

RESEARCH ARTICLE

The Demand for ‘Fair’ Outcomes: An Experimental Study of Payoff Maximization, Social Efficiency, Fairness, Gender, and Personality Type

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Abstract

We use a modified dictator experiment to examine subjects’ willingness to pay for a ‘fair’ outcome and how this is influenced by social efficiency. We find that subjects exhibit a downward-sloping demand for the fair outcome that increases when the fair outcome is socially efficient and decreases with the experimental stakes. Because a subject’s relative emphasis on payoff maximization, fairness and social efficiency may likely be related to personality type, we add controls for personality preferences as measured by the Myers Briggs Type Indicator (MBTI). This also allows for a more precise examination of gender effects. We find that personality preferences are important determinants of decision making. Controlling for personality preferences, we find that women are more likely to choose the fair outcome than men. This effect is particularly strong when the unequal payoff outcome favors the (passive) responder.

Keywords: Payoff Maximization, Social Efficiency, Fairness, Personality Type, Experiments

JEL classifications: C910; D630; D640

1. Introduction

Modern neoclassical economic theory relies on the assumption that individuals are self-interested. Yet in many environments, even

some with decidedly economic connotations, individual behavior undermines the economic perspective. For example, first movers in a dictator game (who determine how to divide a fixed dollar amount

amongst themselves and another participant) frequently take less than 80% of the bargaining pie, and responders in ultimatum bargaining games (who can reject a proposed division with the consequence that both subjects in the pair earn zero) frequently reject small positive offers (Güth, Schmittberger, and Schwarze 1982; Güth and Tietz 1990; Roth 1995; and Forsythe, Horowitz, Savin and Sefton 1994). A growing body of evidence, including both theoretical advances and empirical papers utilizing experimental methods, suggests that concerns for social efficiency, fairness, inequality aversion, and altruism can help to explain deviations from payoff maximizing behavior (Levine 1998; Fehr and Schmidt 1999; Bolton and Ockenfels 2000; Konow 2000; Kritikos and Bolle 2001; Andreoni and Miller 2002; Charness and Rabin 2002; Engelmann and Strobel 2004). Broadening the rational choice framework by incorporating these motives has highlighted the connections between economics and psychology, increasing the interest in ‘behavioral economics’ (Smith 1991; Rabin 2002).

Our paper adds to the behavioral economics literature in two ways. First, we use a modified dictator experiment to examine the effect of price increases on subjects’ choices to implement a ‘fair’ (by which we mean equal payoffs) outcome and how they are influenced by relative payoff standing, social efficiency, and the experimental stakes. We find that subjects exhibit a downward sloping demand for the fair outcome that increases when the fair outcome is socially efficient and decreases with the experimental stakes. Although the

focus of our research is different, several of our results are consistent with the existing literature. That subjects chose to implement the fair outcome less when the price rose is consistent with Andreoni and Miller’s (2002) finding that subject decisions to be altruistic are influenced in a ‘rational’ way by variation in income and the price of giving. Our results regarding the importance of social efficiency reinforce those in Charness and Rabin (2002), who find that many subjects are willing to lower their own income to increase payoffs for all participants and are willing to give up a small amount in order to substantially increase the payoffs of others even when doing so exacerbates differences in subject payoffs. Our social efficiency results are also related to those in Kritikos and Bolle (2001) and Engelmann and Strobel (2004), who suggest that for a majority of subjects, efficiency concerns may outweigh inequity aversion. In contrast to our approach, for almost all of the cases examined by Kritikos and Bolle (2001), the payoff maximizing choice was socially efficient and almost all of the cases in Engelmann and Strobel (2004) involved no cost to the decision maker. While those papers focus on comparing the relative explanatory power of efficiency and inequity aversion, we focus on the impact these motives have regarding subject willingness to pay to implement an equal payoff outcome. Our results regarding the importance of the experimental stakes are in contrast to existing research on the effect of stakes in dictator and ultimatum games (Carpenter, et al. 2005), but this may be due to how our design differs from the standard approach.

Second, we examine subject decisions from the perspective of personality psychology. We view this as particularly important because a subject's concern for own payoff maximization relative to social efficiency or fairness considerations may be related to their personality type. The Myers Briggs Type Indicator (MBTI), which we utilize to measure personality preferences, provides information on four psychological preferences of individuals.¹ Based on Carl Jung's (1923) theory of psychological type, the first pair of psychological preferences (Extraversion or Introversion) measures the extent to which an individual prefers to spend time in the outer world or people and things or the inner world of ideas and images. Because individuals with a preference for extraversion draw energy from other people, we hypothesize that they are more likely to value social efficiency and fairness as opposed to the 'egoistic' concern for own payoff maximization.

The MBTI also characterizes how a person draws conclusions and makes decisions, identifying whether an individual has a preference for "thinking" judgment or "feeling" judgment. As measured by the MBTI, there are substantial differences in personality preferences by gender, with 75.5% of women preferring feeling judgment as opposed to approximately 43.5% for males (Myers, et al., 1998, p.

157-8). Thus, we view personality preferences as a potentially important (and often omitted) variable in several studies of gender based behavioral differences in economics experiments (Ben-Ner, et al. 2004; Eckel and Grossman 1998, 2001, 2008; Solnick 1997; Brown-Kruse and Hummels 1993; Nowell and Tinkler 1994). Specifically, Eckel and Grossman (2008) finds that gender matters in experiments where subjects are not exposed to risk (dictator games and as a responder in ultimatum games). They found that females make "socially-oriented" decisions as opposed to "individually-oriented" decisions. While Eckel and Grossman (2008) indicate that the mixed results regarding gender-based differences in behavior could be related to risk exposure, it is also possible that these differences may be related to the failure to control for personality type. Also, there is (limited) evidence that controlling for personality preferences using the MBTI can help to explain performance and decision making in a variety of economic experiments including dictator, ultimatum, trust, and prisoner's dilemma games (Swope, et al. 2008), a modified ultimatum game (Schmitt, et al. 2008) a restaurant entry game (Bergstrom and Sonstelie, 2006), and student learning of economics (Swope and Schmitt 2006; Ziegert, 2000).

Our use of the MBTI connects our research to a small but growing literature using other personality measures to assess the impact of personality types (Ben-Ner, et al. 2004; Burks, et al. 2003; Brandstätter and Güth 2002; Ma, et al. 2002; and Boone, et al. 1999). Importantly, previous research

¹ The psychological preferences are (1) Extraversion (E) or Introversion (I)—the degree to which a person's attention and energy is directed outward or inward, (2) Thinking (T) or Feeling (F)—how a person makes judgments, (3) Intuitions (N) or Sensing (S)—how a person perceives information, and (4) Perceiving (P) or Judging (J)—the degree to which a person judgment to perception in their attitude towards the outer world.

elicited measures of personality preferences as part of the experiment. Our research was conducted at the United States Naval Academy, which requires completion of the MBTI as part of the admission process. As such, our research avoids potential framing effects associated with collecting data on personality preferences as part of an experiment. Outside of our own research, there are no related studies of which we are aware for which collection of personality data is fully separate from collection of experimental data. A central motivation for using the MBTI rather than alternative personality indicators is this prior availability as well as its popularity in the U.S. among industrial psychologists as well the general public.

Our results indicate that, consistent with the theoretical underpinnings of the test instrument, Extraverted types were less likely to choose the fair outcome when doing so reduced the other participant's payoff. Although the theoretical predictions of the test instrument are not as clear for the other personality dimensions, we find that Judging types were less (more) likely to choose the fair outcome when doing so decreased (increased) the other participant's payoff, Thinking types were less likely to choose the fair outcome when this decreased the other participant's payoff, and Sensing types were more likely to choose the fair outcome when doing so raised the other participant's payoff. Importantly, when we control for personality type in our low risk exposure experiment, we find strong and statistically significant effects associated with gender. Females were approximately 18% more

likely to choose the fair outcome when doing so reduced the other participant's payoff, and about 3% more likely to choose the fair outcome when doing so increased the payoff of the other participant.

Our experimental design (a modified dictator game) makes it unlikely that any of these results are motivated by strategic concerns. While it is possible to use other institutions to investigate preferences for own payoff maximization, social efficiency, and fairness, we chose a modified dictator game because it is a simple game lacking any strategic components.² In our experiments, the dictator subjects make decisions that indicate a preference over alternative income distributions, and these decisions are used to determine the outcome. For example, subject decisions to choose a distribution with equal payoffs rather than one with higher payoffs in which they earn more than another subject cannot be seen as attempts at own payoff maximization. This is in contrast to decisions in ultimatum bargaining experiments (for example), in which a more generous offer by the proposer may be motivated by either 'fairness' or strategic considerations regarding the likelihood of acceptance by a responder. Although the simplicity of our design makes it difficult to draw conclusions about more complicated games, we view the dictator environment as 'pure' in the sense that subject decisions are not contaminated by strategic considerations. The remainder of the paper is

² In fact, the dictator 'game' is not a game at all using the taxonomy of game theory. It may be more properly referred to as a 'decision task' due to the lack of interaction between player decisions.

organized as follows: Section 2 presents the experimental design and procedures. Section 3 contains our results, and section 4 concludes.

2. Experimental Design and Procedures

Subjects for the experiment were students from the United States Naval Academy (USNA). All majors, classes, and genders were considered as possible recruits. Prior to recruitment, potential volunteers were given an e-mail invitation to participate in a 30-minute experiment and informed that their monetary compensation would be linked to decisions made during the experiment. We invited some segments of the student population at higher rates (in particular, females and some personality types) to insure adequate variation in our sample. Participants were randomly assigned a role for the experiment (as either Player 1 or Player 2) and directed to separate rooms and were, therefore, generally aware that there were subjects sent to another room. Subjects were not paid a show-up fee.³ Upon arrival at the experiment site, subjects were given the experiment instructions, which can be summarized as follows. Each subject was anonymously paired with a subject from the other room, and earnings for the pair were determined solely by the decisions of the Player 1 types. Subjects were informed that all decisions would remain anonymous to other participants, and that they would be

paid privately, in cash, at the conclusion of the experiment.

Our experimental design is linked to Holt and Laury (2002), who present subjects with a menu of paired lottery choices to examine risk preferences. We present subjects with a series of choices over alternative income distributions. Subjects assigned to the Player 1 role made a series of 42 choices between ‘Option A’ and ‘Option B’, listed in 7 groups with 6 decisions in each group. Player 1’s indicated their preference in each of the 42 decisions with the understanding that only one choice, selected at random and ex post, would be used to determine earnings for the pair. We used a low payoff treatment and a high payoff treatment. Player 1 decision sheets for the low payoff treatment are reproduced in Table 1. The payoffs for the high payoff treatment were exactly three times the payoffs for the low payoff treatment.

Option A, which we refer to as the ‘fair’ outcome, always provides equal earnings for both subjects in a pair. Option B is always payoff maximizing for Player 1, but earnings for the pair are not equal. The first half of decisions in each block has the Player 1 type earn less than the Player 2 type. In these cases, choosing the payoff maximizing outcome (B) is socially efficient because it raises the payoff for the Player 2 type. The remaining decisions have the Player 1 type earn more than the Player 2 type under option B. In the majority of these cases, choosing the fair outcome (A) is socially efficient because the cost of doing so for the Player 1 type is offset by the increase in earnings of the

³ USNA regulations do not permit paying students for participation in experiments. While this clearly differentiates our work from other experimental studies, the absence of a show up fee eliminates potential wealth effects, providing us with a ‘pure’ experimental setting.

Player 2 type. Thus, for some decisions the payoff maximizing outcome is socially efficient while in others the fair outcome is socially efficient. The absolute value of the difference in subject earnings from Option A and Option B varies from \$1 to \$3 (\$3 to \$9) within each group of six decisions in the low (high) payoff treatment. Moving between groups of six decisions, Player 1 faces an increased cost to implement the fair outcome. The cost (which is the difference in Player 1 earnings under Option A and Option B) ranges from \$0 (for the first 6 decisions) to \$1.50 in \$0.25 (\$4.50 in \$0.75) increments in the low (high) payoff treatment. After making their choices for the low payoff treatment, the decision used to determine subject payoffs was identified by a random draw implemented on a publicly observed laptop computer. At the conclusion of the low payoff treatment, subjects were shown the decision sheet for the high payoff treatment. Similar to the procedure used in Holt and Laury (2002), we required subjects to initial a statement indicating they would not receive payment from their previous decision before allowing them to participate in the high payoff treatment to avoid wealth effects.⁴ The statement also indicated that the experiment would conclude at the end of the high payoff treatment. Of the 35 Player 1 subjects used in the experiment,

only one declined to participate in the high payoff treatment.⁵ After completing the high payoff decision sheets, the computer generated random draw was implemented to identify the payoff determining decision, subjects were called out of the room by subject number, and paid in cash.

3. Results

We conducted three sessions with a total of 70 subjects, split evenly between Player 1 and Player 2 types. Average earnings were \$7.84 and \$7.18 for player types 1 and 2 respectively, and the sessions lasted approximately 25 minutes. In total, we collected the decisions of 35 Player 1 types. Each subject completed the low payoff treatment, making a total of 42 decisions. This gives us a total of 1,470 recorded decisions for the low payoff treatment. One subject chose not to participate in the high payoff treatment, leaving us with 34 Player 1 types making 42 decisions, making the total recorded decisions in the high payoff treatment 1,428.

⁴ Although this procedure allows us to control for wealth effects, it makes it difficult to reverse the sequencing of the high and low payoff treatments to examine order effects. Subjects completing the high payoff treatment are unlikely to forego their earnings to participate in a treatment with lower payoffs. Importantly, we view the dictator decision task as simple enough that it is unlikely that any subject learning between treatments influenced our results.

⁵ We are not sure why this subject declined to participate in the high payoff treatment, but the subject was paid based on the results from the low payoff treatment.

Table 1: Low Payoffs Decision Sheet

Decision	Option A		Option B		Your Choice
	Your Earnings	Other Participant's Earnings	Your Earnings	Other Participant's Earnings	
1	\$3.00	\$3.00	\$3.00	\$6.00	A or B
2	\$3.00	\$3.00	\$3.00	\$5.00	A or B
3	\$3.00	\$3.00	\$3.00	\$4.00	A or B
4	\$3.00	\$3.00	\$3.00	\$2.00	A or B
5	\$3.00	\$3.00	\$3.00	\$1.00	A or B
6	\$3.00	\$3.00	\$3.00	\$0.00	A or B
7	\$2.75	\$2.75	\$3.00	\$6.00	A or B
8	\$2.75	\$2.75	\$3.00	\$5.00	A or B
9	\$2.75	\$2.75	\$3.00	\$4.00	A or B
10	\$2.75	\$2.75	\$3.00	\$2.00	A or B
11	\$2.75	\$2.75	\$3.00	\$1.00	A or B
12	\$2.75	\$2.75	\$3.00	\$0.00	A or B
13	\$2.50	\$2.50	\$3.00	\$6.00	A or B
14	\$2.50	\$2.50	\$3.00	\$5.00	A or B
15	\$2.50	\$2.50	\$3.00	\$4.00	A or B
16	\$2.50	\$2.50	\$3.00	\$2.00	A or B
17	\$2.50	\$2.50	\$3.00	\$1.00	A or B
18	\$2.50	\$2.50	\$3.00	\$0.00	A or B
19	\$2.25	\$2.25	\$3.00	\$6.00	A or B
20	\$2.25	\$2.25	\$3.00	\$5.00	A or B
21	\$2.25	\$2.25	\$3.00	\$4.00	A or B
22	\$2.25	\$2.25	\$3.00	\$2.00	A or B
23	\$2.25	\$2.25	\$3.00	\$1.00	A or B
24	\$2.25	\$2.25	\$3.00	\$0.00	A or B
25	\$2.00	\$2.00	\$3.00	\$6.00	A or B
26	\$2.00	\$2.00	\$3.00	\$5.00	A or B
27	\$2.00	\$2.00	\$3.00	\$4.00	A or B
28	\$2.00	\$2.00	\$3.00	\$2.00	A or B
29	\$2.00	\$2.00	\$3.00	\$1.00	A or B
30	\$2.00	\$2.00	\$3.00	\$0.00	A or B
31	\$1.75	\$1.75	\$3.00	\$6.00	A or B
32	\$1.75	\$1.75	\$3.00	\$5.00	A or B
33	\$1.75	\$1.75	\$3.00	\$4.00	A or B
34	\$1.75	\$1.75	\$3.00	\$2.00	A or B
35	\$1.75	\$1.75	\$3.00	\$1.00	A or B
36	\$1.75	\$1.75	\$3.00	\$0.00	A or B
37	\$1.50	\$1.50	\$3.00	\$6.00	A or B
38	\$1.50	\$1.50	\$3.00	\$5.00	A or B
39	\$1.50	\$1.50	\$3.00	\$4.00	A or B
40	\$1.50	\$1.50	\$3.00	\$2.00	A or B
41	\$1.50	\$1.50	\$3.00	\$1.00	A or B
42	\$1.50	\$1.50	\$3.00	\$0.00	A or B

The inequality in subject earnings associated with column B of our decision sheet differs in terms of whether the chooser earns more or less than the other subject in the pair. We refer to the decisions for which the inequality favors the chooser as cases of ‘advantageous’ inequality, and those that favor the (passive) responder as ‘disadvantageous’ inequality. As previously noted, in all cases of disadvantageous inequality the payoff maximizing choice for the dictator (B) is

socially efficient, and in most of the cases of advantageous inequality the fair outcome (A) is socially efficient. The left side of Table 2 presents the proportion of all decisions for Option A grouped according to payoff treatment (Low vs. High) and type of inequality (Advantageous vs. Disadvantageous), whereas the right side omits the first six decisions in each payoff treatment (to focus on decisions that imposed a cost to implement the fair outcome).

Table 2: Proportion of A Choices, total and omitting first six decisions

Proportion of All decisions for Option A			Proportion of decisions for Option A (omitting first 6)		
	Low Payoffs	High Payoffs		Low Payoffs	High Payoffs
Disadvantageous	0.212	0.154	Disadvantageous	0.180	0.111
Advantageous	0.400	0.391	Advantageous	0.354	0.338

All proportions are above 0.1, indicating a significant number of choices for the fair outcome, even when costly. Also, the proportion of choices for A was significantly lower in the disadvantageous cases (where the motivations of social efficiency and payoff maximization favored option B). Finally, although the differences reported in Table 2 are small in some cases, subjects chose the fair outcome more often under the low payoff treatment. Scaling the payoffs up by a factor of three, particularly in cases of disadvantageous inequality, influences subject decision-making, indicating the stakes of the game are important.

behavior, it is clear that individual payoff considerations have a significant impact on decision-making. For each type of inequality and payoff treatment, the proportion of choices for A decreases when the first six decisions are omitted (the payoff to Player 1 is the same under Options A and B for these decisions), indicating that subjects are less likely to choose the fair outcome when it is costly. Figures 1 and 2 present the number of choices for the fair outcome grouped by cost for the low and high payoff treatments under advantageous and disadvantageous inequality.

Although the data reflect significant deviations from payoff maximizing

Figure 1: Column A Frequency for Low Payoffs

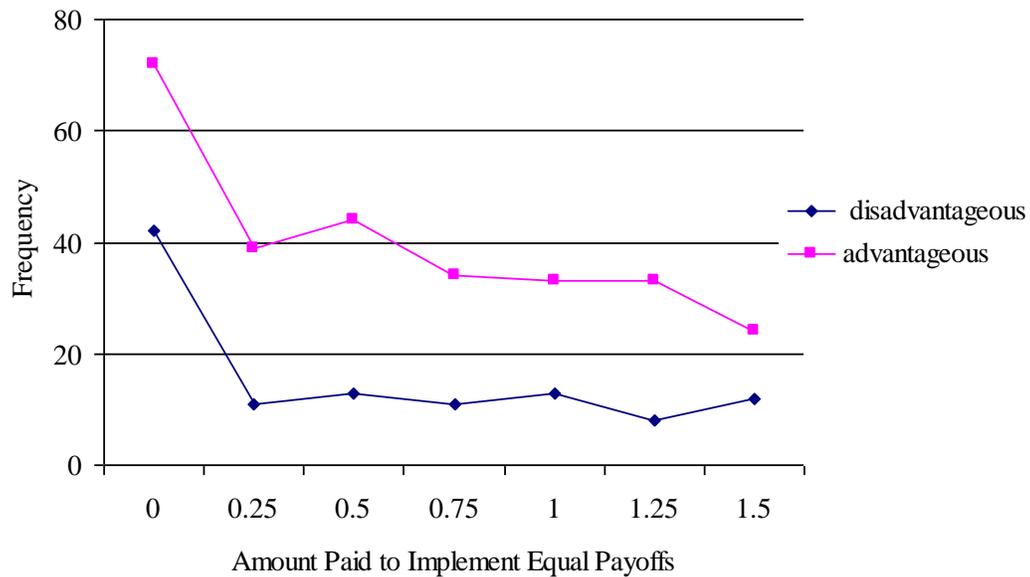
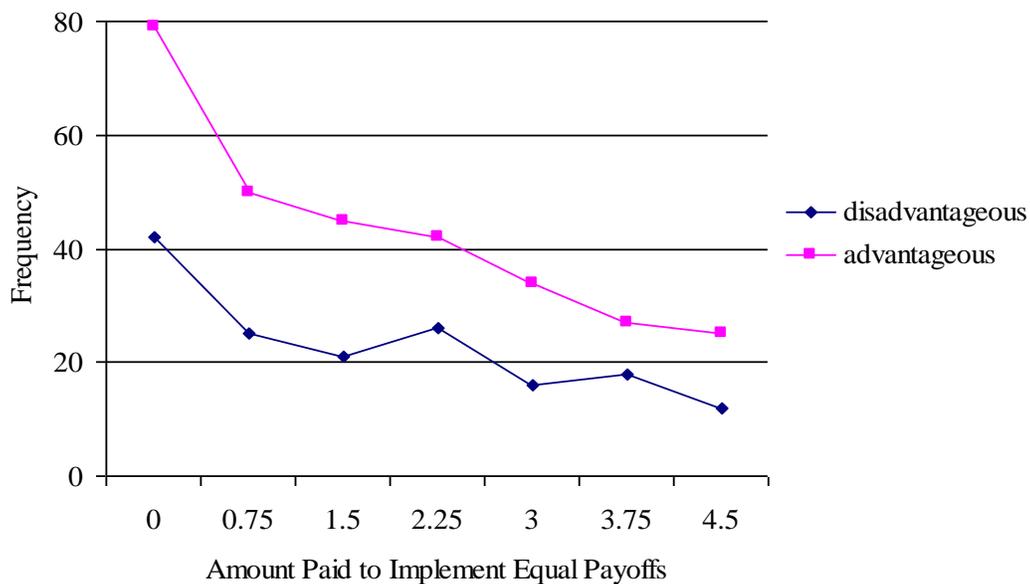


Figure 2: Column A Frequency for High Payoffs



In both the low and high payoff treatments, and for both advantageous and disadvantageous decisions, the demand for the fair outcome is a downward sloping function of its price. The figures indicate that for our design social efficiency is an important ‘shift’ parameter in the sense that the curves associated with the advantageous

decisions lie above those for the disadvantageous decisions.⁶

⁶ Note also that for decisions 28, 34, and 40, choosing Option A achieves no objective other than implementation of a fair outcome because it decreases a subject’s income without increasing the other participant’s income. In these cases, we still find that a non-trivial portion of our subjects chose the fair outcome. In particular, for decisions 28, 34 and 40, the choice proportions for A in the low

An analysis of individual subject decision-making reveals some interesting patterns. The choices of 7 subjects (20% of our sample) are consistent with strict payoff maximization.⁷ Omitting the first six decisions in each treatment (for which payoff maximization does not yield a unique prediction), these subjects always choose Option B. Interestingly, 6 of the 7 chose Option A at least three times in the first 6 decisions of each treatment, indicating a preference for fairness but no willingness to pay for it. In contrast, when the inequality associated with option B was disadvantageous and choosing the fair outcome was costly, 18 subjects (over 50% of our Player 1 sample) chose the fair outcome at least once (the average number of choices for the fair outcome in this group was 10.33). When the inequality associated with option B was advantageous and choosing the fair outcome was costly, 25 subjects (over 70% of our sample) chose the fair outcome at least once (the average number of choices for the fair outcome in this group is 17.2). In addition, one subject's choices are consistent with maximizing the payoffs of the other participant in the pair (a second subject made 83 of 84 choices consistent with this approach), and one subject's choices are consistent with maximizing the joint payoff to the pair. In sum, these results demonstrate the varying motivations of subjects.

payoff treatment were 23%, 11%, and 14%, and in the high payoff treatment 18%, 15%, and 18%, respectively.

⁷ Utilizing a modified dictator decision task with a different structure, Andreoni and Miller (2002) characterize about 25% of their subjects as pure payoff maximizers.

We use regression analysis to assess the impact of gender, personality type, and to provide a more complete analysis of the results above. The dependent variable in our econometric specifications is a binary variable indicating choice of Option A. We present the results from three separate specifications. First, we utilize as independent variables the cost of implementing the fair outcome ($X_a - X_b$), the difference in subject payoffs under option B ($X_b - Y_b$), a dummy variable indicating whether the inequality in option B is advantageous to the chooser (ADV), an interaction term for advantageous inequality and the difference in payoffs under option B ($ADV * (X_b - Y_b)$)⁸, and dummy variables to control for payoff treatment (1 if Low), and whether the decision to choose A entails a cost (which is true after the first six decisions, the dummy variable takes the value 1 for 'not in the first six' (NF6)). Model 2 adds a dummy variable indicating whether Option A is socially efficient (Aeff) and Model 3 adds controls for gender (1 if female), personality type as indicated by the Myers Briggs type indicator (1 if E, N, T, and P), and some interaction terms of inequality type and personality type. The motivation for Model 3 is discussed at length below. The model estimates (Probit regressions with robust standard errors, reporting marginal effects) are provided in Table 3.

⁸ Our econometric specification is linked to the utility function proposed in Fehr and Schmidt (1999), who model utility as a linear function of own payoff, and relative payoff with separate parameters for whether a subject earns more or less than an equitable benchmark.

Table 3: Probit Regression with Robust Standard Errors, reporting marginal effects

p-values in parentheses

Variable	Model 1	Model 2	Model 3
$X_b - X_a$	-0.039 (.000)	-0.018 (.094)	-0.018 (.084)
ADV	0.132 (.000)	0.076 (.019)	0.140 (.010)
$X_b - Y_b$	0.013 (.026)	0.008 (.163)	0.009 (.133)
ADV*($X_b - Y_b$)	0.024 (.000)	0.017 (.012)	0.016 (.018)
LOW	0.102 (.000)	0.096 (.001)	0.098 (.001)
NF6	-0.263 (.000)	-0.267 (.000)	-0.278 (.000)
Aeff		0.144 (.000)	0.149 (.000)
FEMALE			0.184 (.000)
ADV*FEMALE			-0.155 (.000)
E			-0.073 (.010)
ADV*E			0.047 (.211)
N			0.017 (.555)
ADV*N			0.094 (.018)
T			-0.088 (.001)
ADV*T			0.037 (.316)
P			0.078 (.004)
ADV*P			-0.214 (.000)
Prob>Chi ²	0.000	0.000	0.000
Pseudo R ²	0.1149	0.1214	0.1556

Models 1 and 2: The Role of Monetary Payoffs

The regression results provide several important insights. The negative and

significant coefficient on NF6 indicates that subjects were much less likely (by about 26%) to choose option A when costly, and the negative and significant coefficient on $X_b - X_a$ indicates that as the cost of option A

rose, subjects chose it less. The positive and statistically significant coefficient estimate on LOW indicates that the stakes of the game are important, with subjects being more likely to choose A (by about 10%) when the stakes were low. Efficiency concerns also played an important role in subject decision making. Controlling for cost, subjects were more likely to choose A when it was efficient (by about 14%). The positive and significant coefficients on ADV and $ADV*(X_b-Y_b)$ indicate subjects were more likely to choose A when the inequality in option B was advantageous to them.

Note, however, that the magnitude of this effect is cut in half when the control for whether A is efficient is introduced in Model 2.⁹ These results are robust to the introduction of the gender and personality variables, with the magnitude, sign, and significance results largely unchanged in Model 3.

Model 3: The Role of Personality Type and Gender

The MBTI is based on Carl G. Jung's (1923) theory of psychological type, which identifies different tendencies in mental activity among normal, healthy people. The MBTI is a self-report questionnaire

designed to identify personality preferences along the following four dimensions:

1. *Orientation*: Extraversion (E) vs. Introversion (I)
2. *Perception*: Sensing (S) vs. Intuition (N)
3. *Judgment*: Thinking (T) vs. Feeling (F)
4. *Attitude towards outside world*: Judgment (J) vs. Perception (P)

Importantly, the dichotomous attributes are not absolutes. According to the theory people exhibit different personality characteristics at different times and in different settings. The type indicator is intended merely to depict individual personality preferences or tendencies that are dominant.¹⁰

Briefly, *orientation* refers to the degree to which a person's energy and attention is directed outward or inward.¹¹ "In the Extraverted attitude, energy and attention flow out, or are drawn out, to the objects and people in the environment" (Myers, et al., 1998, p. 26). "In the Introverted attitude, energy is drawn from the environment toward inner experience and reflection" (p. 26). Sensing and intuition

⁹ While we view the results with respect to the ADV variable as being primarily associated with efficiency concerns, the coefficient estimate is still positive and significant in Model 2. Further research is necessary to identify whether this result is an artifact of our subject pool. We suspect that the culture of the Naval Academy, with its emphasis on 'ship, shipmate, and self' (in that order) may be an important factor.

¹⁰ Importantly, rather than using raw scores, we follow the dichotomous approach recommended by the developers of the MBTI for statistical purposes. Raw scores indicate 'how sure a respondent is that she or he prefers one pole of the dichotomy over its opposite,' (Myers, et al. 1998, p120). The raw scores do not indicate that a respondent has more or less of a preference.

¹¹ For more discussion relating the MBTI to ultimatum bargaining games, see Schmitt et al (2008) or relating the MBTI to dictator, trust and prisoner dilemma games, see Swope et al (2008).

are the *perception* processes and describe how a person gathers information. Sensing “refers to perceptions observable by way of the senses” (Myers, et al., 1998, p. 24) while intuition “refers to perception of possibilities, meanings, and relationships by way of insight” (p. 24). Thinking and feeling are the *judgment* processes and describe how a person draws conclusions and makes decisions. Thinking judgment leads to a decision “by linking ideas together through logical connections” (p. 24) while feeling judgment leads to a decision “by weighing the relative values and merits of the issues” (p. 24). Finally, judgment and perception reflect differing attitudes towards the outside world. “In the Judging attitude, a person is concerned with making decisions, seeking closure, planning operations, or organizing activities” (p. 26) while “In the Perceiving attitude, a person is attuned to incoming information” (p. 27).

Based on these descriptions, we believe the *orientation* dimension is likely to have a significant impact on decision making in our experiments. Because extraversion is characteristic of individuals who prefer activities involving socialization or interaction with others, E types may place more weight on the payoffs to other participants. Thorne and Gough (1991, p. 74) describe extraverted types as believing in the “intrinsic merit of interpersonal cohesion”. They find that introverts “also appear to find more experiences to be ego-wounding than do Extraverts” (p. 72). This suggests that extraverts should choose the fair outcome more often when doing so raises the other participant’s earnings and

less often when doing so would lower the other participant’s earnings.

The other personality dimensions may also be important (as our regression results indicate) but it is not clear, a priori, how they should affect decision making. For example, individuals with a preference for thinking *judgment* may be impersonal in the sense that they prefer to find an underlying logical principle to guide their decision making, but it is not clear that the underlying principle applied should focus on individual payoff maximization, social efficiency or fairness. However, given the gender based differences in the judgment dimension, we believe it is important to include as a control variable to provide a more precise assessment of the impact of gender. Although we include indicator variables for the remaining two personality attributes identified by the MBTI in our regression, we have no expectations for their impacts on behavior. The mental process of *perception* concerns how individuals acquire information; we find no basis for translating this process into hypotheses about behavior in our experiment because we do not believe the acquisition of information is the fundamental mental function of interest (the decision sheet is fairly simple and transparent). Similarly, we do not have any clear expectations regarding how a person's *attitude* (perceiving or judging as the MBTI developers refer to the dichotomy) should influence behavior. For information on the development and uses of the MBTI, including reliability and validity estimates, consult Myers et al.

The model 3 estimates clearly indicate personality preferences are important, with each preference pair having a statistically significant coefficient either directly, interacted with the ADV term, or both. Subjects with a preference for extraversion in orientation were about 7% less likely to choose the fair outcome for cases of disadvantageous inequality. This suggests extraverts are less likely to lower the payoffs of other subjects, and is consistent with the view that introverts may find disadvantageous inequality ‘ego wounding’ (because the other subject has higher earnings). The results regarding the orientation dimension are consistent with our previous work using the MBTI in ultimatum, dictator, prisoner’s dilemma and trust games (Schmitt et al. 2008, Swope et al. 2008). The results also demonstrate that the perception, judgment, and attitude to the outside world dimensions are important. Thinking types were less likely to choose A for both types of inequality, although the magnitude of the effect (about 9%) is only statistically significant in the disadvantageous case. Intuitive types were more likely to choose option A in both cases, with the effect in the advantageous case (about 11%) being significant. Finally, perceiving types were more likely to choose A for the disadvantageous cases, and less likely for the advantageous cases, with both effects (8% and 21%, respectively) being statistically significant. In our view, future research is necessary to clarify the theory regarding these personality dimensions and performance in economics experiments. While the coefficients are statistically significant, it is not clear why these

variables are important from a theoretical perspective.

Finally, our regression results indicate gender is important, even with controls for personality preferences in place. Females were about 18% more likely to choose option A when the inequality in Option B favored the other subject in the pair, and were about 2.6% more likely to choose A when Option B favored the chooser. Although other interpretations are possible, these results suggest that females may be more inequity averse, or “socially-oriented” as described by Eckel and Grossman (2008), than men. The magnitude of the coefficient on the Female dummy indicates this effect is particularly strong in the disadvantageous case, and may suggest greater ‘jealousy’ amongst females.

4. Conclusion

Deviations from payoff maximizing behavior in economic experiments have become well documented. In recognition, economists are increasingly turning to models that broaden the rational choice framework to include other motives for subject behavior. We find that fairness and social efficiency are, indeed, important determinants of decision making in a modified dictator decision making task. Yet deviations from payoff maximization appear to follow patterns that are consistent with the rational choice approach. In particular, subjects in our experiment were less likely to choose the fair outcome the higher was its cost, demonstrating that the demand for fairness is a downward sloping function of its price. Although this

relationship held for both cases of disadvantageous and advantageous inequality, we find that within the context of our design, social efficiency acts as a 'shift' parameter in the sense that deviations from payoff maximization (in favor of the fair outcome) are more likely when the fair outcome is efficient.

We also examine the effects of personality preferences as measured by the MBTI, illustrating the benefits of interdisciplinary study and the importance of psychological perspectives for decision making in economic experiments. We are motivated to do so because concepts of fairness and efficiency are subjective in nature, and as our results indicate, likely correlated with personality type. By using students from the USNA, which administers the MBTI as part of the matriculation process, we are able to avoid the uncertain framing effects that result from gathering information on personality preferences as part of an experiment. Given the gender based differences in personality preferences as measured by the MBTI, this also provides an important set of control variables that allow for a more precise examination of the role of gender in dictator type decision making environments.

We find that subjects with a preference for extraversion are less likely to choose the fair outcome when doing so lowers the payoff of the other participant, which is consistent with the theoretical underpinnings of the test instrument. However, extraverts were not more likely to choose the fair outcome when doing so raised the other participants payoff (although the $ADV * E$ coefficient is

positive, it is neither statistically significant nor larger than the E coefficient). The regression results strongly suggest that the other personality dimensions are also important. For example, subjects with a preference for judgment were more likely to choose the fair outcome when doing so raised the other participant's payoff and less likely to do so when it lowered the other participants payoff. Judging types (who prefer structure, order, and rules) may have been more likely to pick up on the relative payoff considerations highlighted in our decision sheet, and as such have been more attuned to other participant's payoffs. This is, however, an ad hoc and ex post interpretation. In our view, further research (both theoretical and empirical) is necessary to clarify the relationship between these psychological variables and performance in economic decision making tasks.

Nonetheless, our use of the MBTI variables allows for a more precise estimation of the impact of gender. We find that, with controls for personality preferences in place, females were more likely to choose the fair outcome in cases of both disadvantageous and advantageous inequality, suggesting females are more inequity averse than men. The magnitude of the coefficient estimate in the disadvantageous case (about 18%) was particularly strong, suggesting that women are particularly averse to earning less than the subject they were paired with. The typical finding with respect to gender in dictator games is that women offer more than men. Our results suggest that this result is robust to the addition of controls for personality type. In cases where option

B was advantageous (which is similar to a dictator's decision to raise the other participant's payoff by lowering their own), women were more likely to choose option A. Interestingly, however, our results demonstrate the importance of relative payoffs in the sense that women were much more likely to choose option A when B was disadvantageous.

References:

- Andreoni, J., and Miller, J., 2002. Giving According to GARP: An Experimental Test of the Consistency of Preferences for Altruism. *Econometrica*, 70 (2), 737-753
- Ben-Ner, Avner, Fanmin Kong, and Louis Putterman. 2004. Share and Share Alike? Gender-Pairing, Personality, and Cognitive Ability as Determinants of Giving. *Journal of Economic Psychology* 25(5), 581-89.
- Bergstrom, T. and Sonsteile, J., 2006. Rationality and Personality in a Restaurant Entry Game: Is there an Entrepreneurial Personality Type? University of California at Santa Barbara, Economics Working Paper Series, <http://repositories.cdlib.org/ucsbecon/bergstrom/2006a>
- Bolton, G., and Ockenfels, A., 2000. ERC: A Theory of Equity, Reciprocity, and Competition. *American Economic Review* 90, 166-193
- Boone, C., De Brander, B., and van Witteloostuijn, A., (1999). The Impact of Personality on Behavior in five Prisoner's Dilemma Games. *Journal of Economic Psychology* 20, 343-377.
- Brandstätter, H., and Güth, W., 2002. Personality in Dictator and Ultimatum Games. *Central European Journal of Operations Research* 10, 191-215.
- Brown-Kruse, J. and Hummels, D., 1993. Gender Effects in Laboratory Public Goods Contribution. *Journal of Economic Behavior and Organization*, 22, 255-67
- Burks, Stephen, Jeffrey Carpenter, and Eric Verhoogen. 2003. Playing Both Roles in the Trust Game. *Journal of Economic Behavior and Organization* 51(2), 195-216.
- Carpenter, J., Verhoogen, E., and Burks, S., 2005. The effect of stakes in distribution experiments. *Economics Letters*, 86, 393-98
- Charness, G., and Rabin, M., 2002. Understanding Social Preferences with Simple Tests. *The Quarterly Journal of Economics*, 117 (3), 817-869
- Eckel C., and Grossman P., 2008. Differences in the Economic Decisions of Men and Women: Experimental Evidence. Forthcoming in *Handbook of Experimental Results*, edited by C. Plott and V. Smith. New York, Elsevier.
- Eckel, C., and Grossman, P., 2001. Chivalry and Solidarity in Ultimatum Games. *Economic Inquiry*, 39 (2), 171-88
- Eckel, C., and Grossman, P., 1998. Are Women Less Selfish than Men?: Evidence from Dictator Experiments. *Economic Journal*, 108, 726-35
- Englemann, D., and Strobel, M., 2004. Inequality Aversion, Efficiency, and Maximin Preferences in Simple Distribu-

- tion Experiments. *The American Economic Review* 94(4), 857-69
- Fehr, E., and Schmidt, K.M., 1999. A Theory of Fairness, Competition, and Cooperation. *Quarterly Journal of Economics* 114(3), 817-868
- Forsythe, R., Horowitz, J., Savin, N.E., and Sefton, M., 1994. Fairness in Simple Bargaining Experiments. *Games and Economic Behavior* 6, 347-369.
- Güth W., and Tietz R., 1990. Ultimatum Bargaining Behavior: A Survey and Comparison of Experimental Results. *Journal of Economic Psychology* 11, 417 – 449.
- Güth, W., Schmittberger, R., and Schwarze, B., 1982. An Experimental Analysis of Ultimatum Bargaining. *Journal of Economic Behavior and Organization*, 3, 367-388.
- Holt, C., and Laury, S. 2002. Risk Aversion and Incentive Effects. *American Economic Review* 92 (5), 1644-1655
- Jung, C. G. (1923). *Psychological types*. Princeton, NJ: Princeton University Press.
- Kritikos, A., and Bolle, F., 2001. Distributional Concerns: equity- or efficiency-oriented? *Economics Letters* 73, 333-58
- Konow, J., 2000. Fair Shares: Accountability and Cognitive Dissonance in Allocation Decisions. *The American Economic Review*, 90 (4), 1072-1091.
- Levine, D., 1998. Modeling Altruism and Spitefulness in Experiments. *Review of Economic Dynamics* 1, 593-622.
- Ma, L., Sherstyuk K., Dowling, M., and Hill O., 2002. Altruism and Voluntary Provision of Public Goods. *Economics Bulletin* 3(31), 1-8.
- Myers, Isabel Briggs, Mary H. McCaulley, Naomi L. Quenk, and Allen L. Hammer. (1998). *MBTI Manual: A Guide to the Development and Use of the Myers Briggs Type Indicator*. Palo Alto, CA: Consulting Psychologists Press.
- Nowell, C. and Tinkler, S., 1994. The Influence of Gender on the Provision of a Public Good. *Journal of Economic Behavior and Organization*, 25, 25-36
- Rabin, M. 2002. A perspective on psychology and economics. *European Economic Review*, 46, 657-85
- Roth, A., 1995. Bargaining Experiments. *Handbook of Experimental Economics*. (J. H. Kagel and A. E. Roth, Eds.) pp. 253 – 348. Princeton, NJ: Princeton University Press.
- Solnick, S., 2001. Gender Differences in the Ultimatum Game. *Economic Inquiry*, 39(2), 189– 200.
- Schmitt, Pamela, Robert Shupp, Kurtis Swope, and Justin Mayer. 2008. Personality Preferences and Pre-Commitment: Behavioral Explanations in Ultimatum Games. *Journal of Economic Behavior and Organization*, 66 (3-4), 597-605.
- Smith, V., 1991. Rational Choice: The Contrast between Economics and Psychology. *The Journal of Political Economy*, 99(4), 877-97

Swope, K., Cadigan, J., Schmitt, P., and Shupp, R., 2008. Personality Preferences in Laboratory Economics Experiments. *The Journal of Socio-Economics*, 37, 998–1009.

Swope, K., and Schmitt, P., 2006. The Performance of Economics Graduates over the Entire Curriculum: The Determinants of Success. *The Journal of Economic Education*, 37(4), 387-394.

Thorne, A. and H. Gough. (1991). *Portraits of Type: An MBTI Research Compendium*. Palo Alto, CA: Consulting Psychologists Press, Inc.

Ziegert, A., 2000. The Role of Personality Temperament and Student Learning in Principles of Economics: Further Evidence. *The Journal of Economic Education*, 31(4), 307-22.