Identity, Group Conflict, and Social Preferences

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Abstract: This paper presents a novel experiment on group conflict. Subjects are divided into groups according to preferences on paintings, and subjects are divided into groups according to self-declared political affiliations and leanings. Using a unique within subject design, we find twenty percent of subjects destroy social welfare – at personal cost – when facing a subject outside their group. This effect relates to individual identities. In the political treatment, Democrats and Republicans, in contrast to Independents, behave more selfishly and competitively towards out-group members. The results show social preferences for fairness and social welfare maximization are not universal and depend on the social context.

* The author order combines alphabetical order (the convention in economics) and lab director last (the convention in psychology & neuroscience norm). We are grateful to Jeff Butler, Pedro Rey-Biel and participants at Conference on the Economics of Interactions & Culture (EIEF), Ecole Polytechnique, Pompeu Fabra, Institute for Economic Analysis & Universitat Autònama de Barcelona, and Paris School of Economics for their comments. We thank the Social Science Research Institute at Duke for sponsoring our faculty fellows program in 2010-2011, "From Brain to Society (and Back)," and we are grateful to the Transdisciplinary Prevention Research Center (TPRC) at Duke for funding this project.

I. Introduction

This paper presents a novel experiment on identity, group conflict, and social preferences. There is now a storied academic literature that argues human beings are not purely selfish. Rather, people are concerned about the well being of others when making decisions and allocating income. A series of economic experiments has demonstrated that subjects will give up own income in order to achieve higher social welfare and allocations that are more equitable. Yet this picture of preferences and allocation decisions does not jibe with much of human history. While many cultural and religious traditions involve charity and help to those less fortunate and redistribution is a feature of modern societies and democratic governments, throughout time people have been unfair and cruel to others. Human history is full of prolonged inter-group conflict, forced extraction of goods and labor, and genocide.[1] Empirical research in economics has demonstrated that ethnic divisions are related to lower levels of public goods, dysfunctional institutions, and reduced growth.[2]

This paper delves into this apparent contradiction. We conduct a novel experiment to ask when people behave selfishly, when they maximize social welfare, and when they destroy the payoffs of others. The group division in our experiment is necessarily mild compared to the historical conflicts recalled above. Yet, even in a congenial university environment, we uncover a significant amount of "status-seeking" or "competitive behavior."[3] Using a unique within subject design, we find that twenty percent of participants are concerned with relative payoffs to the extent that they destroy social welfare – at personal cost – when facing a subject outside their group. This behavior is not punishment or retaliation for non-cooperative behavior or "negative reciprocity."[4] Subjects in our experiment are not responding to

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[1] North, Wallace & Weingast (2009) are among those bold enough to tackle the sweep of human history.
[2] Prominent studies include Easterly & Levine (1997), Alesina, Baqir, & Easterly (1999), Alesina & La Ferrara (2005), Miguel & Gugerty (2005).
[3] With the recent exception of Iriberri & Rey-Biel (2011), experiments and proposed formulations of utility have largely ignored such behavior. The model proposed by Andreoni & Miller (2002) does not allow for status seeking behavior, and Bolton & Ockenfels (2000, p. 172, Assumption 3) rule out such behavior by assumption on the shape of their proposed utility function. Fehr & Schmidt's (1999) utility function allows for the possibility of such behavior, but they do not include it in their analysis; they argue would not change equilibrium behavior in the games they consider (p. 824).
[4] See, e.g., Fehr & Schmidt (1999), Fehr & Gächter (2000), Charness & Rabin (2002).

the choices of others; they are simply choosing allocations.[5] Thus we find that there are a variety of social preferences and these preferences depend critically on the social context.

This experiment thus advances the quest for uncovering the distribution of social preferences (Fehr & Schmidt (2009)) and finds support for hypotheses concerning identity and economic outcomes (Akerlof & Kranton (2000, 2010)). In this experiment, subjects allocate money to themselves and to others in three conditions: an asocial control, a minimal group treatment, and a political group treatment. In the minimal group treatment, following the classic method in social psychology, subjects are divided into two groups according to their preferences over images and lines of poetry. In the political group treatment, subjects are divided into two groups according to their self-declared political affiliations and leanings. The asocial treatment serves as a control for both group treatments. The minimal group treatment serves as a control for the political group treatment.

Following the work of Akerlof & Kranton (2000, 2010), we test whether a subject's behavior depends on his or her identity. Identity, here, as in social psychology, indicates an individual's (self)-assignment to a social category, or group. Examples of broad social categories in the real world are gender, race, ethnicity, nationality, political party, etc. Experiments can draw on such existing identities, or experiments can create social categories inside the laboratory, as in the minimal group treatment. The premise of the latter is that studying subjects with temporary identities created in the laboratory serves as a window on behavior outside the laboratory, where identities are longer lasting and more deeply held.

Our experiment combines these methods and tests two hypotheses. First, we test whether subjects' identities affect behavior. In particular, we test if subjects are less willing to allocate money to subjects outside their group. Second, we test whether this effect depends on individual identities and subjects' affinities for their assigned group. We infer this affinity from subjects' self-reported political affiliations as Democrat, Republican, Independent, or None. An Independent assigned to the Democrat

[5] Iriberri & Rey-Biel (2011) find that about 10% of subjects are "competitive" in a setting like our asocial condition. We find that about 5% are "competitive" in the asocial condition and 20% are competitive in group treatments when allocating income to subjects in the other group.

group would likely have less affinity for their assigned group than a Democrat assigned to the Democrat group.

We find support for both hypotheses. In the minimal group treatment, subjects are more competitive and more selfish when allocating money to out-group members. But in the political group treatment, only Democrats and Republicans exhibit this behavior. Independents have significantly different behavior, treating out-group subjects similarly to in-group subjects.

This study builds on two streams of experimental literature in economics: on social preferences and on social identity. The work on social preferences often pits the theory of a "selfish economic man" against a theory where people also have preferences over the payoffs of others. Charness & Rabin (2002) introduce a series of games and method to estimate social preferences and conclude that subjects are not purely selfish and exhibit preferences for social welfare maximization rather than aversion to inequity. Fehr & Schmidt (1999) suggest that there might not be one way to describe people, as selfish or not, or inequity averse or not, but rather there is a distribution of individual social preferences. Andreoni & Miller (2002) find that indeed different individuals follow consistently different rules for the allocation of payoffs. We find that, in the asocial condition, about 25% of subjects are "selfish," they put almost no weight on anyone's payoffs but their own. About 37% of subjects have preferences to maximize social welfare and 33% aim for fair allocations. The remaining 5% are "competitive;" they are willing to reduce their own absolute payoffs in order to increase the difference between their payoffs and the other person's payoffs. These distributions change in the group treatments, indicating that social preferences are not constant but depend on the social context. In particular, there is a significant increase in selfish behavior and competitive behavior when allocating income to out-group subjects. In the minimal group treatment, 35% of subjects are selfish and 21% are competitive, with only 13% maximizing social welfare and 31% striving for fair allocations. Thus well more than half of the subjects are neither fair nor social welfare maximizing when facing out-group subjects.

In the area of social identity, several early experiments showed that the race or ethnicity of subjects changes play in dictator and ultimatum games (e.g., Fershtman & Gneezy (2000), Glaeser,

Laibson, Scheinkman, and Souter (2000)). A recent set of experiments has studied social groups created in the laboratory.[6] Our paper is closest to Chen and Li (2009) who use a minimal group paradigm and find that, on average, subjects are more likely to be social welfare maximizing towards in-group members. Our paper is also close in spirit to, and supports the results of, Klor & Shayo (2010) who divide subjects into two groups according to their university fields of study. Subjects are assigned gross incomes and asked to vote over alternative redistributive tax schemes. They find that subjects vote more often for the tax rate that favors in-group members.[7] Our experiment finds a strong effect of the group treatment: effect: on average, subjects are less fair when allocating to in-group members than out-group members, which is similar to Chen & Li's (2009) results. This average hides the range of subject behavior. It hides the prevalence of purely selfish behavior and the destructive behavior of subjects that emerges strongly in the group context.

To uncover individual preferences, we use a finite mixing model, which is relatively new to experimental economics.[8] We use the utility function proposed by Fehr & Schmidt (1999) and Charness & Rabin (2002) and estimate parameters using a discrete choice maximum likelihood function and a finite mixing model. The mixing model estimates "types" of subjects, where the parameters characterizing each "type" are not assumed but are those that maximize the likelihood function. We can then interpret these "types" according to the utility function: we find subjects are distinctly either "selfish," "weak social welfare maximizing," "strong social welfare maximizing," or "competitive." Iriberri and Rey-Biel's (2011) recent contribution also studies the possibility that subjects adopt significantly different and

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[6] See Chen & Li (1999) and Akerlof & Kranton (2010) for extensive reviews of the experimental literature in economics and social psychology.

[7] Klor & Shayo (2010) find further that subjects' behavior in the experiment relates to answers to questions concerning redistribution in a post-experiment survey using an adaptation of questions from the World Values Survey.

[8] To the best of our knowledge, Stahl and Wilson (1994) was the first use of finite mixture modeling in behavioral experiments. They and followers such as Bosch-Domenech et. al (2010) consider Beauty Contest games, estimating the proportion of subjects who reason at different levels. Harrison and Rutstrom (2009) and Conte et. al allow for a mixture of expected utility and prospect theory. Andersen et. al. (2011) allow for part of the population to behave according to traditional exponential discounting and the remainder to behave according to hyperbolic discounting.

distinct behavior in dictator games. They estimate four types using the Fehr & Schmidt (1999) and Charness & Rabin (2002) linear utility that we also adopt. [9]

We take a further step and classify individual subjects into types in a way consistent with the mixing distribution (Nagin (2005)). We construct a posterior probability that an individual subject is of certain type and assign individuals to the type with the greatest posterior probability. To our knowledge the present study is the only one in behavioral economics that takes this next step and combines this classification with demographics and other subject-specific data to study the sources of individual variation.[10] We use this classification to test the identity hypotheses discussed above. We also study how political ideology and demographic characteristics relate to individual behavior in different treatments. We uncover, in particular, a correlation between social preferences and political ideology; subjects who support "small government" are significantly more selfish than other subjects.

This paper is organized as follows. Section II describes our experiment in detail. Section III provides the theoretical framework and empirical strategy for analyzing the data. We report the behavioral results in Section IV. Section V concludes.

II. The Experiment

The experiment was conducted in the Duke Center for Cognitive Neuroscience, which follows the same protocols as laboratories in experimental economics, in particular the protocol of no deception. The experiment involved 141 subjects drawn from the Duke University community. Summary demographic characteristics of the subjects are presented in the Appendix.

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[9] Econometrically the present paper differs from Iriberri & Rey-Biel (2011) in that we use the mixture model to calculate the posterior probability that an individual is a particular type and use these posterior probabilities to assign each individual to a type. We then determine the demographic and other factors that are associated with each type. Substantively, the goals of the papers are also different. Iriberri & Rey-Biel study how revealing the distribution of play changes future play, and they take great care to minimize any interpersonal influences that could stimulate other-regarding behavior. The purpose of our experiment, in contrast, is to test how different social contexts affect other-regarding behavior.

[10] Klor & Shayo (2010) classify subjects into types according to the individual utility parameter estimates, as in Andreoni & Miller (2002). They then relate this type-classification to individual attributes and answers to survey questions.

Sessions were held at various times of day and were spread across January, February, and March 2011.

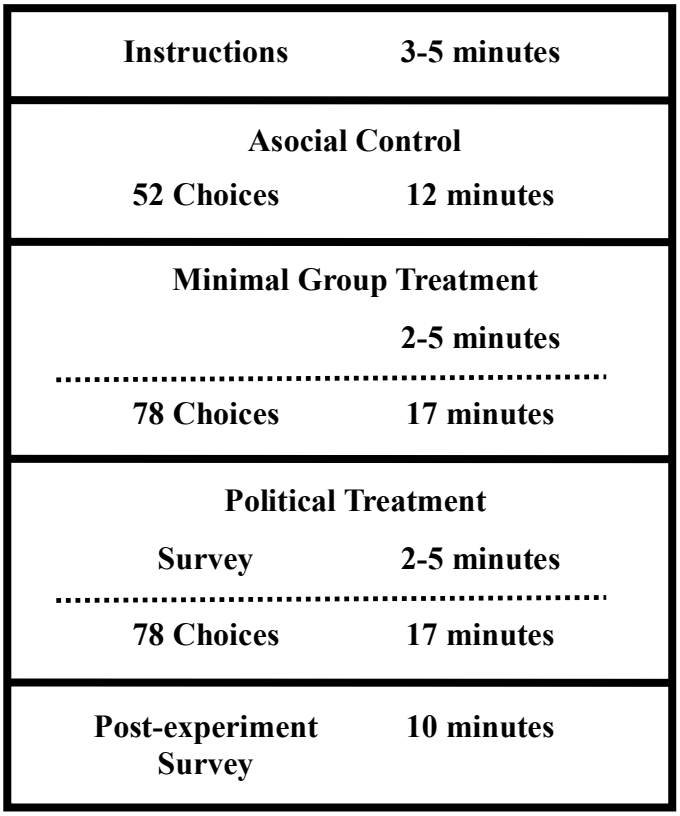

Figure 1. Timeline of Experiment

For all subjects, experimental sessions proceeded as illustrated in Figure 1.[11] First, subjects received instructions on the decisions they would be asked to make and practiced using the pre-defined computer keys that would indicate their choices. All sessions began with the *asocial* condition. Then each subject made decisions in the *minimal group treatment* and the *political group* treatment. The order of the group treatments was randomized across subjects.

In the asocial condition, subjects were asked to allocate money to themselves and other participants. There were two kinds of pairings, which occurred randomly. Subjects allocated money between themselves and other subjects, called YOU-OTHER matches. Subjects also allocated money between two random other subjects, called OTHER-OTHER matches. These

[11] The Appendix provides a transcript of subject instructions and other details of the experiment, including sample screen shots from the minimal group and political group treatments.

latter matches involved no loss or gain to the subject who made the decision.

In each group treatment, subjects were divided into two groups according to their answers to survey questions. In the *minimal group treatment*, subjects stated their preferences between lines of poetry, landscape images, and paintings by Klee and Kandinsky. Subjects were then assigned to one of two groups, and they were given (true) information on the percent of subjects in their group who answered similarly in the survey and the percent of subjects in the other group answered differently. Subjects then allocated money to themselves and others in three different kinds of pairings, which occurred in randomly. Subjects allocated money (i) between themselves and own-group members, called YOU-OWN matches, (ii) between themselves and other-group members, called YOU-OTHER matches, and between own-group members and other-group members, called OWN-OTHER matches. For each of these matches, the subjects were given information on the matched subject–the group assignment and the commonality of answers to survey questions. The screens indicated which match, as in Figure 2, which indicates a YOU-OTHER match.

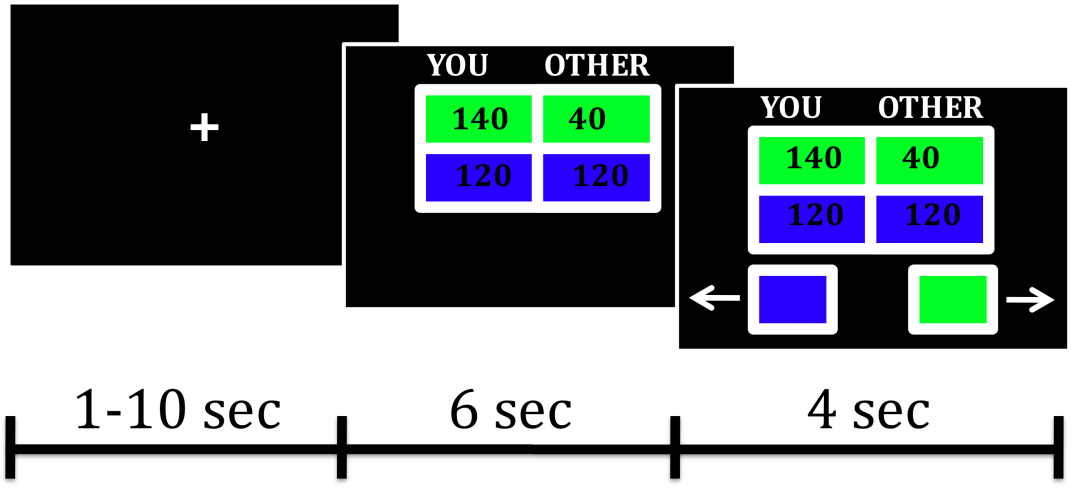

Figure 2. Timing and Presentation of Allocation Choices

The *political treatment* began with a survey of subjects' political affiliations and opinions. Subjects were first asked their political affiliations as Democrat, Republican, Independent, or None. They were then asked to refine their political leanings—strong, moderate, or closer to Democrat, closer to Republican. Subjects were then asked their opinions on issues that were dividing the political spectrum in the United States at that time, as well as their preferred media outlets.[12] Based on their answers, subjects were assigned to two groups, called a Democratic group and a Republican group. Subjects were given information on the percent of subjects in their assigned group that made similar chooses in the survey and the percent of subjects in the other group that expressed different opinions. Note again that there was no deception in this experiment, and we divided the subjects into groups according to an algorithm that would place Democrat and Democrat-leaning subjects in the Democrat group and Republican and Republican-leaning subjects in the Republican group. The information the subjects received was true data about the opinions held in both groups. Subjects were then asked to allocate money to themselves and to participants in their own or other group, as well between two subjects in their own group and the other group. The screens indicating YOU-OWN, YOU-OTHER, and OWN-OTHER had exactly the format as in the minimal group treatment.[13]

For each kind of match, subjects were presented with twenty-six different 2x2 allocation matrices. The collection of these matrices can be found in the Appendix, and Figure 2 provides an example. Following Charness & Rabin (2002), we constructed these matrices to capture three basic types of social preferences. The subjects could, at possible expense to self, (1) increase fairness, (2) increase social welfare, or (3) increase own status, i.e., the difference between their own payoffs and the other's payoffs (also called "status seeking" or "competitive" behavior).

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[12] The issues were abortion, illegal immigration, large government, gay marriage, and the Bush tax cuts. The Appendix provides summary statistics of the political affiliations, leanings, and opinions of the subject pool.

[13] The Appendix describes the procedure and the information subjects received about the other participant's answers to survey questions. In all other ways the matching is anonymous, and the recipient could be from another session of the experiment.

The matrices could involve more than one motive a time: For example, in the matrix in Figure 2, a subject who picked the bottom vector would both be increasing social welfare and reducing inequity at a personal cost. The econometric estimation of social preferences distinguishes among these motives. The total of twenty-six different matrices were presented to each subject in random order, and in random matches, in each condition. The vectors within each matrix were randomized, so that sometimes the top vector gave the subject more money than the bottom vector, or vice versa. The colors of the vectors, blue and green, as well as the left and right keys, were all randomized.[14]

In addition to the show-up fee of $6, subjects received payment for one choice selected at random from each of the three sections of the experiment—asocial, minimal group, and political. The points in the matrix were translated into dollars according to a conversion factor and subjects earned on average $15 for the one-hour sessions.

Before analyzing the results, we discuss possible experimenter demand effects. Within subject designs, it has been argued, are subject to experimenter-demand effects, where the subjects try to behave according to what they think the experimenter desires of them. In this experiment, for example, subjects might think that we (the experimenters) are calling attention to group divisions and therefore might try to act according to what they think we want them to do.

We have several responses to this criticism. First, the aim of this experiment is precisely to see how people behave when groups are made salient. Many real-world actors create and exploit group divisions to their own advantage. And indeed in political campaigns, actors try to accentuate the difference between voters. Second, if there is a demand effect, there is no general agreement among subjects as to what the demand is, as there is a wide range of subject behavior. Third, subjects' choices are correlated with their stated political opinions (as opposed to their party affiliations), as measured by responses to questions on large vs. small government,

[14] In addition, at the end of the asocial condition, subjects were asked to distribute points using tasks similar to those Andreoni & Miller (2002). This objective is to compare the outcomes of the binary choices in our experiment to those in Andreoni & Miller (2002).

government programs, and tax policy. These questions appeared either one-third or two-thirds of the way into the experiment and were interspersed among eight questions on political positions, political affiliation and news outlets. Finally, if there is a demand effect, there is no reason to believe that the demand effect would be different for the minimal group treatment and the political treatment. Hence, we control for any demand effect when comparing those two treatments.

III. A Bird's Eye View: Subjects' Overall Choices across Conditions

In our first pass through the data, we look at the subjects' overall choices of different allocations. We report the percentage of the population that chooses fair vs. competitive vs. social welfare maximizing allocations in each social condition. In the next section, we delve into the individual variation behind these aggregate patterns.

III.A. *Summary Statistics*

Figure 3 presents the summary statistics of subjects' choices in each condition. In each decision, subject *i* choses one of two vectors (π_i, π_j) and (π'_i, π'_j). When a subject chooses (π'_i, π'_j), we say the choice is consistent with being "selfish" if $\pi_i > \pi'_i$. The choice is consistent with being "fair" if $|\pi'_i - \pi'_j| < |\pi_i - \pi_j|$. The choice is consistent with "maximizing social welfare" if $\pi'_i + \pi'_j > \pi_i + \pi_j$. Finally, the choice is "competitive" if $\pi'_i - \pi'_j > \pi_i - \pi_j$. Note that choice of (π'_i, π'_j) could be consistent with several of these characterizations at the same time.

Figure 3 shows the percent of choices that are consistent with being "selfish," "fair," "social maximizing," and "competitive," in each condition, for YOU-OTHER and YOU-OWN matches. We see immediately that the asocial YOU-OTHER matches and the group YOU-OWN matches follow similar patterns, with about 73% of choices consistent with "selfish," 63% percent of choices consistent with "social welfare maximization," 55% consistent with "fairness,"

and 45% consistent with "competitiveness." Figure 3 further shows the divergence between YOU-OWN matches and YOU-OTHER matches in the group treatments. This difference is particularly strong in the political treatment, where in YOU-OTHER matches only 52% of choices are consistent with "social welfare maximization" and 47% consistent with "fairness," while 60% are consistent with "competitiveness." These summaries are consistent with Charness & Rabin's (2002) and Chen & Li's (2009) results for binary choice two-player games.[15]

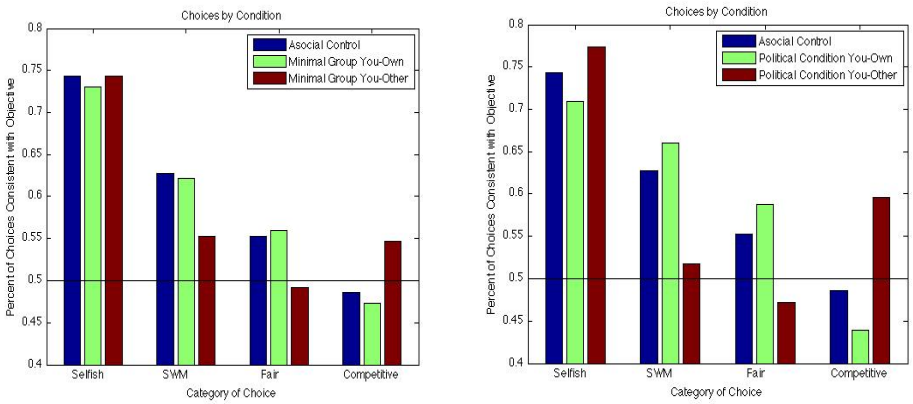

Figure 3. Summary Statistics
Percent of Choices consistent with
Selfishness, Social Welfare Maximization, Fairness, and Competitiveness

III.B. *Price Sensitivity: Tradeoffs between Own Payoffs and Social Objective*

We study next how much subjects are willing to give up in order to achieve a particular social objective. We study the tradeoffs between own payoffs and others' payoffs. For purposes of analysis, we will represent the choice between vectors (π_i, π_i) and (π'_j, π'_j) as a normalized matrix:

π_i	π_j
π'_i	π'_j

[15] See Charness & Rabin (2002, Table 1, pg. 829) and Chen & Li (2009, Table A1, p. 454-455).

where the decision-maker, *i*, earns weakly more money in the top vector than the bottom. (As reported above, in the actual experiment the rows were randomized.) With this formulation, a subject who chooses the bottom vector chooses (weakly) less money for himself. Let $\Delta\pi_{i,} = \pi_i - \pi'_i$ be the loss to subject *i* from choosing the bottom vector; by definition $\Delta\pi_{i,} \geq 0$. A subject who chooses a bottom vector (weakly) gives up some of his own money and achieves a social objective. We again consider three objectives:

(1) *FAIRNESS*: The bottom allocation is fairer when $|\pi'_i - \pi'_j| < |\pi_{i,} - \pi_j|$.

(2) *SOCIAL WELFARE*: The bottom allocation has higher social welfare when $\pi'_i + \pi'_j > \pi_{i,} + \pi_j$.

(3) *COMPETITIVE/STATUS*: The bottom allocation has higher status for *i* when $\pi'_i - \pi'_j > \pi_{i,} - \pi_j$.

We categorize the twenty-six allocation decisions according to whether choosing the bottom vector achieves (1), (2), or (3). Note that choice of the bottom vector can be consistent with multiple objectives.

We order the allocations according to the relative personal cost and social benefits to subject *i*. We construct a "bang-for-the-buck" measure; an allocation is *relatively more expensive* for *i* when $|\Delta\pi_i/(\Delta\pi_i - \Delta\pi_j)|$ is larger—the subject would have to give up relatively more of own money to achieve an increase in the social objective. We examine subjects' choices across social conditions, distinguishing between the matrices where *i* earns more than *j* and the matrices where *j* earns more than *i*. We do so since previous work indicates that subjects are more willing to give to others when they earn more than the other; i.e., $\pi_I > \pi_j$, then when they earn less $\pi_{i,} < \pi_j$.

Figure 4 compares subjects' choices, in aggregate, across different conditions. On the *x*-axis in each figure, we order the matrices according to the measure $\Delta\pi_{i,}/(\Delta\pi_{i,} - \Delta\pi_{j,})$.
The matrices to the right of the origin, then, have bottom vectors that are fairer and/or have higher social welfare. The further the matrix is from the origin, the relatively more it costs for *i* to be fair or social welfare maximizing. The matrices to the left of the origin have bottom vectors that have higher status for subject *i*. The further the matrix is from the origin, the relatively more it

costs for *i* to be competitive. The graphs in Figure 4 show the choices for matrices where *i* earns more than *j* (19 matrices).

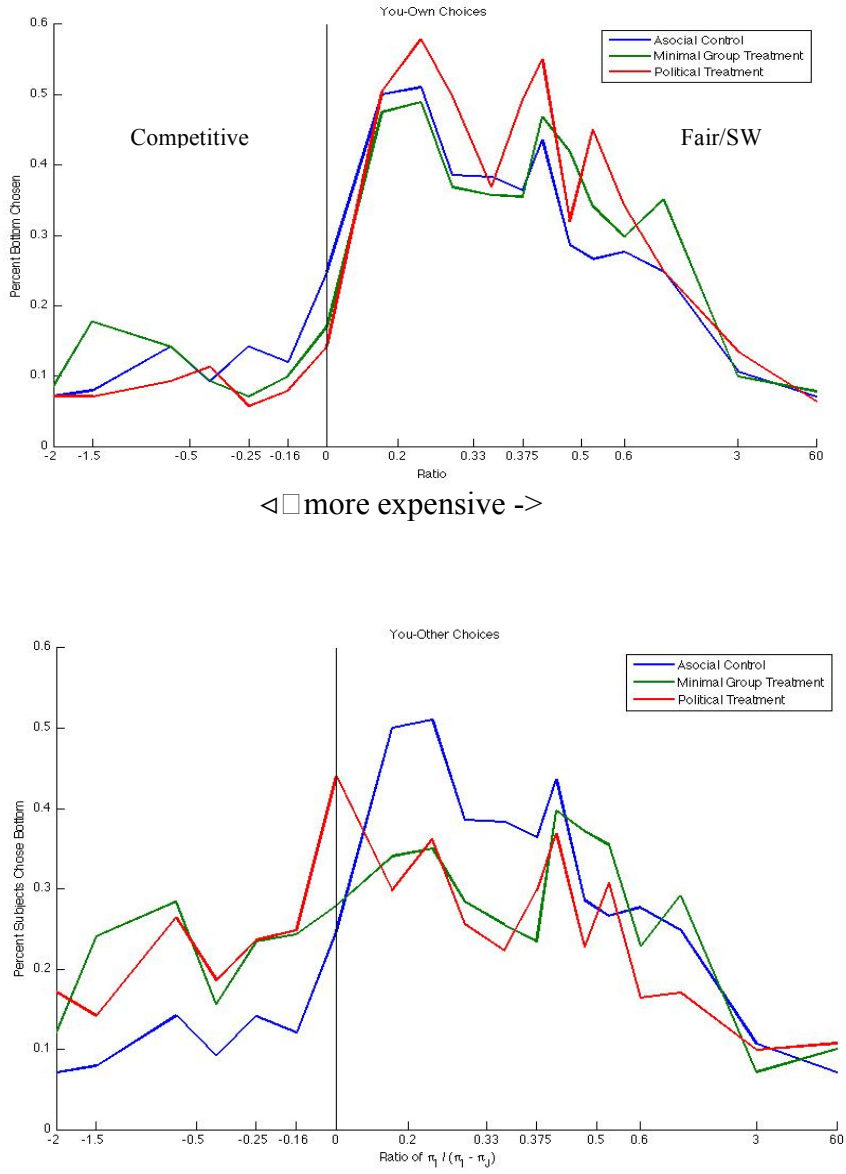

Figure 4. Price Sensitivity
Percent of Subjects that Chose Allocation,
ranked by personal loss vs. gain to social objective

We see that subjects are price sensitive. They are more willing to sacrifice own payoffs for social objectives when it is relatively cheap to do so. The graphs are inverse U-shaped, with subjects choosing inexpensive vectors much more often (50%) than expensive vectors (10%).

We further observe the group divisions affect subjects' willingness to pay for social objectives. There is little difference for group treatment YOU-OWN matches and the asocial control, seen in the top panel of Figure 4. But the YOU-OTHER trials, shown in the bottom panel, indicate less willingness to pay for fair or social welfare maximizing allocations, and greater willingness to pay for competitive allocations. Here it appears there is little difference between the political group and the asocial condition.

III.C. *Response Time: Population Averages*

IV. Social Preferences: Population vs. Distribution of Individuals

In this section we identify patterns in individual behavior. We do so by estimating social preferences and relate these patterns to individual characteristics and answers to survey questions.

IV.A. *Estimation Strategy*

To analyze social preferences, we first follow the standard method in this field: we posit a utility function for choices over allocations and analyze the discrete choice data. We estimate the parameters of the utility function using a maximum likelihood logit regression. It should be noted that results of this kind obviously depend on the specific form of the utility function. For comparison purposes, we adapt the Fehr & Schmidt (1999) and Charness & Rabin (2002) linear utility function, which allows us to see a range of behavior, including competitive behavior.[16] The goal is to test, given this functional form, whether there are individual differences in utility parameters, which indicate different types of social preferences. We study the distributions of types in different social contexts social identity.

[16] We do not argue that this utility function is the best representation of people's motivations. For example, since it is linear, marginal utility of own income is constant. We adopt it following Charness & Rabin (2002) who show that, nonetheless, it is a useful summary of social preferences.

Suppose individuals have preferences for their own payoffs and preferences for others' payoffs possibly in relation to their own. Individual *i*'s utility is then some function of own and the other's payoffs: $U_i(\pi_i, \pi_j)$. There are many different specifications of $U_i(\pi_i, \pi_j)$ in the literature (e.g., Andreoni & Miller (2002), Bolton & Ockenfels (2000), Fehr & Schmidt (1999)). A person is said to have *social preferences* if this utility function does not reduce to some function $v_i(\pi_i)$.

Suppose an individual's motivation is a linear combination of own payoffs and the divergence between own and other's payoffs. Let

$$U_i(\pi_i, \pi_j) = \beta_i \pi_i + w_i(\pi_i - \pi_j)$$

The weight w_i on relative payoffs ($\pi_i - \pi_j$) may depend on whether *i* earns more or less than *j*. To accommodate this possibility, let $w_i \equiv r\rho_i + s\sigma_i$ where r=1 if $\pi_i - \pi_j \geq 0$ and r=0 otherwise and s=1 if $\pi_j - \pi_i < 0$ and s=0 otherwise. We then have

$$U_i(\pi_i, \pi_j) = \beta_i \pi_i + \rho_i(\pi_i - \pi_j)r + \sigma_i(\pi_j - \pi_i)s$$

We can categorize social preferences as "selfish," "fair," "social welfare maximizing," or competitive, by looking at the various combinations of the parameters, as seen in the chart in Figure 5.

$\beta_i > 0$	$\sigma_i = 0$	$\sigma_i > 0$	$\sigma_i < 0$
$\rho_i = 0$	***Purely Selfish***	***Social Welfare Max***	***Fair/Competitive***
$\rho_i < 0$	***Fair/Soc Welf Max***	***Social Welfare Max***	***Fair***
$\rho_i > 0$	***Competitive***	***Impossible***	***Competitive***

Figure 5. Combinations of Utility Function Parameters yielding Selfish, Social Welfare Maximization, Fair, and Competitive

Given $\beta > 0$, if, $\rho = \sigma = 0$ then there are no social preferences; people are *purely selfish*. If, however, $\rho > 0$ and $\sigma > 0$, then the social preferences are for social welfare maximization, since utility is always increasing in both π_i and π_j. If however $\rho < 0$ and $\sigma < 0$, then social preferences are for "fairness," since utility is always decreasing when *i* more earns than *j* or vice versa. When $\rho > 0$ and $\sigma < 0$, then utility always increases when *i* earns more than *j*; this combination indicates a social preference for status, and we say people with these preferences are *competitive*.

IV.B. Population Estimates

We first ask is to whether social preferences on aggregate depend on the social context. That is, we ask whether subjects are more or less fair, etc., depending on whether they are allocating money to a random other subject, as in the asocial condition, or to an in-group or out-group member in the group treatments. Subjects are presumed to choose according to the same utility function with the same context-specific parameters, with independent and identically distributed error. This exercise follows the estimation strategy in Chen & Li (2009).

We estimate utility function parameters for the asocial control and the two group treatments. There are two group treatments, $c \in$ {Minimal Group, Political}, and two types of matches, $m \in$ {You-Own, You-Other}. We posit the following utility function to estimate the value subject's place on different allocations in different contexts:

$$U_i(\pi_i,\pi_j) = \overline{\beta}_i\pi_i + \overline{\rho}_i(\pi_i - \pi_j)r - \overline{\sigma}_i(\pi_j - \pi_i)s + \beta_{i,c,m}\pi_i cm + \rho_{i,c,m}(\pi_i - \pi_j)rcm - \sigma_{i,c,m}(\pi_j - \pi_i)scm$$

where *c* and *m* are indicators for the group treatment and the type of match, respectively, $(\overline{\beta},\overline{\rho},\overline{\sigma})$ is the vector of parameters for the asocial condition, and $\left(\beta_{i,c,m},\rho_{i,c,m},\sigma_{i,c,m}\right)$ is the vector of weights for $\pi_{i,}$ and $(\pi_{i,}-\pi_{j,})$ for condition *c* and match *m* relative to the asocial control.

Using McFadden's (1974) conditional logistic regression framework, the probability of choosing the top vector depends on the difference in utility between the top vector and the bottom

vector. Specifically, the probability of choosing the top vector for individual *i* facing choice *k* in the logistic regression is modeled as

$$\Lambda_{\mathrm{k}}(\beta,\sigma,\rho|\pi_i,\pi_j,) = \frac{exp\left(\beta(\pi_i^T-\pi_i^B)+\sigma\left((\pi_i^T-\pi_j^T)\mathrm{I}[\pi_i^T>\pi_j^T]\right)-\left((\pi_i^B-\pi_j^B)\mathrm{I}[\pi_i^B>\pi_j^B]\right)+\rho\left((\pi_i^T-\pi_j^T)\mathrm{I}[\pi_i^T\le\pi_j^T]\right)-\left((\pi_i^B-\pi_j^B)\mathrm{I}[\pi_i^B\le\pi_j^B]\right)\right)}{1+exp\left(\beta(\pi_i^T-\pi_i^B)+\sigma\left((\pi_i^T-\pi_j^T)\mathrm{I}[\pi_i^T>\pi_j^T]\right)-\left((\pi_i^B-\pi_j^B)\mathrm{I}[\pi_i^B>\pi_j^B]\right)+\rho\left((\pi_i^T-\pi_j^T)\mathrm{I}[\pi_i^T\le\pi_j^T]\right)-\left((\pi_i^B-\pi_j^B)\mathrm{I}[\pi_i^B\le\pi_j^B]\right)\right)}$$

where the *k* subscript on the payoffs (π_i,π_j) has been suppressed for notational clarity. The likelihood function and the log likelihood function are then, respectively,

$$L(\beta,\sigma,\rho)=\prod_{i=1}^{141}\prod_{k=1}^{26}\Lambda_{\mathrm{k}}(\beta,\sigma,\rho|\pi_i,\pi_j,)^{\mathrm{d_{ki}}}\times\left(1-\Lambda_{\mathrm{k}}(\beta,\sigma,\rho|\pi_i,\pi_j)^{(1-\mathrm{d_{ki}})}\right),$$

$$l(\beta,\sigma,\rho)=\sum_{i=1}^{141}\sum_{k=1}^{26}\mathrm{d_{ki}}\log\Lambda_{\mathrm{k}}(\beta,\sigma,\rho|\pi_i,\pi_j,)+(1-\mathrm{d_{ki}})\log\left(1-\Lambda_{\mathrm{k}}(\beta,\sigma,\rho|\pi_i,\pi_j)\right)$$

The maximum likelihood estimates are the value of $\hat{\beta},\hat{\sigma},\hat{\rho}$ that maximizes $l(\beta,\sigma,\rho)$.

We find that on aggregate subjects exhibit social preferences for fairness. Table 1 reports the full set of population estimates. Following the categorization in the chart in Figure 5, subjects are "fair" in all conditions and for all matches. The magnitudes of the social parameters, however, depend on the condition and the match. The biggest difference is between the You-Own and You-Other parameters in the group treatments. Subjects are significantly fairer in You-Own matches than in You-Other matches, and subjects care more about status in You-Other than in You-Own matches. Specifically, in the asocial condition, participants exhibit preferences for fairness as distinct from social welfare maximization; $\rho = -0.0112$ and $\sigma = -0.00247$. When allocating money to a participant in own group, subjects exhibit higher preferences for fairness in both the minimal group and political group treatments $\rho_{\text{MG,Y-Own}} = -0.140$ and $\rho_{\text{POL,Y-Own}} = -0.0130$. When allocating points to a participant in the other group, the fairness parameter estimate falls, but overall subjects are still exhibiting preferences for fairness, rather than social welfare maximization or competitiveness.

< Table 1 about here. >

IV.C. *Distributions of Social Preferences*

In this section we estimate the distribution of social preferences. Rather than presume there is a single set of utility function parameters that represent the preferences of all individuals, we allow for the possibility that there are different "types" of people, where each "type" has distinct preferences. With our design, we essentially have panel data (multiple choices for each individual), and thus it is possible to estimate a finite mixture model, also called a latent class model. A finite mixture model allow there to be a finite number of "types" in the population, where each "type" is characterized by different parameter values. We first find four "types" that best characterize the data. We then classify individuals into types and estimate the precision with which an individual's choice fit with the estimated type parameters. As we will see below, almost individuals can be classified into one of the four types with probabilities close to 99%.

We estimate four types. Four types is the minimum number that would allow us to identify the four distinct motives modeled in the utility function. Five or more types leads to very small number of individuals in some types. While we estimate four types, it is important to emphasize that it is the data that gives us the utility parameters for each type. That is, there is no presumption, a priori, that the types will map into the four different motives outlined above.

Building on the above specification for the likelihood functions, each parameter of the utility function is now subscripted by *t* to indicate a type. That is, $\beta_t, \sigma_t, \rho_t$ are the three main parameters of interest for type *t*. We further estimate the fraction of the population of each type; that is, the prior probability of an individual being of a particular type. The mixture model then has a total of fifteen parameters to estimate: three utility parameters for each of the four types and three mixing probabilities, where the complement gives us the probability of the fourth type.

For each individual, we model the prior probability of being a type as a logistic regression with a constant. That is the probability of being of type 1, 2 or 3 is

$$\mathrm{p_t}(\theta_1, \theta_2, \theta_3) = \frac{exp(\theta_t)}{1 + \sum_{g=1}^{3} exp(\theta_t)}$$

and $\mathrm{p}_4(\theta_1, \theta_2, \theta_3) = 1 - (\mathrm{p}_1 + \mathrm{p}_2 + \mathrm{p}_3)$. The log likelihood function is then

$l(\beta, \sigma, \rho, \theta) =$

$$\sum_{i=1}^{141} \sum_{k=1}^{26} \prod_{\mathrm{t}=1}^{4} \mathrm{p_t}(\theta) \left(\mathrm{d_{ki}} \log \Lambda_{\mathrm{tk}}(\beta_t, \sigma_t, \rho_t | \pi_i, \pi_j) + (1 - \mathrm{d_{ki}}) \log \left(1 - \Lambda_{\mathrm{tk}}(\beta_t, \sigma_t, \rho_t | \pi_i, \pi_j) \right) \right)$$

Having estimated this model it is now straightforward to estimate the *posterior* probabilities that any person *i* is of type *t*. Under the estimated parameters we can calculate the probability of each choice *k* for person *i* if *i* were type *t* just using $\Lambda_{\mathrm{tk}}(\beta_t, \sigma_t, \rho_t | \pi_i, \pi_j)$. Given the full sequence of choices that person *i* actually made, we can calculate the probability of making those choices if person *i* is type *t* as

$$\Gamma_t(\beta, \sigma, \rho) = \prod_{k=1}^{26} \Lambda_{\mathrm{tk}}(\beta_t, \sigma_t, \rho_t | \pi_i, \pi_j)^{\mathrm{d_{ki}}} \times \left(1 - \Lambda_{\mathrm{tk}}(\beta_t, \sigma_t, \rho_t | \pi_i, \pi_j)^{(1 - \mathrm{d_{ki}})} \right)$$

Using Bayes rule, and using the estimated mixing proportions p_1, p_2, p_3, p_4 as a prior of being type *t*, the posterior probability that *i* is type *t* is just

$$P_t = \frac{\mathrm{p_t} \Gamma_t(\beta, \sigma, \rho)}{\sum_{t=1}^{4} \mathrm{p_t} \Gamma_t(\beta, \sigma, \rho)}$$

We then categorize individuals as type t based on their posterior probability of being type *t*. In particular, we assign *i* type *t* if $P_t = max\{P_1 \ldots P_4\}$.

We find there is a precise division of the population into types, each with distinct social preferences. Table 2 reports the social preferences for four types estimated from subjects' choices in the asocial condition.

<Table 2 about here.>

Following the typology in the chart in Figure 5, we categorize the types as: "selfish," "social welfare maximizing," "fair" and "competitive."

<Table 3 about here.>

Table 3 shows that the posterior probabilities for subjects assigned to a type are above 90% for all but a few subjects. The best estimated type assignment is for the competitive type; each subject designated as competitive has 100% posterior probability for being of this type. Assignment to

"selfish" is almost as precise, with all subjects but one having above a 90% posterior probability of being of this type. "Social welfare maximizers" and "fair" types are only a bit less precisely assigned; this slightly smaller precision is due to the fact that these types exhibit somewhat similar behavior, which is less distinctive than "selfish" and "competitive" behavior.

This estimation gives a precise distribution of the social preferences in our population. In the asocial condition, 25% of subjects are selfish, 36% are social welfare maximizers, 34% are fair, and 5% are competitive.

We now turn to our tests of the identity hypotheses; we ask how group divisions affect the distribution of types in the population. The premise is that people may switch from one "type" to another "type" given the particular social context. A person who is "fair" in the asocial condition, for example, could be "selfish" in the group treatment when allocating income to someone outside his group. We classify each individual's behavior into types in each of the group treatments, by match, as seen in Table 4.

<Tables 4 and 5 about here.>

Table 5 provides the cross-tabulations, showing the switching described above; it gives the number of subjects that are type *x* in the asocial condition but type *y* in a group treatment, by match.

Looking at the changes in behavior across condition, we first see that selfish types in the asocial condition tend to stay as selfish across conditions and matches. We also see that competitive types in the asocial condition are competitive across conditions and matches. For these subjects, their social preferences do not depend on the particular social context.

For the rest of the subjects, social context does matter. Across conditions (asocial vs. groups) we see that many subjects who are "social welfare-maximizing" or "fair" become "competitive" in group treatment YOU-OTHER matches. Within each group treatment, there is a similar pattern. For both the minimal group treatment and the political treatment, most "selfish" subjects in YOU-OWN continue to be "selfish" in YOU-OTHER matches. But there are many

subjects who switch from "fair" or "social welfare maximizing" in YOU-OWN matches to the "competitive" in YOU-OTHER matches.

We find that these switches lead to statistically significantly distributions of types for each combination of condition and match. Table 6 provides the Chi-squared tests.

<Table 6 about here.>

We can discern a pattern in these differences. Comparing the asocial control to the group treatments, we see the difference is relatively small for You-Own matches. There is a shift from social welfare maximizing to fairness: In MG-You-Own matches, compared to the asocial condition, fewer subjects are "social welfare maximizers," 18% vs. 37%, and more subjects are "fair," 50% vs. 33%. For You-Other matches, on the other hand, there is a large difference in the distributions; many more subjects are "selfish" and "competitive." For MG-You-Other matches, 35% of subjects are "selfish" and 21% are competitive. For POL-You-Other matches, 30% of subjects are "selfish" and 16% are competitive. Fewer subjects are "social welfare maximizers," with only 13% in MG You-Other matches and 21% in POL-You Other matches.

Within each group treatment, we easily see that more subjects are competitive vis a vis out-group members than in-group members. In the minimal group treatment, in You-Other matches, 21% of subjects are competitive, compared to 1% in You-Other matches. The pattern in the political treatment is a similar, though less pronounced (16% vs. 4%). For You-Other matches, there is also less "social welfare maximizing" and "fair" behavior.

These results support the basic hypothesis that behavior towards self and others depends on social identity and social context. In summary, overall subjects are "fair," and subjects are more "fair" or less "fair," depending on whether they face an in-group vs. out-group member. But this average behavior masks the wide range of individual behavior. When estimating individual social preferences, we find that about half of the subjects are not fair or social welfare maximizing when allocating money to someone out their group—rather they are selfish or competitive.

IV. D. *Test of Strength of Identity*

In this section we test whether individual strength of identity affects behavior. We compare Democrats, Republicans, and Independents in the political treatment. Recall that subjects are divided into two groups – Democratic and Republican – according to their answers to the political survey. Subjects who answered they were Democrats (Republicans) were assigned to the Democratic (Republican) group. Subjects who answered Independent or "None of the Above" were placed into the Democratic group or the Republican group according to whether they stated they were "closer" to the Democratic party or the Republican party, respectively.

<Table 7 about here.>

Table 7 shows the distribution of subjects' answers to these survey questions, which are shown in the Appendix. Just under half of the subjects are Democrats (48%) and only 13% are Republicans. Independents and None of the Above then make up above one third of our subjects (39%). Of these subjects, 62% are Democratic-leaning.[17] Because they behave similarly (as seen in Table 8) and for ease of exposition, we will call "Independent" any subject who responded as either Independent or None of the Above.

<Table 8 about here.>

In this study, the asocial condition serves as a control for the group treatment, and the minimal group treatment serves as a control for the political treatment. In order test whether individual strength of identity matters to behavior, we need both controls. First, the asocial condition controls for any systematic difference in underlying preferences between people who affiliate with different political parties. It is possible, for example, that affiliation with a political party may reflect some underlying preferences for redistribution. Second, the minimal group treatment controls for any systematic difference in how different people feel about being part of a

[17] Our design does not require two groups of equal size. Subjects are only asked to allocate money to another participant in the experiment, identified as being in of the two groups.

group. Being affiliated with a political party per se, for example, may reflect some underlying idiosyncratic attitude or preference for being a group member or for being part of collective.

Table 9 provides the distributions of types for Democrats, Republicans, and Independents by condition and by match.

<Table 9 about here.>

We first see that in the asocial condition and in the minimal group treatment, there is little difference between Democrats, Republicans, and Independents. We cannot reject that the distributions for all three groups are the same in AS-YOU-OTHER, MG-YOU-OTHER and MG-YOU-OWN (see Table 10).

< Table 10 about here.>

In contrast, in the political treatment Independents have a significantly different distribution than Democrats or Republicans; Independents are less competitive and less selfish when facing a subject from either group. Recall that in the experiment, a Democrat-leaning Independent would be assigned to the Democratic group and shown a screen of YOU-OWN (YOU-OTHER) when allocating to a subject in the Democrat (Republican) group. The reverse would be true for a Republican-leaning Independent. Table 8 shows there is no significant difference in the distribution of types for Democrat or Republican-leaning Independents. We therefore pool all the Independents, and Table 9 shows the distribution for all Independents when allocating money to Democrats or Republicans.

Using the minimal group treatment as a control, we compare the distributions of types among Independents in the minimal group and the political group treatments, and we contrast this comparison with that of Democrats and Republicans. As seen in Table 11, while the political treatment seems to be weaker than the minimal group treatment for the Republicans and for the Democrats, this difference is not statistically significant.

<Table 11 about here.>

We cannot reject that distributions for Democrats and Republicans are the same for both group treatments. At this point, we emphasize again the prevalence of competitive behavior against out-group members. For both Democrats and Republicans, in both treatments a significant percent of subjects are competitive when allocating money to an out-group members: 19% of Democrats are competitive and 17% of Republicans are competitive in You-Other pairings.

Independents, however, are not as competitive in the political treatment. We can reject that Independents have the same distribution in the political treatment as in the minimal group treatment. Among Independents, there are significantly less subjects who are selfish or competitive, only 11% of Independents are competitive when allocating money to Democrats, and only 4% are competitive when allocating money to Republicans. Looking back at Table X, we see that the 11% figure is largely due to Republican-leaning Independents. Democratic-leaning Independents are essentially not competitive against either group.

Thus we conclude that group effects depend on individual identities. The minimal group treatment, which creates groups in the laboratory, essentially starts from the same baseline for all subjects. The political treatment, on the other hand, relies on the subjects' individual political identities and their affinities for the assigned group. The political treatment had less effect on subjects who did not fit as well in their assigned groups. This result supports one of the basic hypotheses of identity economics.

IV. Individual Characteristics, Political Opinions, and Social Preferences

In this section we study the relation between individual demographics, political opinions, and social preferences. As described above, using the mixture model, we classify each subject into a behavioral type, by condition and by match. We now look at whether people with different individual characteristics are more likely to be a particular behavioral type.

We examine first the standard demographic categories of gender. Table 12 shows us that women are less likely to be competitive than men, except in the minimal group treatment against out-group members.

<Table 12 about here.>

We then study the relationship between subjects' political opinions, as reported in answers to the survey in the political group treatment. Table 13 presents the subjects' answers to our survey questions.

<Table 13 about here.>

We are particularly interested in any relationship between whether a subject "favors small government" and social preferences. "Small government" is of course a salient political catch phrase relating to lower taxes and less government spending, and our phrasing mirrored this political position.

V. Conclusion

A main tenant of identity economics is that people's preferences depend on the social context; people more or less consciously divide themselves and others into social categories, and people behave differently given their own identities and the identities of those with whom they are interacting (Akerlof & Kranton (2000, 2010)). Social identity is now recognized as critical to individual decision-making and economic behavior, as evident in a growing set of recent applications: identity research (e..g, behavioral experiments by Oxoby and McLeish (2009) and Chen and Li (2009)) and the empirical studies of women's labor supply (Goldin 2006) mobility and migration (Munshi (2006a, 2006b, 2009) and immigration and assimilation (Bisin et.al. 2008)).

This experiment is direct test that individual identity affects social preferences. It demonstrates that group divisions are salient and can lead to behavior that destroys social welfare, even within a relatively homogeneous and collegial population. We further show that the diversity in social preferences is not due to random idiosyncratic preferences, but is related to

participants' political positions and has roots in a person's social environment. Thus this research supports the call for a wider study of social behavior, with the primary research questions (1) when and under what conditions do people act fairly or harm others, and (2) what are the factors that contribute to different social preferences.

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Tables

Parameters	AS You-Other	MG You-Own	MG You-Other	POL You-Own	POL You-Other
Beta	0.0436***	0.0412***	0.0336***	0.0420***	0.0344***
	(0.00168)	(0.00163)	(0.00146)	(0.00164)	(0.00148)
Rho	-0.0112***	-0.0140***	-0.00342***	-0.0130***	-0.00728***
	(0.000655)	(0.000674)	(0.000573)	(0.000679)	(0.000588)
Sigma	-0.00247**	-0.00168	-0.0108***	-0.00288**	-0.00629***
	(0.00124)	(0.00123)	(0.00136)	(0.00126)	(0.00129)
Observations	36,446				
Standard errors in parentheses					
*** p < 0.01, ** p < 0.05, * p < 0.1					

Table 1.
Social Preference Estimates - All Subjects, by Match and by Condition

Table 2: Results from Mixing Model
Social Preferences and Proportions for Four Types in asocial condition

Parameters	Type 1	Type 2	Type 3	Type 4
Beta	0.152***	0.0655***	0.0312***	0.0367***
	(0.0134)	(0.00441)	(0.00310)	(0.00980)
Rho	-0.00372	-0.0144***	-0.0214***	0.0528***
	(0.00254)	(0.00157)	(0.00138)	(0.0106)
Sigma	0.00489*	0.00544**	-0.00747***	-0.0439***
	(0.00287)	(0.00240)	(0.00240)	(0.0169)
Observations	3,636	3,636	3,636	3,636
Probability of Type	25 %	36 %	34 %	5 %
Type Implied by Parameters	**SELFISH**	**SOCIAL MAX**	**FAIR**	**COMPETITIVE**
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 3:
Posterior Probabilities of Being Classified Type in Asocial Condition

Posterior Probability of:	Obs	Mean	Std. Dev.	Min	2nd Low	Max
SELFISH (Type 1)	35	0.966	0.051	0.725	0.908	0.999
SOCIAL W MAX (Type 2)	52	0.932	0.096	0.541	0.717	0.999
FAIR (Type 3)	47	0.971	0.067	0.588	0.865	1.000
COMPETITIVE (Type 4)	7	1.000	0.000	1.000	1.000	1.000

Table 4: Distribution of Types, by Condition and Match

PANEL A: ASOCIAL

	YOU-OTHER	
Type	Freq.	Percent
SELFISH	35	25
SOCIAL MAXIMIZER	52	37
FAIR	47	33
COMPETITIVE	7	5
Total	141	100

PANEL B: MINIMAL GROUP

	YOU-OWN		YOU-OTHER	
Type	Freq.	Percent	Freq.	Percent
SELFISH	42	30	50	35
SOCIAL MAXIMIZER	26	18	18	13
FAIR	71	50	43	31
COMPETITIVE	2	1	30	21
Total	141	100	141	100

PANEL C: POLITICAL GROUP

	YOU-OWN		YOU-OTHER	
Type	Freq.	Percent	Freq.	Percent
SELFISH	40	28	42	30
SOCIAL MAXIMIZER	38	27	30	21
FAIR	57	40	47	33
COMPETITIVE	6	4	22	16
Total	141	100	141	100

Table 5. Cross Tablulations of Subject Types

	MG: You-Other				
AS: You-Other	SELF	SWM	FAIR	COMP	Total
SELFISH	28	3	0	4	35
SOCIAL WEL MAX	16	17	8	11	52
FAIR	1	5	33	8	47
COMPETITIVE	0	0	0	7	7
Total	45	25	41	30	141

	MG: You-Other				
MG: You-Own	SELF	SWM	FAIR	COMP	Total
SELFISH	34	3	0	4	41
SOCIAL WEL MAX	7	16	2	5	30
FAIR	4	6	39	18	67
COMPETITIVE	0	0	0	3	3
Total	45	25	41	30	141

	POL: You-Other				
POL: You-Own	SELF	SWM	FAIR	COMP	Total
SELFISH	34	5	1	0	40
SOCIAL WEL MAX	4	20	9	5	38
FAIR	4	6	36	11	57
COMPETITIVE	0	1	0	5	6
Total	42	32	46	21	141

Table 6.
X-Squared Test of Differences in Distribution of Types, between conditions/match

Comparison	Test Statistic	** P-Val < 0.05 * P-Val < 0.10
AS: You-Other vs.:		
MG: You-Own	30.23	**
MG: You-Other	104.57	**
POL:You-Own	6.75	*
POL:You-Other	42.85	**
MG: You-Other vs.:		
MG: You-Own	49.20	**
POL: You-Other vs.:		
POL: You-Own	15.99	**
MG: You-Other vs.:		
POL: You-Other	11.79	**
MG: You-Own vs.:		
POL: You-Own	15.99	**

Table 7. Distribution of Political Affiliations and Leanings

POLITICAL CATEGORY	% of Subjects
Democrat – Strong	15
Democrat – Moderate	33
Republican – Strong	0
Republican – Moderate	13
Independent – Dem leaning	13
Independent – Rep leaning	10
None of the Above – Dem leaning	11
None of the Above - Rep leaning	5

Table 8
Distributions for Independents – Democrat Leaning vs. Republican Leaning

	Match with Republican Group Leaning			**Match with Democratic Group** Leaning		
Type	Democrat	Republican	Total	Democrat	Republican	Total
Selfish						
number	9	6	15	11	6	17
Percent	26	29	27	32	29	31
Soc Wel Max						
Number	10	3	13	5	3	8
Percent	29	14	24	15	14	15
Fair						
Number	13	12	25	16	8	24
Percent	38	57	45	47	38	44
Competitive						
Number	2	0	2	2	4	6
Percent	6	0	4	6	19	11
Total						
Number	34	21	55	34	21	55
Percent	100	100	100	100	100	100
Pearson chi2(3) = 3.5339 Pr = 0.316				Pearson chi2(3) = 2.3632 Pr = 0.501		

Table 9. Distributions for Democrats, Republicans, and Independents in MG and POL

	POL: v. Republicans			POL: v. Democrat		
Type	Democrat	Republican	**Independent**	Democrat	Republican	Independent
SELFISH	29	28	27	26	33	33
SW MAX	22	56	24	29	17	13
FAIR	29	17	45	38	33	44
COMPETITIVE	19	0	4	6	17	11
Total	100	100	100	100	100	100

	MG: You-Other			MG: You-Own		
Type	Democrat	Republican	Independent	Democrat	Republican	Independent
SELFISH	38	28	35	26	22	36
SW MAX	16	17	7	21	33	11
FAIR	22	33	40	50	44	53
COMPETITIVE	24	22	18	3	0	0
Total	100	100	100	100	100	100

Table. 10 Chi-squared Tests for Differences in Distributions between Dem, Rep, and Independent in MG Condition

	Test Statistic	p-val <0.05 ** p-val < 0.10*
MG-YOU-OTHER		
Dem vs. Republican	0.08	
Dem vs. Independent	0.21	
Rep vs. Independent	0.15	
MG-YOU-OWN		
Dem vs. Republican	0.06	
Dem vs. Independent	0.12	
Rep vs. Independent	0.53	

Table. 11 Chi-squared Tests for Differences in Distributions between MG and POL for Democrats, Republicans, and Independents.

		Test Stat	** p-val <0.05 * p-val < 0.10
DEMOCRATS			
MG: You-Own	POL: v. Dem	6.45	*
MG: You-Other	POL v. Rep	5.07	
REPUBLICANS			
MG: You-Own	POL: v. Rep	6.04	
MG: You-Other	POL v. Dem	0.45	
INDEPENDENTS			
MG: You-Own	POL: v. Dem	37.23	**
MG: You-Own	POL: v. Rep	13.97	**
MG: You-Other	POL v. Dem	4.08	
MG: You-Other	POL v. Rep	27.9	**
POL: v. Dem	POL v. Rep	8.35	**

Table 12. Female vs. Male Distributions of Types, by Condition and Match

	Female AS: You-Other	Female MG: You-Own	Female MG: You-Other	Female POL: You-Own	Female POL: You-Other
Type	Percent	Percent	Percent	Percent	Percent
Selfish	25	27	33	29	33
SWM	38	20	18	29	23
Fair	34	52	30	42	33
Comp	2	1	20	1	11
Total	100	100	100	100	100

	Male AS: You-Other	Male MG: You-Own	Male MG: You-Other	Male POL: You-Own	Male POL: You-Other
Type	Percent	Percent	Percent	Percent	Percent
Selfish	25	33	42	29	25
SWM	31	17	4	23	19
Fair	33	48	31	38	33
Comp	10	2	23	10	23
Total	100	100	100	100	100

Table 13
Distributions for Supporters of Small vs. Big Government, by Condition and Match

	Small AS: You-Other	**Small MG: You-Own**	**Small MG: You-Other**	**Small POL: You-Own**	**Small POL: You-Other**
Type	Percent	Percent	Percent	Percent	Percent
Selfish	37	32	44	29	29
SWM	37	20	7	39	24
Fair	24	49	32	29	34
Comp	2	0	17	2	12
Total	100	100	100	100	100
	Big AS: You-Other	**Big MG: You-Own**	**Big MG: You-Other**	**Big POL: You-Own**	**Big POL: You-Other**
Type	Percent	Percent	Percent	Percent	Percent
Selfish	20	28	28	28	29
SWM	37	18	19	22	22
Fair	37	51	30	45	32
Comp	6	3	23	5	17
Total	100	100	100	100	100
Chi_2	14.23	0.31	14.00	14.34	0.07
P-Val	0.00	0.96	0.00	0.00	1.00
	Population AS: You-Other	**Population MG: You-Own**	**Population MG: You-Other**	**Population POL: You-Own**	**Population POL: You-Other**
Type	Percent	Percent	Percent	Percent	Percent
Selfish	25	29	33	28	29
SWM	37	18	16	27	23
Fair	33	50	30	40	33
Comp	5	2	21	4	16
Total	100	100	100	100	100

Appendix

Below is the instruction sheet presented to each participant.

PAGE 1

WELCOME!

INSTRUCTIONS

Thank you for participating in this experiment. The object of this investigation is to study how people make decisions. There is no deception in this experiment – and we want you to understand everything about the procedures. If you have any questions at any time, please ask the experiment organizer in the room.

PART I: THE CHOICE TASK

A) During the experiment, you will be presented with a series of choices. For each choice, you will be asked to award points to between either (1) yourself and another participant or (2) two other participants. You will earn the points you allocate to yourself, and the other person will earn the points you allocate to him or her. At the end of the experiment, one of your choices will be selected at random by a computer and the points earned will be converted into payments.

Each decision is independent from the others. Your decisions and outcomes in one choice will not affect your outcomes in any other choice. For each choice, you will be paired with new participants.

Use LEFT and RIGHT arrow keys to make your choices.

PART II and III:

A) INITIAL SURVEY
You will take a brief survey. There are no right or wrong answers. Your answers to these questions will not affect your payments. Please only use the RIGHT and LEFT arrow keys or NUMBER keys as instructed to answer all questions.

B) THE CHOICE TASK
After completing the initial survey, you will once again be presented with a series of choices. You will be anonymously paired with two new participants. These participants will remain the same throughout this part of the experiment. At the end of the experiment, one of your choices will be selected at random by a computer and the points earned will be converted into payments. Each decision is independent from the others. Your decisions and outcomes in one choice will not affect your outcomes in any other choice.

TURN PAGE OVER FOR ADDITIONAL INSTRUCTIONS

PAGE 2

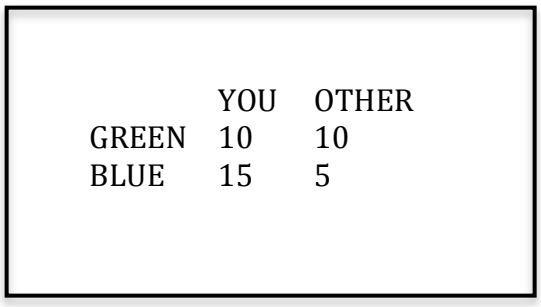
PAYMENT

At the end of the experiment, the points you get will be converted into money by a predetermined conversion factor. This money will be added to your $6 participation payment and given to you at the end of the experiment. Since we want you to focus on completing the experiment and not calculating points to money conversions, we will not inform you of the conversion factor. However, we expect participants to earn between $12 and $18, with an average of $15.

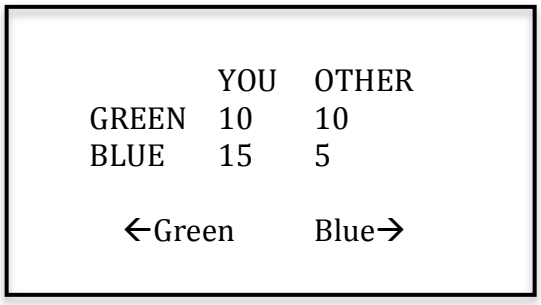
SETUP

You will make all choices on a computer screen. You will make approximately 200 choices.

For each choice, you will see a screen that presents the two different points allocations you can make.



After a one second pause, two arrows will appear so you can pick which allocation you prefer. You can press either 'LEFT' or 'RIGHT' arrow keys on the keyboard to match the arrows presented on the screen. Please only touch the RIGHT or LEFT arrow keys for all choices.



Are there any questions? Press any key to begin.

These are examples of the aesthetic questions used for the Minimal Group Condition survey.

Question 4:

Which painting do you prefer?

Question 8:

Which line of poetry do you prefer?

You friendly boatmen and mechanics! You roughs!

You twain! And all processions moving along the streets!

This is an example of the questions used for the Political Treatment survey.

6. A smaller government would require cuts in spending on domestic programs like Social Security and Medicare.
Which would come closest to your views? I would:

FAVOR CUTS TO HAVE SMALLER GOVERNMENT

NOT FAVOR CUTS TO HAVE SMALLER GOVERNMENT

In the Minimal Group Condition, subjects allocated points to an Own Group Member and an Other Group Member. Taken from a bank of other participant's responses, the Own Group Member answered similarly on the highest number of questions as the subject while the Other Group Member answered most dissimilarly on survey questions. Overall, the Own Group Member answered 76.46% of questions similarly on average and the Other Group Member answered 31.91% of questions differently.

Characteristics of the participant in your OWN GROUP you will be paired with:

- Overall, this OWN GROUP MEMBER answered 83% of survey questions with the same response as you.

- This participant preferred the same painting as you on 6 out of 7 questions.

Characteristics of the participant in the OTHER GROUP you will be paired with:

- Overall, the OTHER GROUP MEMBER answered 29% of survey questions with the same response as you.

- This participant preferred the same poetry lines as you on 1 out of 7 questions.

In the Political Condition, subjects allocated points to an Own Group Member and an Other Group Member. Subject's Own Group Member identified with the same party and answered similarly on at least one out of the five political questions. Likewise, the subject's Other Group Member identified with the opposite party and answered dissimilarly on at least one out of the five political questions. Once an Own and Other Group Member were identified, the subject saw information about their allocation partners. For the Own Group Members, subjects were presented with information about party affiliation and the question on which the subject and Own Group Member answered similarly. If the subject and Own Group Member answered several questions similarly, preference was given, in order, to showing the abortion, gay marriage, Arizona immigration law, Bush tax cut, and government size questions (see **Appendix C.3**). The same applies for the Other Group Member.

Characteristics of the participant in your OWN GROUP you will be paired with:

- This participant identifies with the DEMOCRATIC PARTY.

- This participant believes that gay marriage should be LEGALLY RECOGNIZED.

Characteristics of the participant in the OTHER GROUP you will be paired with:

- This participant identifies with the REPUBLICAN PARTY.

- This participant believes Bush tax cuts should be MADE PERMANENT.

Information about responses on the political survey.

Political Affiliation	Strength of Affiliation	Percent
Republican	Strong	0.00
	Moderate	13.28
	Independent with Republican leaning	10.16
Democratic	Strong	14.84
	Moderate	32.81
	Independent with Democratic leaning	13.28
Other	Republican leaning	5.47
	Democratic Leaning	10.16

Political Question	Response	Percent
Which comes closest to your views on abortion? Abortion should be:	Generally available	60.99
	Under stricter control	30.05
	Not be permitted	8.51
Which comes closest to your views on gay marriage? Gay marriage should be:	Legally recognized	65.25
	Only civil unions, not marriage	24.11
	Not recognized	10.64
An Arizona law requires individuals to produce immigration documents if questioned by the police. Which comes closest to your views on illegal immigration? The law:	Goes too far	51.77
	Is about right	43.26
	Does not go far enough	4.96
The Bush tax cuts for households earning over $250,000 a year were set to expire this year, increasing taxes for these people. Which comes closest to your views? The tax cuts should be:	Made permanent	26.95
	Allowed to expire	73.05
A smaller government would require cuts in spending on domestic programs like Social Security and Medicare. Which would come closest to your views? I would:	Favor cuts to have smaller government	29.08
	Not favor cuts to have smaller government	70.92

Allocation Matrices and Summary Statistics in Asocial Condition.

$\Pi_i > \Pi_j$					
Allocation Number	**(Π_i, Π_j) (Π_i, Π_j)**		**Percent Chose Bottom***	**$\Pi_i / (\Pi_i - \Pi_j)$**	
14	140	100	7.09	-2	
	100	40			
12	140	100	7.91	-1.5	
	80	0			
16	140	100	9.22	-0.5	
	120	40			
19	140	140	14.18	-0.5	
	120	80			
15	140	100	14.18	-0.25	
	120	0			
18	140	140	12.06	-0.16	
	120	0			
1	100	100	24.82	0	
	100	20			
7	140	40	51.06	0.2	
	120	120			
9	140	40	50.00	0.2	
	120	120			
10	140	60	38.57	0.33	
	120	100			
11	140	80	38.30	0.33	
	120	120			
21	160	0	36.43	0.375	
	100	100			
5	120	80	28.57	0.5	
	100	100			
22	160	40	27.66	0.5	
	120	80			
25	200	0	26.62	0.5	
	100	100			
26	200	0	43.57	0.5	
	180	20			
8	140	40	24.82	0.6	
	80	80			
17	140	120	10.64	3	
	80	80			
13	140	100	7.09	NA	
	80	40			
$\Pi_i < \Pi_j$					
Allocation Number	**(Π_i, Π_j) (Π_i, Π_j)**		**Percent Chose Bottom***	**$\Pi_i / (\Pi_i - \Pi_j)$**	
3	100	200	48.9	0	

	100	100			
4	100	200	40.43	0	
	100	140			
2	100	140	30.50	0	
	100	60			
6	140	0	52.14	0.125	
	120	140			
23	160	80	35.00	0.2	
	140	160			
20	140	140	10.07	0.33	
	120	180			
24	160	120	19.15	0.33	
	140	160			

* Asocial Condition You-Other