

**Relative or Absolute Gains:  
Beliefs and Behavior in International Politics<sup>1</sup>**

1 July 1999

David L. Rousseau  
Assistant Professor  
Department of Political Science  
235 Stiteler Hall  
University of Pennsylvania  
Philadelphia, PA 19104  
E-mail: [rousseau@sas.upenn.edu](mailto:rousseau@sas.upenn.edu)  
Phone: (215) 898-6189  
Fax: (215) 573-2073

## **ABSTRACT**

Realists assume that states are obsessed with relative gains and that cooperation is the exception rather than the norm in international relations. In contrast, liberal institutionalists assume that state leaders are primarily motivated by absolute gains. This paper probes these critical assumptions and demonstrates how the salience of relative gains varies with the beliefs of the individual, the nature of the opponent, and the context of the situation.

The central hypotheses are tested using a unique methodological approach: a survey instrument coupled with an experimental iterated prisoner's dilemma game. Four central findings emerge from the analysis: 1) the importance of relative gains varies significantly across individuals; 2) the nature of the opponent strongly influences the salience of relative gains; 3) the importance of relative gains declines rapidly as one moves from security to non-security issues; and 4) beliefs identified in the survey systematically influenced play in the iterated prisoner's dilemma game.

Realists argue that power is by definition a relative concept and that due to the anarchical nature of the international system any gain in power by one state represents an inherent threat to its neighbors. Realists, therefore, assume that any potential exchange between states must exactly preserve the pre-existing balance of power (i.e., they focus on relative gains). In contrast, liberal institutionalists assume that state leaders will accept any agreement which makes the state better off (i.e., they focus on absolute gains). This paper probes these critical assumptions and demonstrates how the salience of relative gains varies with individual beliefs, the nature of the adversary, and the context of the situation.

The central hypotheses are tested using a unique methodological approach. Approximately 500 undergraduates at four universities were given a 45-question survey probing opinions on international issues, including beliefs in absolute and relative gains. Later in the semester, half of these students played a series of iterated prisoner's dilemma games. Four central findings emerge from the analysis. First, the importance of relative gains varies significantly across the subjects. Individuals with strong realist belief systems are much more likely to stress the importance of relative gains than individuals with strong idealist belief systems. Second, the nature of the opponent strongly influences the salience of relative gains. States which are viewed as an economic or military threat are more likely to trigger concerns about relative gains than non-threatening states. Third, the context of the situation strongly influences the importance of relative gains. The importance of relative gains was higher for security issues than non-security issues. Moreover, subjects carefully distinguished military (but not economic) threats from economic (but not military) threats. Fourth, beliefs identified in the survey systematically influenced an individual's willingness to cooperate in the iterated prisoner's dilemma.

## **1. Realists and Liberal Institutionalists**

Realists, both classical and structural, argue that cooperation should be rare in an international system characterized by anarchy (Carr 1939; Morgenthau 1948; Waltz 1979;

Mearsheimer 1994/5). Without a central body to protect states and enforce bilateral agreements, states must rely on themselves for survival and growth. The military and economic power of other states, therefore, represents a constant threat because intentions can never be known with certainty and nothing in anarchy prevents a state from using military force to resolve disputes. Jervis (1978) argues that this environment encourages spirals of hostility and arms races, even among states satisfied with the status quo.

Liberal institutional theorists have challenged the pessimistic conclusions of realism by demonstrating how cooperation can emerge *even after adopting the central assumptions of realism* (Keohane and Nye 1977; Stein 1982; Krasner 1983; Axelrod 1984; Keohane 1984; Oye 1986). Institutionalists assume that state leaders are rational actors and that they are driven by self-interest rather than collective interests (i.e., national welfare rather than global welfare). They argue that realists err by implicitly modeling the world using the classic single-play prisoner's dilemma, which is displayed in Figure 1. In a single-play prisoner's dilemma, a state leader has two choices: *cooperate* with an opponent or *defect* on them. The payoff structure makes defection a dominant strategy for both players because defecting always offers a higher payoff regardless of the strategy selected by the opponent. The symmetrical nature of the game implies that the equilibrium or expected outcome for the single play prisoner's dilemma game is "defect-defect" (i.e., no cooperation).

[insert Figure 1 about here]

Liberal institutionalists, however, argue that in most instances the international environment is more akin to an iterated game in which the players, who are free to communicate verbally or tacitly, interact over and over. Mutual cooperation in this environment can be rational because the sum of relatively small cooperative payoffs over time can be greater than the gain from a single attempt to exploit your opponent followed by an endless series of mutual defections. Moreover, international regimes can increase the probability of cooperation by

providing information, reducing transaction costs, and generating the expectation of cooperation among members (Krasner 1983).

Realists have responded with a vigorous counter-attack. Grieco (1988a, 1988b, 1990) has challenged the institutional theorists by claiming that they have not adopted all the central assumptions of realism. The institutionalist framework, which draws heavily on models from economics, is based on the assumption that states are interested in absolute gains.<sup>2</sup> That is, state leaders will accept any accord that makes the state better off regardless of the gain achieved by any other state. However, power is by definition a relative concept (Dahl 1957). According to realists, any increase in power by the Soviet Union during the Cold War translated into a decrease in the power of the United States. Grieco argues that concern over relative gains greatly restricts the number of possible agreements because all gains must be distributed in a manner that *exactly* preserves the preexisting balance of power.

Realists assume that state leaders are primarily concerned with relative gains; liberal institutionalists claim that under many, but certainly not all circumstances, state leaders focus on absolute gains. Powell (1991) argues that these expectations or beliefs are theoretical questions: “the question of whether states maximize absolute gains or are concerned about relative gains is empirically meaningless. The real question is, which assumption about state preferences is more useful?” (1991, 229). In other words, which model predicts state behavior better? While testing the predictions of models is often the most preferred approach (Lave and March 1975), the complex nature of the models proposed by formal theorists such as Powell and Snidal (1991) have inhibited direct testing of their arguments.<sup>3</sup> Moreover, Keohane (1993) explicitly rejects Powell’s position when he argues that the balance of relative versus absolute gains is a variable (rather than a constant) which can be altered by systemic, domestic, and even individual level factors.

The purpose of this study is three-fold: (1) to evaluate the distribution of beliefs (absolute gains versus relative gains) across individuals; (2) to identify the degree to which these beliefs

vary as the context of the interaction is altered; and (3) to demonstrate how these beliefs can influence behavior in an experimental setting. In the following section, I present the central hypotheses that are empirically tested in the remainder of the paper. In Section 3 of the paper I outline the unique methodological approach employed in the study. In Section 4 of the paper I present the data analyses. In the final section I highlight key findings of the research project and directions for future research.

## 2. Central Hypotheses

Realists such as Greico contend that the structure of the international system and the relative nature of power compels political leaders to view the world in relative terms.

According to realists, states worry that today's friend may be tomorrow's enemy in war, and fear that achievements of joint gains that advantage a friend in the present might produce a more dangerous *potential* foe in the future. As a result states must give serious attention to the gains of partners (Greico 1988a, 118; also see Waltz 1979, 105).

Logically, there should be no individual variation in beliefs because the anarchical structure of the international system drives behavior and this structure is constant across time and space.<sup>4</sup> Hypothesis 1, therefore, predicts that all individuals will focus solely on relative gains.<sup>5</sup> Evidence that a significant portion of the population evaluates problems and potential exchanges in terms of absolute gains constitutes a challenge Hypothesis 1.<sup>6</sup>

As the realist-institutionalist debate evolved, several authors began to synthesize the two views into a single framework by allowing the importance of relative gains can to vary with the context of the situation.<sup>7</sup> Powell (1991) argues that if the cost of using military force is low, concern over relative gains will be heightened. For example, in a world in which offensive technology dominates defensive technology, wars tend to be quick and cheap. Powell contends that leaders in this era become very sensitive to small shifts in relative power and therefore focus on relative gains. In contrast, in a defense dominant world the importance of relative gains should diminish.<sup>8</sup> Snidal (1991) also argues that importance of relative gains is a variable. As the importance of relative gains increases, conflict within a game such as the prisoner's dilemma

becomes more intense (i.e., the payoff structure is transformed by increasing the cost of the sucker's payoff and increasing the gain of the temptation payoff). Snidal also shows how increases in the importance of relative gains can transform relatively cooperative games such as an assurance game into a more conflictual game such as the prisoner's dilemma. When the importance of relative gains is all encompassing (i.e., when "r"=1 in the Snidal model), the game is transformed into a zero-sum game of pure conflict.

Figure 2 displays the impact of varying the importance of relative gains from 0 (not important at all) to +1 (vitally important) using hypothetical cardinal payoffs.<sup>9</sup> The payoffs for Player A are located in the lower left hand quadrant of each cell while the payoffs for Player B are located in the upper right hand quadrant.  $M^*$  is the reward for cooperation,  $T^*$  is the temptation payoff, and  $S^*$  is the sucker's payoff. As "r" increases the size of the sucker's payoff becomes increasingly negative (from -100 to -300) while the size of the temptation payoff becomes increasingly positive (from 200 to 300). By increasing the gap between the DC/CC payoffs (i.e., defect-cooperate/cooperate-cooperate) and the gap between the DD/CD payoffs (i.e., defect-defect/cooperate-defect), the probability of cooperation declines (Jervis 1978, 171). When "r" reaches its maximum at +1, there is no longer any incentive to cooperate.

[insert Figure 2 about here]

If the importance of relative gains is a variable, what causal factors drive the variance? Hypothesis 2 predicts that the perception of the partner in the relationship is critical. If the partner in the game is perceived as a potential military or economic threat, the salience of relative gains should increase (Grieco 1988a, 129; Keohane 1993, 276). Conversely, if the partner in the game is viewed as neither a military nor an economic threat, the importance of relative gains should be minimal.<sup>10</sup>

The importance of relative gains should also shift with context of the situation or the issue area. Even after holding the nature of the adversary constant, we should expect that the importance of relative gains should be highest in the security issue area (Lipson 1984). State

leaders can be expected to focus carefully on the distribution of gains when contemplating nuclear arms reduction treaties, conventional arms accords, and territorial exchanges. In economic issues, the concern over relative gains should be moderate. While economic gains by an opponent can ultimately be transformed into military power, the potential threat is much less immediate relative to security issues. Finally, many issue areas, such as international environmental accords to save the ozone layer, are so far removed from the security issue area that concerns over relative gains should play little, if any, role.<sup>11</sup> Hypothesis 3, therefore, predicts that the importance of relative gains should decline as we move from security issues to economic issues to non-security issues.

Hypothesis 4 predicts that strong beliefs in relative gains should influence how an individual behaves. While anarchy may lead individuals to focus on relative gains, we must also demonstrate that this belief makes them less likely to cooperate. State leaders with strong realist views, including a belief that relative gains are paramount, should be less likely to reach agreements with other state leaders, particularly when these leaders share similar views on the importance of relative gains. As discussed below, the beliefs-behavior hypothesis is tested using an experimental setting involving an iterated prisoner's dilemma game. Specifically, Hypothesis 4 predicts that individuals with strong realist beliefs will be less likely to achieve a stable cooperative arrangement in an iterated prisoner's dilemma simulation.

Table 1 summarizes the five central hypotheses in this study.

[insert Table 1 about here]

### **3. Methodological Approach**

Probing a belief system (such as realist or idealist), or isolating an element of such a belief system (such as a propensity to view the world in terms of absolute or relative gains) is notoriously difficult. Did a belief in relative or absolute gains drive Stalin as he negotiated with Churchill over spheres of influence in the Balkans and Iran? Existing diplomatic records offer scant insight. While we could examine the historical outcome and then work backwards to

construct a belief system consistent with the outcome, the inherent danger is that our measure of “power” may differ considerably from that used by Stalin or Churchill.

An alternative approach involves the use of a survey instrument and an iterated prisoner's dilemma game. Given that the hypotheses do not propose any systematic differences in beliefs between elites and masses, a preliminary investigation of the importance of relative versus absolute gains can be made by surveying the public.<sup>12</sup> Approximately 500 undergraduate students at four American universities responded to a broad 45-question survey on international relations.<sup>13</sup> The survey was experimental in that students were randomly assigned variations of specific questions. For example, some respondents were presented relative gains scenarios in which China was the opponent while others were presented an identical scenario except that Japan (or Canada or Russia) was substituted for the opponent. The experimental approach is commonly used in telephone surveys (see Herrmann, Tetlock, and Visser (1997)).

Some weeks later, approximately half of these students read a 10-page tutorial on the prisoner's dilemma and its application to international relations. After taking a short quiz on the topic, students played four iterated prisoner's dilemma games that randomly varied in length.<sup>14</sup> Their objective was to maximize their score while playing an opponent employing unknown strategy. Strategies employed by the computer, which varied for each game, included tit-for-tat, 90%-tit-for-tat, tit-for-two-tats, and a random strategy. An example of the computer display is shown in Figure 3. As an incentive, the student with the highest score at each university was awarded a \$20 prize.<sup>15</sup>

[insert Figure 3 about here]

A tit-for-tat strategy involves cooperating on the first move of the game and reciprocating your opponent's behavior on every subsequent move; after the first move, if the opponent cooperates you reward them with cooperation and if they defect you punish them with defection. Studies have shown that tit-for-tat is an effective means for fostering cooperation in computer tournaments (Axelrod 1984), laboratory experiments (Boyle and Lawler 1991), and international

relations (Huth 1988). Unfortunately, tit-for-tat is highly susceptible to an “echo effect” (i.e., I punish you for defection, so you punish me for defection, so I punish you for defection, ....). In order to mitigate this problem, Axelrod (1997) and others have suggested using more forgiving strategies such as 90%-tit-for-tat in which defections are only punished 90% of the time or tit-for-two-tats in which only two consecutive defections triggers a retaliatory defection. These more forgiving strategies are particularly important as the amount of uncertainty in the game rises. Uncertainty was introduced into one of the four games by randomly reversing 10% of the plays by both the subject and their computer opponent. While it was obvious to students when their own plays were reversed, it was unclear if the computer opponent was freely defecting or not.<sup>16</sup>

There are at least three important critiques of the methodological approach employed in this study. First, critics could argue that undergraduate respondents do not represent a random sample of American citizens. Therefore, any conclusions about the distribution of beliefs or their impact on behavior cannot be generalized to a broader population. This critique is certainly correct. However, the purpose of the study is to examine whether or not beliefs vary across respondents and situations. While I develop an idealist-realist index below, I do not claim that the distribution would exactly match that found in a random sample of the American public. I simply contend that if there is great variance in beliefs in the sample and that beliefs vary in systematic ways, there is a very strong likelihood that there will be variance and systematic change for both political elites and the population at a whole.

Second, critics could contend that internet surveys are of little or no value due to selection bias. This is also correct. Simply placing a survey instrument on a web page and waiting to see who drops by introduces bias into the analysis. However, the survey and game were administered in undergraduate international relations courses just as in many undergraduate psychology courses students are required to participate in laboratory experiments. In psychology, preliminary findings based on student respondents are typically generalized with caution until further analysis can confirm the relationship. In order to ensure that only registered students

participated, each student was given a unique 5-digit password on their instruction sheet and only responses using a password were included in the final data set.<sup>17</sup>

Third, critics will point out that the iterated prisoner's dilemma game is an artificial environment which cannot truly simulate the tension facing foreign policy decision makers when negotiating with a potentially deadly adversary. While this is certainly true as well, the experimental game is superior to historical experiments in which students in a laboratory cubicle simply pressed "cooperate" or "defect" buttons for countless iterations.<sup>18</sup> The current configuration, by providing a payoff matrix, history of interactions, and cumulative score, led students to assess the behavior of their adversary and determine their optimal strategy move after move. While more realistic and complex interaction will undoubtedly be developed in the future, the current version of the game appears to be adequate for a preliminary test.

#### **4. Data Analysis**

Hypothesis 1 examines the realist assumption that all individuals are solely concerned with relative absolute gains. The results clearly indicate that this assumption is incorrect. Table 2 presents the results from Questions 7, 40, and 14 of the survey. In Questions 7 and 40 respondents were asked to choose between two worlds: Scenario 1 in which gains were large but unevenly distributed and Scenario 2 in which gains were small but preserved the pre-existing balance. An individual preferring relative gains to absolute gains would be expected to choose Scenario 2; if everyone possessed equally strong beliefs in relative gains then the vast majority of respondents should "strongly" or "somewhat" prefer Scenario 2.<sup>19</sup> However, the data shows a wide distribution. While many respondents preferred the world in which gains are evenly distributed, a significant portion (51% in Question 7 and 49% in Question 40) expressed a preference (strongly or somewhat) for absolute gains rather than relative gains. Question 14 frames the debate in terms of the division of a pie. Those possessing strong beliefs in relative gains are expected to view the world as a zero sum game in which any gain by the opponent must come at the expense of the state. The results clearly demonstrate that this zero sum perspective is

not shared by all individuals. In fact, a strong majority of respondents (65%) reject that idea that gains for another state must come at the expense of the United States. In sum, the results clearly demonstrate that *at least some* individuals focus on absolute gains rather than relative gains.

[insert Table 2 about here]

How can we explain the distribution of opinion? If the structure of the international system does not compel all individuals to share similar preferences, then domestic cultures (Johnston 1995) or individual belief systems (George 1979) could be driving the observed distribution of opinion. This paper focuses on the latter.<sup>20</sup> In order to probe the role of belief systems, I created an “idealist-realist continuum” using responses from nine questions in the survey (Questions 1, 6, 8, 11, 13, 16, 17, 19, 23 which are reproduced in Appendix A). The distribution of the index, which ranges from -21 to +21, is unimodal with a mean of -3. Table 3 compares the responses of “strong idealists” (bottom ¼ of the distribution), those with “mixed views” (middle ½ of the distribution), and “strong realists” (top ¼ of the distribution). When faced with a choice between relative gains and absolute gains in Question 32, 52% of the Strong Idealists indicated a preference for absolute gains (i.e., chose Scenario 1). In sharp contrast, only 18% of Strong Realists indicated a preference for the absolute gains scenario. The differences are statistically significant at the 0.01 level. An identical pattern of results emerges for Questions 7, 14, and 40; the differences are statistically significant for Questions 14 and 40. Clearly, beliefs influence the salience of relative gains.

[insert Table 3 about here]

Hypothesis 2 proposes that a belief in either absolute or relative gains is not static; rather the nature of the adversary has a strong impact on the salience of one type of gains versus another. Specifically, I hypothesize that the more the opponent is viewed as a threat to the state, the more salient relative gains will become. In order to test this hypothesis, the experimental survey randomly inserted one of four opponents into selected questions. In terms of threat, I assumed that Russia would be viewed as the most threatening, followed by China, Japan, and

Canada. I therefore hypothesized that the importance of relative gains would gradually diminish as the opponent shifted from Russia, to China, to Japan, to Canada. The results are presented in Table 4.

[insert Table 4 about here]

Two patterns quickly emerge from the table. First, the results with respect to Russia do not conform to expectations in any of the questions. In the Russian version of Question 7, 66% of respondents strongly or somewhat preferred Scenario 1 or the world of absolute gains. In Question 40 (where the differences are not statistically significant), 60% prefers the absolute gains world while only 29% prefers the relative gains world. In the Russian version of Question 14, only 6% of the respondents believed that gains by Russia come at the expense of the United States. Second, the results support the hypothesis when we contrast potential challengers such as China and Japan with non-threatening neighbors such as Canada. This pattern is most clear in Question 14 where 18% and 25% of the respondents view gains by China and Japan coming at the expense of the United States. In contrast, only 9% of the respondents viewed relations with Canada in relative terms. Overall, a majority viewed relations with China and Japan in relative terms while relations with Canada and Russia are viewed in absolute terms.

How can we explain the surprising results with respect to Russia? In order to answer this question, a subset of the sample (150 subjects) was given a questionnaire with the Japanese, Russian, and Canadian variants of Question 7. The subjects were asked to explain the logic behind their responses to the close-ended questions and to explain why their answers differed across the three questions. The open-ended responses clearly indicate that the unexpected responses with respect to Russia stemmed from the economic turmoil in Russia since the breakup of the Soviet Union. The Russian economy seen as a "mess", in "shambles," in a "grave state," and "in a desperate need of economic revival." Questions 7, 40, and 14 tap "economic" concerns rather than security concerns and it appears that most of the respondents view Russia as an

economic basket case. Many respondents indicated the disintegrating Russian economy opened the door for a return to autocracy and could destabilize the global economy.

The results in Table 4 become clearer if we focus on the perception of threat as articulated *by the subjects* rather than imposed by the author. Subjects were asked if particular countries posed an economic, a military, both economic and military, or no threat. The responses appear in Table 5. While 41% of respondents view Russia as a military threat, only 23% (i.e., 8%+15%) view it as an economic threat. In contrast, China is viewed as both a military and economic threat to American interests. Japan (and to a lesser degree Germany) is viewed as strictly an economic threat and Canada is seen as no threat at all.

The pattern of responses hints that for economic questions we should find relative gains concerns highest for China and Japan and for military questions we should find relative gains concerns highest for Russia. Table 6 clearly supports this contention by contrasting the responses to Question 7 (the economic question shown in Table 4) with Question 32 (the security question). While 66% of respondents prefer the absolute gains scenario for Russia in economic matters, this falls to a mere 28% when the issue is shifted to security. In Question 7, the responses with respect to China and Japan are similar. Both are viewed as economic threats, and both trigger similar concerns about relative gains. However, in the security question Japan is clustered with Canada because neither are viewed as security threats.

Hypothesis 3 predicts that the salience of relative gains will also vary by issue area. In the security issue area, the importance of relative gains should peak. In the economic issue area, concerns over relative gains should be important but not overwhelming. Economic gains can in the long term be converted into military power. The results presented in Table 6 support this view. Overall, only 38% of the respondents preferred the absolute gains world (i.e., Scenario 1) in the security question. This rises to 51% in economic growth question in Table 6. In the tariff question and the distribution of the pie question shown in Table 4, the total preferring the

absolute gains world is 49% and 66% respectively. The data indicates that relative gains concerns are heightened in the security issue area.

Hypothesis 4 predicts that beliefs influence behavior. While this hypothesis may appear obviously true to many readers, the theoretical framework constructed by Grieco and other realists minimizes the importance of individual beliefs in explaining behavior. If the structure of the international system determines beliefs, individual variation is virtually impossible and therefore uninteresting. Hypothesis 4 postulates that individual beliefs, such as strong idealist or strong realist beliefs, should influence one's willingness to cooperate. In the computer experiment, the willingness to cooperate was measured within an iterated prisoner's dilemma computer game. Three measures of cooperation were recorded across four games: (1) the percentage of cooperative plays by the subject in each game; (2) the percentage of jointly cooperative outcomes (i.e., both the subject and the computer opponent cooperate); and (3) whether the subject cooperated or defected on the critical first move of the game.<sup>21</sup>

I should stress that the iterated prisoner's dilemma as configured cannot directly demonstrate that any particular defection was due *entirely or primarily* to concerns associated with relative gains. Establishing a relative gains motive for observed behavior has bedeviled both qualitative case studies and game theoretic experiments. Snidal (1991, 202) and Keohane (1993, 280) question Grieco's (1990) assertion that haggling (i.e., behavior) over the distribution of gains is clear evidence of a concern about relative gains (i.e., motive). Similarly, in an experimental setting a defection can be due to a wide variety of factors including: 1) a fear that opponent will not cooperate on the first move, 2) a greedy desire to exploit an opponent who is expected to cooperate, 3) the wish to punish an opponent for defecting as part of a TFT strategy, and 4) an informational probe to discern the strategy of one's opponent. As Majeski and Fricks (1995, 628) state: "Unfortunately, the {Prisoner's Dilemma} game structure does not allow the researcher to tease apart the motives of fear and greed. A defection choice can be the product of fear, greed, or both." McCallum et al. (1985) make a similar point.

"In the {Prisoner's Dilemma Game}, what have been designated here as competitive choices may reflect several motivations. A motivation to maximize one's own outcomes (max own), as well as a motivation to maximize the relative advantage for self between own and other outcomes (max rel) would result in a competitive choice. The two orientations are confounded in the {Prisoner's Dilemma Game}...(1985, 309).

Given this inability to isolate motivations, I have chosen a more indirect route. Table 3 clearly established that strong realists are more concerned about relative gains (see Table 3). I hypothesize that these same realists are less likely to cooperate in the game theoretic setting. Although the experimental game theory literature has explored how different *structures* of the game affect the emergence of cooperation, the relationship between individual *beliefs* and the willingness to cooperate has been largely neglected.<sup>22</sup> The purpose then is to demonstrate that beliefs influence behavior; should we find that strong realist are less likely to cooperate, subsequent research will be required to conclusively establish how central a role relative gains plays in determining this outcome.

Table 7 compares the degree of cooperation among strong idealists, individuals with mixed views, and strong realists. In parts (a) and (b) of the Table, subjects are categorized in one of three groups: "uncooperative" individuals (bottom ¼ of the distribution), "cooperative" individuals (middle ½ of the distribution), and "very cooperative" individuals (top ¼ of the distribution). In part (c) of the Table, those that cooperate on the first move are distinguished from those that defect on the first move. The results from all parts of the table strongly support the hypothesis that idealists are more likely to cooperate than realists. .

Part (a) of Table 7 shows that of those identified as strongly idealistic in the survey, 33% were recorded as very cooperative in the iterated prisoner's dilemma. Only 25% of these idealists could be categorized as uncooperative. In contrast, strong realists were much less likely to select cooperation when playing the iterated game. Only 16% of strong realist fell within the "very cooperative" portion of the distribution (i.e., the top quartile). A full 38%, however, were uncooperative. The chi square test reveals that this pattern of results is statistically significant at the 0.000 level.

A similar pattern emerges in part (b) of the Table in which the percentage of Cooperate-Cooperate outcomes is recorded. Idealists are much more likely to sustain mutually cooperative relationships. While 36% of strong realists fall within the uncooperative portion of the distribution, only 23% of idealists are similarly placed. This pattern of results is also significant at the 0.000 level of significance.

Part (c) of the table shows that idealists are more likely cooperate on the critical first move which is central to establishing a pattern of cooperation. While 70% of the time idealists opened the game with a cooperative move, only 63% of strong realists cooperated on the first move. While the pattern of behavior conforms to expectations, the results are only marginally significant from a statistical point of view. Overall, however, the results from the iterated prisoner's dilemma in Table 7 strongly support hypothesis 4.

## **5. Conclusions and Directions of Future Research**

The analyses support four central findings. First, beliefs in the importance of relative versus absolute gains vary significantly across individuals. Strong realists were much more likely to focus on relative gains than strong idealists. Second, the nature of the opponent strongly influences the salience of relative gains. States which are viewed as an economic or military threat are more likely to trigger concerns about relative gains than non-threatening states. Third, the context of the situation strongly influences the importance of relative gains. The importance of relative gains was higher for security issues than non-security issues. Moreover, subjects carefully distinguished military (but not economic) threats from economic (but not military) threats. Fourth, beliefs identified in the survey systematically influence an individual's willingness to cooperate in the iterated prisoner's dilemma. Together, these findings support the *synthesis* of realism and liberal institutionalism. As the importance of relative gains shifts from zero to all encompassing, we transition from the world of the liberal institutionalists to the world of the realists. While the findings provide strong empirical evidence for the formal model

developed by Snidal (1991), the project moves beyond this earlier research by expanding our understanding when and why relative gains may be salient.<sup>23</sup>

The findings strongly support the contention that patterns of behavior in the international system can vary widely. While the Hobbsean world populated by leaders obsessed with relative gains in constant battle with their rivals is a distinct possibility, it is clearly not the only possibility. Beliefs in absolute and relative gains are not hard wired into human nature. While the importance of “nature” should not be discounted, beliefs are to a significant degree the product of socialization. Reich (1990) provides evidence that economists, socialized within a framework of absolute gains, rarely conceive of bargaining within the realist-relative gains perspective. In this sense, the research supports the contention of Wendt (1992) that anarchy is not synonymous with conflict.

Finally, research currently underway will probe the robustness and generalizability of these findings. First, the survey and iterated prisoner’s dilemma are currently being translated into Japanese in order to undertake parallel analysis at universities in Japan. The results will allow us to investigate whether concern over relative gains is a cross cultural phenomenon. Second, a reduced form of the survey instrument will be used in a national telephone survey to explore the generalizability of the findings. Third, the research is being replicated using more realistic scenarios in place of the highly abstract iterated prisoner's dilemma game. These new scenarios allow subjects to determine the level of cooperation rather than restricting them to a dichotomous choice between cooperation or defection.

## **APPENDIX A: Survey Questions Used To Develop The Realist-Idealist Index**

6. In general, the use of military force only makes problems worse. [Strongly Agree, Somewhat Agree, Neutral, Somewhat Disagree, Strongly Disagree, Not Sure]
8. The following statement is often made with respect to national security: "The best defense is a strong offense." The statement implies that increasing the quality and quantity of US weapons systems always enhances US security. Do you agree or disagree with this perspective? [Strongly Agree, Somewhat Agree, Neutral, Somewhat Disagree, Strongly Disagree, Not Sure]
11. Respond to the following statement: The U.S. may have to support some military dictators or authoritarian regimes because they are friendly toward the U.S. and opposed to states which threaten U.S. security. [Strongly Agree, Somewhat Agree, Neutral, Somewhat Disagree, Strongly Disagree, Not Sure]
13. It is essential for the United States to work with other nations to solve problems such as overpopulation, hunger, and pollution. [Strongly Support, Support, Neutral, Oppose, Strongly Oppose, Not Sure]
16. The best way to ensure peace around the globe is through American military strength. [Strongly Agree, Somewhat Agree, Neutral, Somewhat Disagree, Strongly Disagree, Not Sure]
17. We are faced with many problems at home and abroad, none of which can be solved easily or inexpensively. For the following programs, please indicate whether they should have their budgets and/or scopes expanded, cut, or maintained at current levels. (Aid For Education; Defense Spending; Farm Subsidies; Military Aid Abroad; Economic Aid Abroad; Domestic Welfare Programs; Support for the U.N.; Peace-Keeping Operations) [Expand Significantly, Expand Slightly, Maintain, Cut Slightly, Cut Significantly, Not Sure]
19. Some observers of the international system believe that states generally share similar goals and that by working through international organizations such as the United Nations and supporting international law the global community can effectively control the handful of renegade states in the system. [Strongly Agree, Somewhat Agree, Neutral, Somewhat Disagree, Strongly Disagree, Not Sure]
23. Although most people would agree that all of the following goals are important to some degree, sometimes we have to choose one goal over another. If you had to choose between the following goals, which is more important:
  - a. Strengthening the United Nations OR b. Avoiding international entanglements?
  - a. Protecting human rights abroad OR b. Maintaining cordial relations?
  - a. Protecting jobs of American workers OR b. Promoting democracy abroad?
  - a. Containing Russia OR b. Protecting weak states from aggression?
  - a. Combating world hunger OR b. Protecting U.S. business interests abroad?

## BIBLIOGRAPHY

- Andreoni, James and John H. Miller. 1993. "Rational Cooperation in the Finitely Repeated Prisoner's Dilemma: Experimental Evidence." *The Economic Journal* 103/418 (May): 570-585.
- Axelrod, Robert. 1984. *The Evolution of Cooperation*. New York: Basic Books.
- Axelrod, Robert. 1987. "The Evolution of Strategies in the Iterated Prisoner's Dilemma." in Lawrence Davis's (ed.) *Genetic Algorithms and Simulated Annealing*. London: Pitman.
- Axelrod, Robert. 1997. *The Complexity of Cooperation: Agent-Based Models of Competition and Collaboration*. Princeton, NJ: Princeton University Press.
- Bendor, Jonathan. 1993. "Uncertainty and the Evolution of Cooperation," *Journal of Conflict Resolution* 37/4 (December), 709-734.
- Bornstein, Gary, David Budescu, and Shmuel Zamir. 1997. "Cooperation in Intergroup, N-Person, and Two-Person Games of Chicken." *Journal of Conflict Resolution* 41/3 (June), 384-406.
- Boyle, Elizabeth H. and Edward J. Lawler. 1991. "Resolving Conflict through Explicit Bargaining." *Social Forces*, 69/4(June), 1183-105.
- Brewer, Marilyn B. and Roderick M. Kramer. 1986. "Choice Behavior in Social Dilemmas: Effects of Social Identity, Group Size, and Decision Framing." *Journal of Personality and Social Psychology* 50/3: 543-549.
- Carr, E. H. 1946. *The Twenty Years' Crisis: 1919-1939*. New York: Harper Torchbooks.
- Dahl, Robert. 1957. "The Concept of Power." *Behavioral Science* 2, 201-15.
- Friedland, Nehemia. 1990. "Attribution of control as a determinant of cooperation in exchange interactions." *Journal of Applied Social Psychology* v0/4-5 (March): 303-22.
- Friedman, Milton. 1962. "The Methodology of Positive Economics," in *Essays in Positive Economics*. Chicago, IL: University of Chicago Press.

- George, Alexander L. 1979. "The Causal Nexus Between Cognitive Beliefs and Decisionmaking Behavior: The 'Operational Code' Belief System," in Lawrence S. Falkowski, (ed.) *Psychological Models in International Politics*. Boulder, CO: Westview Press. p.95-124
- Grieco, Joseph M. 1988a. "Anarchy and the Limits of Cooperation: A Realist Critique of the Newest Liberal Institutions." *International Organization* 42(August),485-507. Reprinted in David A. Baldwin (ed.) *Neorealism and Neoliberalism: The Contemporary Debate*. New York: Columbia University Press, 1993.
- Grieco, Joseph M. 1988b. "Realist Theory and the Problem of International Cooperation: Analyss with an Amended Prisoner's Dilemma Model." *Journal of Politics* 50/3(August),600-624.
- Grieco, Joseph M. 1990. *Cooperation Among Nations: Europe, America, and Non-Tariff Barriers to Trade*. Ithaca, NY: Cornell University Press.
- Gulick, Edward V. 1955. *Europe's Classical Balance of Power*. New York: WW Norton.
- Herrmann, Richard K., Phillip E. Tetlock, and Penny S. Visser. 1997. "Mass Public and Decisions on Going to War: A Cognitive-Interactionist Framework." Paper presented at the annual meeting of the American Political Science Association, Washington DC, August 28-31, 1997.
- Holsti, Ole R. and James N. Rosenau. 1990. "The Structure of Foreign Policy Attitudes Among American Leaders." *Journal of Politics* 52/1(February), 94-125.
- Hopf, Ted. 1998. "The Promise of Constructivism in International Relations Theory." *International Security* 23/1 (Summer), 171-200.
- Insko, Chester et al. 1993. "The Role of Communication in Interindividual-Intergroup Discontinuity." *Journal of Conflict Resolution* 37/1 (March): 108-138.
- Jervis, Robert. 1976. *Perception and Misperception in International Politics*. Princeton, NJ: Princeton University Press.
- Jervis, Robert. 1978. "Cooperation Under the Security Dilemma," *World Politics* , 167-214.

- Johnston, Alastair Iain. 1995. *Cultural Realism: Strategic Culture and Grand Strategy in Chinese History*. Princeton, NJ: Princeton University Press.
- Keohane, Robert. O. 1984. *After Hegemony: Cooperation and Discord in the World Political Economy*. Princeton, NJ: Princeton University Press.
- Keohane, Robert O. 1993. "Institutional Theory and the Realist Challenge After the Cold War." In David A. Baldwin (ed.) *Neorealism and Neoliberalism: The Contemporary Debate*. New York: Columbia University Press.
- Keohane, Robert O. and Joseph S. Nye. 1977. *Power and Interdependence: World Politics in Transition*. Boston, MA: Little, Brown and Company. Chapters 1 and 2 (p.3-37)
- Keohane, Robert O. and Joseph S. Nye. 1987. "Power and Interdependence Revisited." *International Organization*, 41/4 (Autumn 1987), 725-753.
- Keohane, Robert O. and Joseph S. Nye. 1977. *Power and Interdependence: World Politics in Transition*. Boston, MA: Little, Brown and Company.
- Kissinger, Henry. 1957. *A World Restored; Metternich, Castlereagh and the Problems of Peace, 1812-22*. Boston, MA: Houghton Mifflin.
- Komorita, S.S., J. A. Hilty, and C. D. Parks. 1991. "Reciprocity and Cooperation in Social Dilemmas." *Journal of Conflict Resolution*. 35/3 (September), 494-518.
- Krasner, Stephen D. (ed). 1983. *International Regimes*. Ithaca, NY: Cornell University Press.
- Lave, Charles A. and James G. March. 1975. *An Introduction to Models in the Social Sciences*. New York: Harper and Row.
- Lipson, Charles. 1984. "International Cooperation in Security and Economic Affairs." *World Politics* 37/1 (October), 1-23.
- Lutzker, Daniel R. 1960. "Internationalism as a Predictor of Cooperative Behavior." *Journal of Conflict Resolution* 4/4: 426-430.
- Majeski, Stephen J. and Shane Fricks. 1995. "Conflict and Cooperation in International Relations." *Journal of Conflict Resolution* 39/4 (December): 622-645.

- Mearsheimer, John. 1994/5. "The False Promise of International Institutions." *International Security* 19(Winter):9-12.
- Milner, Hellen. 1991. "The Assumption of Anarchy in International Relations Theory: A Critique." *Review of International Studies* 17(January), 67-85.
- Molander, Per. 1985. "The Optimal Level of Generosity in a Selfish, Uncertain Environment." *Journal of Conflict Resolution*. 29(), 611-18.
- Morgenthau, Hans. 1948. *Politics Among Nations: The Struggle for Power and Peace*. New York: Knopf.
- Nemeth C. 1972. "A Critical Analysis of Research Utilizing the Prisoner's Dilemma Paradigm for the Study of Bargaining." In L. Berkowitz (ed) *Advances in Experimental Social Psychology, Volume 6*. New York: Academic Press.
- Nisbett, Richard and Lee Ross. 1980. *Human Inference: Strategies and Shortcomings of Social Judgment*. Englewood, NJ: Prentice-Hall.
- Oye, Kenneth (ed). 1986. *Cooperation Under Anarchy*. Princeton, NJ: Princeton University Press.
- Poundstone, William. 1993. *Prisoner's Dilemma: John Von Neumann, Game Theory and the Puzzle of the Bomb*. Anchor
- Powell, Robert. 1991. "Absolute and Relative Gains in International Relations Theory." *American Political Science Review* 85(December),1303-20. Reprinted in David A. Baldwin (ed.) *Neorealism and Neoliberalism: The Contemporary Debate*. New York: Columbia University Press, 1993.
- Powell, Robert. 1994. "Anarchy in International Relations Theory: the Neorealist-Neoliberal Debate." *International Organization* 48/2(Spring), 313-44.
- Quester, George. 1977. *Offense and Defense in the International System*. New York: Wiley.
- Reich, Robert. 1990. "Do We Want the U.S. to be Rich or Japan Poor?" *Wall Street Journal*, June 18. A10.

- Ruggie, John Gerard. 1983. "Continuity and Transformation in World Polity: Toward a Neorealist Synthesis." *World Politics* 35,2(January), 261-285.
- Snidal, Duncan. 1991. "Relative Gains and the Pattern of International Cooperation." *American Political Science Review* 85(September),701-26. Reprinted in David A. Baldwin (ed.) *Neorealism and Neoliberalism: The Contemporary Debate*. New York: Columbia University Press, 1993.
- Snyder, Jack. 1984. *Ideology of the Offensive*. Ithaca, NY: Cornell University Press.
- Stein, Arthur A. 1982. "Coordination and Collaboration: Regimes in an Anarchic World." *International Organization* 36(Spring), 294-324.
- Van Evera, Steven. 1984. "The Causes of War." University of California at Berkeley Ph.D. dissertation.
- Walt, Stephen M. 1987. *The Origins of Alliances*. Ithaca, NY: Cornell University Press.
- Waltz, Kenneth N. 1979. *Theory of International Politics*. New York: Random House.
- Wendt, Alexander. 1992. "Anarchy is What States Make of It: The Social Construction of Power Politics." *International Organization* 46,2(Spring), 391-425.
- Werner, Suzanne. 1997. In Search of Security: Relative Gains and Losses in Dyadic Relations. *Journal of Peace Research* 34/3(August), 289-302.
- Wittkopf, Eugene R. 1994. "Faces of Internationalism in a Transitional Environment." *Journal of Conflict Resolution* 38/4 (September), 376-401.
- Wu, Jianzhong and Robert Axelrod. 1995. "How to Cope with Noise in the Iterated Prisoner's Dilemma." *Journal of Conflict Resolution* 39/1 (March), 183-89.

**Table 1: Summary of Central Hypotheses.**

- H1:** Individuals are solely concerned about relative gains.
- H2:** The importance of relative gains increases when the partner in the exchange is viewed as an adversary or potential threat.
- H3:** The importance of relative gains increases as one moves from non-security issues areas (e.g., environmental or economic issues) to the security issue area (e.g., arms agreements).
- H4:** Individuals with strong realist beliefs will be less likely to achieve a stable cooperative arrangement in an iterated prisoner's dilemma simulation.

**Table 2: Relative Gains Question from the Survey**

Question 7. Which scenario would you prefer to see happen over the next decade?

**Scenario 1:** The U.S. economy grows by 3 percent per year while the economy of *country X* grows by 5 percent per year.

**Scenario 2:** The U.S. economy grows by 1.5 percent per year and the economy of *country X* also grows by 1.5 percent per year.

Strongly Prefer Scenario 1	25%
Somewhat Prefer Scenario 1	26%
Neutral	9%
Somewhat Prefer Scenario 2	24%
Strongly Prefer Scenario 2	17%

Question 40. Which scenario would you prefer to see?

**Scenario 1:** The U.S. cuts its tariffs by 12% on average and *country X* cuts their tariffs by 10% on average over the next three years.

**Scenario 2:** The U.S. cuts its tariffs by 2% on average and *country X* cuts their tariffs by 2% on average over the next three years.

Strongly Prefer Scenario 1	21%
Somewhat Prefer Scenario 1	28%
Neutral	10%
Somewhat Prefer Scenario 2	27%
Strongly Prefer Scenario 2	13%

Question 14. According to one school of thought, any gains by *country X*, including economic growth, represent a loss by the United States. This school sees the world as analogous to an apple pie; the larger the *country X's* slice the smaller the American slice. Another school of thought contends that *country X's* gains need not come at the expense of the United States; this second school contends that *country X's* gains simply imply that the entire pie is getting bigger.

Strongly Agree that <i>country X's</i> Gains Come at the Expense of the US.	3%
Agree that <i>country X's</i> Gains Come at the Expense of the US.	13%
Neutral	18%
Disagree that <i>country X's</i> Gains Come at the Expense of the US.	46%
Strongly Disagree that <i>country X's</i> Gains Come at the Expense of the US.	19%

Notes: N=464 for Question 7; 452 for Question 14; and 394 for Question 40. Percentages may not add to 1.0 due to rounding. As discussed in the text *country X* was randomly replaced by either Russia, China, Japan, or Canada.

**Table 3: Realism and the Importance of Relative Gains**

Question 32. Which scenario would you prefer to see happen over the next decade?

**Scenario 1:** The U.S. cuts defense spending by 10% and *country X* cuts their defense spending by 7%.

**Scenario 2:** The U.S. cuts defense spending by 2% and *country X* cuts their defense spending by 2%.

	Prefer Scenario 1 (Absolute Gains)	Neutral	Prefer Scenario 2 (Relative Gains)
	-----	-----	-----
Strong Idealist	52%	7%	41%
Mixed Views	38%	10%	51%
Strong Realist	18%	18%	64%

n=206; Chi Square(4) = 12.9; Probability =0.01

Note: Percentages may not add to 1.0 due to rounding. The realist-idealist index varies from -21 to +21; the distribution is unimodal with a mean of -3. For the table, “Strong Idealists” refer to the one quarter of respondents with the strongest idealist views (less than or equal to -9 on the continuum) while “Strong Realists” refer to the one quarter of respondents with the strongest realists views (greater than or equal to +1 on the continuum).

**Table 4: Relative Gains and the Nature of the Opponent**

Question 7. Which scenario would you prefer to see happen over the next decade?

**Scenario 1:** The U.S. economy grows by 3 percent per year while the economy of *country X* grows by 5 percent per year.

**Scenario 2:** The U.S. economy grows by 1.5 percent per year and the economy of *country X* also grows by 1.5 percent per year.

	Overall (N=464)	Russia (N=123)	China (N=103)	Japan (N=117)	Canada (N=121)
Strongly or Somewhat Prefer Scenario 1	51%	66%	43%	38%	55%
Neutral	9%	6%	5%	12%	13%
Strongly or Somewhat Prefer Scenario 2	40%	28%	52%	50%	32%

n=464; Chi Square(6) = 31.1; Probability =0.000

Question 40. Which scenario would you prefer to see?

**Scenario 1:** The U.S. cuts its tariffs by 12% on average and *country X* cuts their tariffs by 10% on average over the next three years.

**Scenario 2:** The U.S. cuts its tariffs by 2% on average and *country X* cuts their tariffs by 2% on average over the next three years.

	Overall (N=394)	Russia (N=62)	China (N=121)	Japan (N=95)	Canada (N=116)
Strongly or Somewhat Prefer Scenario 1	49%	60%	44%	48%	48%
Neutral	10%	11%	9%	7%	13%
Strongly or Somewhat Prefer Scenario 2	41%	29%	45%	44%	39%

n=394; Chi Square(6) = 6.7; Probability =0.347

Question 14. According to one school of thought, any gains by *country X*, including economic growth, represent a loss by the United States. This school sees the world as analogous to an apple pie; the larger the *country X's* slice the smaller the American slice. Another school of thought contends that *country X's* gains need not come at the expense of the United States; this second school contends that *country X's* gains simply imply that the entire pie is getting bigger.

	Overall (N=452)	Russia (N=113)	China (N=119)	Japan (N=115)	Canada (N=105)
Agree that <i>country X's</i> Gains Come at the Expense of the U.S.	16%	6%	18%	25%	9%
Neutral	18%	13%	22%	16%	24%
Disagree that <i>country X's</i> Gains Come at the Expense of the U.S.	66%	81%	60%	52%	57%

n=452; Chi Square(6) = 29.0; Probability =0.000

Notes: Percentages may not add to 1.0 due to rounding. Respondents were randomly assigned each question with multiple versions so the number receiving the Russian version of the question varies from question to question.

**Table 5: Threat Perception**

Question 37. Identify the type of the threat, if any, the following countries represent to American national interests.

	Military Threat Only	Economic Threat Only	Military & Economic Threat	No Threat At All	Not Sure
Russia	41%	8%	15%	28%	7%
China	7%	27%	46%	10%	10%
Japan	0%	77%	10%	11%	2%
Canada	0%	14%	1%	80%	5%
Germany	1%	43%	13%	29%	14%

Notes: Percentages may not add to 1.0 due to rounding.

**Table 6: Security Threats Versus Economic Threats**

Question 7. Which scenario would you prefer to see happen over the next decade?

**Scenario 1:** The U.S. economy grows by 3 percent per year while the economy of *country X* grows by 5 percent per year.

**Scenario 2:** The U.S. economy grows by 1.5 percent per year and the economy of *country X* also grows by 1.5 percent per year.

	Overall (N=464)	Russia (N=123)	China (N=103)	Japan (N=117)	Canada (N=121)
Strongly or Somewhat Prefer Scenario 1	51%	66%	43%	38%	55%
Neutral	9%	6%	5%	12%	13%
Strongly or Somewhat Prefer Scenario 2	40%	28%	52%	50%	32%

n=464; Chi Square(6) = 31.1; Probability =0.000

Question 32. Which scenario would you prefer to see happen over the next decade?

**Scenario 1:** The U.S. cuts defense spending by 10% and *country X* cuts their defense spending by 7%.

**Scenario 2:** The U.S. cuts defense spending by 2% and *country X* cuts their defense spending by 2%.

	Overall (N=213)	Russia (N=50)	China (N=59)	Japan (N=48)	Canada (N=56)
Strongly or Somewhat Prefer Scenario 1	38%	28%	31%	44%	48%
Neutral	12%	10%	7%	13%	18%
Strongly or Somewhat Prefer Scenario 2	51%	62%	63%	44%	34%

n=213; Chi Square(6) = 13.9; Probability =0.031

Notes: Percentages may not add to 1.0 due to rounding.

**Table 7: Cooperation in the Iterated Prisoner’s Dilemma Simulation**

***a. Percentage of Cooperative Moves Played by the Subject***

	Uncooperative (lowest quartile) -----	Cooperative (middle two quartiles) -----	Very Cooperative (upper quartiles) -----
Strong Idealist	25%	41%	33%
Mixed Views	26%	54%	20%
Strong Realist	38%	46%	16%

n=819; Chi Square(4) = 28.4; Probability =0.000

***b. Percentage of Jointly Cooperative Moves Achieved by the Subject and Computer Opponent***

	Uncooperative (lowest quartile) -----	Cooperative (middle two quartiles) -----	Very Cooperative (upper quartiles) -----
Strong Idealist	23%	43%	33%
Mixed Views	24%	54%	49%
Strong Realist	36%	47%	17%

n=819; Chi Square(4) = 23.4; Probability =0.000

***c. Cooperative First Move by the Subject***

	Defects on First Move -----	Cooperates on First Move -----
Strong Idealist	30%	70%
Mixed Views	29%	71%
Strong Realist	37%	63%

n=829; Chi Square(2) = 4.7; Probability =0.095

Notes: Percentages may not add to 1.0 due to rounding. See Table 3 for categorization of idealist and realist.

**Figure 1: The Prisoner's Dilemma**

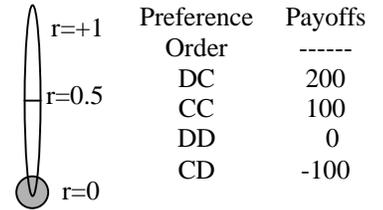
		Player B		Preference Order
		Cooperate	Defect	
Player A	Cooperate	2 2	1 4	1. DC: Defect-Cooperate (best) 2. CC: Cooperate-Cooperate
	Defect	4 1	3 3	3. DD: Defect-Defect 4. CD: Cooperate-Defect (worst)

Notes: In each quadrant, the lower left payoff is for Player A and the upper right payoff is for Player B.

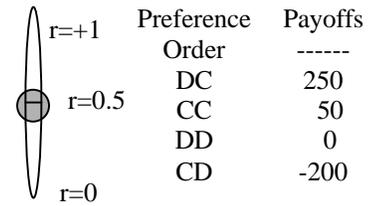
Figure 2: Varying the Importance of Relative Gains within the Prisoner's Dilemma

		Player B	
		<i>Cooperate</i>	<i>Defect</i>
Player A	<i>Cooperate</i>	$M^*=(1-r)M$	$T^*=T-rS$
	<i>Defect</i>	$S^*=S-rT$	<b>0</b>

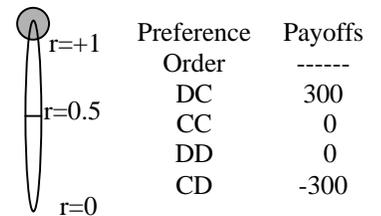
		Player B	
		<i>Cooperate</i>	<i>Defect</i>
Player A	<i>Cooperate</i>	$100=(1-0)100$	$200=200-(0^*-100)$
	<i>Defect</i>	$200=200-(0^*-100)$	<b>0</b>



		Player B	
		<i>Cooperate</i>	<i>Defect</i>
Player A	<i>Cooperate</i>	$50=(1-.5)100$	$250=200-(.5^*-100)$
	<i>Defect</i>	$250=200-(.5^*-100)$	<b>0</b>



		Player B	
		<i>Cooperate</i>	<i>Defect</i>
Player A	<i>Cooperate</i>	$0=(1-1)100$	$300=200-(1^*-100)$
	<i>Defect</i>	$300=200-(1^*-100)$	<b>0</b>



**Figure 3: The Interactive Iterated Prisoner's Dilemma Game**

<p><b>INFORMATION ON CURRENT GAME</b></p> <p>-----</p> <p><b>GAME:</b> ITERATED PRISONERS DILEMMA</p> <p><b>OPPONENT'S STRATEGY:</b> UNKNOWN</p> <p><b>DURATION OF GAME:</b> UNKNOWN</p> <p><b>OBJECTIVE:</b> MAXIMIZE YOUR TOTAL</p> <p><b>UNCERTAINTY:</b> 0%</p>	<p style="text-align: center;"><b>PRISONERS' DILEMMA PAYOFF MATRIX</b></p> <table border="0" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td></td> <td colspan="2" style="text-align: center;">Opponent</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">COOPERATE</td> <td style="text-align: center;">DEFECT</td> </tr> <tr> <td style="text-align: right;">COOPERATE</td> <td style="border-right: 1px solid black; border-bottom: 1px solid black; padding: 5px;">5,5</td> <td style="border-bottom: 1px solid black; padding: 5px;">-10,20</td> <td></td> </tr> <tr> <td style="text-align: right;">John Doe</td> <td style="border-right: 1px solid black; padding: 5px;">20,-10</td> <td style="padding: 5px;">0,0</td> <td></td> </tr> <tr> <td style="text-align: right;">DEFECT</td> <td style="border-right: 1px solid black;"></td> <td></td> <td></td> </tr> </table>			Opponent				COOPERATE	DEFECT	COOPERATE	5,5	-10,20		John Doe	20,-10	0,0		DEFECT			
		Opponent																			
		COOPERATE	DEFECT																		
COOPERATE	5,5	-10,20																			
John Doe	20,-10	0,0																			
DEFECT																					
<p style="text-align: center;">Current Round: 9</p> <p>Your Current Play</p> <p style="margin-left: 40px;"><input type="radio"/> Cooperate</p> <p style="margin-left: 40px;"><input type="radio"/> Defect</p>	<p style="text-align: center;">History of Interactions</p> <table border="0" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding-right: 10px;">Round:</td> <td>9 8 7 6 5 4 3 2 1</td> </tr> <tr> <td style="padding-right: 10px;">John Doe:</td> <td>? C C C C C C C C</td> </tr> <tr> <td style="padding-right: 10px;">Opponent:</td> <td>? D D D D D D D C</td> </tr> </table>	Round:	9 8 7 6 5 4 3 2 1	John Doe:	? C C C C C C C C	Opponent:	? D D D D D D D C														
Round:	9 8 7 6 5 4 3 2 1																				
John Doe:	? C C C C C C C C																				
Opponent:	? D D D D D D D C																				
<p><b>CUMULATIVE TOTALS</b></p>	<table border="0" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding-right: 20px;"><b>JOHN DOE</b></td> <td><b>OPPONENT</b></td> </tr> <tr> <td style="padding-right: 20px;"><b>-80</b></td> <td><b>+160</b></td> </tr> </table>	<b>JOHN DOE</b>	<b>OPPONENT</b>	<b>-80</b>	<b>+160</b>																
<b>JOHN DOE</b>	<b>OPPONENT</b>																				
<b>-80</b>	<b>+160</b>																				

---

<sup>1</sup> I would like to thank Erick Duschesne, Avery Goldstein, Joseph Grieco, Ted Hopf, Dan Reiter, Anne Sartori, Lynn Warner, Claude Welch, and Frank Zinni for commenting on earlier drafts. I would also like to thank Ross Winston for developing the computer programs used in this project.

<sup>2</sup> Movement toward the pareto optimum can be achieved if one party can be made better off without the second party being made worse off; the focus in much of economics is, therefore, on collective gains rather than the distribution of gains.

<sup>3</sup> While Milton Freidman (1962) may argue that the descriptive accuracy of assumptions is irrelevant, a complete explanation (as opposed to a prediction) requires an understanding of the causal mechanisms producing the observed phenomenon. While conceding that assumptions are by necessity simplifications, they should be innocuous, constant rather than conditional, and generally descriptively accurate. Moreover, the empirical validity of critical assumptions has long been an important avenue of research in many fields such as economic (e.g., are firms and individuals maximizers?) and psychology (e.g., are individuals rational decision makers?).

<sup>4</sup> While structural realists such as Waltz (1979) view anarchy as a constant, this assumption has been hotly contested. Milner (1991) argues that anarchy is a continuous rather than a dichotomous variable. Ruggie (1983) argues that the middle ages, which were characterized by overlapping lines of authority across political units, represent a hierarchical rather than anarchical system. Finally, Wendt (1992) contends that the implications of anarchy are socially constructed rather than structurally determined.

<sup>5</sup> Grieco could argue (and Powell (1994) would concur) that he never claims states are only concerned with relative gains. While it is true his model incorporates a variable ("v") which allows the importance of relative gains to vary, the language he uses in the body of the article points to an exclusive focus on relative gains (e.g., neoliberalism "is likely to be proven wrong"

---

and "realism is still the most powerful theory of international relations"). See Keohane (1993, 298) on this point.

<sup>6</sup> While the argument here assumes that the belief in the importance of relative gains is the product of anarchy, others argue that the belief can be the product of many different factors. Johnston (1995) argues that the dominant (and stable) realist belief system in China is the product of domestic culture rather than a response to the structure of the international system.

<sup>7</sup> The synthesis has its roots in Keohane and Nye's *Power and Interdependence* (1977). The authors create a continuum between realism and "complex interdependence" and argue that their framework become increasingly relevant as one moves toward the complex interdependence pole. In their 1987 article entitled "Power and Interdependence Revisited" the authors lament the fact that most readers viewed interdependence as a substitute for realism rather than a synthesis with it. As stated in footnote 5, Grieco can be viewed as an attempt to synthesis realism and liberalism via the inclusion of "v" in his model.

<sup>8</sup> The logic of this argument follows directly from Jervis (1978) who pointed out that the security dilemma becomes worse if offensive weapons are dominant or if weapons can be used for either offensive or defensive purposes. For a discussion of offensive versus defensive weapons, see Quester (1977). For a related discussion of the "cult of the offensive" see Snyder (1984) and Van Evera (1984).

<sup>9</sup> As Werner (1997) points out, theoretically "r" should vary from -1 to +1. In a world with many actors, a state can benefit from relative gains by potential allies. For example, in French-Polish relations during the Interwar period relative gains by Poland increased French utility because it increased Poland's ability to balance against Germany. Grieco (1990, 323) also makes this point. In order to simplify the Figure, I have used Snidal's bounds for "r."

<sup>10</sup> While Waltz (1979) contends that states balance against power, Walt (1987) argues that they balance against threats. Walt states that threats are a function of geographic proximity, relative

---

capability, offensive power, and hostile intentions. While all four factors should influence decision makers estimates of "r" (which will vary from dyad to dyad), the last factor is of particular interest. Hopf (1998, 186) argues that a sense of shared identity can decrease the likelihood that one views another state as a potential threat. For example, democracies may be less likely to fight each other because they have constructed a shared identity and norms of conflict resolution. Hopf, who argues identity and threat perception can be best understood from a constructivist approach, would reject Powell's (1994) contention that the strategic setting *alone* determines the value of "r".

<sup>11</sup> This is not to say the relative gains are irrelevant in every environmental issue. For example, proposals to halt global warming, which could in theory constrain American growth while leaving the Chinese free to continue to grow rapidly, could trigger concerns over relative gains.

<sup>12</sup> Public opinion analyses by Wittkopf (1994) and Holsti and Rosenau (1990) highlight important differences between elite opinion and mass opinion. In general, political elites tend to be much more internationalist than the average American citizen and slightly more idealistic than the average American citizen. As will become clear, the following analysis does not propose (nor does it require) that the distribution of preferences between elites and masses is identical.

<sup>13</sup> The survey was accessed by subjects via the internet. The four universities participating in the project were the University of Michigan, Florida State University, the State University of New York at Buffalo, and the University of Pennsylvania. I would like to thank Bear Braumoeller, David Rivera, Paul Hensel, Will Moore, Michael Kraig, Scott Lake and Karl Mueller for assisting with the administration of the survey. The original survey, responses, and prisoner's dilemma page can be found at "<http://www.ssc.upenn.edu/~rousseau>".

<sup>14</sup> Randomly varying the length of the game ensured that students would not know when the game was going to end; theoretically if the end point is known, the iterated game collapses backward and cooperation never emerges.

---

<sup>15</sup> I would like to thank Ross Winston from SUNY-Buffalo's Computing and Information Technology group for developing the computer scripts for the experimental survey and interactive game. The scripts are available from the author upon request.

<sup>16</sup> For a more complete discussion of strategies and uncertainty, see Axelrod (1984), Wu and Axelrod (1995), Molander (1985), and Bendor (1993). Uncertainty can relate to the identity of the opponent, the preferences of the opponent, the strategy employed by the opponent, and the current move by the opponent.

<sup>17</sup> Students at the State University of New York at Buffalo and the University of Pennsylvania were required to either complete the survey and game or a written exercise of similar length and difficulty. No student chose the alternative written exercise. At other universities, participation was voluntary. This potentially introduces bias into the analysis because participation is limited to the most motivated students. However, the bias should not impact my results because I am interested in the distribution of preferences rather than generalizing from a sample mean to a broader population. Approximately 80% of the students playing the iterated prisoner's dilemma game were from the State University of New York at Buffalo or the University of Pennsylvania.

<sup>18</sup> For an interesting discussion of these early experiments and the prisoner's dilemma more generally, see Poundstone (1993).

<sup>19</sup> The "scenario" questions were informally tested by Robert Reich (1990) and are discussed by Mastanduno (1991). In theory, by proposing a scenario with such enormous gap between American and Japanese growth rates in Scenario 1 (25% and 75% respectively), Reich could be stacking the deck in favor of relative gains. However, by narrowing the gap to 3% versus 5% in question #7, I demonstrate that even slight differences can provoke concerns about relative gains.

<sup>20</sup> A cross-national analysis of Japan, China, and the United States is currently underway.

---

<sup>21</sup> The percentage of cooperative moves rather than the number of cooperative moves is used because each game varied randomly in length. The first play is critical in numerous strategies such as tit-for-tat because it establishes a pattern of cooperative or conflictual behavior.

<sup>22</sup> The structure of the game has been varied by altering the payoffs (Bornstein, Budescu, and Zamir 1997), introducing communication (Insko et al. 1993), allowing iteration (Andreoni and Miller 1993), injecting uncertainty (Friedland 1990), altering the opponent's strategy (Komorita, Hilty, & Parks 1991), adding groups to the decision process (Brewer and Kramer 1986), and permitting contingent moves (Nemeth 1972). An exception to the statement that beliefs have been neglected is Lutzker (1960).

<sup>23</sup> Snidal (1991, 173) explicitly states he is concerned with examining the consequences of particular beliefs rather than explaining where these beliefs come from.