a longer, alternative route by which you can reach your terminal. Your pay in the experiment is directly related to the time it takes your trolley to reach its destination.

Let me explain the payoff structure. Each of you has been given $1.00 which is yours to keep. It is possible to gain more money or lose some during the course of the task. At the beginning of each trial you will each be credited with 35¢ working capital. As with any business, there are operating costs. Operating expenses for your companies will be calculated at the rate of 2¢ per second and are monitored by the E.
Under maximum conditions the first trolley traveling over the short route to its terminal takes approximately eight seconds. At 2¢ per second operating costs this works out to 16¢ operating expenses, which is deducted from your 35¢ working capital. The profit for the first trolley to reach its terminal is therefore 19¢. The second trolley to pass over the short route takes thirteen seconds to reach its terminal. In deducting the 26¢ operating expenses from the 35¢ working capital, this trolley company realizes a 9¢ profit. Finally, each of you may choose to take the longer, alternative route to your respective terminals. Since it takes approximately twenty seconds minimum time if you travel this route directly from your starting position, you will incur 40¢ operating expenses. Deducting the 40¢ operating expenses from your 35¢ working capital results in a loss of 5¢ or more if you take a longer amount of time. Each trial begins with the E saying "Ready" "Set" "Go" and ends when both trolley companies have reached their destinations.

You are to try to earn as much money as possible for yourselves and to have no interest in whether the other person makes or loses money. After each trial, I will tell you how much you made or lost. Please do not keep a written record during the task. Do not be concerned with how the other person is doing. The important thing for you to consider is whether you are making or losing money, not how you compare with the other person.

**Unilateral Threat Condition:**

One more point. Broadway Trolley Company will have one advantage over Crosstown Street Trolley Company during this task. Broadway Trolley Company will have access to the use of a barrier with which he may employ to block the passage of Crosstown Street Trolley Company over the short route. The barrier that you control is nearest your starting position. There is one rule concerning its use. You must be on the short route, though not necessarily in the common sector, in order to lower the barrier. Once lowered, the barrier may be kept down for as long as you wish, regardless of the route subsequently taken. It is your choice concerning whether or not to use the barrier. It may be used as many times as you wish.

**Bilateral Threat Condition:**

One more point. Both Broadway Street Trolley Company and Crosstown Street Trolley Company will have access to the use of a barrier with which you may employ to block each others passage over the short route. The barrier that you control is nearest your starting position. There is one rule concerning its use. You must be on the short route in order to lower the barrier. In other words, you may not depart
directly from your starting positions via the long route and sub-
sequently lower the barrier. Once lowered, the barrier may be kept
down for as long as you wish. It is your choice concerning whether
or not to use the barrier. It may be used as many times as you wish.
Appendix B

Analysis of Variance and Combined Tables of Means for Joint Profit Measures
Table 1
LIP (3) x Threat (3) x Trials (4) Analysis of Variance for Joint Profits

<table>
<thead>
<tr>
<th>Source</th>
<th>Sums of Squares</th>
<th>d.f.</th>
<th>Mean Square</th>
<th>F</th>
<th>P</th>
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<td>LIP</td>
<td>575153.500</td>
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<td>287576.750</td>
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<td>LIP x Threat</td>
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<td>200266.125</td>
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<td>.0002</td>
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<td>1971186.000</td>
<td>63</td>
<td>31288.664</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial</td>
<td>239360.000</td>
<td>3</td>
<td>79786.625</td>
<td>9.77</td>
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<td>.2286</td>
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<td>Error</td>
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<td>189</td>
<td>8158.688</td>
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<td>Total</td>
<td>5618623.000</td>
<td>287</td>
<td>19577.082</td>
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Table 1 (a)
Means for Joint Profit Measure
by LIP and Threat

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<th>AIP-AIP</th>
<th>AIP-CIP</th>
<th>CIP-CIP</th>
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</thead>
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<tr>
<td>No Threat</td>
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<td>309.875</td>
<td>161.375</td>
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<tr>
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<td>395.000</td>
<td>-301.625</td>
<td>161.375</td>
</tr>
<tr>
<td>Bilateral Threat</td>
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<td>192.875</td>
<td>-488.375</td>
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<tr>
<td></td>
<td>397.833</td>
<td>67.042</td>
<td>-16.000</td>
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</table>

Table 1 (b)
Means for Joint Profit Measure
by Trial and LIP

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<th>Three</th>
<th>Four</th>
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<td>-8.861</td>
<td>38.056</td>
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Table 1 (c)

Means for Joint Profit Measure
by Trial and Threat

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<td>-8.861</td>
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<td>51.764</td>
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Table 1 (d)
Means for Joint Profit Measure
by LIP, Threat and Trial

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<th>Bilateral Threat</th>
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<td>Trial Block Three</td>
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<td>Trial Block Two</td>
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<td>AIP-AIP</td>
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<td>105.00</td>
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<td>98.00</td>
<td>24.25</td>
<td>74.00</td>
<td>-5.00</td>
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