Social Preferences for Negotiated Outcomes

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Negotiation research and training assumes that utility is only a function of payoffs to oneself. However, the past four decades of research in psychology, behavioral economics, and organizational behavior has documented that individuals actually care about the payoffs of others. Such "social preferences" arise because people are competitive or have a norm of fairness or equality. Negotiations research often examines what types of environments, tactics, or negotiation behaviors produce "good" agreements. However, if social preferences matter, a "good" agreement is determined by what makes negotiators satisfied. As a result, the standard measures for evaluating negotiations (sum of payoffs, Pareto efficiency relative to payoffs) may be inadequate measures of outcome quality.

This research seeks to incorporate social preferences into negotiation theory. I estimate the drivers of utility by using individualized regression and statistical clustering methods to sort negotiators' utility functions into "types". I identify the relationship between demographic variables such as gender and race and the negotiator types. These groupings are then used to explore how different measures of outcome quality and outcome inequality are affected by utility functions that differ from pure self-interest. Finally, I evaluate whether negotiators perform better using traditional measures of negotiation quality or using the new measures that incorporate "social utility" type preferences. Far more than economic gains are at stake when people negotiate, and if the notion of concern for both self and others is considered in measuring outcome quality, negotiators' performance may be evaluated more effectively using these new measures.

INTRODUCTION AND MOTIVATION

Negotiations research and training assumes that utility is only a function of payoffs to oneself. However, the past four decades of research in psychology, organizational behavior, and more recently in behavioral economics has documented that individuals actually care about the payoffs of others. Neale and Bazerman (1992) use the economic concept of rationality and the psychological concept of cognitive biases to explain why individuals deviate from rational behavior, that is, why they exhibit behavior not solely self-interested[1]. People exhibit behavior that is not solely self-interested in that they evaluate their payoffs relative to the payoffs of others (cf. Rabin, 1993; Fehr and Schmidt, 1999), often because they have an interest in building harmony in their relationships, which can cause a norm of fairness or equality to prevail (Tripp, Sondak, and Bies, 1995; Messick, 1993). Negotiators *increase* utility by following equality norms. In this theory, concern for equality is not a mere cognitive bias; rather, it is a motive that serves broadly defined self-interest over the long term.

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[1] Rationality in economics is actually silent on the issue of preferences: whatsoever one's preferences are, it is rational to maximize those preferences. Nonetheless Neale and Bazerman interpret exhibiting behavior that is not solely self-interested as deviating from rationality.

The different literatures have approached measuring the determinants of utility differently. The research on social motives or social value orientations estimate motives regarding one's own and one's opponent's outcome from a set of choices that people make and categorize people into motive types (cf. Messick and McClintock, 1968; McClintock, 1972; MacCrimmon and Messick, 1976; Liebrand, 1983; Liebrand et al., 1986; McClintock and Liebrand 1988; De Dreu and Boles, 1988; De Dreu and Van Lange, 1995; Olekalns and Smith, 1999; De Dreu, Weingart, and Kwon, 2000). The literature on social utility or social preferences takes a more quantitative approach and estimates individual utility functions from a set of choices that people make (cf. Knight and Dubro, 1984; Loewenstein, Thompson, and Bazerman, 1989; Hoffman, McCabe, Shachat and Smith, 1994; Forsythe, Horowitz, and Savin, 1994; Berg, Dickhaut and McCabe, 1995; Fehr and Schmidt, 1999; Fehr and Fischbacher, 2002).

Negotiations research often examines what types of environments, tactics, or negotiation behaviors produce "good" agreements. This research is used by negotiation instructors to help students become better negotiators. However, in order to evaluate what constitutes good agreements, it is critical to understand what makes negotiators more satisfied with agreements. Thus research on the building blocks of utility is important for negotiations research and negotiations training. Negotiation researchers often use the sum of the parties' payoffs to compare alternative agreements, with agreements that result in larger sums being judged of higher quality than agreements resulting in smaller sums. However, if negotiators derive utility from the payoffs of others or derive utility from having reached an agreement where the parties have equal payoffs, the sum of the payoffs will be a poor measure of outcome quality. Other researchers use the measure of Pareto efficiency to measure outcome quality. Tripp and Sondak (1992) argue that Pareto efficiency is the appropriate measure of dyadic performance because it better incorporates theoretical models of individual rationality than the sum of payoffs. In this setting, an outcome is Pareto efficient if one side's *payoff* can not be improved without decreasing another side's *payoff*. However, if negotiators care about their utility and utility differs from payoffs because utility captures preferences for outcomes of the other negotiators or an equality norm, Pareto efficiency defined relative to payoffs will also be a poor measure.

The objective of this paper is to advance research on how to measure people's preferences so that new measures of outcome quality can be derived. I extend the research by Loewenstein, Thompson, and Bazerman (1989) on estimating the drivers of utility by using individualized regression and statistical clustering methods and then sort negotiators' utility functions into relatively homogeneous groups or "types". By using this approach, it allows the number of estimated negotiator types to be endogenously determined rather than determined a priori by the researcher. However, based on previous research which used clustering techniques, I expect to find three types (Knight and Dubro, 1984). This approach maintains individual specification and also allows a direct comparison between the individual specification and the "types" regarding the extent to which they care about payoffs to the self versus payoffs to others.

I also conduct analyses to identify the relationship between demographic variables such as gender and race and the negotiator types. Major and Adams (1983) report that women allocated rewards more equally than men did between themselves and a same-sex counterpart with inferior performance. In a review, Kahn and Gaeddert (1985) note that women tend to prefer equality (rewards allocated in a more uniform fashion) more so than men. Given these findings, I expect to find women's preferences more so than men's to want equality for negotiation outcomes. Markus and Kitayama (1991) suggest that much of psychologists' knowledge about human nature is based on the western view of the individual as an independent,

autonomous entity found in American and Western European cultures. Markus and Kitayama contrast this with a more interdependent view of self with respect to others found in Asian, African and Latin-American cultures. Given their findings which broadly support these differing world views, I expect to find differences in western versus non-western cultures with respect to self versus other in preferences for negotiation outcomes.

Finally, I evaluate whether negotiators perform better using a traditional measure of negotiation quality or using the new measures that incorporate "social utility" type preferences. Far more than economic gains are at stake when people negotiate, and if the notion of concern for both self and others is considered in measuring outcome quality, negotiators' performance may be evaluated more effectively using these new measures.

RE-THINKING HOW TO MEASURE THE QUALITY OF AGREEMENTS

Traditional notions of Pareto efficiency assume that people only receive utility from their own outcomes or payoffs. In this paper, I explore how the concept of Pareto efficiency needs to be re-defined if people receive utility from the outcomes of others. Even when an outcome that is Pareto efficient with respect to the player's *payoff*, it may not be Pareto efficient with respect to the player's *utility*.

To demonstrate, first consider a simple distributive negotiation in which two individuals must decide how to split $100. If an individual's preferences are increasing linearly only in own payoff, then the utility function can be represented, for example, as $U = self/10$, where U is utility and $self$ is payoff to oneself as shown in Figure I-a. I will refer to this as s*elf-interested utility*. Suppose that both negotiators have utility functions of this form. In this case, the utility possibility set (both sides' utilities associated with each possible negotiated outcome) is also linear as shown in Figure I-b.). I will call this the *self-interested outcome possibility set*. Recall that an outcome is Pareto efficient if one side's utility can not be improved without making another side worse off. It is clear from this graph that all points are Pareto efficient. That is, there are no interior points (where both side's utilities could improve by moving to another outcome), assuming all money is allocated. Outcomes that are Pareto efficient comprise the *self-interested Pareto efficient frontier*. Note that in this stylized example the *self-interested outcome possibility set* and the *self-interested Pareto efficient frontier* contain the same points, but this will not always be the case.

Again, consider the simple distributive negotiation in which two individuals must split $100. As long as each side's utility function is monotonically increasing in own payoff and no utility is received from the payoff of the other side, all points will be Pareto efficient. For example, consider the utility function in Figure I-c, where utility is monotonically increasing but concave in payoff. Here $U = \sqrt{self}$. If both negotiators have utility functions of this form, then the resulting utility possibility set is such that all points are Pareto efficient (see Figure I-d).

Now consider a situation where a person's utility depends upon her own payoff as well as the payoff of the other side. For example, an individual may have a utility function that evaluates their payoff relative to the payoff of the other person. Consider a utility function $U(self, other) = (100 - |self - other - 20|)/10$, where $self$ is the payoff to oneself and $other$ is the payoff to one's opponent. It is clear from the mathematical formulation and the utility graph in Figure I-e (solid line) that this individual cares about her own outcome as well as how her outcome differs from that of the other person. Notice that the x-axis is the *difference in payoffs*,

that is, *self – other* rather than simply payoffs. I will refer to this type of utility as s*ocial utility*. For comparison purposes, the utility function from Figure I-a is also graphed on this figure (dashed line). An individual with social utility function given in Figure 1-e most likes a split of $60 to herself and $40 to her opponent: her utility is highest at +10 when she is $20 ahead. She increasingly dislikes less money to herself as well as increasingly dislikes more money to herself. If her opponent gets the full $100 and she gets $0, her utility is –2. If she gets the full $100 and her opponent gets $0, her utility is +2. That is, this individual is most comfortable with a split that slightly favors herself ($20 positive difference) with decreasing utility for more or less.

When both negotiators have this type of utility functions, the utility possibility set looks quite different than it does in Figures I-b or I-d. Figure I-f graphs the utility possibility set when both parties have the utility function represented in Figure I-e. I will refer to this as the *social utility outcome possibility set* and the set of Pareto efficient points here as the *social utility Pareto efficient frontier*. Notice that there are now inefficient outcomes as well as efficient outcomes. Only the outcomes on the line segment from (6,10) to (10,6) are efficient. For the inefficient outcomes, there exist alternative outcomes where both sides' utility is greater.

Given the self-interested Pareto efficient frontier and the social utility Pareto efficient frontier, it is possible to derive two measures of outcome quality. One measures the negotiated outcome with respect to how close it is to being Pareto efficient as determined by the self-interested negotiation frontier. The other measures the negotiated outcome with respect to how close it is to being Pareto efficient as determined by the social utility negotiation frontier.

Comparable re-formulations can be derived that take into account other aspects of the quality of the agreement. For example, one measure might be the inequality of the negotiated outcome – the extent to which one party does better than the other side. A common traditional measure simply looks at the absolute value of the difference between the payoffs. However, this measure as well can be adjusted to measure the difference in the two sides' utilities rather than simply payoffs.

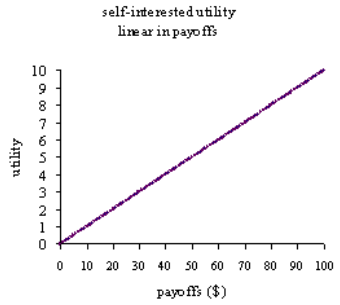

Figure I-a

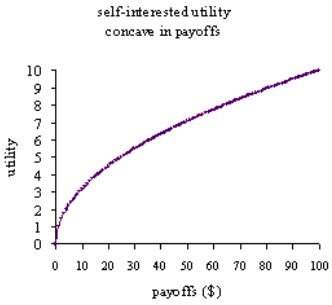

Figure I-c

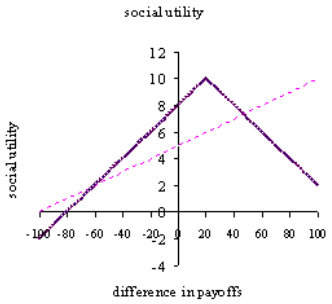

Figure I-e

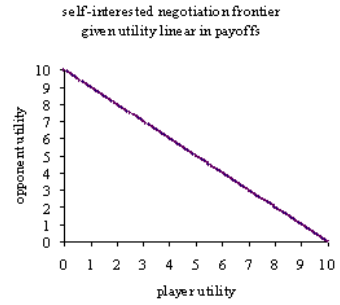

Figure I-b

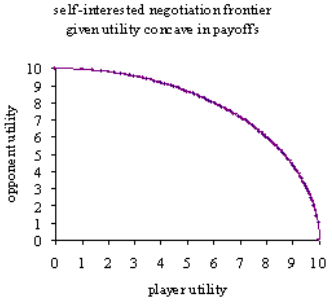

Figure I-d

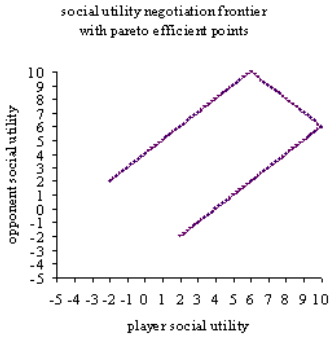

Figure I-f

Figure I

THEORY AND RESEARCH QUESTIONS

Traditional economic theory and the concept of utility provide a parsimonious and powerful framework for negotiations research. I propose that social utility can enhance the negotiations framework. Social utility in a negotiations context specifies level of satisfaction as a function of outcome to oneself and to one's opponent. The utility function graphed in Figure I-e: $U(self, other) = (100 - |self - other - 20|)/10$, where $self$ is the payoff to oneself and $other$ is the payoff to one's opponent, is an example of a social utility function. Specifically, I propose that the social utility formulation composed by Loewenstein et al. (1983) can enhance the negotiations framework. The specific formulation is introduced below in the methods section.

I concur with Tripp and Sondak (1992) that traditional economic Pareto efficiency provides a key measure for evaluating outcome success in a negotiation. In addition however, I propose that social utility as conceived by Loewenstein et al. (1989) can provide another key measure for evaluating outcome success. If the notion of concern for both self and others is considered, then negotiators' performance may be evaluated more effectively and favorably (Tripp et al., 1995). Social Utility as developed by Loewenstein et al. (1989) can be effectively adapted to account for the notion of concern for both self and others in negotiation, and provide a complimentary role to that of traditional economic Pareto efficiency in providing measures of quality for evaluating negotiation outcomes. While individuals may "fail" (perform less than optimally) with respect to self-interested Pareto efficient criteria, they may indeed succeed with respect to social utility Pareto efficient criteria (or perhaps vice-versa). I posit both measures are valid for evaluating outcomes, because both frames are valid. Which measure to apply depends

on what the individuals involved are trying to achieve, and that may not always be to maximize self-interested payoff without concern for others.

Furthermore, a common measure of outcome inequality is absolute difference in payoffs. I additionally propose that absolute difference in social utility may provide another insightful inequality measure that better captures the concern for one's opponent's payoffs as well as one's own payoffs.

Finally, given past research on gender which found that women allocate rewards more equally than do men (Major and Adams, 1983) and prefer equality more so than men (Kahn and Gaeddert, 1985), I expect to find that the social utility curves for women, more so than men, demonstrate a concern for the outcome of their opponent, in addition to their own outcome. Given past research on non-western versus western races which suggest that non-western races have more interdependent view of self with respect to others (Markus and Kitayama, 1991), I expect to find that the social utility curves for non-western races, more so than western races, demonstrate a concern for the outcome of their opponent, in addition to their own.

This research addresses the following questions. 1) What proportion does self-interest versus differential-interest account for preferences? 2) How do gender and race influence this proportion? 3) Do people more often reach a Pareto efficient agreement when defined by self-interested utility or by social utility? 4) Do people more often reach equal outcomes when evaluated against payoff distribution or joint social utility? A key question boded by this research is 5) Will research into differential-interest as well as self-interest considerations result in new negotiation strategies and techniques?

METHODS

Overview

Data was gathered for four in-class negotiation sessions. Students participated for course credit. Students prepared the case materials first, and then filled out a spreadsheet in which they rated their satisfaction with various potential outcomes (payoff to oneself and payoff to one's opponent). Then they negotiated the simulation. The spreadsheet information and the negotiated outcome provided the source data for the analysis. Each person's settlement preferences were represented using the social utility parameterization as specified by Loewenstein et al (1989). Therefore each person's settlement preferences were represented by that individual's social utility curve. All individuals' social utility curves were grouped into three types using statistical clustering[2] and the cluster composition was analyzed. Cluster composition was verified by significant differences between clusters with respect to demographic variables. Two measures were developed to measure the quality of a negotiated outcome, one based on self-interested Pareto efficiency and the other based on social utility Pareto efficiency. Two measures were developed to measure the equality of the negotiation outcome, one based on payoffs equality and the other based on social utility. Finally, social utility and cluster composition were analyzed to see if they were predictive of negotiated outcome.

[2] The fact that there were three types was not established a priori, but instead established during the course of cluster analysis.

Participants

Participants in the experiment were 136 Masters students in Negotiation classes at Carnegie Mellon University. Of the 136 students, 38 were female (28%) and 98 were male (72%). The students were country-citizenship diverse (1% African, 7% Latin, 24% Eastern and 68% Western)[3], and culturally diverse (1.5% Multiethnic, 3% Black, 5% Latin, 39% Eastern and 51.5% Western)[4]. They were age diverse (33% age 20-25, 45% age 26-30, 19% age 31-35, 2% age 36-40, and 1% age 41-45), and they were diverse in work experience (75% 0-5 years, 19% 6-10 years, 4% 11-15 years, and 2% 16-20 years).

Experimental Procedure

Four negotiation simulations all representing two-party, multi-issue, integrative-potential negotiations were used. All were scorable in that options of the issues to be negotiated had monetary or monetary-equivalent values and payoffs were calculated. The instructed goal of each negotiation simulation was to maximize payoffs. Participants were provided case materials in the class session prior to that of the simulation. They were instructed to prepare by reading the case materials and determining their BATNA, reservation value, aspiration value, and general strategy. With the case materials, participants received a spreadsheet through their student e-mail that contained a set of outcomes or payoff pairs (payoff to oneself and payoff to one's opponent), each with a rating scale from –10 (very unsatisfied) to 10 (very satisfied). A sample spreadsheet is given in Appendix A. Participants were instructed to prepare the case first, and then express their satisfaction for the potential outcomes, that is, payoff to oneself and payoff to one's opponent. They also answered questions to explain their reasons and thought process for the rating, and provided demographic information. Participants returned the spreadsheets via e-mail to the course teacher's assistant prior to the negotiation simulation. Each student chose to participate in one or two of the experiments.

Pre-experiment Preparation

A computer program was developed and run to generate all possible outcomes in each of the four simulations. There are 206,761 possible outcomes with each party above his or her reservation value in two of the simulations. There are 47,520 and 2856 possible outcomes above the reservation values in the third and fourth negotiation simulations respectively. Twenty-five outcomes were selected in each of the four simulations. They represented a stratified random sample of all possible outcomes. The strata were: the Pareto efficient outcome that was most equal in payoff distribution, other Pareto efficient outcomes, and the top, 2nd, 3rd and bottom quartile outcomes for each party.

[3] Country groups. African: Ghana. Latin: Argentina, Brazil, Colombia, Mexico, Uruguay. Eastern: China, Hong Kong, India, Indonesia, Japan, Korea, Oman, Pakistan, Singapore, Taiwan, Thailand, Turkey, Ukraine. Western: Austria, Canada, France, Israel, South Africa, Spain, United States.

[4] Race groups. Multiethnic: Asian/Hispanic. Black: African, African-American. Latin: Hispanic. Eastern: Asian, Asian/Indian, Middle Eastern. Western: White.

Post-experiment Individualized Regression and Normalization

For each individual submission, the 25 rated outcomes provided the source data for that individual's regression. The ratings became the dependent variable and the outcomes (payoff pairs) became the source data for the independent variables as follows.

The parameterization used to express the social preferences was that developed in Loewenstein et al. (1989):

$$U_{SU} = c + b_1 SELF + b_2 NEGDIFF + b_3 NEGDIFF^2 + b_4 POSDIFF + b_5 POSDIFF^2 \qquad \textbf{Equation (1)}$$

U_{SU} is defined as social utility, SELF as payoff to oneself, and DIFF as the difference between one's own and one's opponent's payoff. The prefixes NEG and POS act as binary switches that activate the terms for negative and positive values of DIFF respectively. From the perspective of each individual, when subtracting the opponent's from one's own payoff results in a negative difference then NEGDIFF is in play, whereas when the result is positive then POSDIFF is in play.

For each simulation, all possible outcomes were normalized between 0 and 100 separately for each role[5]. The 25 rated outcomes were mapped into the normalization scale for that simulation. With the normalization, it was thus possible to combine the data from all four simulations as appropriate for cluster and outcome analysis.

Therefore, for each individual, the normalized payoff pairs were the source data for the independent variables SELF and DIFF, while the rated outcomes were the dependent variable U_{SU}. A linear regression was run for each individual to determine the coefficients $c, b_1, b_2, b_3, b_4,$ and b_5, which capture the information about that individual's social preferences for the possible outcomes according to the parameterization in Equation (1). In this paper, these coefficients are collectively referred to as an individual's social utility curve.[6] In fact, all but five submissions were valid according to the linear regression criteria that the F statistic be significant at the 5% level. These five submissions were dropped.

Each individual submission was also checked to insure against rating inversion (i.e. a participant reversed the parties' payoffs while rating them). Four submissions were inverted (this was clear from comparing the ratings to their expressed thought process behind the ratings), and corrected. The end result was 250 valid submissions from 136 individuals[7] and 97 valid dyads. For individuals who participated twice, the two submissions were combined for the purpose of parameterizing that individual's social preferences[8]. The 136 social utility curves were used in the cluster analysis described below while only the 97 valid dyads were used in the outcome analysis. Not all individuals with valid submissions were part of valid dyads, either

[5] Payoffs of 0 were mapped to 0, maximum possible payoffs (there may be more than one) were mapped to 100, and all other payoffs were mapped to values between 0 and 100 using linear scaling.

[6] Social utility increases with positive coefficients c, b_1, b_3, b_4 and b_5, and increases in *SELF*, *NEGDIFF*, and/or *POSDIFF*. Social utility decreases (increases) with a positive (negative) coefficient b_2 and increases in NEGDIFF.

[7] 114 people participated twice, 22 people participated once: 114+22 = 136 people; 2*114+22 = 250 submissions.

[8] Two submissions of 25 ranked payoff pairs per submissions. Hence for individuals with 2 submissions, the submissions were combined and 50 ranked payoff pairs provided the source data for that individuals' regression.

because the social utility information for their opponent was unavailable and/or the actual negotiated outcome information was not available.

Cluster Analyses

Statistical clustering was used to identify negotiator types by identifying natural groupings of the social utility curves. A k-means pass using an input partition derived from average linkage clustering was used.[9] The average linkage input partition was done using the angular similarity measure[10], and the k-means pass clustering was done using the Manhattan dissimilarity measure[11].

Individuals' social utility curves were grouped into clusters using the normalized beta coefficients[12] that are counterpart to the linear regressions' regular coefficients. The normalized beta coefficients were used to prevent the constant term, which provides little interesting information, from dominating the clustering.

Cluster characteristics are explained by comparing the R^2 from four auxiliary regressions that tease apart the effect of self-interest versus differential-interest in negative versus positive differences. This provides a composition analysis of different social utility types. First, the R^2 from the full regression that uses five independent variables: *SELF, NEGDIFF,* $NEGDIFF^2$*, POSDIFF,* $POSDIFF^2$, explains the variance accounted for by all the independent variables in the model given in Equation (1). An auxiliary regression done on *SELF* alone, on *SELF* and *NEGDIFF*, and finally on *SELF* and *POSDIFF* provides R^2's that explain the variance accounted for by self-interest alone, self interest and interest in negative differences, and self interest and interest in positive differences respectively, in a given individual's social utility. The auxiliary regressions are given in TABLE I.

Cluster characteristics are additionally explained by a total effect analysis of the regression coefficients themselves. The total effect analysis explains how social utility changes as the payoff to oneself changes, and how social utility changes as the payoff to one's opponent changes. Specifically, four analyses are done. The first looks at the change in one's own social utility when a change in one's payoff occurs when a negative difference exists, the second looks at the change in one's social utility when a change in one's payoff occurs when a positive difference exists, the third looks at the change in one's social utility when a change in one's opponent's payoff occurs when a negative difference exists, and the fourth looks at the change in

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[9] This method was shown by Milligan (1980) to provide superior recovery of known data structure when compared to the performance of other iterative and hierarchical clustering methods. The initial partition into the average linkage clustering was the sum of the absolute value of the effect of change in other given a negative difference plus the absolute value of the effect of change in other given a positive difference, sorted in descending order. See the discussion for TABLE II for an explanation of these change effects.

[10] The angular similarity measure, $\frac{\sum_{k=1}^{p} x_{ki}x_{kj}}{\sqrt{\sum_{k=1}^{p} x_{ki}^2 \sum_{l=1}^{p} x_{lj}^2}}$, is the cosine of the angle between the i and j observation vectors measured from zero and takes values from -1 to 1. p = 5 variables were used in the cluster analysis.

[11] The Manhattan dissimilarity measure, $\sum_{k=1}^{p} \left| x_{ki} - x_{kj} \right|$, is best known as the absolute value distance between the i and j observation vectors. p = 5 variables were used in the cluster analysis.

[12] Also known as standardized coefficients or mean-deviated coefficients.

one's social utility when a change in one's opponent's payoff occurs when a positive difference exists. The total effect calculations are given in TABLE II.

Two methods were used to validate the clusters. First significance tests were done on external variables, that is, variables not used to generate the clusters. The external variables used were demographic variables[13]. Second the cluster types are compared to and discussed to be consistent with social motive theory – a theory first introduced by Messick and McClintock (1968) that has gained empirical support in negotiation research over the last decade.

Measures of Negotiated Outcome Quality

To measure the quality of negotiated outcomes, two measures were developed. In both measures, a negotiated outcome is "graded" on a scale from 0 to 1, where 1 is the highest quality possible. A negotiated outcome received a quality grade of 1 if it was Pareto efficient (it is not possible for both parties to do simultaneously better). The quality grade reflects how close to being Pareto efficient the negotiation outcome was. In one measure outcomes were evaluated against self-interested Pareto efficiency and in the other measure outcomes were evaluated against social utility Pareto efficiency.

In both definitions of Pareto efficiency, negotiated outcome grade is calculated by the following formula:

$$Outcome_o = \frac{\max_a d_a - d_o}{\max_a d_a} \quad where \quad d_a = \min_e \left[\sqrt{(x_a - x_e)^2 + (y_a - y_e)^2} \right] \qquad \textbf{Equation (2)}$$

$$and \qquad d_o = \min_e \left[\sqrt{(x_o - x_e)^2 + (y_o - y_e)^2} \right]$$

$a \in \{\text{valid agreements}\}$, $e \in \{\text{pareto efficient agreements}\}$

(x_a, y_a) coordinates of the *a*th possible agreement

(x_e, y_e) coordinates of the *e*th possible agreement

(x_o, y_o) coordinates of the negotiated agreement (outcome)

That is, for each outcome, find the distance to the closest Pareto efficient point. This is a distance measure from Pareto efficiency, i.e. the closer to 0, the closer to being Pareto efficient. Invert the distance measure and normalize between 0 and 1 so that the closer to 1, the more Pareto efficient. This new measure is a "grade" of the quality of the negotiated outcome. Note that in the case of self-interested Pareto efficiency when it is assumed that $U = self$ where U is utility and $self$ is payoff to oneself, the coordinates of the negotiated agreement are the same as the payoffs.

The measure in Equation (2) can be compared with two previously developed measures as discussed in Tripp and Sondak (1992). Tripp and Sondak propose a measure of Pareto efficiency (hereafter referred to as the T&S measure) and compare it with the integrative quotient (IQ) measure developed by Lax and Sebenius in 1987. Tripp and Sondak propose measuring Pareto efficiency as 1 – (the number of possible agreements Pareto superior to the reference

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agreement/the sum of the number of possible agreements Pareto superior to the agreement and the number of possible agreements Pareto inferior to the agreement). The Lax and Sebenius' IQ measure is: 1 – (area that contains agreements Pareto superior to the reference agreement/the total area under the Pareto frontier). For both measures, outcomes that are Pareto superior are so with respect to both the x and y coordinates of the reference agreement. Likewise outcomes that are Pareto inferior are so with respect to both the x and y coordinates of the reference agreement. Outcomes that are neither Pareto superior on both dimensions, nor Pareto inferior on both dimensions do not fall within these categories.

All three measures scale between 0 a "worst" outcome, to 1 a Pareto efficient outcome. There may be more than one "worst" outcome and more than one Pareto efficient outcome. The normalization makes it possible to compare the same measure across different outcome possibility sets associated with different negotiations.

The three measures differ in several key characteristics. For example, the T&S measure enables discussion of the reference agreement as a given percentile relative to comparable agreements (those Pareto superior and those Pareto inferior): "the negotiated outcome is in the x%-tile of comparable agreements." It is sensitive to the density distribution of other comparable agreements. In contrast the IQ measure is a measure of absolute inefficiency distance based on the *ratio of areas* under the Pareto efficient frontier, and is a measure independent of the density distribution of other possible agreements. The measure in Equation (2) is a measure of absolute inefficiency distance to the nearest Pareto efficient *outcome*, and is a measure independent of the density of other possible agreements.

Which measure is the "best" measure is an area for future research, because the score for a given negotiated outcome may differ given the different measures. In this research however, results are reported with respect to Equation (2) above.

Measures of Negotiated Outcome Inequality

Negotiated outcomes were also analyzed to see how equal they were against two measures of inequality: payoff inequality and social utility inequality. Both measures of inequality are calculated by the following formula:

$$Inequality_o = \begin{cases} \dfrac{x_o - y_o}{maxposdiff} & \text{if } x_o > y_o \quad maxposdiff = \max\limits_a \left(x_a - y_a\right) \\ \dfrac{x_o - y_o}{maxnegdiff} & \text{if } x_o < y_o \quad maxnegdiff = \min\limits_a \left(x_a - y_a\right) \end{cases} \qquad \textbf{Equation (3)}$$

$a \in \{\text{valid agreements}\}$

$\left(x_a, y_a\right)$ coordinates of the ath possible agreement

$\left(x_o, y_o\right)$ coordinates of the negotiated agreement (outcome)

In the case of self-interested utility, inequality is measured by the *difference between payoffs* normalized between 0 and 1. In the case of social utility, inequality is measured by the *difference between social utility* normalized between 0 and 1. In both cases, when the difference between payoffs for x_o and y_o is positive ($x_o > y_o$) it is divided by the maximum possible

positive difference so that the difference is normalized between 0 (most equal) and 1 (most unequal). When the difference is negative ($x_o < y_o$) it is divided by the maximum possible negative difference so that the measure will likewise run between 0 (most equal) and 1 (most unequal).

RESULTS

Individual Social Utility Curves

Individualized regressions were run to generate social utility curves for the participants in the study. There were five regressions were not significant at the 5% level, hence were not included in the results. The end was result was 136 individualized regressions significant at the 5% level. The regressions are noteworthy in that the median R^2 was 0.86 and the largest was 0.99; see TABLE III for all R^2 percentiles. Of the 136 individualized regressions, 79% of the coefficients for *SELF* (from Equation (1)) were significant at the 5% level. See TABLE IV. Fifty-one percent of the coefficients for *NEGDIFF*, 28% of the coefficients for $NEGDIFF^2$, 39% of the coefficients for *POSDIFF* and 35% of the coefficients for $POSDIFF^2$ were significant at the 5% level respectively.

An example social utility curve is graphed in Figure II and the associated individualized regression is given in TABLE V. The graph is the social utility curve of one of the 136 individuals. Each point in the graph represents a negotiation outcome. Differences in payoffs between this individual and his opponent (negative and positive) are graphed against social utility (negative and positive). The horizontal spread measures differential-interest, that is, interest in himself relative to his opponent. The vertical thickness measures self-interest. Specifically, this individual is happier with a higher payoff than lower payoff to himself at a point where the difference in payoffs between himself and his opponent is constant. But as we shall subsequently see, the vertical spread for most individuals is larger. From TABLE V we see that this individual likes self-interest (all else held constant, a unit increase in self increases social utility by 0.08), but not as much as he dislikes negative differences (all else held constant, a unit increase in negdiff decreases social utility by 0.10: a positive coefficient times a negative difference) and not as much as he likes positive differences (all else held constant, a unit increase in posdiff increases social utility by 0.16).

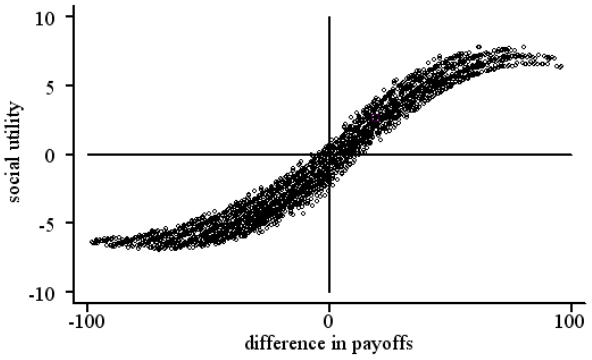
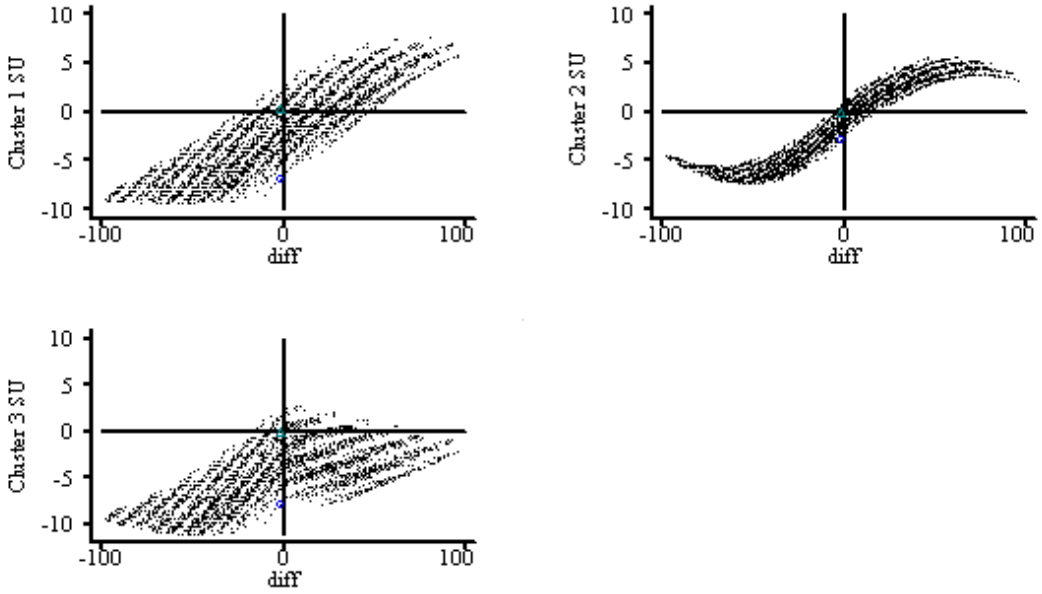


Figure II

Social Utility Types

Using statistical clustering, the individual social utility curves were clustered into one of three types (see Figure III). Each graph represents a median[14] individual's social utility in that cluster. Forty-one percent of the participants are represented by cluster 1, 43% by cluster 2 and 16% by cluster 3.

Again, the horizontal spread measures differential-interest, that is, interest in oneself relative to one's opponent. The vertical thickness measures self-interest. Note the relative thickness in cluster 1 relative to cluster 2. This thickness represents cluster 1 types' self-interest. Cluster 3 types also demonstrate more self-interest than cluster 2 types.



Social utility versus payoff distance, by cluster

Figure III

Composition Analysis of Social Utility Types

The R^2's from the auxiliary regressions defined in TABLE I provide information on cluster composition. The results are given in TABLE VI. In all three clusters, the proportion of the variance explained by the independent variables is very good with R^2 equal to 90%, 82% and 73% for clusters 1, 2 and 3 respectively. In cluster 1, self explains most of the variance at 86% whereas in clusters 2 and 3, self explains relatively less at 59% and 45% respectively. In cluster 1, negdiff and posdiff explain little beyond self (2%), whereas in cluster 2, negdiff and posdiff explain an additional 18% and 17%, and in cluster 3, negdiff and posdiff explain an additional 6% and 24% respectively. The median coefficients found in TABLE VII further summarize the three cluster types.

[14] A hypothetical individual whose preferences are represented by the median coefficients.

A total effect analysis of the social utility coefficients explains how social utility changes as the payoff to oneself, and the difference between payoffs to oneself and one's opponent, changes. Recall that the coefficients are those from Equation (1). The coefficients total effect is calculated using the equations in TABLE II. See the results in TABLE VIII. For cluster 1 types, every unit increase in self results in a mean 0.23 unit increase in social utility given a negative difference and a mean 0.21 unit increase given a positive difference[15]. In contrast, a unit increase for the opponent results in negligible changes in one's own social utility. For cluster 1 types, positive increases in one's own payoff is most important and they show little concern for the payoff of their opponent. For cluster 2 types differential-interest is additionally very important. Cluster 2 types like positive increases to one's own payoff (mean unit increases of 0.19 and 0.14 for negative and positive differences respectively) and dislike positive increases to the opponent's payoffs (mean unit decrease of -0.20 for negative and -0.14 for positive differences respectively). For cluster 3 types, if a negative difference exists a positive change in one's own payoff increases social utility by a mean 0.27, whereas a positive change in the opponent's payoff decreases social utility by a mean -0.09. If a positive difference exists, then relatively less social utility is gained by increases in one's own payoff (mean 0.07 unit increase), but considerable social utility is *gained* by increases in the opponent's payoff (mean 0.18 unit increase).

In summary, the median individual in cluster 1 is primarily interested in self-maximizing. Cluster 1 individuals are *self-interest maximizers.* In contrast, the median individual in cluster 2 is concerned with self in the context of differential-interest; the concern for self is relative to others. They dislike gains for their opponent. They are *differential-interest competitors.* The median individual in cluster 3 gains utility by winning, but does not gain more utility by winning big; and they strongly dislike losing big. Cluster 3 types are *equality seekers*.[16] TABLE IX summarizes the three cluster types.

Social Utility Types and Social Motives

The components of all three social types are the same: self-interest, interest in negative differences, and interest in positive differences. The types differ only in their relative weight of these components. The three types are broadly consistent with the social motive types first introduced by Messick and McClintock (1968), which have been used widely in negotiation research over the last decade. The *self-interest maximizer* parallels the individualist, the *differential-interest competitor* parallels the competitor or egoist, and the *equality seeker* parallels the cooperator or prosocial (see TABLE X).

In contrast to the social motives paradigm, the social utility paradigm provides a framework for analyzing, comparing and contrasting individual, dyads and types (or any other level of aggregation), using social utility, individualized regression, and statistical clustering. Rather than assuming an individual is a particular type, consider that, while broadly three types exist, individual specifications also exist, and can be evaluated by how "close" or "far" they are to each of the types. Individual specification as well as grouping specifications can be used for analysis. Cluster groupings are useful for tractable analysis (it is easier to draw conclusions for

[15] Recall that the social utility parameterization of Equation (1) distinguishes between negative and positive differences. Therefore, the total effect calculations in TABLE II, which are based on this parameterization, makes this distinction as well.

[16] Or alternatively, they are *inequality averse*.

three clusters than for hundreds of individuals), but maintaining individual specification allows for more granular inference. My own future research agenda includes the study of complex context and culture in negotiations. I posit that a refined specification such as that introduced in this research is necessary for such studies.

Knight and Dubro (1984) first proposed an individualized regression and clustering framework for studying social motives. The types they identified differ by underlying distribution rules, which are unique to each type. They introduced no common building blocks between types for comparison. The additional contribution of this research is the use of social utility as specified by Loewenstein et al. (1989) as the individual utility specification, in the context of multi-issue, integrative negotiations. The social utility components (self-interest, interest in negative differences, and interest in positive differences) are common across types and thus facilitate compare and contrast analysis more so than the unique distribution rules across social motives. MacCrimmon and Messick (1976) developed a theory proposing six basic social motive types, and four combination motive types. They introduced a framework for combining and thus creating an infinite number of social motives. In contrast, the benefit of the social utility paradigm introduced in this research is that it is based on economic and econometrics methods, which facilitate compare and contrast analysis with social preference research in economics and game theory – fields that conduct research highly relevant to negotiations.

Gender and Race Significance

Gender composition difference between clusters 1 and 2 was significant. A significantly greater number of females are in cluster 2, while a significantly greater number of males are in cluster 1. Specifically, females are over two times as likely as males to be in cluster 2 versus cluster 1. See TABLE XI and TABLE XII. Race category (Multiethnic, African, Latin, Eastern, Western) composition difference between clusters is significant for Non-western versus Western race-categories between clusters 1 and 2. Non-western races are over two times as likely as western races to be in cluster 2 versus cluster 1. See both TABLE XII and TABLE XIII. In surprising[17] contrast there is no significant difference between clusters with respect to country category (African, Latin, Eastern, Western). In fact it is not significant with probability 34%. There is no significant difference between clusters with respect to school, age, and years of work experience in the labor force.

A total effect analysis was also done for gender and non-western versus western races. TABLE XIV shows that a positive change in one's own payoff results in a sizable increase in social utility for both men and women whether given a negative or a positive difference between one's own payoffs and the payoffs of one's opponent. However, women more so than men, dislike a positive gain for one's opponent whether a positive or negative difference exists. This is consistent with the interpretation that women are more differential-interested then men are. TABLE XV shows that non-western races, more so than western races, dislike a positive gain for one's opponent whether a positive or negative difference exists. Western races on the other hand, gain more utility with an increase to self more so than non-western races.

To summarize, a Chi-square analysis, a multinomial logit analysis, and a total effect analysis demonstrate that there is a significant relationship between clusters 1 and 2 and gender and between clusters 1 and 2 and non-western versus western races. A significantly greater number of females and non-western races are in cluster 2 (*differential-interest competitors*)

[17] This is surprising to the extent that one considers country citizenship to be a good proxy for race.

versus cluster 1, whereas a significantly greater number of males and western races are in cluster 1 (*self-interest maximizers*) versus cluster 2. There is no significant difference in gender and race between the overall population and cluster 3 (*equality seekers*).

Previous research found that women, more so than men, prefer equality. One way to interpret equality is differential interest, where the individual dislikes both negative and positive differences. Results in this research found that women are indeed more differential interested than men, and they dislike negative differences, but they *like* positive differences at least to a degree. Previous research found that non-western races, more so than western races have an interdependent sense of self, that is, they think of self in the context of others. The fact that in this research non-western races were found to be differential-interested more so than western races, is broadly consistent with previous research findings.

Differential-interest, where differential interest could mean liking equal outcomes, or being competitive, is a new way of looking at other regarding behavior. Previous gender research does not make this distinction, as such it is possible that other regarding behavior was uniformly interpreted as liking equality, when in fact it may have meant either liking equality or being competitive. This is an intriguing interpretation especially in light of the fact there is no significance for gender in cluster 3, the *equality-seekers*. Other regarding behavior is indeed thinking of others (not just of self), but it may indicate being very competitive, instead of, or in addition to liking equality.

Pareto Efficiency

The payoff outcome possibility set is generated jointly from the payoffs available to the negotiating parties. As an example, the payoff outcome possibility set for one of the negotiation simulations is given in Figure IV. For this case, there are 2856 possible outcomes of which 46 are Pareto efficient[18].

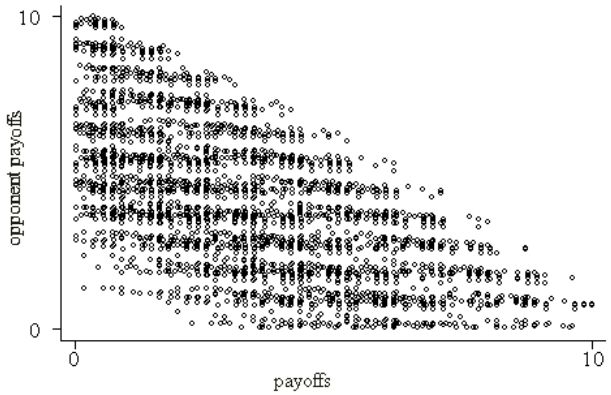


Figure IV

In contrast, the social utility outcome possibility set for a given negotiating dyad is generated jointly from the two side's social utility curves. As examples, the social utility outcome possibility set, given the median social utility curves of each cluster in Figure III, are

[18] The payoffs presented here are normalized between 0 and 10.

graphed in Figure V. Two median cluster 1 individuals negotiating with each other will have the social utility outcome possibility set graphed in the upper left-hand corner. A median cluster 1 and a median cluster 2 individual negotiating together will have the social utility outcome possibility set graphed second row left, or first row middle, depending on which role each has.

Payoffs are asymmetric in this negotiation simulation. Therefore the social utility outcome possibility set for a cluster 1 versus a cluster 2 is similar but not identical to the social utility outcome possibility set for a cluster 2 versus a cluster 1 (opposite roles). This fact is reflected in the differing number of Pareto efficient points for each cluster frontier. The numbers of Pareto efficient points for all the frontiers in Figure V are given in TABLE XVI. Note that for two median cluster 2 individuals negotiating against each other (middle-middle), the outcome possibility set is "thin" relative to two median cluster 1 individuals, for example. That is, all possible outcomes are relatively close to the Pareto efficient frontier and it is not a big gain to move from an interior point to a Pareto efficient point. This fact has an important implication. It is the case that more outcomes are close to being Pareto efficient. There is less integrative potential, and what is an integrative-potential negotiation from a self-interested Pareto efficient perspective (Figure IV) is more distributive given both parties' social preferences for negotiated outcomes (the middle-middle graph in Figure V). Compared to 46 Pareto efficient points on the self-interested Pareto efficient frontier, there are 41 Pareto efficient points on this social utility Pareto efficient frontier even though all points are closer to being Pareto efficient. In contrast, note that for two median cluster 3 individuals negotiating against each other (bottom-right), there are far fewer Pareto efficient points (4 compared to 46 points on the self-interested frontier) and most of the outcomes are farther from being Pareto efficient.

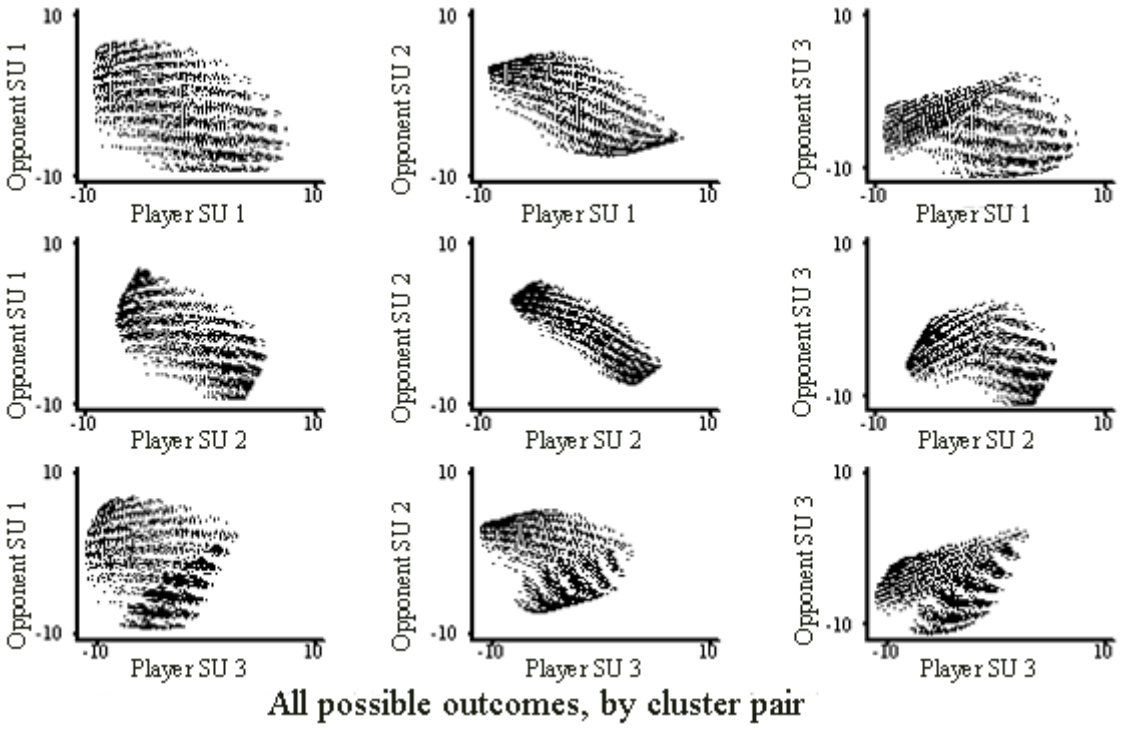


Figure V

To summarize, the self-interested outcome possibility set is generated jointly from the payoffs available to the negotiating parties. An example self-interested outcome possibility set is given in Figure IV. The social utility outcome possibility set is unique to a negotiating dyad and is generated jointly from their social utility curves. Examples of median individuals from each cluster negotiating with each other are given in Figure V. Note that two key characteristics define the social utility outcome possibility set: the degree of integrativeness and the number of Pareto efficient points. An area for future research is the study of how the degree of integrativeness affects the likelihood of achieving a high quality outcome. If more integrative, are negotiators more likely to find ways to improve both sides and hence more likely to achieve a high quality outcome? Or is it easier given a less integrative outcome possibility set to achieve a high quality outcome (because all points are already closer to being Pareto efficient)? The specific outcome quality measure plays a crucial role in the answer to these questions. The concomitant question is how does the number of Pareto efficient points affect the likelihood of achieving a high quality outcome? Is it easier to achieve Pareto efficiency given more Pareto efficient points (more options), or fewer points (easier to converge when fewer target options?). These are all fruitful research questions for future research.

Outcome Quality

Independent of negotiating partner type, all median cluster types did better when measured by self-interested Pareto efficiency than when measured by social utility Pareto efficiency, clusters 1 and 2 significantly so. See TABLE XVII. When considering cluster type of both negotiating parties, negotiators did better when measured by self-interested Pareto efficiency than when measured by social utility Pareto efficiency in all cases except when a cluster 2 individual negotiated with a cluster 3 individual. See TABLE XVIII. The difference is only significant however, when a cluster 1 type negotiated with a cluster 2 type. More teams are needed to demonstrate significance or validate insignificance between measures in other cluster groups.

As shown in TABLE XIX, males did significantly better than females when measured by self-interested Pareto efficiency but not as measured by social utility Pareto efficiency. Males did significantly better as measured by self-interested Pareto efficiency than by social utility Pareto efficiency. There was no significant difference for females between self-interested and social utility Pareto efficiency. As shown in TABLE XX, between gender groups, males against males did significantly better than females against females as measured by self-interested Pareto efficiency, but not as measured by social utility Pareto efficiency. There was no significant difference in outcome quality, given either measure, for females against females versus females against males, or for males against males versus males against females. Within gender groups, males against males did significantly better as measured by self-interested Pareto efficiency than by social utility Pareto efficiency. There was no significant difference between the two measures for females against females, and females against males.

To summarize, all cluster types did significantly better when measured by self-interested Pareto efficiency than when measured by social utility Pareto efficiency. Males do better overall as measured by self-interested Pareto efficiency than by social utility Pareto efficiency, whereas there is no significant difference in females' performance between the two measures. Why many did better as measured by self-interested versus social utility Pareto efficiency may be explained by the fact that individuals in the experiment were negotiating to maximize their score in a given negotiation and the scoring in all the negotiation simulations were designed to maximize payoffs.

Future research should take into account the individuals' expressed social preferences when developing the scoring system. Individuals may then be evaluated more favorably with respect to social utility Pareto efficiency. In light of this discussion, it is particularly interesting to note again that there was no significant difference in females' performance between the two measures given that the scoring systems used were biased in favor of outcome quality with respect to payoffs. Perhaps if the scoring systems developed were from social utility, females would do far better as measured by social utility Pareto efficiency. This is a ripe topic for future research.

Outcome Inequality

To address the research question as to whether negotiators more often reach equal outcomes when evaluated against payoff distribution or joint social utility, two outcome inequality measures using Equation (3) were used: the first was outcome inequality with respect to payoffs, and the second was outcome inequality with respect to social utility. Note that negotiators do not know what an equal outcome is during the negotiation, because they are not privy to their opponent's (normalized) payoffs or social utility preferences.

All cluster types had more equal outcomes (less inequality) when measured by payoffs inequality versus social utility inequality. See TABLE XXI. All cluster groups (TABLE XXII) had more equal outcomes when measured by payoffs inequality versus social utility inequality. The results are significant for all except when a cluster 1 negotiated with a cluster 3, or a cluster 3 negotiated with another cluster 3. More observations would be needed to verify significance or insignificance in cluster groups with relatively few teams. Both females and males had more equal outcomes when measured by payoffs inequality versus social utility inequality. Both differences are significant. See TABLE XXIII. Between genders, the differences between either measure were not significant at the 5% level. Likewise within gender groups (TABLE XXIV), groups had more equal outcomes (less inequality) as measured by payoffs inequality than as measured by SU inequality. The differences are significant for all gender groups. More research should be done on female, female gender groups with a larger number of teams in order to verify significance.

Therefore, the answer to the research question is that negotiators more often reach equal outcomes (have less inequality) when evaluated against payoff distribution versus social utility distribution when they are negotiating to maximize their score given a scoring system designed to maximize payoffs. Perhaps different results would occur if the scoring system were designed to maximize social utility. This is an area for future research.

SUMMARY, CONCLUSIONS AND IMPLICATIONS FOR FUTURE RESEARCH

This research addresses the following questions. 1) What proportion does self-interest versus differential-interest account for preferences? 2) How do gender and race influence this proportion? 3) Do people more often reach a Pareto efficient or nearly Pareto efficient agreement when defined by self-interested utility or by social utility? 4) Do people more often reach more equal outcomes when evaluated against payoff distribution or joint social utility?

Negotiations research and training assumes that utility is a monotonically increasing function only of one's own payoff and that what constitutes a "good" agreement is achieved by maximizing one's own payoffs subject to striving to realize all integrative gains and achieve a Pareto efficient agreement. However recent research in the fields of psychology, organizational

behavior and behavioral economics have documented that individuals actually care about the payoffs of others as well as the payoffs to oneself. Therefore, in order to evaluate what constitutes a good agreement, it is critical to understand how caring for the payoffs of others affects one's utility.

This paper advances research on how to measure social utility and develops new measures of outcome quality. This paper extends the research by Loewenstein, Thompson, and Bazerman (1989) by using individualized regression to represent individuals' social utility, and then developing measures of good agreements that consider both traditional self-interested utility and social utility. Statistical clustering techniques are used to group individuals into three "types." One cluster type consists of individuals primarily interested in maximizing their own payoff: they are *self-interested maximizers.* In the cluster, self-interest explains 86% of the variance in utility while differential-interest (like for positive differences and dislike for negative differences) explains an additional 2% each. A second type, *differential-interest competitors,* consists of individuals concerned for oneself in the context of differential-interest, that is, the concern for self is relative to others. For example, they strongly dislike gains for their opponent even if those gains have neutral impact on their own position. Here self-interest explains a little more than half of the social utility variance, while differential-interest (again, like for positive differences and dislike for negative differences) explains 17-18% each over and above self-interest alone. A third type, *equality seekers,* consists of individuals who gain utility by winning, but do not necessarily gain more utility by winning big, and they dislike losing big. Here self-interest explains little under half of the social utility variance. In this cluster, differential-interest is a like for reducing positive differences and a dislike for negative differences. Notably, interest in positive differences explains 24% of the social utility variance over and above self-interest alone. Males and western races more so than females and eastern races are *self-interest maximizers,* while females and non-western races more so than males and western races are *differential-interest competitors*. Exactly why this is the case is a topic for cultural theory development and experimentation. It could be that in a western society such as the U.S. in which men more so than women dominate positions of power, it is economical for men and western cultures to be self-interested (there is no additional benefit to self to being differential-interested), where it is necessary for women and non-western cultures to be differential-interested to insure one's own success.

A key potential contribution of this approach is that, rather than identifying a specific individual as a given type and subsequently not using the individual specification, it is instructive to know that in general these three types exist, and the question to ask is how "close" or "far" to the three types a particular individual is. Since the specifications of the types and of the individuals are comprised of the same components (self-interest and differential-interest for both negative and positive differences) it is easy to evaluate how an individual differs from or is similar to all three types. Cluster groupings are useful for tractable analysis (it is easier to draw conclusions for three clusters than for hundreds of individuals), but maintaining individual specification allows for more granular inference. I posit that the more refined specification is necessary for the study of issues such as complex context, gender, and culture in negotiations.

I use the cluster types and gender and race to explore how different measures of outcome quality are affected by social utility. Independent of negotiating partner type, all cluster types did better when measured by self-interested Pareto efficiency than when measured by social utility Pareto efficiency. Males do better overall as measured by self-interested Pareto efficiency than by social utility Pareto efficiency, whereas there is no significant difference in females'

performance between the two measures. Why individuals did better as measured by self-interested versus social utility Pareto efficiency may be explained by the fact that individuals in the experiment were negotiating to maximize their score in a given negotiation and the scoring in all the negotiation simulations were designed to maximize payoffs. If this is indeed the explanation, then it is particularly interesting to note that there is no significant difference in females' performance between the two measures. It could mean that social utility is a far better representation of females' preferences, and that if the scoring systems developed were from social utility versus payoffs, females would do far better as measured by social utility Pareto efficiency. This is a ripe topic for future research.

All cluster types had more equal outcomes (less inequality) when measured by payoffs inequality than by social utility inequality. Both females and males had more equal outcomes when measured by payoffs inequality versus social utility inequality. The differences are significant. Therefore, in general, negotiators more often reach equal outcomes (have less inequality) when evaluated against payoff distribution rather than social utility distribution when the scoring systems of the negotiations are designed to maximize payoffs. Perhaps different results would occur if the scoring system were designed to maximize social utility. This is an area for future research.

A key question boded by this research is: Will research into differential-interest as well as self-interest considerations result in new negotiation strategies and techniques? Overall, negotiators did not do better as measured by social utility than traditional self-interested utility. In general, this is significantly so for males and western races. But it is not significantly so for women and non-western races. Exactly why this is the case is a topic for cultural theory development and experimentation. It could be that in a western society such as the U.S. in which men more so than women dominate positions of power, it is economical for men and western cultures to be self-interested (there is no additional benefit to self to being differential-interested), where it is necessary for women and non-western cultures to be differential-interested to insure one's own success.

It is interesting to note that social utility, even when the component values indicate self-interest (as in cluster 1: *self-interest maximizers*) does not do as well as predicting outcomes as traditional self-interested utility. It is the case that the social utility parameterization given in Equation (1) is an excellent model for specified preferences: the median R^2 for cluster 1 is 0.90. Yet it does not do as well as the traditional self-interested utility parameterization, for example $U = self$, in explaining actual negotiated outcomes as judged by the measures introduced here. More research is needed to determine why this is the case.

Other areas not addressed by this paper include the impact of context on social utility. How does social utility change across situations, and change across time? How does it change as a result of the actual negotiation process (social utility before and after a single negotiation), and how does it change in repeated negotiations with the same counterpart? Gender and race are briefly explored in this research. Future research should more specifically target diversity in understanding social utility and behavior in negotiations. In general, there is opportunity to determine more definitively the combined roles of self-interest, differential-interest, context and culture on negotiation behaviors and outcomes.

REFERENCES

Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster analysis*. Series/Number 07-044, Newbury Park, CA: Sage Publications.

Berg, J., Dickhaut, J., & McCabe, K. (1995). Trust, reciprocity, and social history. *Games and Economic Behavior,* **10**, 122-142.

Blount, S., Bazerman, M. H., & Neale, M. A. (1995). Alternative models of negotiated outcomes and the nontraditional utility concerns that limit their predictability. In Bies, R. J., Lewicki, R. J., & Sheppard, B. H. (Eds.), *Research on Negotiations in Organizations, Volume 5.* (pp. 95-116). Greenwich, CT: JAI Press

De Dreu, C. K. W., & Boles, T. L. (1998*).* Share and share alike or winner take all?: The influence of social value orientation upon choice and recall of negotiation heuristics. *Organizational Behavior and Human Decision Processes,* **76(3)**, 253-276.

De Dreu, C. K. W., & Van Lange, P. A. M. (1995*).* The impact of social value orientations on negotiator cognition and behavior. *Personality and Social Psychology Bulletin,* **21(11)**, 1178-1188.

De Dreu, C. K. W., Weingart, L. R.. & Kwon, S. (2000) Influence of social motives on integrative negotiation: A meta-analytic review and test of two theories. *Journal of Personality & Social Psychology*, **78**, 889-905.

Fehr, E., & Fischbacher, U. (2002). Why social preferences matter – The impact of non-selfish motives on competition, cooperation and incentives. *The Economic Journal*, **112**, C1-C33.

Fehr, E., & Schmidt, K. M. (1999). A theory of fairness, competition and cooperation. *The Quarterly Journal of Economics*, 817-868.

Forsythe, R., Horowitz, J. L., & Savin, N. E. (1994). Fairness in simple bargaining experiments. *Games and Economic Behavior,* **6**, 347-369.

Hamer, R., & Cunningham, J. (1981). Cluster analyzing profile data confounded with interrater differences: A comparison of profile association measures. *Applied Psychological Measurement*, **5**, 63-72.

Hegtvedt, K. A., & Killian, C. (1999). Fairness and emotions: reactions to the process and outcomes of negotiations. *Social Forces,* **78(1)**, 269-302.

Hoffman, E., McCabe, K., Shachat, K. & Smith, V. (1994). Preferences, property rights, and anonymity in bargaining games. *Games and Economic Behavior*, **7**, 346-380.

Kahn, A. S., & Gaeddert, W. P. (1985). From theories in equity to theories in justice: Deliberating consequences of studying women. In O'Leary, V. E., Unger, R. E., & Wailston, B. S. (Eds.), *Women, Gender, and Social Psychology.* (pp. 129-148). Hillsdale, NJ: Erlbaum.

Kahneman, D., Knetsch, J. L., & Thaler, R. H., (1986). Fairness as a constraint on profit seeking: Entitlements in the market. *American Economic Review*, **76(4)**, 199-219.

Kahneman, D. & Varey, C. (1991). Notes on the psychology of utility. In Elster, J. & Roemer, J. E. (Eds.), *Interpersonal Comparisons of Well-Being.* (pp. 127-163). Cambridge: Cambridge University Press.

Knight, G. P., & Dubro, A. F. (1984). Cooperative, competitive and individualistic social values: An individualized regression and clustering approach. *Journal of Personality and Social Psychology,* **46(1)**, 98-105.

Liebrand, W. B. G. (1983). A classification of social dilemma games. *Simulation and Games,* **14(2)**, 123-138.

Liebrand, W. B. G., Wilke, H. A. M., Vogel, R., & Wolters, F. J. M. (1986). Value orientation and conformity. *Journal of Conflict Resolution,* **30(1)**, 77-97.

Loewenstein, G. F., Thompson, L., & Bazerman, M. H. (1989). Social utility and decision making in interpersonal contexts. *Journal of Personality and Social Psychology*, **57**, 426-440.

MacCrimmon, K. R., & Messick, D. M. (1976). A framework for social motives. *Behavioral Science,* **21**, 86-100.

Major, B., & Adams, J. B. (1983). Role of Gender, interpersonal orientation, and self-presentation in distributive-justice behavior. *Journal of Personality & Social Psychology,* **45(3)**, 598-608.

Markus, H. R., & Kitayama, S. (1991). Culture and the self implications for cognition, emotion, and motivation. *Psychological Review*, **98(2)**, 224-253.

McClintock, C. G., & Leibrand, W. B. (1988). Role of interdependence structure, individual value orientation, and another's strategy in social decision making: A transformational analysis. *Journal of Personality and Social Psychology,* **55(3)**, 396-409.

McClintock, C. G. (1972). Social motivation – A set of propositions. *Behavioral Science,* **17**,438-454.

Messick, D. M. (1993). Equality as a decision heuristic. In Mellers, B. A., & Baron, J. (Eds.), Psychological *Perspectives on Justice.* (pp. 10-31). Cambridge: Cambridge University Press.

Messick, D. M., & McClintock, C. G. (1968). Motivational bases of choice in experimental games. *Journal of Experimental Social Psychology*, **4**, 1-25.

Milligan, G. W. (1980). An examination of the effect of six types of error perturbation of fifteen clustering algorithms. *Psychometrika*, **45**, 325-342.

Neale, M. A., & Bazerman, M. H. (1992). Negotiator cognition and rationality: A behavioral decision theory perspective. *Organizational Behavior and Human Decision Processes,* **51**, 157-175.

Northcraft, G. B., Preston, J. N., Neale, M. A., Kim, P. H., & Thomas-Hunt, M. C. (1998). Non-linear preference functions and negotiated outcomes. *Organizational Behavior and Human Decision Processes,* **73(1)**, 54-75.

Olekalns, M. & Smith P., L. (1999). Social value orientations and strategy choices in competitive negotiations. *Personality and Social Psychology,* **25(6)**, 657-668.

Rabin, M. (1993). Incorporating fairness into game theory and economics. *The American Economics Review,* **83(5)**, 1281-1302.

Raiffa, H. (1982). *The Art and Science of Negotiation.* Cambridge, MA: Cambridge University Press.

Stata Reference Manual Release 7 Volume 1 A-G, (2001). (pp. 228-230). College Station, TX: Stata Press.

Tripp, T. M., & Sondak, H. (1992). An evaluation of dependent variables in experimental negotiation studies: Impasse rates and Pareto efficiency. *Organizational Behavior and Human Decision Processes,* **51**, 273-295.

Tripp, T. M., Sondak, H., & Bies, R. J. (1995). Justice as rationality: A relational perspective on fairness in negotiations. In Bies, R. J., Lewicki, R. J., & Sheppard, B. H. (Eds.), *Research on Negotiations in Organizations, Volume 5.* (pp. 45-64). Greenwich, CT: JAI Press.

Weingart, L. R., Bennet R. J., & Brett, J. B. (1993). The impact of consideration of issues and motivational orientation on group negotiation process and outcome. *Journal of Applied Psychology,* **78(3)**, 504-517.

APPENDIX A

Name
Recruiter (Yes=1,No=0) 0 <== change this value only **OK**
Candidate 1

Mark your selections with "x" or "X" in the WHITE BOXES

Recruiter Payoffs	Candidate Payoffs	Very Unsatisfied -10	-9	-8	-7	-6	-5	-4	-3	-2	-1	Neutral 0	1	2	3	4	5	6	7	8	9	Very Satisfied 10	Preference Rating
1000	200																						unspecified
11400	600																						unspecified
10200	3000																						unspecified
7900	2900																						unspecified
4300	2900																						unspecified
7200	6000																						unspecified
6000	7200																						unspecified
4900	4700																						unspecified
4500	300																						unspecified
100	2900																						unspecified
3500	1300																						unspecified
3700	1100																						unspecified
6600	6600																						unspecified
3000	2400																						unspecified
3000	4800																						unspecified
1800	4800																						unspecified
1800	7800																						unspecified
2500	5300																						unspecified
1400	1600																						unspecified
2200	3800																						unspecified
1300	7100																						unspecified
1100	3700																						unspecified
600	4200																						unspecified
300	1500																						unspecified
3000	10200																						unspecified

Answer the Following Questions in the *WHITE SPACES*

For the options you rated the *LOWEST*, why?

For the options you rated *NEUTRAL*, why?

For the options you rated *HIGHEST*, why?

Briefly explain your thought process or methdology.

Gender male or female

Age years

Country of Citizenship e.g. U.S., Canada, Mexico …

Race e.g. White, Black, Hispanic, Asian, Native American …

Number of years of full-time work experience *in the labor market*
years

How many **full-time** jobs have you ever held?

TABLES

TABLE I

AUXILIARY REGRESSIONS

Auxiliary Regression	Description	R^2
$U_{SU} = c + b_1 SELF + b_2 NEGDIFF + b_3 NEGDIFF^2 + b_4 POSDIFF + b_5 POSDIFF^2$	• full regression	R_T^2
$U_{SU} = c + b_1 SELF$	• regression on SELF	R_S^2
$U_{SU} = c + b_1 SELF + b_2 NEGDIFF + b_3 NEGDIFF^2$	• regression on SELF and NEGDIFF	$R_{S,N}^2$
$U_{SU} = c + b_1 SELF + b_4 POSDIFF + b_5 POSDIFF^2$	• regression on SELF and POSDIFF	$R_{S,P}^2$
$NEGDIFF = (SELF - OTHER)$ *if* $SELF < OTHER$ *and* 0 *otherwise* $POSDIFF = (SELF - OTHER)$ *if* $SELF > OTHER$ *and* 0 *otherwise*		

TABLE II

TOTAL EFFECT CALCULATIONS

$\frac{\partial U_{SU}}{\partial SELF_{NEGDIFF}} = b_1 + b_2 + 2 \times b_3 \times \overline{NEGDIFF}$	Effect of change in self given a negative difference
$\frac{\partial U_{SU}}{\partial SELF_{POSDIFF}} = b_1 + b_4 + 2 \times b_5 \times \overline{POSDIFF}$	Effect of change in self given a positive difference
$\frac{\partial U_{SU}}{\partial OTHER_{NEGDIFF}} = -b_2 + 2 \times b_3 \times \overline{NEGDIFF}$	Effect of change in other given a negative difference
$\frac{\partial U_{SU}}{\partial OTHER_{POSDIFF}} = -b_4 + 2 \times b_5 \times \overline{POSDIFF}$	Effect of change in other given a positive difference
$\overline{POSDIFF}$, $\overline{NEGDIFF}$: *average over all possible outcomes* $NEGDIFF = (SELF - OTHER)$ *if* $SELF < OTHER$ *and* 0 *otherwise* $POSDIFF = (SELF - OTHER)$ *if* $SELF > OTHER$ *and* 0 *otherwise*	

TABLE III

DISTRIBUTION OF $R^2 = R_T^2$

PERCENTILES

1%	5%	10%	25%	50%	75%	90%	95%	99%
0.38	0.47	0.60	0.74	0.86	0.91	0.96	0.97	0.99
Smallest		0.34						
Largest		0.99						
Mean		0.81						
Variance		0.14						

TABLE IV

PERCENTAGE OF SOCIAL UTILITY COEFFICIENTS SIGNIFICANT AT THE 5% LEVEL

SELF	79%
NEGDIFF	51%
$NEGDIFF^2$	28%
POSDIFF	39%
$POSDIFF^2$	35%

TABLE V

INDIVIDUAL REGRESSION EXAMPLE

Number of obs = 50				
F(5, 44) = 61.87				
Prob > F = <0.01				
R-squared = 0.88				
Adj R-squared = 0.86				
Rank	Coefficient	Standard Error	t	P>|t|
SELF	0.08	0.03	2.60	0.01
NEGDIFF	0.10	0.03	2.87	0.01
$NEGDIFF^2$	<0.01	<0.01	1.12	0.27
POSDIFF	0.16	0.04	3.85	<0.01
$POSDIFF^2$	>-0.01, <0	<0.01	-2.21	0.03
_CONS	-3.49	1.28	-2.73	0.01
▪ Mean-deviated values for *NEGDIFF*, $NEGDIFF^2$, *POSDIFF*, $POSDIFF^2$ reported				

TABLE VI

CLUSTER COMPOSITION ANALYSIS RESULTS – MEDIAN R^2

Cluster Measure	1	2	3
R_T^2	0.90	0.82	0.73
R_S^2	0.86	0.59	0.45
$R_{S,N}^2$	0.88	0.77	0.51
$R_{S,P}^2$	0.88	0.76	0.69
• 136 individuals total	• 55 individuals • self-interest explains the most	• 59 individuals • negdiff and posdiff explains a lot above self	• 22 individuals • posdiff explains a lot above self

TABLE VII

CLUSTER COEFFICIENTS

	median coefficients				
Cluster	b1	b2	b3	b4	b5
1	0.21	0.01	<0.01	0.01	>-0.01, <0
2	0.08	0.15	<0.01	0.11	>-0.01, <0
3	0.23	0.06	<0.01	-0.13	<0.01

TABLE VIII

TOTAL EFFECT BY CLUSTER

	mean total effect				
Cluster	Δ SU/ Δ self (negdiff)	Δ SU/ Δ self (posdiff)	Δ SU/ Δ other (negdiff)	Δ SU/ Δ other (posdiff)	No. Obs.
1	0.23	0.21	-0.01	-0.03	101
2	0.19	0.14	-0.20	-0.14	112
3	0.27	0.07	-0.09	0.18	37
• Total effect is negotiation dependent, hence all 250 observations used					

TABLE IX

CLUSTER TYPES

Cluster	Description	Name
1	• self-interested	• *self-interest maximizer*
2	• dislikes negative differences • likes positive differences	• *differential-interest competitor*
3	• seeks equality • dislikes negative differences • dislikes positive differences	• *equality seeker*

TABLE X

SOCIAL UTILITY TYPES AND SOCIAL VALUE ORIENTATIONS

Present Research	Social Motive Theory (general)	Knight and Dubro (1984)	MacCrimmon and Messick (1976)
self-interest maximizer	individualist	individualist • individualism	self-interest
differential-interest competitor	competitor/ egoist	competitor • rivalry • superiority	aggression competition proportional competition
equality seeker	cooperator/ pro-social	cooperator • altruism • equality • group enhancement	cooperation proportional cooperation equalitarianism maximin
	altruist		self-sacrifice altruism
social utility components • self-interest, interest in negative differences, interest in positive differences			
social motive distribution rules (Knight and Dubro, 1984) • individualism – maximize own outcome • rivalry – minimize other outcome • superiority – maximize positive difference • altruism – maximize other outcome • equality – minimize difference • group enhancement – maximize sum of joint outcomes			
social motive definitions (MacCrimmon and Messick, 1976) • self-interest – maximize own outcome • aggression – minimize other outcome • competition – maximize positive difference • proportional competition – maximize ratio of own to other outcome • cooperation – maximize sum of joint outcomes • proportional cooperation – maximize product of joint outcomes • equalitarianism – minimize difference • maximin – minimize difference (dyad) • self-sacrifice – minimize own outcome • altruism – maximize other outcome			

TABLE XI

CONTINGENCY TABLE: CLUSTERS BY GENDER

Gender	Cluster 1	2	3	Total
Female	11 8.09	23 16.91	4 2.94	38 27.94
Male	44 32.35	36 26.47	18 13.24	98 72.06
Total	55 40.44	59 43.38	22 16.18	136 100.00

$\chi^2 =$ 6.33 Fischer's exact p = 0.05

TABLE XII

GENDER AND RACE SIGNIFICANCE BETWEEN CLUSTERS

$cluster = f(gender, racegroup)$ $\chi^2 = 10.81$, Prob > χ^2 =0.03

cluster 1 is the comparison group

cluster	odds ratio	std. err.	z	P > |z|
2				
Female / Male	2.33	1.02	1.94	0.05
Non-Western / Western	2.17	0.85	1.98	0.05
3				
Female / Male	0.88	0.57	-0.19	0.85
Non-Western / Western	1.04	0.54	0.09	0.93

TABLE XIII

CONTINGENCY TABLE: CLUSTERS BY NON-WESTERN VERSUS WESTERN RACES

Race Category	Cluster 1	2	3	Total
Non-Western	22 16.18	36 26.47	9 6.62	67 49.26
Western	33 24.26	23 16.91	13 9.56	69 50.74
Total	55 40.44	59 43.38	22 16.18	136 100.00

$\chi^2 =$ 5.76 Fischer's exact p = 0.06

TABLE XIV

TOTAL EFFECT BY GENDER

	mean total effect				
Gender	Δ SU/ Δ self (negdiff)	Δ SU/ Δ self (posdiff)	Δ SU/ Δ other (negdiff)	Δ SU/ Δ other (posdiff)	No. Obs.
Female	0.22	0.15	-0.14	-0.08	67
Male	0.23	0.16	-0.10	-0.03	183
• Total effect is negotiation dependent, hence all 250 observations used					

TABLE XV

TOTAL EFFECT BY WESTERN VERSUS NON-WESTERN RACES

	mean total effect				
Race Category	Δ SU/ Δ self (negdiff)	Δ SU/ Δ self (posdiff)	Δ SU/ Δ other (negdiff)	Δ SU/ Δ other (posdiff)	No. Obs.
Non-Western	0.21	0.15	-0.13	-0.06	126
Western	0.24	0.17	-0.09	-0.03	124
• Total effect is negotiation dependent, hence all 250 observations used					

TABLE XVI

NUMBER OF PARETO EFFICIENT POINTS BY CLUSTER PAIR

Cluster	1	2	3
Cluster			
1	23	28	12
2	30	41	16
3	15	20	4
Self – Interested Pareto Efficient Points: 46			

TABLE XVII

QUALITY OF NEGOTIATED OUTCOME BY CLUSTER

cluster	self-interested Pareto efficiency		social utility Pareto efficiency		No. Obs.
1	0.76		0.66		78
	(0.04)	18%	(0.03)	9%	
2	0.73		0.66		86
	(0.03)	13%	(0.03)	7%	
3	0.76		0.68		30
	(0.05)	17%	(0.04)	3%	

- 1 = highest quality, 0 = lowest quality
- Numbers in parentheses are standard errors for within cluster tests
- Percentages are % that achieved Pareto efficiency for the given measure
- Significant tests are regressions with robust standard errors
- Within cluster regressions were run between measures. The difference is significant at the 5% level for cluster 1 and cluster 2
- None of the differences between clusters for either measure is significant at the 5% level
- 194 individual observations comprising 97 teams

TABLE XVIII

QUALITY OF NEGOTIATED OUTCOME BY CLUSTER GROUP

cluster group	self-interested Pareto efficiency	social utility Pareto efficiency	No. Teams
1 versus 1	0.71 (0.07)	0.65 (0.06)	15
1 versus 2 & 2 versus 1	0.78 (0.04)	0.67 (0.04)	39
1 versus 3 & 3 versus 1	0.85 (0.06)	0.68 (0.06)	9
2 versus 2	0.72 (0.06)	0.65 (0.06)	16
2 versus 3 & 3 versus 2	0.63 (0.08)	0.63 (0.06)	15
3 versus 3	0.94 (0.01)	0.78 (0.09)	3

- 1 = highest quality, 0 = lowest quality
- Numbers in parentheses are standard errors
- Only the paired t-test within cluster group 1,2 & 2,1 is significant at the 5% level

TABLE XIX

QUALITY OF NEGOTIATED OUTCOME BY GENDER

Gender	self-interested Pareto efficiency		social utility Pareto efficiency		No. Obs.
Female	0.67		0.62		49
	(0.05)	10%	(0.03)	6%	
Male	0.78		0.68		145
	(0.03)	17%	(0.03)	8%	

- 1 = highest quality, 0 = lowest quality
- Numbers in parentheses are standard errors for within gender tests
- Significance tests are regressions with robust standard errors
- Only the within-gender test for Males is significant at the 5% level
- Only the between-gender test for self-interested Pareto efficiency is significant at the 5% level

TABLE XX

QUALITY OF NEGOTIATED OUTCOME BY GENDER GROUP

Gender Group	self-interested Pareto efficiency	social utility Pareto efficiency	No. Teams
Female, Female	0.59 (0.11)	0.58 (0.07)	8
Female, Male	0.71 (0.04)	0.64 (0.04)	33
Male, Male	0.79 (0.03)	0.69 (0.03)	56

- 1 = highest quality, 0 = lowest quality
- Numbers in parentheses are standard errors
- Only the paired t-test of differences for Male, Male is significant at the 5% level
- Only the two-sample t-test of differences for self-interested Pareto efficiency between Female, Female and Male, Male is significant at the 5% level

TABLE XXI

INEQUALITY OF NEGOTIATED OUTCOMES BY CLUSTER

cluster	Payoffs Inequality	SU Inequality	No. Obs.
1	0.27 (0.03)	0.42 (0.03)	78
2	0.25 (0.03)	0.44 (0.04)	86
3	0.29 (0.06)	0.49 (0.05)	30

- 1 = more unequal, 0 = equal
- Numbers in parentheses are standard errors
- Significance tests are regressions with robust standard errors
- All within-cluster tests for differences between inequality measures are significant at the 5% level
- No between-cluster tests for inequality are significant at the 5% level

TABLE XXII

INEQUALITY OF NEGOTIATED OUTCOMES BY CLUSTER GROUP

Cluster Group	Payoffs Inequality	SU Inequality	No. Teams
1 versus 1	0.23 (0.04)	0.41 (0.07)	15
1 versus 2 & 2 versus 1	0.29 (0.03)	0.42 (0.04)	39
1 versus 3 & 3 versus 1	0.30 (0.08)	0.43 (0.07)	9
2 versus 2	0.21 (0.05)	0.42 (0.07)	16
2 versus 3 & 3 versus 2	0.25 (0.06)	0.52 (0.08)	15
3 versus 3	0.34 (0.27)	0.48 (0.15)	3

- 1 = most unequal, 0 = equal
- Numbers in parentheses are standard errors
- All paired t-tests for differences between inequality measures are significant at the 5% level except 1 versus 3 & 3 versus 1, and 3 versus 3

TABLE XXIII

INEQUALITY OF NEGOTIATED OUTCOMES BY GENDER

Gender	Payoffs Inequality	SU Inequality	No. Obs.
Female	0.21 (0.04)	0.38 (0.05)	49
Male	0.28 (0.03)	0.46 (0.03)	145

- 1 = most unequal, 0 = equal
- Numbers in parentheses are standard errors
- Significance tests are regressions with robust standard errors
- Within gender, tests are significant at the 5% level
- Between genders there is no significant difference for either measure

TABLE XXIV

INEQUALITY OF NEGOTIATED OUTCOMES BY GENDER GROUP

Gender Group	Payoffs Inequality	SU Inequality	No. Teams
Female, Female	0.18 (0.09)	0.38 (0.12)	8
Female, Male & Male, Female	0.23 (0.03)	0.38 (0.04)	33
Male, Male	0.30 (0.03)	0.48 (0.04)	56

- 1 = most unequal, 0 = equal
- Numbers in parentheses are standard errors
- All paired t-tests for differences between inequality measures are significant at the 5% level