# **Groupy and Not Groupy Behavior:**

# **Deconstructing Bias in Social Preferences**

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*Abstract:* This paper finds systematically different individual behavior in group settings. Each participant allocates income in two treatments, a minimal group setting and a political group setting. A large set of subjects show ingroup bias in both, indicating that bias depends on group division per se rather than group identity. Other subjects show no bias in either setting. While the average subject is more inequity averse towards ingroup than towards outgroup (replicating previous studies), the average is not representative. Thirty-four percent of subjects have the same social preferences for outgroup and ingroup. On the other hand, twenty percent of subjects destroy income when facing an outgroup participant—sacrificing own income to lower outgroup incomes. The results indicate some people are "groupy" and respond to group divisions, while others are "not groupy" with the same social preferences throughout the experiment. Out-of-laboratory behavior support these categorizations; "not groupy" subjects are less likely to affiliate themselves with a political party, all else equal.

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## I. Introduction

Group conflict is a continual feature of human societies. A long tradition of social psychology studies group divisions, and experiments largely find that people placed in groups favor those within their group.<sup>1</sup> This tradition has recently shaped several areas of experimental economics, with similar results (reviewed below). This paper presents a novel within-subject experiment on group divisions and income allocation that deconstructs this ingroup bias. Participants allocate income in two separate group settings: minimal groups and political groups. The findings are two-fold. First, some people show ingroup bias, while others do not. Second, and relatedly, bias could derive less from a group identity than from an individual tendency, which we call "groupiness," for ingroup bias per se.

The results, from raw data and from structural estimation, present a new picture of individuals, groups, and identity. One set of subjects, whom we call "not groupy," exhibits no bias in either group setting. These subjects treat ingroup and outgroup the same, whether they aim for equal allocations or they aim to gain as much as possible for themselves. Another set of subjects, whom we call "groupy," shows ingroup bias throughout the experiment—in both minimal group and political group treatments— implying that for them the particular group identity does not matter. A significant subset of these latter subjects (twenty percent of the total) are destructive towards outgroups—in

<sup>1.</sup> For a broad overview of social psychology on social conflict and groups, see, for example, Berreby (2008). This paper builds particularly on social identity theory (Tajfel & Turner (1979)) and the experimental tradition of Sherif et. al. (1961) and Tajfel et. al. (1971), where in the latter participants are divided into two groups and then perform an experimental task that involves benefits and costs for individuals in the groups. For an historical review of social identity theory see Hornsey (2008); for a meta-analysis of minimal group experiments in the Tajfel et. al. (1971) tradition, see Pechar & Kranton (2017); for further discussion of social psychology experiments and economics, see Akerlof & Kranton (2010) and especially Chen & Li (2009). Section II provides discusses the economics experimental literature.

both minimal group and political group treatments— sacrificing own income in order to lower the income of the outgroup participant.

We see these outcomes thanks to our with-in subject design and the econometric techniques we adapt to capture possibly different individual social preferences towards subjects in different settings. In the experiment, participants allocate income to themselves and to other subjects in three conditions. In the non-group control, subjects allocate income to themselves and to a random participant in the experiment. In the minimal group treatment, subjects are divided into two groups according to answers to a questionnaire on preferences for lines of poetry, paintings, and landscape images. Each subject then (i) allocates income to self and to a recipient in the subject's own group, and (ii) allocate incomes to self and to a recipient in the other group, presented randomly.<sup>2</sup> The political group treatment is similar with subjects divided into two groups – Democrat and Republican – according to a political questionnaire. Subjects who say they are Democrats (Republicans) are assigned to the Democrat (Republican) group. Subjects who say they have no party affiliation are assigned to Democrat (Republican) group if they say are they are "closer" to the Democrats (Republicans). The order of the group treatments is randomized.<sup>3</sup>

The experiment was cast to test whether people show more ingroup bias when they identify more closely with their assigned groups. Within each political group, the subjects who are party affiliates (Democrat or Republican) arguably identify more with

<sup>2.</sup> Separately, subjects allocate income between an ingroup participant and an outgroup participant. We study the data only from the decisions described in the text, where the participant's decisions affected own income.

<sup>3.</sup> Possible order effects are discussed below.

their group than the political independents. To conduct our test, we compare selfidentified Democrats to the political independents placed in the Democrat group, whom we call D-Independents. We compare these subsets because they are large enough to give power to our statistical tests and they are identical in political opinions and related demographics.<sup>4</sup>

The unexpected findings begin with the different behavior of these two subsets in the minimal group treatment. In both the raw data and in the estimation of social preferences, Democrats show ingroup bias in the minimal group treatment, but D-Independents do not. Furthermore, Democrats show similar bias in the minimal group and the political group treatments, indicating that group identity has only small additional effect on their bias. D-Independents, on the other hand, show increased ingroup bias in the political treatment, but not much. Using the terminology developed below, the Democrats are "groupy;" they show ingroup bias regardless of group identity. D-Independents are "not groupy;" they show little ingroup bias in either setting. Upon reflection, we see this behavior relates to their out-of-laboratory choices. The two sets have the same political opinions (to the extent that we can observe them), but Democrats choose to join a group; they affiliate with the Democratic party.

This marked difference between the Democrats and D-Independents responses to the group treatments leads to our larger investigation of individual differences in group treatment response. For the whole sample, we structurally estimate individual social preferences. Using a latent-class model, we estimate *social-preference types* and classify

<sup>4.</sup> As shown in the on-line Appendix, Republicans and Republican-leaning subjects have similar behavior to their Democratic and Democratic-leaning counterparts. However, in our subject pool there are too few Republicans and Republican-leaning subjects to give power to the statistical tests.

each subject's play in different conditions and pairings according to these types. We then identify subjects whose type does not change when allocating income to ingroup vs. outgroup participants. In the minimal group treatment, only 26% of subjects change their type vis à vis ingroup and outgroup, while 62% of subjects do not change their preferences and thus show no bias. (The remaining 13% do not pass either criterion). The percentage of subjects with no bias drops to 40% when the political treatment is included. Looking across the entire experiment (control, minimal group, and political group), more than a third (34%) of subjects never change their preferences.

The paper therefore reveals robust heterogeneity in behavior in group contexts. "Groupy" people—like many of the Democrats in our sample—respond readily to group divisions; the identity of the group is not critical. Moreover, many of these "groupy" subjects adopt particularly destructive behavior towards their outgroups. "Not groupy" people—like many of the D-Independents in our sample—respond little if at all to group divisions. The characterization of individual subjects is correlated with out-of-laboratory demographics. Across the whole sample, "not groupy" subjects are significantly more likely to be politically independent. They are also more likely have fathers with high levels of education.

The rest of the paper is organized as follows. Section II places the study in the literature and Section III describes the experiment in detail. Section IV presents the raw data, while Section V structurally estimates social preferences and compares Democrats and D-Independents. Section VI studies individual social preferences and identifies "not groupy" and "groupy" subjects. The Conclusion elaborates future research.

# **II. Advancing the Literature**

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This experiment and analysis advance three strands of research. First, this paper advances our understanding of identity and economic choices. Identity here, as in social psychology, describes an individual in terms of a social category or group, such as gender, race, ethnicity, nationality, political party (Akerlof & Kranton 2000, 2010). An increasing number of experiments in economics studies the impact of groups and identity on behavior. One experimental approach employs such "natural groups." In income allocation experiments, race, ethnicity, and political party of subjects affects allocations in, variously, dictator, ultimatum games and charitable giving (e.g., Fershtman & Gneezy (2000), Glaeser, Laibson, Scheinkman, & Souter (2000), Fowler & Kahn (2007), Fong and Luttmer (2009).<sup>5</sup> Experimental work on strategic settings also shows "natural groups" affects play.<sup>6</sup> Following the social psychology literature, a second experimental method creates social categories inside the laboratory, as in Chen & Li's (2009) minimal group experiment on social preferences.<sup>7</sup> The present study uses both methods in a within

<sup>5.</sup> Researchers are now also considering multiple group settings. Studying allocations between members of five university departments, Grimm, V., Utikal, V. and Valmasoni, L. (2017) find evidence of indirect reciprocity; dictators' allocations reflect their correct beliefs about how participants in their own group and participants in other groups will treat them. Tanaka, Tomomi and Camerer, Colin (2017) find that Vietnamese subjects allocate more to Khmer than Chinese recipients and relate the pattern to the perceived differences in warmth and competence of the two.

<sup>6.</sup> Natural groups impact play, for example, in prisoner's dilemma, public goods and trust games (e.g., Goette, Huffman & Meier (2006), Bernard, Fehr, & Fischbacher (2006)). In an experiment studying redistribution, Klor & Shayo (2010) divide subjects according to their university fields of study and find subjects vote more often for the tax rate that favors ingroup members.

<sup>7.</sup> Other economic experiments using arbitrary groups, with different tasks, include Charness, Rigotti & Rustichini (2006), Chen & Chen (2011) and Hargreaves Heap & Zizzo (2009). In a minimal group setting, Guala & Filipin (2017) find that ingroup bias in social preferences can depend on the exact payoff structure. The present paper holds the payoff structure constant and considers differences in bias in social preferences in minimal and natural groups.

subject design that allows us ask for individuals whether a salient group identity matters or not.<sup>8</sup>

Second, the paper contributes to the experimental study of income allocation by uncovering patterns in bias in group settings. Much of the literature on which we build estimates social preferences, which represent the relative value people place on their own and others' incomes, often depending on whether others' incomes are higher or lower than one's own income.<sup>9</sup> The literature largely concludes that on average subjects are inequity averse or seek to maximize total income (e.g. Charness & Rabin (2002), Camerer & Fehr (2004)). Another track of this literature emphasizes individual heterogeneity in social preferences (e.g., Bolton & Ockenfels (2000), Andreoni & Miller (2002), Engelmann & Strober (2008), Fisman, Kariv and Markovits (2007)). Many subjects are inequity averse or maximize total income, but many subjects simply seek to maximize own income and some destroy the income of others (e.g. Levine (1998), Fershtman, Gneezy and List (2012), Iriberri and Rey-Biel (2013)). Experiments on social preferences in groups follow both tracks. In seminal work using a minimal group paradigm, Chen & Li (2009) finds that subjects on average are inequity averse towards ingroup and inequity averse towards outgroup, with a difference in utility parameters implying they suffer less from advantageous inequality and more from disadvantageous inequality vis-à-vis outgroup participants (results we replicate in full). Using real world groups, Klor & Shayo (2010) find heterogeneity of social preferences toward others

<sup>8.</sup> Goette, Huffman & Meier (2012) compare two sets of subjects, one randomly assigned to minimal groups and the other randomly assigned to groups that involve real social interactions leading to social ties. The present paper employs a within subject design and estimates individual patterns across contexts.

<sup>9.</sup> For a critical review of the social preferences literature, see Levitt & List (2007).

within a group treatment. The present paper uncovers a new and different sort of individual heterogeneity: responsiveness to a group division per se.

Finally, this paper employs methods relatively new to experimental economics to study data generated by a within subject design. Several papers in experimental economics have used latent class models in single experimental conditions to discern typical behaviors.<sup>10</sup> To study individual behavior, the present research and Fischbacher, Hertwig and Bruhnin (2013) uses each subject's actual choices and calculate the posterior probability a subject is a type.<sup>11</sup> We then compare subjects' social preference types in the different conditions to determine whether individual preferences change depending on the context.<sup>12</sup> We further consider individual demographic correlates to these patterns.<sup>13</sup>

### III. Description of Experiment and Subject Pool

The experiment was conducted at Duke's Human Neuroeconomics Laboratory,

which follows the experimental economics protocol of no deception. The experiment

<sup>10.</sup> For example, Stahl & Wilson (1995), Stahl (1996), Bosch-Domènech et. al. (2010) estimate the proportion of subjects who reason at different levels. Harrison & Rutström (2009) and Conte, Hay, and Moffatt (2011) allow a mixture of expected utility and prospect theory.

<sup>11.</sup> Fischbacher, Hertwig, and Bruhin (2013) study the relationship between response time and play in dictator games as a window on individual social preferences.

<sup>12.</sup> Criminologists have used latent class models to study patterns in "real-world" behavior; Nagin (2005), for example, uses arrest data to determine which individuals are likely to become career criminals and which only commit crimes as adolescents. As another example with "real-world" panel data, Bruhin et.al. (2015) use a latent class model to discern canonical behavioral responses over time to a blood-donation policy intervention.

<sup>13.</sup> We also estimated a latent class model using the panel data generated by the minimal group and the political group treatments. Model selection criteria favor a nine-type model. These nine types largely match patterns below in our cross-tabulations of subjects as social preference types. We choose to report the social preference estimations since the patterns are easier to interpret. Sets of subjects, for example, are inequity averse towards ingroup but selfish towards outgroup. Furthermore, the reduced form nine-type model does not allow us to see the differential social preferences of party affiliates and non-party affiliates in each condition, which lends external validity to our analysis. The nine type latent class model is reported in the online Appendix and details are available upon request.

Instructions	3-5 Minutes		
Non-Group Cont	rol		
52 Choices	12 Minutes		
Minimal Group or Political G	roup Treatment		
(randomized)			
Survey	2-5 Minutes		
78 Choices	17 Minutes		
Minimal Group or Political Group Treatment			
(randomized)			
Survey	2-5 Minutes		
78 Choices	17 Minutes		
Post Experiment Survey	3-5 Minutes		

involved 141 subjects drawn from the Duke University community.<sup>14</sup>

**Figure 1. Timeline of Experiment** 

Sessions proceeded as in Figure 1. Subjects received instructions on the decisions they would make and practiced using the computer keys that would indicate their choices. (See the Appendix for instructions.) All sessions began with the *non-group* control. Each subject then made decisions in the *minimal group treatment* and the *political group treatment*, with the order randomized across subjects.<sup>15</sup> The post-experiment survey

<sup>14.</sup> Seventy-six percent were Duke students, 11% students from other schools (largely the University of North Carolina, Chapel Hill), and the remainder were non-students (largely staff). Of the students, 86% percent were undergraduates. Eighteen percent of all subjects were born abroad. Sixteen percent were born in North Carolina, 12% in New York or New Jersey, and 6% in California, with the rest of the subjects born in one of 28 states or the District of Columbia. Students reported a wide range of major fields of study, many listing multiple fields. In all, 27 different fields were mentioned, with the most mentioned as follows: biology 21%, psychology/neuroscience 16%, economics 8%. The pool was 65% female.

<sup>15.</sup> Chi-squared tests show no statistically significant difference between the distribution of social preferences for subjects receiving the minimal group treatment first vs. the political group treatment first.

asked for demographic information (e.g., age, sex, major field of study, hometown).

In the control, subjects allocated money to themselves and randomly selected participants in two kinds of pairings: (1) themselves and other subjects, labeled YOU-OTHER, and (2) between two other subjects, labeled OTHER-OTHER.<sup>16</sup> The screens indicated the pairing, as in Figure 2 below for YOU-OTHER. The pairings occurred randomly. For shorthand below, the initials NG (non-group) designate the control.

In each group treatment, subjects were divided into two groups according to answers to survey questions. In the *minimal group treatment*, subjects were presented pairs of lines of poetry, landscape images, and abstract paintings (by Klee or Kandinsky) and asked which item in each pair they preferred. The items were matched (e.g., the landscape images were almost identical) so that this choice is unrelated to individual subject characteristics. The online Appendix provides examples. Subjects were then divided based on their answers to these questions and were given (true) information about similarity, or not, in answers to survey questions.<sup>17</sup> Subjects then allocated money in three kinds of pairings, presented randomly: (1) between themselves and one own-group member, labeled YOU-OWN, (2) between one own-group member and one other-group member, labeled OWN-OTHER. For shorthand below, we refer to pairings (1) and (2) as MG You-Own and MG You-Other, respectively.

<sup>16.</sup> The latter allocations do not affect a subject's own payoffs. The present paper does not use data from the Other-Other pairings or the Own-Other pairings in the group treatments.

<sup>17.</sup> The online 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.



Figure 2. Timing and Presentation of Allocation Choices

The *political treatment* began with a political survey. Subjects were first asked their affiliation as Democrat, Republican, Independent, or None of the Above. The next question asked subjects to refine their political leanings: "strong" or "moderate" for party affiliates, "closer to Democratic" or "closer to Republican" for Independents and None of the Above. Subjects were then asked their opinions on five issues dividing the political spectrum in the United States at that time,<sup>18</sup> as well as on media outlets and religious service attendance. Subjects were then placed into the Democrat group (containing all Democrats and "closer to Republican" subjects) or the Republican group (containing all Republicans and "closer to Republican" subjects). Subjects were given (true) information on similarity and differences in answers to survey questions. Subjects allocated income in three types of pairings, YOU-OWN, YOU-OTHER, and OWN-OTHER, with exactly the format as in the minimal group treatment. Below for shorthand, we refer to the relevant

<sup>18.</sup> Abortion, illegal immigration, size of government, gay marriage, and repeal of the Bush tax cuts.

pairings as POL You-Own and POL You-Other.

For each kind of pairing in each condition, subjects were randomly presented 26 different 2x2 allocation matrices. The Appendix provides the collection of matrices, and Figure 2 provides an example. The rows within each matrix were randomized, and the colors of the rows (blue or green), as well as the left and right keys, were all randomized.

These matrices were constructed following Fehr & Schmidt (1999) and Charness & Rabin (2002) and choices have the following interpretation. Consider *i*'s choice in a normalized matrix  $\begin{bmatrix} \pi_{i'} & \pi_{j'} \end{bmatrix}$ , where *i* earns weakly more in the top row than the bottom. The choice of the top row is consistent with being "selfish." Choosing the bottom row, the subject sacrifices own income and exhibits preferences for: (1) "inequity aversion" if  $|\pi_{i'} - \pi_{j'}| < |\pi_{i,-} - \pi_{j'}|$ , (2) "maximizing total income" if  $\pi_{i'} + \pi_{j'} > \pi_{i,+} + \pi_{j,-}$  (3) "dominance-seeking" if  $\pi_{i'} - \pi_{j'} > \pi_{i,-} - \pi_{j,-}$ <sup>19</sup> A choice could involve more than one objective; in Figure 2, a subject who picks the bottom row would both increase total income and increase equity. Our structural estimation below distinguishes these motives.

In addition to the show-up fee of \$6, subjects received payment for one choice selected at random from each of the three conditions—non-group, minimal group, and political group. Following the protocol of the lab, the choices were translated into dollars, and subjects earned about \$15 for a one-hour session.

Before analyzing the data, we discuss possible experimenter demand effects.

<sup>19.</sup> Previous literature has used some different terminology, e.g., total income maximizing has been called "social welfare maximizing" and "dominance-seeking" has been called "spitefulness" and "competitiveness." We choose total income maximizing since the utility function below is concerned only with the income, and not utility, of others, and we choose dominance-seeking since it describes a subject who wants to decrease another subject's income relative to his own (whereas "competitiveness" in many economic settings leads to efficiency and alternatives such as "inequity loving" do not indicate the direction of the inequity).

Subjects might think experimenters are emphasizing groups and act according to what they think experimenters expect. There are several responses to this concern. First, real-world actors create, highlight, and exploit group divisions, and the aim of this experiment, following a long tradition in social psychology, is to see how people behave in such circumstances. Second, if there is a demand effect, there is apparently no common understanding as to what the demand is; many subjects do not differentiate between ingroup and outgroup, and among those that do, there is heterogeneity in behavior. Finally, if there is a demand effect *per se*, we control for it when comparing the political and the minimal group treatments.<sup>20</sup> Some might argue that the political group treatment would have a higher demand effect, but the political treatment is also more salient by design. If there is such a differential, again there is little commonality among subjects as to the differential demand, and indeed a main result is that for Democrats there is only a small difference between behavior in minimal group and in political group treatments.

#### **IV.** Income Allocations in the Raw Data

This section provides an overview of subjects' choices in the experiment. We simply look at differences in the allocation of income to in vs. outgroup participants.<sup>21</sup> We consider the full sample, then separately Democrats and D-Independents.

< Table 1 about here. >

<sup>20.</sup> As discussed above, the order of the treatments was randomized, and empirically there is no difference in the social preference distributions of the subsets of subjects who received the political group treatment first and those who received the minimal group treatment first.

<sup>21.</sup> In addition to the study of the raw data below, we conducted a factor analysis of subjects' choice data which shows (1) subjects make consistent choices on matrices that are shown, by the analysis, to be similar, (2) subjects have heterogeneous choice patterns, and (3) subjects are sensitive to the losses in own income when choosing allocations. The model and analysis are available upon request.

Table 1 gives the breakdown of the subjects by political party and leanings according to the political treatment survey. Just under half are Democrats (48%) and only 13% are Republicans. Independents and None of the Above make up more than one third of subjects (39%). Of these subjects, 62% are Democratic-leaning, whom we label "D-Independents." As stated above, we only compare Democrats and D-Independents below since (1) they are observationally equivalent in political positions and related demographics (see Appendix), and (2) there are too few Republicans and Republican-leaning subjects to give power to our statistical tests.<sup>22</sup>

Consider the following measure of ingroup bias: In each group treatment *g*, for each subject *i*, take each matrix *m* faced by agent *i*,  $m = \{1, ..., 26\}$ , and the choice of  $\pi_j$ when *j* is in *i*'s group versus when *j* is in the other group. The difference,  $\Delta_i(m)$ , is positive when *i* gives more to the subject in his group for that matrix. In each group treatment *g*, for each subject *i* the average of these differences yields an individual statistic we call *favoritism*:  $d_i(g) = \frac{1}{26} \sum_m \Delta_i(m)$ . The maximum possible favoritism is 69.23.<sup>23</sup> We consider the distributions of favoritism for each group treatment, for all subjects, for Democrats, and for D-Independents.

22. The subject pool appears to be representative of the Duke University community. Overall the majority (by at least 10 percentage points) of North Carolina's population is Democratic or "leans" Democratic, with a concentration of Democrats in the region where Duke is located (<u>http://www.gallup.com/poll/114016/state-states-political-party-affiliation.aspx</u>). Nationally this age cohort is largely Democratic (<u>http://www.people-press.org/2011/11/03/the-generation-gap-and-the-2012-election-</u><u>3/</u>). The distribution of our subject pool also matches the political spectrum of undergraduates at Princeton, which has a similar undergraduate program and is the one peer institution for which we could find survey data (<u>http://www.dailyprincetonian.com/2008/11/04/21969/</u>).

<sup>23.</sup> This amount is calculated by subtracting, for each matrix, the lowest possible income for j from the highest possible income for j.



Figure 3. Distributions of Favoritism: All Subjects, Democrats, D-Independents < Tables 2 and 3 about here. >

Figure 3 provides box and whisker plots of the medians, interquartile ranges, and outliers. Superimposed are white diamonds for the means and the 95% confidence intervals around the means; the means and standard errors are reported in Table 2 and mean comparisons are in Table 3.

The left panel of Figure 3, for the minimal group treatment, illustrates our main findings: (a) for All Subjects and for Democrats, the bias is driven in large part by outliers, but (b) for D-Independents, there is no bias, with virtually the same amounts given to participants in own and other group. Precisely, for All Subjects, both the median and mean are positive, 1.6 and 6.38 respectively, with the mean significantly different than zero. The mean is higher than the median, pulled up the many outliers who allocate between about 30 and 55 more to ingroup participants than to outgroup participants. For Democrats the median and mean favoritism is 3.08 and 8.14 respectively, and many subjects are outliers with high levels of favoritism. D-Independents, on the other hand, have a median of zero and mean favoritism of 1.38, which is not significantly different

than zero, and a tight interquartile range. Table 3 compares the means for Democrats and D-Independents, with a t-test rejecting that they are same.

The right panel of Figure 3 gives the distributions for the political condition, showing marginally higher favoritism for both Democrats and D-Independents, but with similar pattern. The Democrats' median favoritism is 8.85 with a mean of 13.19, while for D-Independents the median is 3.08 with a mean of 5.83. Both means are significantly different than zero, and Table 3 shows the differences in means is significant. Table 3 also shows that, for both Democrats and D-Independents, the mean favoritism in the political group is significantly higher than the respective means for the minimal group. However, t-test fails to reject that the absolute increase in mean for the Democrats from minimal to political group (5.05) is greater than the increase for the D-Independents (4.45). The higher favoritism Democrats exhibit in the political treatment is thus arguably not due the salience of the group but the effect of group treatments per se.

Looking across the whole subject pool, we find that individual favoritism in the political group is directly related to individual favoritism in the minimal group. Figure 4 plots each subject's favoritism in the minimal group on the x-axis and favoritism in the political group on the y-axis. The dashed line is the 45° line. The data show a strong correlation, with a correlation coefficient is 0.63; the linear regression (not shown) has an  $R^2$  of 0.4. Hence, the favoritism measures in the raw data suggest ingroup bias in the minimal group is a good predictor of ingroup bias in the political group.

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Figure 4. Favoritism in Political Group vs. Favoritism in Minimal Group

# V. Structural Estimation of Social Preferences

This section begins our estimations of social preferences. We first replicate for the full sample Chen & Li's (2009) minimal group results on average social preferences. We then consider average social preferences for Democrats and for D-Independents. The estimations support the findings in the raw data above; in particular, D-Independents show no ingroup bias in the minimal group treatment, with social preferences towards ingroup and outgroup. The following section (Section VI) studies individual social preferences, the distribution of individual social preferences, and "groupy" vs. "not groupy" subjects.

# V.A. Utility Function

Suppose an individual *i*'s utility is some function of own and the other's income:  $U_i(\pi_i, \pi_j)$ . To allow for a range of social preferences including dominance-seeking, and for continuity with previous studies, we adapt the specification of Fehr & Schmidt (1999), Charness & Rabin (2002) and Chen & Li (2009). Utility derives from  $\pi_i$  and the divergence between own and other's income,  $(\pi_i - \pi_j)$ , depending on whether  $\pi_i \ge \pi_j$  or the reverse. Let

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

where  $\beta_i$  is the weight on own income,  $\rho_i$  is the weight on income difference when  $\pi_i \ge \pi_j$ , *r* is an indicator variable for  $\pi_i \ge \pi_j$ ,  $\sigma_i$  is the weight on income difference when  $\pi_i < \pi_j$ , and *s* is an indicator variable for  $\pi_i < \pi_j$ .<sup>24</sup>

$\beta_i > 0$	$\sigma_i = 0$	$\sigma_i > 0$	$\sigma_i < 0$
$ ho_i = 0$	Selfish	Total Income Max* if $\beta_i - \sigma_i > 0$	Inequity Averse/ Dominance Seeking
$ ho_i < 0$	Inequity Averse/ Total Income Max* $if \beta_i + \rho_i > 0$	$Total Income Max^*$ $if \beta_i + \rho_i - \sigma_i > 0$	Inequity Averse
$ ho_i > 0$	Dominance-Seeking	Inequity Loving **	Dominance-Seeking

\* The weights on  $\pi_i$  and  $\pi_j$  are not necessarily the same, but since marginal utility is always positive for both own and other's income, a person with such parameters would opt for an allocation that is higher in either or both. This would not be the case for other sets of utility function parameters.

\*\* If  $\rho_i > 0$  and  $\sigma_i > 0$ , then an individual is "inequity loving" in that utility always increases when inequality increases, whether *i*'s income is higher than *j*'s income or vice versa.

#### Figure 5. Social Preferences as Combinations of Utility Function Parameters

Combinations of utility function parameters yield the motives discussed above, as seen in Figure 5 above. Given  $\beta_i > 0$ , if  $\rho_i = \sigma_i = 0$  then an individual places no weight on  $\pi_j$ ; he is then *(purely) selfish*. If  $\rho_i < 0$  and  $\sigma_i > 0$  and  $\beta_i + \rho_i - \sigma_i > 0$ , utility is always increasing in both  $\pi_i$  and  $\pi_j$ , which corresponds to *total income maximizing*. If  $\rho_i < 0$  and  $\sigma_i < 0$ , an individual is *inequity averse*, since utility is always increasing when  $\pi_i$  and  $\pi_j$ 

<sup>24.</sup> While this function is simple and captures social preferences described in the literature, it is linear and thus does not allow for diminishing marginal utility in  $\pi_i$  or  $(\pi_i - \pi_j)$ . To correct for this, we also conduct our analysis for polynomial specifications of  $U_i(\pi_i, \pi_j)$ . This estimation, available upon request, yields more precise parameter estimates, but does not qualitatively change the distributions of social preferences.

are closer together. If  $\rho_i > 0$  and  $\sigma_i < 0$ , then utility always increases when *i*'s income rises relative to *j*'s income, which corresponds to *dominance seeking*.

### V.B. Estimation of Average Social Preferences

We first estimate utility function parameters on average; that is, we assume there is a single set of utility function parameters for all individuals. We estimate a binary choice model for choosing the bottom row in each normalized matrix. Assuming an extreme value distribution for the error terms yields the well-known logit model, which we estimate for each condition/match by maximizing the following likelihood function:

$$L(\beta,\sigma,\rho) = \prod_{i=1}^{141} \prod_{m=1}^{26} \Lambda_{ki} (\beta,\sigma,\rho | \pi_i,\pi_j)^{b_{mi}} \left(1 - \Lambda_{ki} (\beta,\sigma,\rho | \pi_i,\pi_j)\right)^{1-b_{mi}}$$
(1)

where 
$$\Lambda_{mi}(\beta,\sigma,\rho) = exp(U_{mi}^{bot} - U_{mi}^{top})/(1 + exp(U_{mi}^{bot} - U_{mi}^{top}))$$
 and

$$(U_{mi}^{bot} - U_{mi}^{top} | \beta, \sigma, \rho) = \begin{pmatrix} \beta(\pi_{i,m}^{bot} - \pi_{i,m}^{top}) + \\ \rho\left(\left(\pi_{i,m}^{bot} - \pi_{j,m}^{top}\right) \cdot r^{bot} - \left(\pi_{i,m}^{bot} - \pi_{j,m}^{top}\right) \cdot r^{top}\right) + \\ \sigma\left(\left(\pi_{i,m}^{bot} - \pi_{j,m}^{top}\right) \cdot s^{bot} - \left(\pi_{i,m}^{bot} - \pi_{j,m}^{top}\right) \cdot s^{top}\right) + \end{pmatrix}.$$

Tables 4, 5, and 6 give the parameter estimates for the control and group treatment ingroup and outgroup matches for All Subjects, for Democrats, and for D-Independents, respectively.<sup>25</sup>

< Tables 4, 5 and 6 about here. >

Table 4 replicates the findings of Chen & Li's (2009). The parameter estimates are given in panel A; on average, subjects are inequity averse towards ingroup and inequity averse towards outgroup. The parameters show an ingroup bias, with smaller disutility

<sup>25.</sup> Charness and Rabin (2002) and Chen and Li (2009) restrict  $\beta$  to be equal to one and measure  $\rho$  and  $\sigma$  relative to  $\beta$ . The logit model is identified up to a scale parameter, that is var( $\varepsilon$ )=s<sup>2</sup> $\pi^2/3$  where s is a scale parameter. By restricting  $\beta$ =1, they estimate this scale parameter and how it changes across conditions. We take the more traditional approach in labor economics of setting s=1 and estimating  $\beta$ . If the variance is the same across conditions, then changes in  $\beta$  give changes in marginal utility of own income. However, since the logit model is only identified to a scale parameter, the alternative interpretation of changes in  $\beta$  is differences in the variance of the error which is reflected in  $\beta$  as we restrict all scale parameters to 1.

from advantageous inequality and greater disutility from disadvantageous inequality visà-vis outgroup participants. The Wald tests in panel B show that we can reject that participants have the same social preferences across all conditions/pairings except for the comparison MG You-Own vs. POL You-Own.

Tables 5 and 6 shows that Democrats have the same pattern as All-Subjects, but D-Independents do not. Statistically, D-Independents have the same social preferences in the control, and in MG You-Own, and in MG You-Own (see Table 6 panel B for Wald tests). In the political treatment, D-Independents are on average more inequity averse towards the ingroup.

To see whether the parameters suggest a meaningful difference in behavior across conditions/pairings, we perform a simulation exercise. Consider a matrix  $\begin{bmatrix} 200 & 100 \\ X & 150 \end{bmatrix}$  where *X* ranges from 200 to 100. Figure 6 shows, for All Subjects, the probability of a subject choosing the bottom row in different conditions/pairings for different values of *X* as implied by the estimated parameter values. For example, the probability of choosing [150,150] over [200,100] is 34% when the recipient is an ingroup member in the minimal group condition and falls to 21% when the recipient is an outgroup member in the political condition. The plots show this gap for *X* between 150 and 200.



We then conduct this simulation to contrast the implied behavior of Democrats and D-Independents. Because our subject pool is dominated by Democrats, the implied behavior of a Democratic subject is qualitatively similar to All-Subjects. The implied behavior of D-Independents is quite different, as shown in Figure 7. In particular, unlike Democrats, in the minimal group treatment D-Independents pick the bottom matrix at the same rate for ingroup and outgroup subjects.



# VI. Individuals and Social Preference Types across the Experiment

Here we study individual social preferences, finding systematic heterogeneity in how individuals respond to group treatments. In most experiments, and here, individual-specific parameters cannot typically be estimated, since each subject would need to make more decisions than is feasible in an experimental setting to yield precise estimates.<sup>26</sup> As a compromise strategy, we estimate different *types*, where each type has distinct preferences. We then use each subject's actual choices to calculate the posterior probability that the subject is a certain type in each condition/pairing.

VI.A. Latent Class Model and Individual Classification as Type

<sup>26.</sup> Other researchers studying social preferences have calibrated the extent to which individual utility functions match canonical forms. For seminal papers, see Andreoni & Miller (2002) and Fisman, Kariv, & Markovits (2007).

Formally, our method follows: Our design generates panel data (multiple choices for each individual), and thus it is possible to estimate a finite mixture model (a.k.a. latent class model). A mixture model allows for a finite number of types in the population, where each type *t* is characterized by parameters ( $\beta_t$ , $\rho_t$ , $\sigma_t$ ), and each type *t* is a proportion of the population  $p_t$ , where  $\sum_t p_t = 1$ . We estimate four types, i.e., four sets of utility parameters ( $\beta_1$ ,  $\rho_1$ , $\sigma_1$ ), ( $\beta_2$ ,  $\rho_2$ , $\sigma_2$ ), ( $\beta_3$ ,  $\rho_3$ , $\sigma_3$ ), ( $\beta_4$ ,  $\rho_4$ , $\sigma_4$ ), and four proportions ( $p_1$ ,  $p_2$ ,  $p_3$ ,  $p_4$ ). Let  $\mu$  denote the full set of utility parameters and proportions. We choose four because it is the minimum number that could capture four distinct motives. We find estimation of five or more types does not yield qualitatively more information for the purposes of our analysis.<sup>27</sup> While we estimate four types, it is important to emphasize that it is the data that yields the utility parameters and proportions of each type. That is, there is no presumption, a priori, that the types map into the four motives outlined above.

If each individual's type were known, we could estimate a binary choice model for choosing the bottom row in each matrix for individuals of type *t*. Assuming an extreme value distribution for the error terms, as above, the parameters could be estimated for type *t* individuals by maximizing:

$$L(\beta_{t},\sigma_{t},\rho_{t}) = \prod_{i=1}^{141} \prod_{m=1}^{26} \Lambda_{mi} (\beta_{t},\sigma_{t},\rho_{t} | \pi_{i},\pi_{j})^{d_{mi}} (1 - \Lambda_{mi} (\beta_{t},\sigma_{t},\rho_{t} | \pi_{i},\pi_{j}))^{1-d_{mi}}$$
(2)  
where  $\Lambda_{mi} (\beta_{t},\sigma_{t},\rho_{t})$  and  $(U_{mi}^{bot} - U_{mi}^{top} | \beta_{t},\sigma_{t},\rho_{t})$  are defined analogously to (1).  
Since we do not know each individual's type, we condition on an individual being a type  
and then sum over the distribution of types. That is, for four types, we estimate  
 $L(\mu) = \prod_{i=1}^{141} \prod_{m=1}^{26} \prod_{t=1}^{4} p_{t} \Lambda_{mi} (\beta_{t},\sigma_{t},\rho_{t} | \pi_{i},\pi_{j})^{d_{mi}} (1 - \Lambda_{mi} (\beta_{t},\sigma_{t},\rho_{t} | \pi_{i},\pi_{j}))^{1-d_{mi}},$  (3)

<sup>27.</sup> As shown in the online Appendix, the five-type estimation divides one of the types into two sub-types, while the other three have the same parameter estimates and mixing proportions.

where  $(p_1, p_2, p_3, p_4)$  is estimated along with the utility parameters for each type.<sup>28</sup>

Having estimated the model, it is straightforward to calculate the *posterior* probability that a particular subject i is type t. Under the estimated parameters and given the choices that i actually made, the probability of making those choices if i is type t is

$$\Gamma_{t}(\beta,\sigma,\rho) = \prod_{k=1}^{26} \Lambda_{tk}(\beta_{t},\sigma_{t},\rho_{t} \mid \pi_{i},\pi_{j})^{d_{ki}} \times \left(1 - \Lambda_{tk}(\beta_{t},\sigma_{t},\rho_{t} \mid \pi_{i},\pi_{j})^{(1-d_{ki})}\right)$$

Using Bayes' rule with the estimated mixing proportions  $p_t$  as priors of being type t, the posterior probability that i is type t is just

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

We then categorize individuals as type t based on their posterior probability of being type *t*. In particular, we assign *i* type *t* if  $P_t = max\{P_1...P_4\}$ .<sup>29</sup>

#### < Tables 7, 8 and 9 about here. >

While the methodology is different, the results confirm the findings of previous studies of social preferences (Andreoni & Miller (2002), Fisman, Kariv & Markovits (2007)) that most individuals are well-described by a small set of distinct utility types.<sup>30</sup> Table 7 gives the results of the parameter estimation for four types and the corresponding proportions of the population for the control; mapping the parameter values to the typology in Figure 5, the four types are "selfish" (25%), "total income maximizers"

<sup>28.</sup> To insure that  $0 \le p_t \le 1$  for all *t*, the mixing distribution is specified as a logistic function with a constant. That is, three constants,  $\theta_1$ ,  $\theta_2$ , and  $\theta_3$  are estimated and the probability of being of type 1 is then calculated as  $\exp(\theta_1)/(1+\exp(\theta_1)+\exp(\theta_2)+\exp(\theta_3))$  and similarly for the probability of being type 2 or 3.

<sup>29.</sup> For ease of exposition, we present the results where each individual is assigned a type based on the highest posterior probability. All the results below hold when individuals are characterized by a weighted average of types, using individual posterior probabilities for each type (available upon request).

<sup>30.</sup> We also conduct goodness of fit tests (available in the online Appendix) that show the results of the mixing model fits the data much better than the estimates of average social preferences.

(36%), "inequity averse" (34%), and "dominance-seeking" (5%). Table 8 gives the result of categorizing each subject as a type in the control by the posterior probabilities. The first column gives the number of subjects classified as each type when a subject is classified to a type if it is the type with the largest posterior probability. The second column gives the mean posterior probability of subjects assigned to the type, with the third column giving the standard deviation. To give statistical confidence to each categorization, we construct a 90% confidence interval for each individual<sup>31</sup> and in column 4 only include individuals in our count of subjects of each type if with 90% confidence or above the subject is that type. Of the 141 subjects in our experiment, 138 in the control are assigned to a specific type with greater than 90% confidence. The best estimated types are selfish and dominance-seeking; all 35 subjects categorized as selfish and all 7 subjects categorized as selfish had at least a 90% probability of being of that type. Total income maximizers and inequity averse types are just a bit less precisely assigned, due to the fact that these types exhibit closer behavior. Using the same type estimates, Table 9 provides the subject type classifications for the MG You-Other, indicating again the precision of the classifications.<sup>32</sup>

< Tables 10 and 11 about here. >

<sup>31.</sup> To do this, we used the fact that the asymptotically, the parameter distribution is normal with an expected value equal to the estimated parameters and an expected variance-covariance matrix equal to the estimated one. We therefore drew 1,000 sets of parameters from this distribution, calculating the type that each subject's data suggested under each parameter draw. Someone was then classified as a specific type if in at least 900 out of the 1000 set of parameter values the subject's original assignment occurred.

<sup>32.</sup> An alternative method would estimate new utility function parameters for each condition-match. Rather than hold the specification of utility functions constant, this alternative would allow the utility parameters for each estimated type to change across conditions. The results, available upon request, are qualitatively similar to what is presented in the paper.

# VI.B. Ingroup Bias in Distributions of Individual Social Preference Types

With these subject classifications, we return to our questions about biases in social preferences—ingroup versus outgroup. We compare the distributions of types for each condition/pairing, first for all subjects, and then separating out Democrats and D-Independents. For all subjects, Table 10 shows more dominance-seeking and selfish subjects for You-Other pairings than for the control or for You-Own pairings. Moreover, in You-Other pairings, nearly half of all subjects are neither inequity averse nor total income maximizing. In MG You-Other, 30% are selfish and 16% are dominance seeking; in POL You-Other, these percentages rise to 35% and 21% respectively. Table 11 reports the Chi-squared tests for the differences in these distributions.

< Tables 12, 13, 14, and 15 about here. >

Tables 12, 13, 14, and 15 show the distributions for Democrats and D-Independents. For Democrats, for the minimal group treatment, the distributions for You-Own is significantly different than the distribution for You-Other. The proportion of subjects who are selfish is almost the same (26% vs. 29%). The proportions of inequity averse and total income maximizing subjects is somewhat smaller (29% to 22%, 38% to 29%, respectively). The largest difference is the proportion of subjects who are dominance-seeking in MG You-Own vs. MG You-Other (6% vs. 19%). The differences in the type distributions for the political treatment shows a similar, stronger pattern.

For D-Independents, in contrast, the minimal group treatment does not change the distribution of types at all. By the Chi-square tests, we cannot reject that the distributions for the MG You-Own and MG You-Other are the same, and for each of these we cannot reject they are the same as the Non-Group control. In particular, there is no increase in

the percentage of subjects who are dominance seeking. The political treatment, however, does show such an increase (as well as other small changes in the distribution), and we can reject that the distributions are the same.

# VI.C. "Groupy" vs. "Not Groupy" Subjects

Here we examine the full sample to identify the subjects who exhibit little to no ingroup bias across the experiment. We consider each subject's type in each condition/match and consider those subjects who do not switch their utility-type across condition/matches of the experiment. Since the conditions are meant to capture the impact of group divisions, we call the subjects who change type "groupy" and those who do not change type "not groupy."

### < Tables 16 about here. >

We first look at the minimal group condition and ask how many subjects, with 90% confidence, have the same type for You-Own and You-Other pairings, and how many subjects, with 90% confidence, have a different type. Table 16 shows the cross-tabulation of the 123 subjects that satisfy one of these criteria. Thirty-seven subjects are "groupy," and 86 subjects are "not groupy," given by the count of the subjects on and off the diagonal respectively. The diagonal shows that subjects who are selfish in You-Own pairings tend to be selfish in You-Other pairings, and all subjects who are dominance-seeking in You-Own pairings are dominance seeking in You-Other pairings. For the off-diagonals, many subjects who are inequity averse for You-Own pairings become dominance-seeking or selfish in You-Other pairings, and subjects who maximize total income for You-Own pairings switch to another type for You-Other pairings.

To fully distinguish between "groupy" and "not groupy" subjects, we consider increasingly stronger criteria for non-responsiveness to experimental conditions. The above criterion—90% confidence of no change in type between MG You-Own and MG You-Other—is our weakest criterion. A moderate criterion is that a subject does not change types with 90% confidence across minimal group and political group conditions. The strongest criterion is that the subject does not change types with 90% confidence across all conditions of the experiment. Table 17 provides the numbers of subjects classified in these ways.<sup>33</sup> The first column shows that 61% percent of total subjects (86 out of 141) satisfy the weakest criterion for "not groupy," 40% satisfy the moderate criterion, and 34% of the subjects satisfy the strongest criterion. The second column gives the corresponding numbers of "groupy" subjects, defined similarly.

< Table 17 about here. >

Before turning to demographic and other correlates, as a check on our categorization of subjects as "groupy or "not groupy" we return to our raw-data measure of favoritism in income allocation. For the minimal group and the political group

<sup>33.</sup> To construct these subsets, we performed an extension of our Monte Carlo bootstrap described above. We draw from the parameter distribution where the parameters and variance covariance matrix are estimated from in the control. For each draw, we classify each subject using the subject's choices in each condition, scoring whether the individual is classified the same or not for each condition. A subject is considered to be "not groupy" if for at least 900 out of 1000 draws from the parameter distribution the subject has the same classification. A subject is considered to be "groupy" if at least 900 out of 1000 draws the subject is classified differently between in and outgroup.



Figure 8. Distributions of Favoritism: "Not Groupy" and "Groupy" Subjects <br/>
Table 18 and 19 about here. >

conditions, Figure 8 gives favoritism distributions for "not groupy" vs. "groupy" subjects according to the weak, moderate, and strong criteria (moving from left to right in each panel). Table 18 provides the means and t-tests. Figure 8 and the mean comparison show that the different criteria for "not groupy" yield similar results. Furthermore, in the left panel showing the minimal group treatment, almost all "not groupy" subjects show no favoritism; the means and medians are near zero, with little spread. "Groupy" subjects, on the other hand, almost all show favoritism, and there is a large spread, with many subjects exhibiting high levels. Both patterns hold for the political group treatment, with a slight difference that "not groupy" subjects exhibiting small positive levels of favoritism. Table 19 provides the differences in means for the strongly defined "not groupy" vs. "groupy" subjects and show the differences in mean favoritism are significant.

In another tack on the differential behavior of "groupy" vs. "not groupy" subjects, we study response times. We ask whether "groupy" subjects make decisions more slowly, possibly indicating they make decisions more slowly in general or that they need to take the time to pay attention to the designations YOU-OWN vs. YOU-OTHER which appear above the choice matrices (as shown in the screen shots in Figure 2). To do so, we consider the time to make the decision to keep as much as money for self as possible in POL You-Other matches.



Figure 9 displays the average time it takes for subjects classified as selfish in POL You-Other to make their choices for each matrix, contrasting "groupy" and "not groupy" subjects (moderate criterion). The x-axis gives the utility difference between the two rows in a matrix computed from the social preference parameters, and the y-axis gives time in seconds.<sup>34</sup> "Not groupy" subjects choose allocations on every matrix faster than "groupy" subjects. Overall, for these choices, the mean response time for "not groupy" subjects is faster than for groupy subjects at 1.7 seconds versus 2.3 seconds, which are significantly different at well above the 1% level (t = 7.8).

### < Table 20 about here. >

Finally, we consider individual characteristics that could relate to individual groupiness. For example, groupiness could vary by sex or ethnicity. Church going,

<sup>34.</sup> The downward slope of both plots illustrates a well-known relationship from cognitive psychology—the smaller the utility differential between two options, the longer it takes to make a decision.

political party affiliation, and distrust of strangers could be correlated with groupiness. Lower socioeconomic status could be associated with groupiness. For the latter, while we do know subjects' family wealth or income, we can consider parents' education as a proxy. Parents' education could directly relate to individuals' attitudes towards group division. For the 133 subjects classified as "groupy" or "not groupy" by the strong criterion, Table 20 presents these demographics and possible correlates. Sex and African American compositions of "groupy" and "not groupy" subjects are nearly identical; "not groupy" subjects are less likely to be born in the United States but this difference is not statistically significant. "Groupy" subjects are not more likely to distrust strangers and not significantly more likely to attend church. "Not groupy" subjects are significantly more likely to be politically independent (and hence, given the high fraction of Democrats in the sample, less likely to be Democrats). "Not groupy" subjects are more likely to have lived with both parents and have a mother with an advanced though these differences are not statistically significant. "Not groupy" subjects are significantly more likely to have highly educated fathers—62% had fathers with a Master degree or higher while only 44% of "groupy" individuals have fathers with advanced degrees.

# VII. Conclusion

From the sandlot, where a friendly pick-up game can turn into a brawl, to the public square where a democracy movement can turn into a civil war, people form groups that alternatively coalesce or conflict. This experiment studies individual behavior in group settings. It builds on the long history of experiments in social psychology on group conflict and on the established literature in economics on social preferences. The experiment strips away social interactions, punishments, collective benefits and other dynamics that might drive people to help or hurt others in different groups. The simplicity of the task places the focus on individuals' underlying predispositions. With a new design and methods, the paper asks whether group identity and the personal salience of groups relate to their treatment of others, or whether individuals may be more or less prone to treat people differently.

In the experiment, subjects choose allocations of income to self and others. Each subject allocates income in a control and two group settings—minimal group and political group—in both own-group pairings and outgroup pairings. We study the differences in amounts of income given to ingroup and outgroup subjects. Using a finite mixture model, we estimate social preferences allowing for distinct types of social preferences and classify individual subjects as types.

The results reveal systematically different responses to group treatments. For the subject pool as a whole, there are significant average group treatment effects. Democrats exhibit bias in both the minimal group and political group treatments. Not so for D-Independents, who have same politics but are not members of the political party. D-Independents do not change their behavior in the minimal group setting, adopting a bias only in the political setting. However, both the raw data and structural estimation of individual social preferences indicate that many subjects do not exhibit ingroup bias, while a subset shows considerable bias in allocation of income.

The results call for a richer model of bias—one that includes individual characteristics and predilections as key variables. The results speak to the variety of human behavior in situations of group conflict. While some people actively engage in wars and disputes, sacrificing their lives or livelihoods, there are others who seek ways to profit, and yet others who risk everything to protect the persecuted. The experiment reveals this heterogeneity in the lab and gives directions for possible sources of this heterogeneity—individual differences in basic social preferences, individual differences in predispositions towards groups, and differential attachment to groups related to individual identities. Continuing and future research investigates psychometric, demographic, and cultural correlates of "groupy" vs. "not groupy" behavior.<sup>35</sup>

<sup>35.</sup> Supporting the results in the present study, Kranton and Sanders (2017) finds in minimal group M-Turk experiment that participants with the same social preferences towards ingroup and outgroup (and hence would be "not groupy" by the definitions here) are more likely to be politically independent and less likely to be located in a deindustrialized county. The study also finds that behavior does not relate to the Big Five personality measures, indicating "groupiness" is a different phenomenon.

### References

Abbink, Klaus and Abdolkarim Sadrieh. 2009. "The pleasure of being nasty," *Economics Letters* 105(3), pp. 306-308.

Akerlof, George and Rachel Kranton. 2000. "Economics and Identity," *The Quarterly Journal of Economics* CVX (3), August, pp. 715-753.

Akerlof, George and Rachel Kranton. 2010. *Identity Economics*, Princeton: Princeton University Press: 2010.

Alesina, Alberto and Reza Baqir and William Easterly. 1999. "Public Goods and Ethnic Divisions," *The Quarterly Journal of Economics*, Vol. 114, No. 4, pp. 1243-1284.

Alesina, Alberto and Eliana La Ferrara. 2005. "Ethnic Diversity and Economic Performance," *Journal of Economic Literature Vol. XLIII (September 2005), pp. 762–800.* 

Andreoni, James and John Miller. 2002. "Giving according to GARP: An Experimental Test of the Consistence of Preferences for Altruism," *Econometrica* 70(2), pp. 737-753.

Andreoni, James, William Harbaugh and Lise Vesterlund. 2003. "The Carrot or the Stick: Rewards, Punishments, and Cooperation," *American Economic Review* 93(3, pp. 893-902.

Bernhard, Helen, Ernst Fehr, and Urs Fischbacher. 2006. "Group Affiliation and Altruistic Norm Enforcement," *American Economic Review*, 96(2), pp. 217-21.

Bolton, Gary & Axel Ockenfels. 2000. "ERC: A Theory of Equity, Reciprocity, and Competition," *American Economic Review* 90 (1, pp. 166-193.

Bosch-Domènech, Antoni, José García-Montalvo, Rosemarie Nagel and Albert Satorra. 2010. "A Finite Mixture Analysis of Beauty-Contest Data Using Generalized Beta Distributions, *Experimental Economics*, December 13(4), pp. 461-475..

Charness, Gary and Matthew Rabin. 2002. "Understanding Social Preferences with Simple Tests," *The Quarterly Journal of Economics* 117(3), August 2002, pp. 817-869.

Charness, Gary, Luca Rigotti, and Aldo Rustichini. 2007. "Individual Behavior and Group Membership," *American Economic Review* 97(4), pp. 1340-1352.

Chen, Roy and Yan Chen. 2011. "The Potential of Social Identity for Equilibrium Selection." *American Economic Review* 101 (6) October, pp. 2562--2589.

Chen, Yan and Sherry Li. 1999. "Group Identity and Social Preferences," *American Economic Review* 99(1), pp. 431-457.

Conte, Anna & Hey, John D. & Moffatt, Peter G., 2011. "Mixture models of choice under risk," *Journal of Econometrics*, 162(1), May, pp. 79-88.

Dawes, Christopher T., Peter John Loewen, and James H. Fowler. 2011. "Social Preferences and Political Participation," *The Journal of Politics*, 73(3), pp. 845-856.

Easterly, William and Ross Levine. 1997. "Africa's Growth Tragedy: Policies and Ethnic Divisions," *The Quarterly Journal of Economics* (1997) 112 (4): 1203-1250.

Engelmann, Dirk and Martin Strobel. 2004. "Inequality Aversion, Efficiency, and Maximin Preferences in Simple Distribution Experiments," *American Economic Review* 94 (4), pp. 857-869.

Esteban, Joan, Laura Mayoral, and Debraj Rey. 2012. "Ethnicity and Conflict: An Empirical Investigation," *American Economic Review*, 102, pp. 1310-1342.

Falk, Armin, Ernst Fehr, and Urs Fischbacher. 2008. "Testing Theories of Fairness— Intentions Matter," *Games and Economic Behavior* 62(1), pp. 287-303.

Fehr, Ernst and Simon Gächter. 2000. "Fairness and Retaliation: The Economics of Reciprocity," *Journal of Economic Perspectives*, 2000 (14); 159-181.

Fehr, Ernst and Klaus M. Schmidt. 1999. "A Theory of Fairness, Competition, and Cooperation," *Quarterly Journal of Economics* 114(3), pp. 817-68.

Fehr, Ernst and Klaus M. Schmidt. 2009. "On Inequity Aversion: A Reply to Binmore and Shaked," GESY Discussion Paper No. 256.

Fehr, Ernst, Karla Hoff, and Mayuresh Kshetramade. 2008. "Spite and Development," *American Economic Review: Papers & Proceedings* 98(2), 494-499.

Fershtman, Chaim & Uri Gneezy. 2000. "Discrimination in a Segmented Society: An Experimental Approach," *Quarterly Journal of Economics*, 116(1), February, 351-377.

Fershtman, Chaim, Uri Gneezy, and John List. 2012. "Equity Aversion: Social Norms and the Desire to Be Ahead." *AEJ: Microeconomics*, 4(4), 131-44.

Fischbacher, Urs, Ralph Hertwig, and Adrian Bruhin. 2013. "How to Model Heterogeneity in Costly Punishment: Insights from Responders' Response Times," *Journal of Behavioral Decision Making*, 26, pp.462-476.

Fisman, Raymond, Shachar Kariv, and Daniel Markovits. 2007. "Individual Preferences for Giving." *American Economic Review*, 97(5), pp.1858-1876.

Fong, C. and Luttmer, E. (2009), What Determines Giving to Hurricane Katrina Victims? Experimental Evidence on Racial Group Loyalty. *American Economic Journal: Applied Economics*, 1(2): 64-87.

Fowler, James H. and Cindy D. Khan. 2007. "Beyond the Self: Social Identity, Altruism, and Political Participation," *The Journal of Politics*, 69(3), pp. 813-827.

Gintis, Herbert, Samuel Bowles, Robert Boyd, and Ernst Fehr. 2006. *Moral Sentiments and Material* Interests, Cambridge MA: MIT Press, 2006.

Glaeser, Edward and David Laibson, Jose Scheinkman, Christine Souter. 2000. "Measuring Trust," *Quarterly Journal of Economics*, 115(3), pp. 811-846.

Goette, Lorenz, David Huffman, and Stephan Meier. 2006. "The Impact of Group Membership on Cooperation and Norm Enforcement: Evidence Using Random Assignment to Real Social Groups." *American Economic Review*, 96(2), pp. 212-16.

Goette, Lorenz, David Huffman, and Stephan Meier. 2012. "The Impact of Social Ties on Group Interaction: Evidence from Minimal Groups and Randomly Assigned Real Groups." *American Economic Journal: Microeconomics*, 41(1), pp. 101-115.

Grimm, V., Utikal, V. and Valmasoni, L. 2017., Ingroup favoritism and discrimination among multiple outgroups. *Journal of Economic Behavior & Organization*, 143, pp. 254-271.

Guala, F. and Filippin, A. 2017. The Effect of Group Identity on Distributive Choice: Social Preference or Heuristic? *Economic Journal*, 127, pp. 1047-1068.

Harrison, Glenn and Elizabet Rutström. 2009 "Expected Utility *And* Prospect Theory: One Wedding and Decent Funeral," *Experimental Economics* 12(2), June 2009, 133-158.

Hargreaves Heap, Shaun P., and Daniel John Zizzo. 2009. "The Value of Groups." *American Economic Review*, 99(1), pp. 295-323.

Haslam, S. Alexander. 2001. Psychology in Organizations, London: Sage Publications.

Iriberri, Nagore and Pedro Rey-Biel. 2013. "Elicited Beliefs and Social Information in Modified Dictator Games," *Quantitative Economics*, 4, pp. 515–547.

Klor, Esteban and Moses Shayo. 2010. "Social Identity and Preferences over Redistribution," *Journal of Public Economics* 94(3-4), pp. 269-278.

Kranton, Rachel and Seth Sanders. 2017. "Groupy vs. Non Groupy Social Preferences: <u>Personality, Region, and Political Party</u>," *American Economic Review Papers and Proceedings*, 107(5), May 2017, pp. 65-69.

Levine, David K. 1998. "Modeling Altruism and Spitefulness in Experiments," *Review of Economic Dynamics* 1, pp. 593-622.

Nagin, Daniel. 2005. *Group-Based Modeling of Development*. Cambridge: Harvard University Press.

Stahl, D. O. 1996. "Boundedly Rational Rule Learning in a Guessing Game," *Games and Economic Behavior* 16, pp. 303-330.

Stahl, Dale and Paul Wilson. 1995. "On Players' Models of Other Players: Theory and Experimental Evidence," *Games and Economic Behavior* 10, pp. 218-254.

Tajfel, Henri and John Turner, "An Integrative Theory of Intergroup Conflict," in Stephen Worchel and William Austin, eds., *The Social Psychology of Intergroup Relations*, Monterey, CA: Brooks/Cole, 1979.

Tanaka, Tomomi and Camerer, Colin. F. 2017. Trait perceptions influence economic outgroup bias: lab and field evidence from Vietnam. *Experimental Economics* 19(3), pp. 513-534.

SURVEY 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 1. Distribution of Subjects' Political Affiliations and Leanings

Table 2: Mean Favoritism: All Subjects, Democrats, D-Independents

Subset	Mean Favoritism	Mean Favoritism
	MG	POL
All Sample (N=141)	6.38***	11.31***
,	(1.22)	(1.35)
Democrats (N=68)	8.14***	13.19***
	(1.85)	(1.89)
D-Independents (N=34)	1.38	5.83***
•	(1.39)	(2.15)

Comparison	Difference in Mean Favoritism
Dem MG v. D-Ind MG	6.76**
	(2.81)
Dem POL v. D-Ind POL	7.35**
	(3.08)
Dem MG v. Dem POL	5.05***
	(1.64)
D-Ind MG v. D-Ind POL	4.45**
	(1.67)
(Dem MG – Dem POL) v	-0.60
(D-Ind MG – D-Ind POL)	(2.61)
Notes: Standard errors in pa	rentheses; ***p<0.01,**p<0.05, * p<0.1

# Table 4: All Subjects Average Utility Function Estimates

	Non-Group	Minima	l Group	Politica	l Group
Utility Function Parameters		You-Own	You-Other	You-Own	You-Other
Beta	0.0436***	0.0420***	0.0344***	0.0412**	0.0336***
	(0.00168)	(0.00164)	(0.00148)	(0.00163)	(0.00146)
Rho	-0.0112***	-0.0130***	-0.00728***	-0.0140***	-0.00342***
	(0.000655)	(0.000679)	(0.000588)	(0.000674)	(0.000573)
Sigma	-0.00247**	-0.00288**	-0.00629***	-0.00168	-0.0108***
	(0.00124)	(0.00126)	(0.00129)	(0.00123)	(0.00136)
Observations	3,636	3,650	3,645	3,652	3,640
Notes: Standard errors in parenth	neses; *** p<0.01,	** p<0.05, * p<0.1			

# **A. Utility Function Parameters**

		*** P-Val < 0.01
		** P-Val < 0.05
Comparison	Test Statistic	* P-Val < 0.10
Non-Group vs.:		
Minimal Group You-Own	10.81	**
Minimal Group You-Other	27.85	***
Political Group You-Own	28.36	***
Political Group You-Other	110.70	***
Minimal Group		
You-Own vs. You-Other	47.33	***
Political Group		
You-Own vs. You-Other	212.14	***
Minimal Group You-Own vs.		
Political Group You-Own	4.27	
Minimal Group You-Other vs.	20.00	ala ala ala
Political Group You-Other	39.96	* * *

# **B. Wald Tests of Differences in Utility Parameters**

# **Table 5: Democrats Average Utility Function Estimates**

# **A. Utility Function Parameters**

	Non-Group	Minimal	l Group	Politica	l Group
Utility Function Parameters		You-Own	You-Other	You-Own	You-Other
Beta	0.0440***	0.0406***	0.0327***	0.0398***	0.0368***
Rho	(0.0024) -0.0109***	(0.0023) -0.0119***	(0.0021) -0.0054***	-0.0132***	(0.0022) -0.0019**
Sigma	(0.0009) -0.0011	(0.0010) -0.0004	(0.0008) -0.0065***	(0.0010) 0.0017	(0.0008) -0.01116***
B	(0.0018)	(0.0018)	(0.0019)	(0.0018)	(0.0020)
Observations	1755	1760	1755	1759	1750

Average Utility Function Parameters by Condition/Match

# **B.** Wald Tests of Differences in Utility Parameters

		*** P-Val < 0.01
	Test	<b>**</b> P-Val < 0.05
Comparison	Statistic	* P-Val < 0.10
Non-Group vs.:		
Minimal Group You-Own	4.94	
Minimal Group You-Other	26.77	***
Political Group You-Own	16.65	***
Political Group You-Other	79.79	***
_		
Minimal Group		
You-Own vs. You-Other	36.43	***
Political Group		
You-Own vs. You-Other	148.47	***
Minimal Group You-Own vs.		
Political Group You-Own	3.63	
Minimal Group You-Other vs.		
Political Group You-Other	25.78	***

# **Table 6: D-Independents Average Utility Function Estimates**

# A. Utility Function Parameters

	Non-Group	Minimal Group		Political Group	
Utility Function Parameters		You-Own	You-Other	You-Own	You-Other
Beta	0.0430***	0.0395***	0.0381***	0.0421***	0.0328***
	(0.0034)	(0.0032)	(0.0032)	(0.0034)	(0.0029)
Rho	-0.0107***	-0.0120***	-0.0117***	-0.0135***	-0.0074***
	(0.0013)	(0.0013)	(0.0013)	(0.0014)	(0.0012)
Sigma	-0.0052**	-0.0061**	-0.0054**	-0.0049*	-0.0096***
	(0.0026)	(0.0026)	(0.0026)	(0.0026)	(0.0027)
Observations	876	880	880	882	882
Notes: Standard errors in parenth	neses; *** p<0.01,	** p<0.05, * p<0.1			

Average Utility Function Parameters by Condition/Match

	Test	*** P-Val < 0.01
	Statistic	<b>**</b> P-Val < 0.05
Comparison		* P-Val < 0.10
Non-Group vs.:		
Minimal Group You-Own	3.19	
Minimal Group You-Other	4.20	
Political Group You-Own	5.08	
Political Group You-Other	6.97	*
Minimal Group		
You-Own vs. You-Other	0.15	
Political Group		
You-Own vs. You-Other	13.96	***
Minimal Group You-Own vs.		
Political Group You-Own	0.76	

# **B. Wald Tests of Differences in Utility Parameters**

8.18

\*\*

Minimal Group You-Other vs. Political Group You-Other

Parameter Est	imates and Pro	portions for Fou	ır Types versus Po	pulation
Type 1	Type 2	Type 3	Type 4	Population
0.152***	0.0655***	0.0312***	0.0367***	0.0436***
(0.0134)	(0.00441)	(0.00310)	(0.00980)	(0.00168)
-0.00372	-0.0144***	-0.0214***	0.0528***	-0.0112***
(0.00254)	(0.00157)	(0.00138)	(0.0106)	(0.000655)
0.00489*	0.00544**	-0.00747***	-0.0439***	-0.00247**
(0.00287)	(0.00240)	(0.00240)	(0.0169)	(0.00124)
3,636	3,636	3,636	3,636	3,636
25 %	36 %	34 %	5 %	100%
SELFISH	TOTAL INCOME MAX	INEQUITY AVERSE	DOMINANCE SEEKING	INEQUITY AVERSE
	Parameter Est         Type 1         0.152***         (0.0134)         -0.00372         (0.00254)         0.00489*         (0.00287)         3,636         25 %         SELFISH	Parameter Estimates and Pro           Type 1         Type 2           0.152***         0.0655***           (0.0134)         (0.00441)           -0.00372         -0.0144***           (0.00254)         (0.00157)           0.00489*         0.00544**           (0.00287)         (0.00240)           3,636         3,636           25 %         36 %           SELFISH         TOTAL           INCOME         MAX	Parameter Estimates and Proportions for Fou           Type 1         Type 2         Type 3           0.152***         0.0655***         0.0312***           (0.0134)         (0.00441)         (0.00310)           -0.00372         -0.0144***         -0.0214***           (0.00254)         (0.00157)         (0.00138)           0.00489*         0.00544**         -0.00747***           (0.00287)         (0.00240)         (0.00240)           3,636         3,636         3,636           25 %         36 %         34 %           SELFISH         TOTAL         INEQUITY           INCOME         AVERSE           MAX         AVERSE	Parameter Estimates and Proportions for Four Types versus Portions           Type 1         Type 2         Type 3         Type 4           0.152***         0.0655***         0.0312***         0.0367***           (0.0134)         (0.00441)         (0.00310)         (0.00980)           -0.00372         -0.0144***         -0.0214***         0.0528***           (0.00254)         (0.00157)         (0.00138)         (0.0106)           0.00287)         (0.00240)         (0.00240)         (0.0169)           3,636         3,636         3,636         3,636           25 %         36 %         34 %         5 %           SELFISH         TOTAL         INEQUITY         DOMINANCE           MAX         AVERSE         SEEKING

# Table 7. Results from Mixture Model—Control

Notes: Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 8. Individual Type Classifications: Control

Posterior Probability of:	Obs.	Mean	Std. Dev.	Obs > LB 90% CI
SELFISH (Type 1)	35	0.966	0.051	35
TOTAL INCOME MAX (Type 2)	52	0.932	0.096	50
INEQUITY AVERSE (Type 3)	47	0.971	0.067	46
DOMINANCE (Type 4)	7	1.00	0.000	7
All Types	141	0.958	0.077	138

	Table 9.	Individual	Type	<b>Classifications:</b>	Minimal G	roup You-Other
--	----------	------------	------	-------------------------	-----------	----------------

Posterior Probability of:	Obs.	Mean	Std. Dev.	Obs > LB 90% CI
SELFISH (Type 1)	42	0.964	0.096	41
TOTAL INCOME MAX (Type 2)	30	0.823	0.141	22
INEQUITY AVERSE (Type 3)	47	0.957	0.103	44
DOMINANCE (Type 4)	22	0.960	0.116	19
All Types	141	0.940	0.118	126

# Table 10. Distribution of Types, by Condition and MatchALL SUBJECTS

#### PANEL A: NON-GROUP

Туре	Freq.	Percent
SELFISH	35	25
TOTAL INCOME	52	37
INEQUITY AVERSE	47	33
DOMINANCE	7	5
Total	141	100

# PANEL B: MINIMAL GROUP

	YOU	J-OWN	YOU-	OTHER
Туре	Freq.	Percent	Freq.	Percent
SELFISH	40	28	42	30
TOTAL INCOME	38	27	30	21
INEQUITY AVERSE	57	40	47	33
DOMINANCE	6	4	22	16
Total	141	100	141	100

# PANEL C: POLITICAL GROUP

	YOU	J-OWN	YOU	OTHER
Туре	Freq.	Percent	Freq.	Percent
SELFISH	42	30	50	35
TOTAL INCOME	26	18	18	13
INEQUITY AVERSE	71	50	43	31
DOMINANCE	2	1	30	21
Total	141	100	141	100

		*** P-Val < 0.01
		<b>**</b> P-Val < 0.05
Comparison	Test Statistic	* P-Val < 0.10
•		
Non-Group vs.:		
Minimal Group You-Own	3.55	
Minimal Group You-Other	14.30	***
Political Group You-Own	16.80	***
Political Group You-Other	33.64	***
Minimal Group		
You-Own vs. You-Other	11.09	**
Political Group		
You-Own vs. You-Other	33.71	***
Minimal Group You-Own vs.		
Political Group You-Own	5.79	
Minimal Group You-Other vs.		
Political Group You-Other	5.10	

# Table 11. Chi-Squared Test of Differences in Distribution of TypesALL SUBJECTS

PANE	LA: NO	N-GROUP			
YOU-OTHER					
Туре	Freq.	Percent			
SELFISH	15	22			
TOTAL INCOME	27	40			
INEQUITY AVERSE	21	31			
DOMINANCE	5	7			
Total	68	100			
PANEL I	B: MININ	AL GROU	2		
	YOU	J-OWN	YOU-	OTHER	
Туре	Freq.	Percent	Freq.	Percent	
SELFISH	18	26	20	29	
TOTAL INCOME	20	29	15	22	
INEQUITY AVERSE	26	38	20	29	
DOMINANCE	4	6	13	19	
Total	68	100	68	100	
PANEL C	: POLITI	CAL GROU	Р		
	YOU-OWN YOU-OTHER			OTHER	
Туре	Freq.	Percent	Freq.	Percent	
SELFISH	18	26	26	38	
TOTAL INCOME	14	21	11	16	
INEQUITY AVERSE	34	50	15	22	
DOMINANCE	2	3	16	24	
Total	68	100	68	100	

Table 12. Distribution of Social Preferences, by Condition and MatchDEMOCRATS

PANEL A: NON-GROUP					
YOU-OTHER					
Туре	Freq.	Percent			
SELFISH	9	26			
TOTAL INCOME	11	32			
INEQUITY AVERSE	12	35			
DOMINANCE	2	6			
Total	34	100			
PANEL B	: MININ	AL GROU	P		
	YOU	J-OWN	YOU-	OTHER	
Туре	Freq.	Percent	Freq.	Percent	
	_		_		
SELFISH	11	32	9	26	
TOTAL INCOME	5	15	10	29	
INEQUITY AVERSE	16	47	13	38	
DOMINANCE	2	6	2	6	
Total	34	100	34	100	
PANEL C:	POLITI	CAL GROU	JP		
	YOU	J-OWN	YOU-	OTHER	
Туре	Freq.	Percent	Freq.	Percent	
21			1		
SELFISH	12	35	12	35	
TOTAL INCOME	5	15	1	3	
INEQUITY AVERSE	17	50	16	47	
DOMINANCE	0	0	5	15	
Total	34	100	34	100	

# Table 13. Distribution of Social Preferences, by Condition and MatchD-INDEPENDENTS

		*** P-Val < 0.01
	Test	** P-Val < 0.05
Comparison	Statistic	* P-Val < 0.10
Non-Group vs.:		
Minimal Group You-Own	1.96	
Minimal Group You-Other	7.72	*
Political Group You-Own	8.75	**
Political Group You-Other	16.51	***
Minimal Group		
You-Own vs. You-Other	6.37	*
Political Group		
You-Own vs. You-Other	21.08	***
Minimal Group You-Own vs.	<b>2 5</b> 0	
Political Group You-Own	2.79	
Minimal Group You-Other vs.	2.00	
Political Group You-Other	2.96	

# Table 14. Chi-Squared Tests of Differences in Distribution of Types in Condition/Match WITHIN DEMOCRATS

# Table 15. Chi-Squared Tests of Differences in Distribution of Types in Condition/Match WITHIN D-INDEPENDENTS

	Test Statistic	*** P-Val < 0.01 ** P-Val < 0.05
Comparison		* P-Val < 0.10
Non-Group vs.:		
Minimal Group You-Own	3.02	
Minimal Group You-Other	0.09	
Political Group You-Own	5.54	
Political Group You-Other	10.62	**
Minimal Group		
You-Own vs. You-Other	2.18	
Political Group		
You-Own vs. You-Other	7.70	*
Minimal Group You-Own vs		
Political Group You-Own	2.07	
Minimal Group Vou Other vo		
Political Group You-Other	9 39	**
ronnear Oroup rou-Other	7.37	

# Table 16. Cross Tabulations of Individual Subjects 90 Percent Confidence of Type Assignment on/off Diagonal Minimal Group

	Minimal Group You-Other					
		SELFISH	TOTAL INC	INEQUI	DOMIN	Total
<u>Minimal</u> <u>Group</u> You-Own	SELFISH	34	3	1	0	38
	TOT INC MAX	3	12	8	4	27
	INEQUITY A	4	4	36	10	54
	DOMIN	0	0	0	4	4
	Total	41	19	45	18	123

# Table 17. Number of "Not Groupy" and "Groupy" Subjectsby Weak, Moderate, Strong Criteria90% Confidence of Assignment

	Not Groupy	<u>Groupy</u>	Total <u>Classified</u>	Total <u>Subjects</u>
<u>Weak Criterion</u> (MG You Own = MG You Other)	86	37	123	141
Moderate Criterion (MG You Own = MG You Other= POL You-Own = POL You Other)	57	75	132	141
Strong Criterion (MG You Own = MG You Other= POL You-Own = POL You Other= NG)	48	85	133	141

Subsample	Mean Favoritism MG	Mean Favoritism POL
All Subjects N= 141	6.28 (1.22) ***	11.31 (1.35)***
Not Groupy - Weak Criterion N=86	1.10 (0.66)	7.04 (1.35)***
Not Groupy -Moderate Criterion N= 57	1.17 (0.61)*	2.88 (0.93)***
Not Groupy- Strong Criterion N=48	1.19 (0.65)*	2.70 (1.07)**
Groupy - Weak Criterion N = 37	17.86 (3.41)***	22.69 (3.15)***
Groupy - Moderate Criterion N=75	10.74 (2.11)***	18.26 (2.08)
Groupy - Strong Criterion N=85	9.52 (1.90)***	16.33 (1.95)***
Notes: Standard errors in parentheses: *** p<0	0.01. ** p<0.05. * p<0.1	

Table 18.	Mean Favoritism "Groupy" and "Not Groupy" Subjects
	Minimal Group and Political Group

# Table 19: Comparison of Mean Favoritism in Income Allocations"Groupy" vs. "Not Groupy" (Strong Criterion)

Comparison	Difference in Mean Favoritism	
	-8.33***	
Groupy MG v. Not Groupy MG	(2.59)	
Group POL v. Not Groupy POL	13.63***	
1 15	(2.72)	
Notes: Standard errors in parentheses: *** p<	0.01. ** p<0.05. * p<0.1	

	Groupy	Not Groupy	P-Val
	(N=85)	(N=48)	
Female	65%	65%	0.98
African American	19%	19%	0.99
Born in United States	85%	78%	0.32
Mostly Distrust Strangers	68%	69%	0.95
No Religious Attendance	23%	29%	0.42
Political Party			
Republican	14%	13%	0.44
Democrat	54%	40%	0.11
Political Independent *	32%	48%	0.06
Lived with Both Parents	74%	83%	0.22
Mother Advanced Degree	35%	46%	0.24
Father Advanced Degree **	48%	69%	0.02

# Table 20: Demographics"Groupy" vs. "Not Groupy" (Strong Criterion)

# Appendix

# **Instructions to Participants**

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 <u>will not affect your payments</u>. 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.

YOU OT GREEN 10 10 BLUE 15 5	THER )
------------------------------------	-----------

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.

GREEN BLUE	YOU 10 15	OTHER 10 5	
←Green		Blue→	

Are there any questions? Press any key to begin.

A. Matrices w	where $\pi_i \geq \pi_j$ is	in both rows	, ordered by $\Delta \pi_{i,i}/(\Delta \pi_{i,i})$	$-\Delta \pi_i$ )
Matrix Number	$egin{array}{llllllllllllllllllllllllllllllllllll$		Social Objective	$\Delta \pi_{i,j}/(\Delta \pi_{i,j} - \Delta \pi_{j})$
14	140 100	100 40	Dominance	-2
12	140 80	100 0	Dominance	-1.5
16	140 120	100 40	Dominance	-0.5
19	140 120	140 80	Dominance	-0.5
15	140 120	100 0	Dominance	-0.25
18	140 120	140 0	Dominance	-0.16
1	100 100	100 20	Dominance	0
7	140 120	20 100	Inequity Aversion/ Total Income Max	0.2
9	140 120	40 120	Inequity Aversion/ Total Income Max	0.2
10	140 120	60 100	Inequity Aversion/ Total Income Max	0.33
11	140 120	80 120	Inequity Aversion/ Total Income Max	0.33
21	160 100	0 100	Inequity Aversion/ Total Income Max	0.375
5	120 100	80 100	Inequity Aversion	0.5
22	160 120	40 80	Inequity Aversion	0.5
25	200 100	0 100	Inequity Aversion	0.5
26	200 180	0 20	Inequity Aversion	0.5
8	140 80	40 80	Inequity Aversion	0.6
17	140 80	120 80	Inequity Aversion	3
13	140 80	100 40	None	NA

 Table A1. Normalized Matrices and Social Objectives

B. Matrices where  $\pi_i < \pi_j$  in at least one rows ordered by  $\Delta \pi_i / (\Delta \pi_i - \Delta \pi_j)$ 

Matrix Number	$(\pi_i \ , \ \pi_j \ ) \ (\pi'_i \ \pi'_j)$		Social Objective	$\Delta \pi_{i,j}/(\Delta \pi_{i,j} - \Delta \pi_{j})$
2	100	200	Inequity Aversion/	0
3	100	100	Dominance	0

4	100 100	200 140	Inequity Aversion/ Dominance	0
2	100 100	140 60	Dominance	0
6	140 120	0 140	Inequity Aversion/ Total Income Max	0.125
23	160 140	80 160	Inequity Aversion/ Total Income Max	0.2
20	140 120	140 180	Total Income Max	0.33
24	160 140	120 160	Total Income Max	0.33

# Table A2. Demographics and Political Opinions of Democrats and D-Independents

Demographics &	Democrat	D-Independent	T-test of
Distribution of Answers to Political Survey	(N=68)	(N=34)	Difference
Fraction Female	0.72	0.65	0.756
Fraction White	0.40	0.32	0.718
Fraction Asian	0.32	0.44	1.161
Attends religious services at least once a week:			
No	0.81	0.82	0.178
Yes	0.19	0.18	
Would you have less Social Security & Medicare			
for smaller government :			
No	0.82	0.79	0.356
Yes	0.18	0.21	
Bush Tax Cuts Should be:			
Allowed to Expire	0.78	0.88	1.256
Made Permanent	0.22	0.12	
Abortion Should be:			
Generally Available	0.73	0.62	1.214
Under Stricter Control	0.24	0.35	1.252
Not Available	0.03	0.02	0.000
Gay Marriage Should be:			
Legally Recognized	0.75	0.79	0.491
Civil Unions Only	0.16	0.12	0.588
Not Recognized	0.09	0.09	0.000
Arizona Immigration Law:			
Goes Too Far	0.63	0.68	0.435
Is About Right	0.35	0.29	0.589
Does not Go Far Enough	0.02	0.03	0.501