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Is Reciprocity Necessary for Co-opetition? Some Experimental Evidence

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ABSTRACT

Cooperative strategy is increasingly being accepted as a legitimate construct in strategic management. In this paper we argue that in order to use cooperative strategy in concert with competitive strategy, what some have called ***co-opetition***, an environment of reciprocity is required. This paper reviews the theoretical roots of co-opetive behavior and reciprocity, describes a two-stage game designed to test competing hypotheses of co-opetive behavior, then reports the results of two experiments where subjects played the co-opetition game under differing conditions. Our results show that game-theoretic predictions of co-opetive behavior are not supported. Most subjects elect to cooperate in the first stage of the game, thereby increasing the size of the "pie" but potentially weakening their role in the second stage of the game. Further, subjects do not make large demands in the ultimatum bargaining (second) stage of the game and frequently reject positive offers. The results show that giving subjects an opportunity for reciprocal interaction improves overall rates of cooperation and lowers the likelihood of rejected demands.

Introduction

Cooperative strategy is receiving increased attention in strategic management research. While much of the recent work has been in the area of interorganizational relationships, such as joint ventures and strategic alliances (Kogut, 1988; Dyer & Singh, 1998), a broader concept, dubbed "co-opetition", has recently surfaced in the strategy literature. Brandenburg and Nalebuff (1996) argue that the essence of co-opetition is in the search for complements. A complement is a product or service that makes another more attractive. Examples include hardware and software, automobiles and car loans, televisions and videocassette recorders, even hot dogs and mustard. Firms with complementary products are advised to first ***cooperate*** with each other to expand the size and attractiveness of the market, and then ***compete*** with one another to get the largest possible share of profits from the expanded market.

Evidence of the quick acceptance of co-opetition in mainstream thinking abounds. Kessler (1998) used co-opetition to explain the continually shifting partnerships and co-dependencies prevalent in the computer industry. Bill Gates, CEO of Microsoft, is quoted as saying, "I come from a business where everybody is a competitor with everybody else, and everybody cooperates with everybody else" (Editor and Publisher, 1998). One healthcare consultant advises that his industry "… is poised and ready for the concept of co-opetition …" and believes the concept could "… usher in a new era for the nation's largest service sector" (Gee, 2000). Wheatley (1998) contends that competitors who ship goods on the same trucks are using co-opetition in their supply chains. Similarly, competing newspaper groups that are jointly selling advertising insert packages are said to have found co-opetition (Editor and Publisher, 1998). Ghemawat (2001) endorses Brandenburg and Nalebuff's "Value Net" analysis -- a tool of strategic management that explicitly considers complementors. He advocates this tool as an accompaniment to Porter's Five Forces Model, thus adding an important cooperative dimension to the standard competitive forces analysis.

Co-opetition is seemingly a smart and clever construct to add to the strategist's handbook. However, it is difficult to implement because it requires participants, who operate predominantly in competitive business environments, to know when and how to cooperate. While there is an abundance of theory informing competitive strategy, much less is known on how or when firms should cooperate. Although co-opetition is a recent addition to the strategic management jargon, the idea that a single actor should both cooperate and compete in situations of strategic interdependence has a long history in economics and behavioral research. Given the growing acceptance and potential value of cooperative strategy, further research from multiple perspectives is warranted.

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In this paper, we examine co-opetive behavior from a game-theoretic perspective, beginning with the premise that the addition of cooperative strategy is a positive development in strategic management. The rest of the paper is organized as follows. We briefly review select theoretical and experimental evidence relevant to co-opetive behavior. We then present and discuss the results of a new experiment specifically designed to elicit co-opetive behavior. However, as our laboratory will results show, even in simplified environments, co-opetive behavior is not easily mastered or maintained. The paper concludes with some basic advice on how to manage the duality of co-opetition.

The Roots Of Co-Opetive Behavior

When should a person cooperate or defect in an ongoing interaction with another is the question Robert Axelrod (1984) posed several decades ago in his investigation into the evolution of cooperation. Although his question was certainly not novel, Axelrod's method of research was. A repeated play Prisoner's Dilemma (PD) round-robin tournament was conducted. Participants from around the world submitted computerized strategies with algorithms for playing the repeated PD. Each singular strategy was matched against each other strategy for 200 repetitions of the game, with scoring determined by cumulative payoffs. Tit-for-Tat (TFT) a surprisingly simple strategy submitted by Anatol Rapoport won the tournament. TFT begins play with cooperation, and then simply does whatever its opponent did in the prior round. This simple yet highly effective strategy, whose unbending rules for when to defect and when to cooperate, performed remarkably well against a wide range of opponents.

TFT is clearly a simplistic forerunner to inter-firm co-opetition. In order to frame and understand the success of TFT, it is necessary to understand the nature of the PD. The game presents the player with a basic choice between cooperative and competitive behavior. The standard non-cooperative game theoretic solution to the one-shot prisoner's dilemma game is to always defect (compete). The reasoning is that the individual payoff for defection is greater than the individual payoff for cooperation, regardless of the opponent's choice. The dilemma exists because both players could earn greater payoffs through mutual cooperation. When the PD game is repeated for a number of periods, a strategy that sustains mutual cooperation is more effective in maximizing long-term payoff than a strategy that does not. The success of TFT lies in its ability to promote and maintain long periods of cooperation. As Axelrod's tournament showed, cooperation among egoists can only be maintained when a strategy determines when and how to both cooperate and defect.

Axelrod argued that the success of TFT was attributable to the strategy being: (1) nice -- not being the first to defect; (2) retaliatory -- repaying defection with defection; (3) forgiving -- willing to restore mutual cooperation; and (4) clear -- easily understood by its opponents. TFT engages in reciprocity by repaying cooperation with cooperation, and defection with defection. Reciprocity, in the context of a repeated PD, allows TFT to maintain long periods of cooperation by denying another strategy the ability to exploit it. TFT is always willing to cooperate, but is quick to retaliate defection as a punishment in order to deter continued defections. To externally validate the power of reciprocity, Axelrod offered several real world examples of TFT promoting cooperation in competitive environments where friendship or foresight did not exist.

Subsequent research by Axelrod (1997) and others (Smith, 1998; Hoffman, McCabe & Smith, 1994; Fehr & Gächter, 2000) has proposed that reciprocity is a key element in the development and maintenance of cooperative behavior in many different economic and social environments. Evolutionary biologists have suggested that reciprocity is an important factor in the success of the human species because it allows cooperative behavior to emerge in a community of competitors (Cosmides, L. & Tooby, J., 1992). If reciprocity is a necessary condition for realizing cooperation in competitive environments, one may argue it is also a necessary condition for co-opetition, which requires both cooperative and competitive behavior.

Reciprocity

The notion of reciprocal, give-and-take behavior is one of man's oldest conceptions and is found throughout the literature. Consider the following excerpts:

"There is no duty more indispensable than that of returning a kindness…all men distrust one forgetful of a benefit." (Cicero, as quoted in Gouldner, 1960).

"A man ought to be a friend to his friend and repay a gift with a gift. People should meet smiles with smiles and lies with treachery." (Edda, a 13th century collection of Nordic verses, as quoted in Fehr & Gächter, 2000).

"A new commandment I give unto you, That ye love one another; As I have loved you, that ye also love one another. By this shall all men know that ye are my disciples, if ye have love one to another." (Gospel of John, King James Bible version)

Each passage describes an obligation of mankind in rather strong terms, such as "duty", "ought" and "commandment." Modern-day notions of reciprocal behavior have changed little from these early views. Gouldner (1960) argued that the norm of reciprocity makes two demands: 1) people should help those who have helped them, and 2) people should not injure those who have helped them. Fehr & Gächter (2000) make a distinction between *positive reciprocity*, in which people tend to repay gifts, and *negative reciprocity*, in which people may take revenge, even against complete strangers and even if it is costly for them to do so. Reciprocity has also been defined as a form of altruism. Adam Smith (1759) proposed that: "How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it" (The Theory of Moral Sentiment, pg. 159). Smith's definition is considered *pure altruism*. Pure altruism occurs when a person gives something to another without the expectation of anything in return. *Reciprocal altruism* (Trivers, 1971) takes place when an altruistic act is given at one point in time on the expectation or possibility that it will be reciprocated in the future.

How prevalent and widespread reciprocity is in the human species is much debated. Gouldner (1960) argues that the norm of reciprocity is most likely universal and found in nearly all value systems and known cultures. He suggests we are generically hard-wired for reciprocal behavior, and that reciprocity is one of several "Principal Components", which are commonly present in codes of moral behavior. Trivers (1971) offered one of the first models to account for the natural selection of reciprocal altruism in the population. He showed that even though there is a cost associated with the altruistic act, as long as there is the possibility of the act being reciprocated with sufficient enough benefits the characteristic of reciprocal altruism will evolve into the population. The view that the human mind has cognitively adapted for reciprocal social exchange (cooperation) was investigated by Cosmides and Tooby (1992). Their argument is that in response to the myriad problems in the social world, the human mind has evolved and adapted into a collection of dedicated, functionally specialized, and interrelated modules employed to handle specific problems. One of these modules has specialized to handle instances of social exchange. Summarizing their findings they write:

"From the child who gets dessert if her plate is cleaned, to the devout Christian who views the Old and New Testaments as covenants arrived at between humans and the supernatural, to the ubiquitous exchange of women between descent groups among tribal peoples, to trading partners in the Kula Ring of the pacific—all of these phenomenon require, from the participants, the recognition and comprehension of a complex set of implicit assumptions that apply to social contract situations. Our social exchange psychology supplies a set of inference procedures that fill in all these necessary steps, mapping the elements in each exchange situation to their representational equivalents within the social contract algorithms, specifying who in the situation counts as an agent in the exchange, which items are costs and benefits and to whom, who is entitled to what, under what conditions the contract is fulfilled or broken, and so on" (pg. 206-207, Cosmides & Tooby, 1992)

The arguments made by sociologists and psychologists on the importance of reciprocity in social interactions have prompted many economists to use reciprocity to explain subject behavior in various economic experiments (Berg, Dickhaut & McCabe,1995; Smith, 1998; Hoffman, McCabe & Smith, 1998; Hirshleifer, 1999; Fehr & Gächter, 2000; Ortmann, Fitzgerald & Boeing, 2000). What distinguishes economic theories from those of other disciplines is the guiding presumption that behavior can be explained by notions of individual rationality; that people attempt to maximize their self-interests, without consideration for the collective welfare of the group. This is an important canon of economists' noncooperative models, widely used to predict behavior in both natural market and experimental settings. However, noncooperative models have often been poor predictors of behavior (in games such as PD, ultimatum and dictator), and results that have long puzzled economists are now being explained using reciprocity.

In making the case for the use of reciprocity in economic markets Vernon Smith (1998) writes:

"All humans, in all cultures, engage in the trading of favors. Although the cultural forms of reciprocity are endlessly variable, functionally, reciprocity is universal. We do beneficial things for our friends, and implicitly we expect beneficial acts in kind from them. In fact, this condition essentially defines the difference between friends and foes. We avoid close relationships with those who do no reciprocate. You invite me to dinner and two months later I invite you to dinner."

A key issue raised by V. Smith (1998) concerns the existence and form of reciprocity in an impersonal market exchange economy. Adam Smith (1776) in the Wealth of Nations proposed that: "It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own self interest." V. Smith (1998) reiterates that noncooperative behavior in impersonal markets "maximize the gains from exchange, the basis of specialization and wealth creation" (pg 2). In order to explain these seemingly contradictory behaviors, that cooperation and reciprocity are universal in social relationships and yet competitive behavior is predominant and beneficial in economic markets, V. Smith (1998) argues that one must distinguish between personal and impersonal exchange. Friends exchange favors and can easily monitor the equality of reciprocity in the relationship. In exchanging goods in the marketplace, parties compete within the context of established property rights, and have implicitly established reciprocal duties. V. Smith (1998) writes:

If A gives help, favors, food, or objects to B, B must recognize his own obligation to fulfill A's right to something in return, somewhere, sometime, if the relationship is to be maintained. This is the foundation of human social behavior, of bilateral associations, friendships in particular, and friendships in general. But social exchange requires not only positive reciprocity—trading favors—but also negative reciprocity, the endogenous policeman whereby failures to reciprocate are punished with unkind acts in which A reminds B of his or her obligations. Without negative reciprocity, reciprocating altruists invite invasion by free riders (pg. 17-18).

Smith's (1998) argument is that reciprocity is universal, even in impersonal market exchanges, and that different rules or property rights will develop to maintain its existence.

To summarize, sociologists have argued that reciprocity is a fundamental norm found in all cultures. Evolutionary psychologists have provided evidence to indicate that reciprocity is a characteristic beneficial to the survival of a species and that reciprocity has likely been adapted into the human mind. Experimental economists have begun using reciprocity to explain some puzzling laboratory results and have argued that reciprocity is a necessary feature for the formation and proper functioning of economic markets.

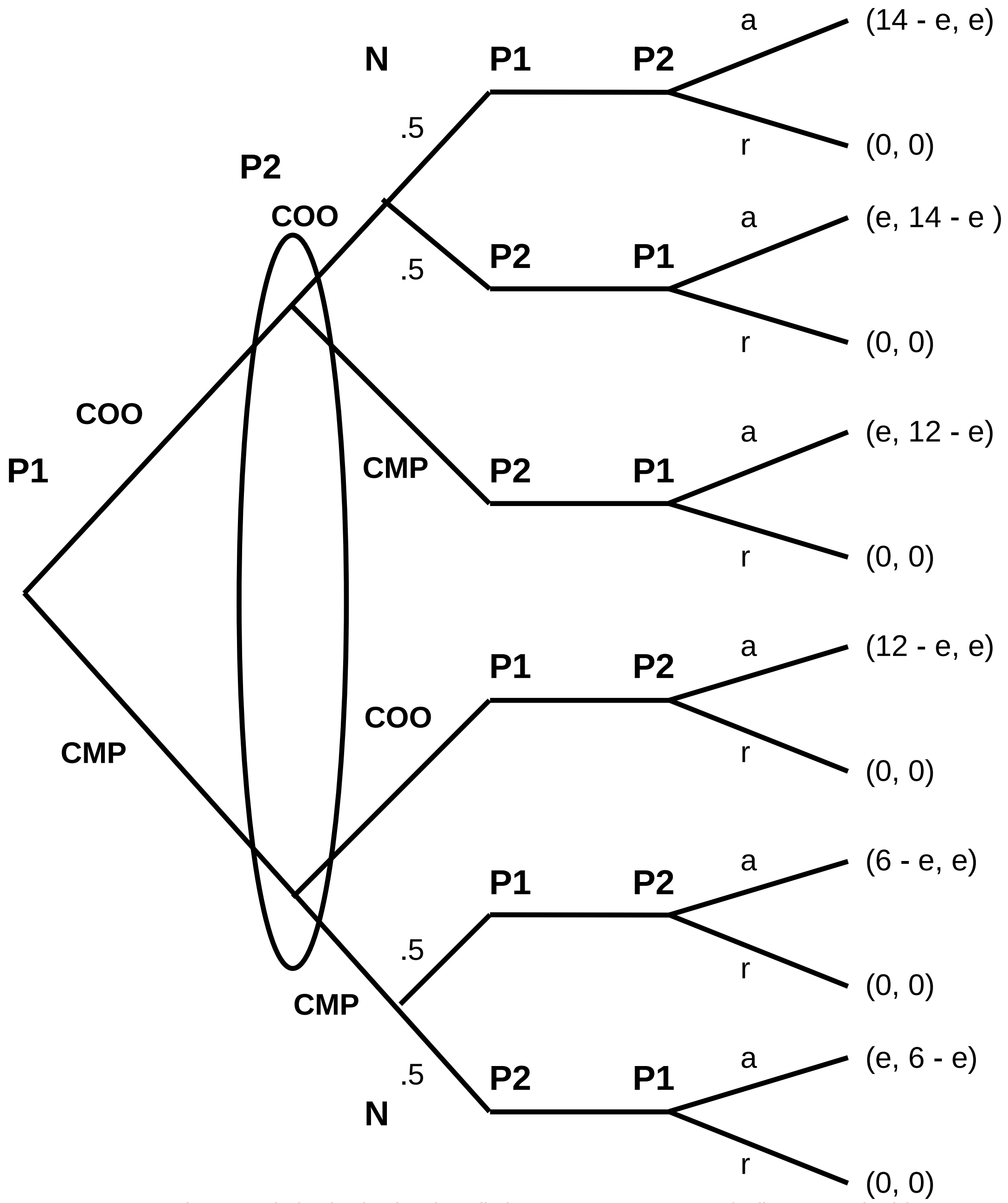
If reciprocity is a key variable in social exchange, then in order for co-opetition to flourish, the parties must develop norms or rules of reciprocal behavior. These norms or rules will be contingent on the environment in which the behavior takes place. While it is beyond the scope of this paper to propose necessary and sufficient universal norms or rules of behavior for co-opetition, we will illustrate how different experimental environments will lead to different cooperative and competitive behavior.

The next section of this paper outlines a two-stage game where players choose either cooperative or competitive behavior in Stage 1, followed by an opportunity for reciprocal behavior in Stage 2. Several competing hypotheses are offered to explain subject behavior. The third section of the paper presents two experiments, one conducted in the classroom and the other in a computerized laboratory, designed to test the competing hypotheses. The results are described separately for each experiment. The final section of the paper compares and contrasts the outcomes from both experiments, and concludes with several implications for management and strategy.

A Co-Opetition Game

Figure 1 presents a diagram of the two-player, two-stage co-opetition game in extensive form. In Stage 1, each player chooses simultaneously between cooperation and competition. To reduce potential bias in the results, the choices actually presented to the subjects were simply labeled "X" and "Y", respectively. However, to avoid confusion in our discussion, we shall refer to the cooperative choice as COO and the competitive choice as CMP. After players make their simultaneous decisions in Stage 1, the choices are revealed and Stage 2 begins. Stage 2 is a one-round ultimatum bargaining game, where the combination of choices determines the size of the pie to be divided, and the assignment of bargaining roles. In ultimatum bargaining games one player is designated the Sender and the other the Receiver. Typically, the Sender makes a proposal to the Receiver on how to split the pie. The amount the Sender proposes to keep is called the "demand". The remainder available for the Receiver is called the “offer”. If the Receiver accepts the offer, each receives their share of the pie. If the Receiver rejects the offer, each receives nothing.

Figure 1
Co-opetition Game in Extensive Form, Experiment 1



In the first experiment if both players chose COO in Stage 1, the size of the pie in Stage 2 was 14 units and the Sender was determined randomly with each player having a 50/50 chance. If one player chose COO and the other CMP, the size of the pie shrank to 12 units, but the player choosing CMP was designated the Sender. Finally, if both players chose CMP, the pie shrank to 6 units and once again the role of the Sender was chosen randomly with each player having a 50/50 chance. Thus, players faced a choice between acting cooperatively to ensure a larger sized pie but not guaranteeing their role of the Sender, or acting competitively, where the size of the pie shrinks but their chance of becoming the Sender improves. The game was designed to capture the essence of co-opetition - cooperate to create the largest possible pie then compete to divide the proceeds.

Three different sets of hypotheses are offered to predict behavior in the game. Hypotheses are generated based on the assumptions: 1) of game theoretic reasoning; 2) of co-opetition, as described the literature, and 3) that the norm of reciprocity is the driving factor in player behavior. The hypotheses are summarized in Table 1. We begin by specifying the game theoretic solution.

Table 1

Hypotheses

General Hypotheses based upon Reasoning from:	Decisions in Stage 1	Sender's Demand	Receiver's Decision
Game Theory	CMP/CMP	Pie - e	Accept any positive offer
Co-opetition	COO/COO	Pie - e	Accept any positive offer
Reciprocity	COO/COO	$P * R_n$	Accept offer if reciprocally fair

Because players may not make binding commitments in advance, and the pie size and roles are common knowledge, the game can then be solved by backward induction. Backward induction presumes you begin your analysis at the end of the game and work backwards to find the optimal strategy. To illustrate this technique, assume that the game will be played just once, both players have chosen COO, and the size of the pie is 14 units. Further, assume that Player 1 has been assigned the role of the Sender and has made an offer of e units ($e \geq 0$) to Player 2. Player 2 must decide whether to accept or reject e. This situation corresponds to the top two branches of Figure 1. For ease of presentation, the potential payoffs and subsequent branches in the game tree are displayed with a single end-point: pie size – e. If we assume that any payoff is preferred to a zero payoff, Player 2 should accept e and Player 1 receives 14 - e. Since any positive offer should be accepted, the actual amount of e should be the minimum possible positive offer. Similarly, if Player 1 had been assigned as the Receiver, we expect Player 1 to accept e. Since the COO/COO choices result in the random assignment of roles, the expected payoff to each player is 0.5*(14 - e + e) = 7 units.

A similar analysis reveals the payoffs for each remaining combination of Stage 1 choices. For example, if both players choose CMP, following the logic above, the size of the pie shrinks to 6 units and their expected payoffs are 0.5*(6 - e + e) = 3 units. If one player chooses COO and the other CMP, the size of the pie is 12 units, and the player choosing CMP is assigned the role of the Sender, and the player choosing COO the role of the Receiver. The payoffs are 12 – e for the Sender and e for the Receiver. Thus, each player has a dominant strategy to choose CMP since the expected payoff is greater than that for choosing COO, regardless of what the other player does. Game-theoretic reasoning also specifies that the Sender make only a minimal offer, e, to the Receiver, and that the Receiver accepts all positive offers.

A second set of hypotheses can be derived from the prescriptions of co-opetition. Co-opetition is presumably a normative theory and while exact predictions are not easily specified, we offer the following interpretation: co-opetition proposes that competitors cooperate when creating a pie and compete when dividing it up. Thus, in Stage 1 each player should make the cooperate (COO) choice, attempting to generate the largest possible pie. In Stage 2, where strict competition is prescribed, the player's should adhere to the standard game theoretic prediction of ultimatum bargaining. The Sender offers only a minimal amount of the pie, and the Receiver accepts any positive offer.

The third set of predictions is based on reciprocity. If a player expects that he or she will meet up with the other player again, then the norm of reciprocity is activated. If there is no or a very unlikely chance of the two players meeting again, then reciprocity is not a factor. Reciprocity requires that in Stage 1 both players choose COO since this results in the largest pie. In Stage 2, the Sender should offer a "fair" amount of the pie. We propose that the reciprocity hypothesis predicts the Sender will offer ($P*R_n$), where P is the size of the pie and R_n is the percentage required for reciprocal fairness. We next present two experiments to examine these hypotheses.

Experiment 1

Design And Method

Experiment 1 was conducted with 184 students, in the last semester of their undergraduate degree program, enrolled in two sections of a capstone strategic management course at a large mid-western university. The experiment was conducted during a regularly scheduled class.

To begin the experiment all subjects were given written instructions on the structure of the two-stage co-opetition game. The instructions were also read aloud. Subjects were playing for extra credit points amounting to about 1% of their final grade. The strategy method was used to elicit responses; this required each subject to specify his or her strategy under every possible contingency of the game. Subjects filled out the form shown in Figure 2, which captures all decision contingencies. In Stage 1, subjects were asked to choose either COO or CMP. In Stage 2 of the game, each subject was asked to designate how many points he would be willing to offer as the Sender, and the minimum number of points he would be willing to accept as the Receiver, under all the possible contingencies of the game.

Figure 2
Decision Form for Experiment 1

Stage 1:

I choose X / Y (circle choice)

Stage 2:

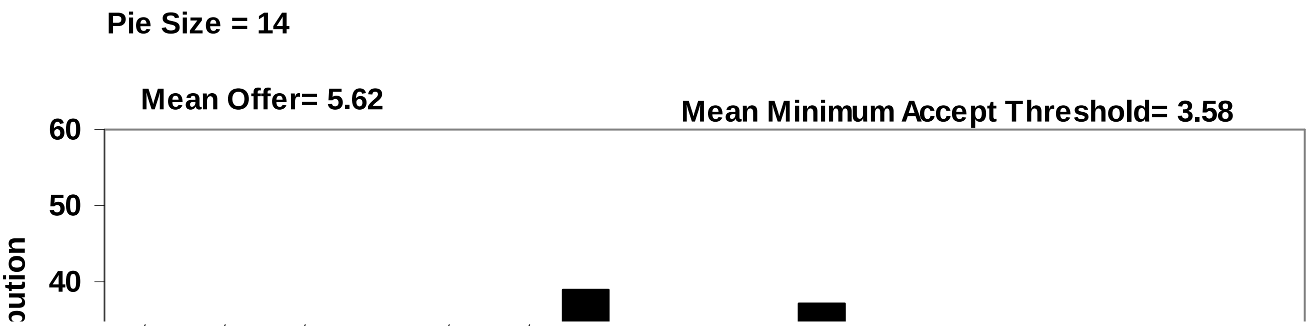
If the pie size is:	As Sender, I will offer:	As Receiver, I am will to accept any offer greater than:
14		
12		
6		

Each subject was told that his or her strategy would be randomly matched against another subject's strategy. If both subjects choose COO (CMP), the size of the pie would be 14 extra-credit points (6) and each would have a 50/50 chance of being assigned the Sender. If one chose COO and the other chose CMP, the pie would be 12 points, and the player choosing CMP would be assigned the role of the Sender. The offer amount would be read from the Sender's decision sheet and compared to the minimum accept threshold reported on the Receiver's decision sheet. If the offer exceeded this amount, the points were split as specified. If the offer was less than this amount, both players received zero extra credit points. Subjects were told the game would be played once and that all players' choices would remain anonymous. The random matching of subjects occurred after the class and the results were given to the students during the next class meeting.

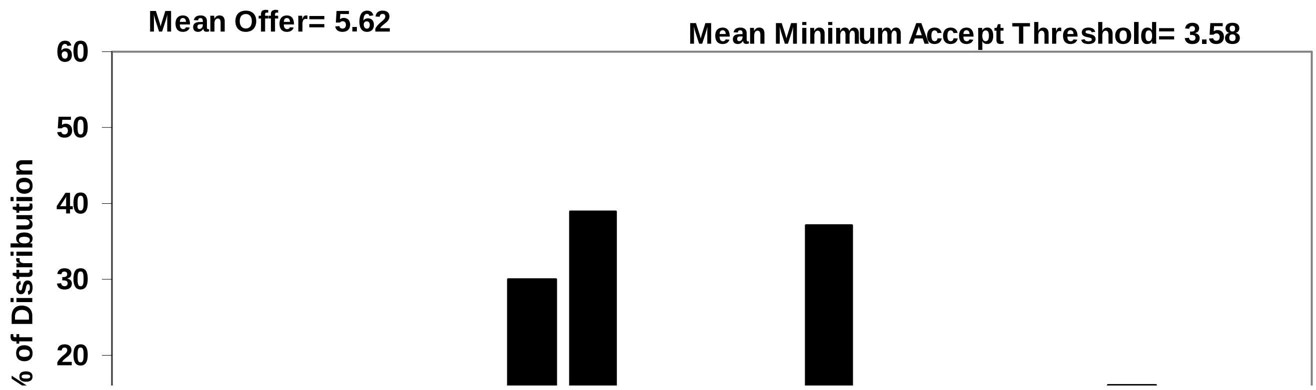
Experiment 1 – Results

Eighty eight percent of subjects chose to play cooperatively in Stage 1. While the decisions were randomly paired (per instructions) to determine the extra credit points each student earned, the analyses that follow do not reflect these pairings. Since the data was collected using the strategy method, we focus on aggregate responses across all contingencies. The distribution of Stage 2 offers and minimum accept thresholds by pie size are shown in Figure 3. The top panel shows the aggregate Stage 2 decisions for players, assuming both made cooperative choices in Stage 1, and the pie size was 14. The middle panel shows similar distributions if the players discovered that one had chosen cooperatively and the other competitively in Stage 1, and the pie size was 12. Finally, the bottom panel reports the decisions for players who both made competitive choices in Stage 1. The distribution of offers is shown as the left set of vertical bars, and the minimal accept threshold as the right set. Because the size of pie varies between panels, the figure reports the percent distribution, a comparable metric. The mean offer and mean accept thresholds are shown near the top of each panel.

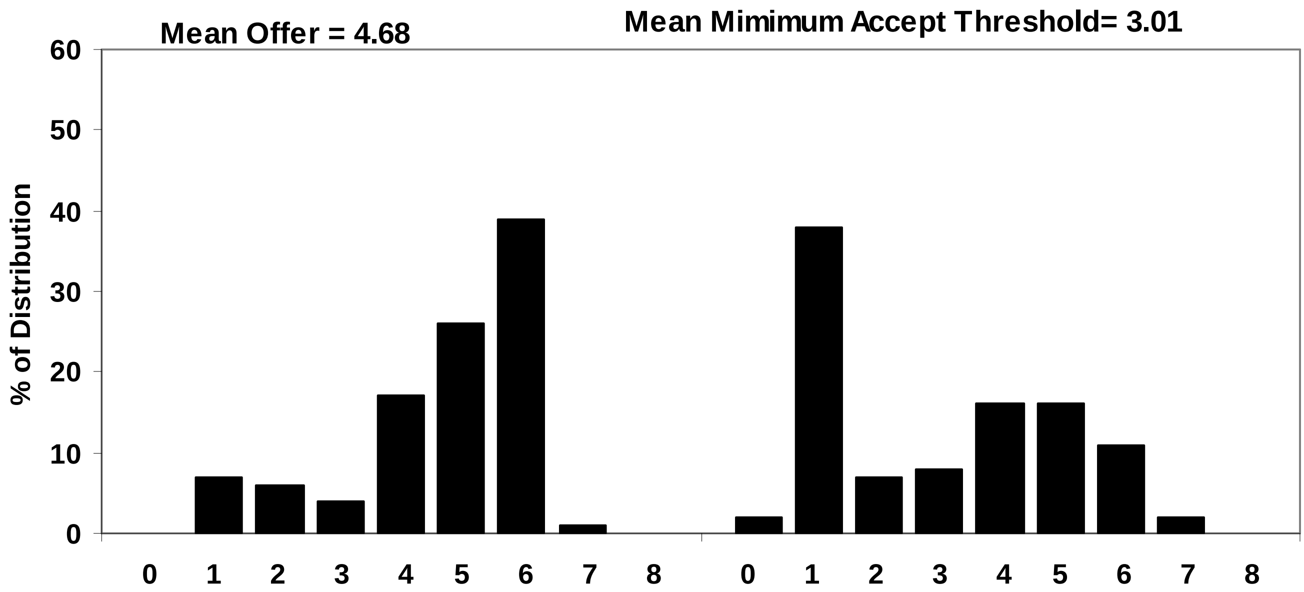
Figure 3
Distribution of Sender's Offers and Minimum Acceptable Offers



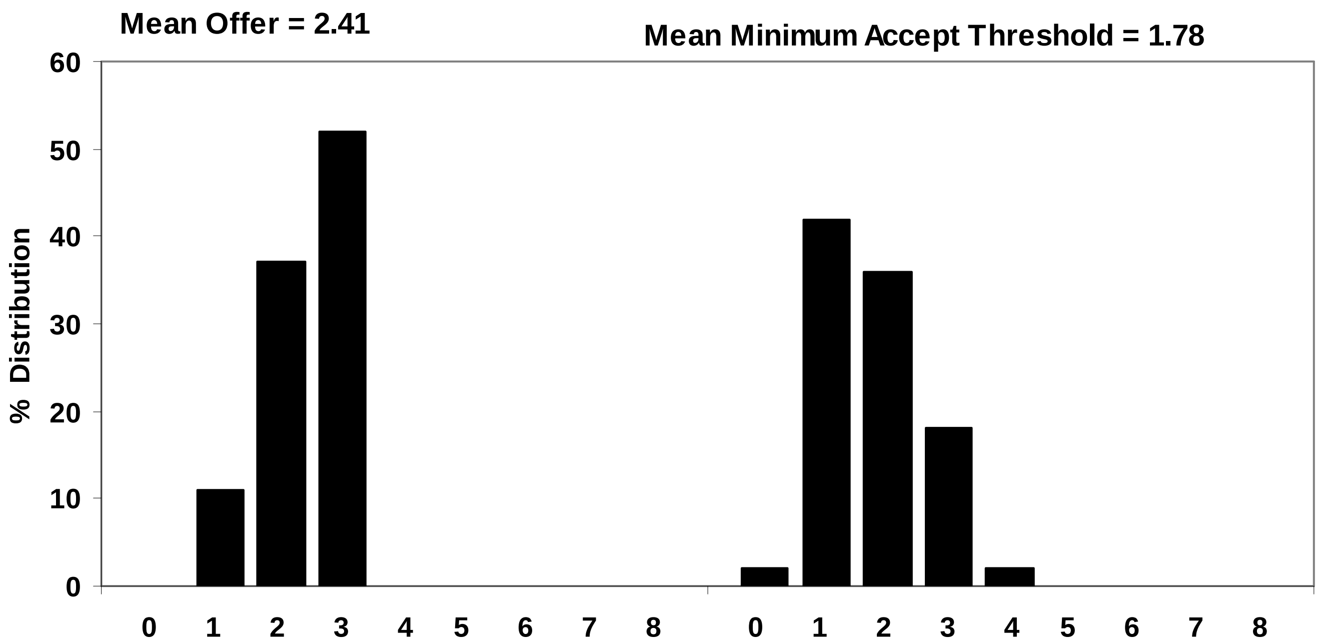
Pie Size = 14



Pie Size = 12



Pie Size = 6



For a pie size of 14 the mean offer was 5.62 and the mean minimum accept threshold was 3.58. For a pie size of 12 the mean offer dropped to 4.68 and the mean minimum accept threshold fell to 3.01. If the resulting pie size was 6, the mean offer dropped to 2.41 and the mean accept threshold fell to 1.78. These declines are not surprising, given that players have a smaller pie to split. What's interesting is the consistency of results between pie sizes. For each pie size, the modal response was to offer half of the pie. Thirty nine percent of players offered 7 when the pie was 14, 39% offered 6 when the pie was 12, and 52% offered 3 when the pie was 6. The modal response for the minimum accept threshold across each pie size was to accept an offer of 1 or more. Thirty seven percent of all players accepted an offer of 1 or more when the pie was 14, 38% accepted a similar amount when the pie was 12, and 42% accepted when the pie was 6.

We also calculated the ratio of offer to minimum accept threshold for each subject by pie size. Excluding three subjects who were willing to accept a zero offer, the ratio was 1.55, 2.37, and 2.64 for pie sizes of 6, 12, and 14 respectively. Roughly, subjects were willing to offer more than twice the minimum amount they were willing to accept.

Using the complete strategies collected from the subjects, a round robin tournament was simulated in which each strategy was matched against every other strategy in the population. A score was computed for each strategy based on its aggregate performance (in extra credit points) against all other strategies. For example, assume that a strategy has a policy of choosing to cooperate in Stage 1, accepting all offers equal to or greater than 1 in Stage 2, and offering exactly half the pie in all contingencies. If this strategy is matched up against itself, it will earn 7 as a Sender and 7 as a The Receiver when the pie is 14. Since it is possible for each strategy to be randomly assigned as either a Sender or a Receiver, strategies were matched against each other twice and, where appropriate, a strategy's score as both a Sender and a Receiver was computed. The analysis revealed that the 184 subjects used 100 different strategies. A summary of the more popular strategies (unique strategies that were used by more than two different subjects) is reported in Table 2. This table shows the rank, frequency, Stage 1 decision, offer and minimum accept threshold by pie size, and the final score from the round-robin tournament. Three different strategies tied for the highest

score, earning 2204 points, and one of these three was the most frequently used (n = 21) strategy in the entire population. This popular strategy chose to cooperate in Stage 1, offered exactly half of the pie as the Sender, and accepted all offers of 1 or greater as the Receiver. Of the 11 popular strategies, 10 chose cooperation in Stage 1. A review of the best-performing strategies, including those not reported in Table 2, indicates several common features. Typically, these strategies cooperated in Stage 1, offered half of the pie as the Sender, and accepted minimal offers as the Receiver. The worst performing strategy, with a score of 1016, cooperated on Stage 1, but demanded half when the pie was 6, and more than half (7 and 8) when the pie was 12 and 14 (respectively). Only seventeen strategies, adopted by a total of 21 subjects, chose competition in Stage 1. The median rank of these strategies was 77, clearly under-performing the average. The highest performing strategy that chose to compete in Stage 1 was ranked 37th overall, earning 2072 points.

Table 2
Selected Results for Experiment 1 Round Robin Tournament

Strategy Label	Rank2	Frequency	Stage 1	O3	A3	O12	A12	O14	A14	Tourney
1	1	21	X	3	1	6	1	7	1	2204
2	1	1	X	2	1	5	1	7	1	2204
3	1	1	X	3	0	6	0	7	0	2204
4	24	3	X	3	1	5	1	6	1	2202
5	24	1	X	3	1	4	1	6	1	2202
6	24	1	X	2	4	5	1	6	1	2202
19	47	2	X	3	2	6	3	7	4	2152
20	47	1	X	3	1	6	4	7	4	2152
25	55	1	X	3	2	6	3	7	5	2124
26	55	6	X	3	2	6	4	7	5	2124
27	62	1	X	3	2	5	4	6	5	2122
28	62	1	X	2	2	5	4	6	5	2122

29	62	1	X	2	2	4	3	6	5	2122
36	73	1	X	2	2	5	4	6	5	2080
37	75	1	Y	3	1	5	1	6	1	