Group Preferences or Group Strategies?  
Untangling the Determinants of Successful Collective Action  
Among Ethnic and Gender Groups*

James Habyarimana  
Georgetown University

Macartan Humphreys  
Columbia University

Daniel N. Posner  
University of California, Los Angeles

Jeremy M. Weinstein  
Stanford University

Abstract
We use experimental methods and a multi-ethnic, mixed gender sample to distinguish between preference-based and strategy-based explanations for how groups succeed in solving collective action problems. Our results suggest that strategic considerations play a more prominent role than preferences in explaining variation across gender and ethnic groups in the choices that players make. Although we find that males have stronger preferences for co-ethnics than for non-co-ethnics, we find only weak evidence that preferences are structured ethnic lines. Strikingly, we find no evidence that preferences are structured along gender lines: when unobserved, neither gender treats the other gender substantively differently. Nonetheless, strategic action can be observed, especially within gendered pairings. We find that co-ethnics are more successful in achieving efficient outcomes and that this is not due to more stringent punishment behavior but rather because of greater consistency in strategies. We find stronger evidence that gender conventions structure the behavior of our subjects. Men, we find, act “chivalrously” towards women, but only when they can be seen to be acting chivalrously. Women expect this better treatment from men, and punish men that fail to treat them well.

* Prepared for delivery at the 2004 Annual Meeting of the American Political Science Association, September 2-5, 2004. Copyright by the American Political Science Association. The authors thank Chris Crabbe for his superb programming work; Dan Young, Donna Horowitz, and Kevin Thelen for their research assistance; the Russell Sage Foundation, the Harry Frank Guggenheim Foundation, the Harvard Academy for International and Area Studies, and the International Institute at UCLA for their financial support; and the staffs of the California Social Science Experimental Laboratory (CASSEL) at UCLA and the Center for International Studies and the Law School Library at USC. Extremely helpful comments were received from participants at the 9th meeting of the Laboratory in Comparative Ethnic Processes (LiCEP), University of Wisconsin, 7-8 May 2004.
Rival Explanations for Successful Collective Action

Why are groups better able to solve collective action problems than unorganized individuals? One account holds that group membership facilitates collective action by structuring actors’ preferences to assign positive values to the welfare of fellow group members (Tajfel, Billig, and Bundy 1971). Media accounts that stress ethnic hatred are particularly beholden to this view. Another hypothesis focuses on the informal social institutions that groups possess. These institutions facilitate collective action by promoting the flow of information about reputations and facilitating sanctioning of non-cooperative members (Plattau 1994; Landa 1994). Whereas the first account emphasizes preferences—people join the collective effort because they care about the welfare of their fellow group members—the second emphasizes strategy—people participate because they fear they will be penalized for not doing so.

Although theoretically distinct, these different mechanisms are interrelated in practice and, in some instances, may even be products of each other. For example, informal institutions may form within groups because there are shared values between group members. Alternatively, in-group preferences may form through the experience of common participation in social institutions. The larger issue, however, is that in many instances these different mechanisms are observationally equivalent. In a simple one-shot public goods game in which each player benefits from the contributions of other players, a cooperative outcome can emerge as a Nash equilibrium in one of two ways. The first – the preference mechanism – is if players are sufficiently other-regarding that the collective action problem simply ceases to exist. The second – the strategy mechanism – arises if players treat the interaction as part of a stream of repeated interactions and use punishment strategies to condition each other’s behavior to maintain the equilibrium. The outcome (cooperation) is the same, but the mechanism through which it is arrived at is totally different.

The observational equivalence of cooperation arrived at through other-regarding preferences and through conventions (or norms of reciprocity) that emerge due to the risk of being penalized for defection in subsequent rounds of the game is a problem for both empirical work and experimental games. Both of these tend to focus on only a short series of players’ actions, yet players themselves may treat their actions as if they were part of a longer terms set of interactions (Hoffman et al 1996). In this paper, we use experimental methods to try to differentiate between these two mechanisms.

We use two approaches. The first approach allows us to distinguish between other-regarding preferences and internalized punishment norms (i.e., strategy). To do this we place subjects in an environment in which they have the option of making choices that affect

---

1 A simple example: Consider a stage game between $i \in \{1,2\}$ with action sets $A_i = \{a,b\}$ and monetary payoffs, $\pi_i : A_i \times A_j \rightarrow \mathbb{R}$ given by $\pi_i(a,b) = 0$, $\pi_i(b,b) = 1$, $\pi_i(a,a) = 3$, $\pi_i(b,a) = 4$. Let player $i$’s utility $u_i : \mathbb{R}^2 \rightarrow \mathbb{R}$ be given by $u_i(\pi_i, \pi_j) = \lambda \pi_i + (1-\lambda) \pi_j$. In this game if $\lambda \leq 3/4$ then $(a,a)$ is a Pareto efficient Nash equilibrium. It is also a Nash equilibrium of a repeat play version of the game. If however $\lambda > 3/4$ then this game is a Prisoners’ dilemma. In this case $(a,a)$ is not an equilibrium of the stage game; but (for sufficiently low discounting) it is still an equilibrium of the repeated game in which punishment off the equilibrium path is used to keep players on the equilibrium path. Below we present analyses of games that parse out these effects.
the welfare of other players. The game employed – the dictator game (described in more
detail below) – has the characteristic of being a simple distributive game that contains a
collective action problem in its repeated form. In its usual one-shot form, the actions of
players depend only on the self- and other-regarding preferences of the offerer. However, in
the repeat play version, they depend also on the success of both players in solving a
collective action problem – to wit, how to arrive at sufficiently generous offers so that the
players enjoy optimal income streams over time. We therefore expect different behavior in
this game between players who view an interaction as isolated (i.e., one-shot) and players
who view their interactions as embedded in an on-going interaction (i.e., repeated play).

How, then, can we tell whether players view the interaction as isolated or as a part of
an on-going relationship? Our strategy to elicit this information is based on varying the
informational context of the game. A key difference between joint strategies to achieve
collective action and unilateral strategies to maximize individual utility, is that the former
require that individuals must have a minimal amount of information linking identity to
behavior in order to condition their actions on the past behavior of other players. Our
strategy rests on the idea that if players have this information they can embed a single play of
a game in a repeat play context; in the absence of this information, they treat single plays as
isolated incidents and do not invoke strategies derived from the iterated game. In practice
this manipulation involves playing (i) some versions of the game in which players are
mutually anonymous, (ii) some in which there is common knowledge about the identity of
the player in the receiver role, (iii) some in which there is common knowledge about the
player in the offerer role only and (iv) some in which the identity of both players is common
knowledge.

The first two manipulations provide a simple way of discovering evidence of other-
regarding preferences. They also provide a means of investigating the extent to which these
other-regarding preferences depend on features such as the ethnic identity and/or gender of
the receivers (and offerers). Since it is common knowledge in both manipulations that the
receiver has no information about the identity of the offerer, it is hard to ascribe the actions
of offerers to expectations of punishment by receivers. The third and fourth
manipulations, in which the receiver has information about the offerer, introduce strategic
considerations for the offerer. We take differences in behavior between versions of the
game when players are observed in their actions (i.e., the third and fourth manipulations) and
those in which they are not (i.e., the first and second) as evidence of internalized
expectations of punishment. Our design also allows us to record how these differences
depend on the ethnic or gender composition of the offerer-receiver pairings.

In the second approach we employ a game – the ultimatum game (described in more detail
below) – that presents a collective action problem even in its unrepeated form. In this game,
players may bear a cost to punish other players for ungenerous actions. The game allows us
to observe punishment actions directly as well as actions that anticipate punishment by other
players. Combining the results of this game with the results of the dictator game with one-
sided information (i.e., the first two versions of the dictator game) allows us to distinguish
(once again) between actions taken in anticipation of punishment and actions taken as a
function of other-regarding preferences.

While it is possible that observation by experimenters does affect the overall level of altruism exhibited it is
less likely that it will alter the relation between ethnicity or gender and altruism.
The use of the ultimatum game and the systematic variation of the ethnic and gender composition of the pairings allows us also to check two other aspects of collective action within groups. First, it allows us to check whether actions across in-group pairs are more consistent than those across out-group pairings, in the sense that actions by one player more accurately anticipate actions by the other player. Second, it allows us to test the hypothesis that co-ethnics are more successful in solving the collective action problem presented by the one shot game than mixed pairings.

In the experiments reported in this paper, we employ a key experimental innovation. In addition to varying the group memberships of subjects, we employ a richer range of manipulations of the information players have about their interacting partners than has been used before. Introducing these controls, and employing these games with a sample of 120 students from universities in California, allows us to study the extent to which success in collective action within and between ethnic and gender groupings can be attributed to preferences or to strategies.

Broadly, we find evidence that players employ strategies but little evidence that they have other regarding questions. Where strategic play is observed, this is typically stronger among gender pairings than among ethnic pairings. In particular, we find strong evidence for a public “chauvinism” effect. In plays of the ultimatum game we find that in-group pairings do indeed play more consistently and perform more successfully that out-group pairings but we find that this is not due to a stronger punishment norm within co-ethnic pairings but rather to a failure-aversion within co-ethnic pairs.

We proceed as follows. In the next section we study the dictator and ultimatum games analytically, showing when and how repeat play versions of these games differ substantively from single play versions. In doing so we provide the microfoundations for the expectations we have just described. In section 3 we describe past work undertaken in this area, noting the main areas in which our research constitutes an innovation. Section 4 describes the experimental structures used and Section 5 reports the results of our enquiry. Section 6 concludes.

II Individual Choices and Collective Action in the Dictator and Ultimatum Games

Consider the following representation of the ultimatum and dictator games:

In the ultimatum game, Player A chooses \( \alpha \in [0,1] \) and Player B then chooses \( \beta \in \{0,1\} \). Allocations to Players A and B are then given by \( \pi_A = \alpha \beta \) and \( \pi_B = (1-\alpha)\beta \) respectively. Utility is given by \( u_i = \pi_i \theta \pi - \pi_i \phi \), with \( \phi \geq 0 \), \( \theta \geq \phi \) and \( \theta + \phi \in (0,1) \).

The conditions on \( \theta \) and \( \phi \) restrict attention to risk averse players who may (or may not) have positively other-regarding but not to the extent that they weight welfare gains to others above gains to themselves. If \( \theta = \phi \) we say that players have strictly egalitarian preferences. The dictator game is identical to the ultimatum game described above with the exception that Player B’s “choice” is constrained to \( \beta \in \{1\} \).
Both games admit a simple analysis. Since, in the ultimatum game, Player B’s utility is increasing in $\beta$, we expect B to select $\beta=1$ in this game as well as in the dictator game.

Anticipating B’s actions (where relevant), A chooses $\alpha^*=\text{argmax}(\alpha^0(1-\alpha^0))=\frac{\theta}{\theta+\phi}$ in both games. In both games, then, the (unique) Nash equilibrium is given by: $(\alpha^*,\beta^*)=(\frac{-\theta}{\theta+\phi},1)$.

Equilibrium utilities are given by: $u_A^*=\frac{\theta^0\phi^0}{(\theta+\phi)^{\alpha^0+\phi}}$ and $u_B^*=\frac{\theta^0\phi^0}{(\theta+\phi)^{\alpha^0+\phi}}$.

Hence with other regarding preferences, rational players in both the dictator and ultimatum games may offer some positive share of the dollar, but reject no share of the dollar.

Now consider a situation in which the players belong to a community in which these games are repeated indefinitely, with, in each period, Nature choosing randomly whether each player will play in the role of player A or player B, and with each player’s actions publicly observable and each player’s utility given by the sum of each period’s utility, discounted by constant discount factor $\delta$. If, in this indefinitely repeated game, each player plays the Nash equilibrium strategy, $(\alpha^*,\beta^*)$, identified above in each round, then, the expected value of all future games for each player are given by:

$$\frac{\gamma}{1-\delta}$$

where $\gamma = .5u_A^* + .5u_B^* = .5\frac{\theta^0\phi^0 + \theta^0 \phi^0}{(\theta+\phi)^{\alpha^0+\phi}}$.

However, the utilitarian social welfare maximizing outcome is given by each player offering $\alpha=.5$ in each round. In this case the expected value of the game for each player is given by:

$$\frac{\gamma}{1-\delta}$$

where $\gamma = .5^0.5^\theta = .5^{\phi+\theta}$.

We use these facts to establish the following claim:

**Claim 1:** Although the one shot Nash equilibrium is Pareto efficient, the iteration of this equilibrium in the repeated dictator and ultimatum games is inefficient whenever players have less than egalitarian preferences. If players have egalitarian preferences, then the iterated one shot Nash equilibrium is equivalent to the social welfare maximizing outcome. That is: $\gamma = \hat{\gamma}$ if $\theta = \phi$, $\gamma > \hat{\gamma}$ if $\theta > \phi$.

**Proof:** See Appendix A.

We have then that even though the basic dictator game is a zero-sum game, its repeated version entails a collective action problem. The ultimatum game, although it contains the possibility for collective action failure (if $\beta=0$) even in the simple game, also embeds a new type of collective action problem in the repeated game. Intuitively, the benefits from collective action in the repeated game arise because players care not simply about the amount of income they receive in each period, but also about the timing of their income gains; by acting cooperatively players can achieve smoother income streams than can be obtained by acting unilaterally.

For sufficiently patient players, this collective action problem can be solved by employing an analogue of the “grim trigger” strategy. This is described in the next claim.
Claim 2: For sufficiently patient players, $\delta \geq \frac{u_A^* - \hat{\gamma}}{u_A - \gamma}$, the following is an equilibrium of the repeat play version of the dictator and ultimatum games: If in all previous rounds all players in role $A$ offered $\alpha \geq 0.5$, then player $i$ offers $\alpha = 0.5$ if playing in role $A$; if in some round some player playing in role $A$ offers $\alpha < 0.5$ then in all subsequent rounds players in role $A$ play $\alpha^*$. Players playing in role $B$ accept all offers made.

Proof: See Appendix A.

Note that collective action of this form requires that players be sufficiently patient, in particular that $\delta \geq \frac{u_A^* - \hat{\gamma}}{u_A - \gamma}$. This condition can always be satisfied for sufficiently high $\delta$, since because $\hat{\gamma} > \gamma$, we have $\frac{u_A^* - \hat{\gamma}}{u_A - \gamma} < 1$. The range of values for which this is satisfied is increasing in $\hat{\gamma}$ and decreasing in $\gamma$. We have then that for players with other-regarding preferences for their partners, we can observe cooperative action even if they are impatient, for players with selfish preferences we observe other regarding behavior only if players are sufficiently patient. However, the difference in the size of offers made between those in this equilibrium and those in the one shot equilibrium are greatest for players that do not have other regarding preferences.

It is important to note that punishment in this equilibrium takes the form of $A$ players making low offers to $B$ players. Except for the case of perfectly egalitarian players, we expect players playing these equilibrium strategies to make higher offers in the repeat play game than they make in the one shot game. Note also that in this equilibrium $B$ players in the ultimatum game do not use the fact that they can punish $A$ players in order to sustain the equilibrium, and we do not expect to observe ultimatum game $B$ players refusing offers made by $A$ players.

This is not however true of all equilibria in the ultimatum game. More forgiving equilibria can be sustained in the ultimatum game by $B$ players refusing to accept low offers made by $A$ players. Such an equilibrium is described in the next claim.

Claim 3: For sufficiently patient players, $\delta \geq \frac{\hat{\gamma}}{2\hat{\gamma} - \gamma}$, the following is an equilibrium of the repeat play version of the ultimatum game. We describe the equilibrium as a machine with three states, beginning in State 1:

**State I** (Equilibrium play): Players in role $A$ offer $\alpha = 0.5$, players in role $B$ accept all offers $\geq 0.5$. The state switches to State II if and only if Player $A$ offers $\alpha < 0.5$.

**State II** (Punishment Phase): Player $B$ rejects the offer of $\alpha < 0.5$ and play returns to State I for the next round. If Player $B$ deviates by accepting the offer, then the state switches to State III.

**State III**: (Collective Action Failure): All player $A$’s offer $\alpha^*$ in all subsequent rounds and all player $B$s accept every offer.
The minimum $\delta$ required to sustain this equilibrium is greater than that required to sustain the equilibrium identified in Claim 1.

This result has an important implication: in the repeated game, B players may refuse low offers in equilibrium in order to punish A players for mean play. In this game this is an indication of the existence of equilibrium play that supports collective action. Even if in the game with perfect information it is observed only in cases of a deviation by A players, punishment of this form is equilibrium play in some sub-games. But punishment of this form is never equilibrium play for the one shot game.

The main results from this inquiry then are that: (risk averse) players who consider a play of the game to be part of a repeated sequence of interactions and who succeed in coordinating on an efficient equilibrium make higher offers than those that consider play to be one shot, and differences in the size of these offers are larger in cases where players do not have positive other-regarding preferences. Punishments in which B players refuse offers by A players are off the equilibrium path in both the one shot and the repeated ultimatum games. However, while such punishments are not consistent with equilibrium play in subgames of the one shot game, they are consistent with subgame perfect Nash equilibrium strategies in subgames of the repeated game.

In the context of the study of group effects and collective action, we expect two things. First, in contexts consistent with repeated play settings, players will make offers to in-group players in excess of those made to out-group members. These offers will also be higher than those made to in-group members in one-shot settings. Second, players will be willing to punish in-group members in contexts consistent with repeat play settings but not in one-shot settings.

### III Previous Results

An advantage of employing these two games – dictator and ultimatum – is that both have been studied extensively by economists and psychologists.\(^3\)

In the standard dictator game, one player (the dictator or offerer) is given a sum of money to divide between herself and a partner (the receiver). Typically the dictator has information about the receiver but the receiver has no information about the dictator. Researchers have employed different versions of the game in which the amount of information offerers have or the amounts of money to be divided are manipulated.

In the standard ultimatum game, the offerer is given an amount of money to allocate between her and a recipient, just as in the dictator game. This time however the receiver has the right to reject the offer made by the offerer. There are two different ways in which the receiver’s choice has been operationalized in the literature. In the standard version, the offerer’s offer is reported to the receiver, and the receiver is then given the opportunity to accept or reject the offer. In the minimum acceptable offer (MAO) version of the game, which we employ in this paper, the receiver simply declares – prior to hearing the offerer's

---

3 See Thaler 1988 and Camerer 2003 for reviews.
A number of variations of the prototypical dictator/ultimatum games have been studied since the early experiments of Guth (1982) and Kahneman et al (1986). These variations include altering the size of the pie to be divided and having subjects play multiple games to examine the impact of experience on subject offers (e.g., Roth et. al 1991; Bolton and Zwick 1995). The results show little evidence of an impact of experience. Furthermore, dictator/ultimatum games played in different parts of the world and have, with very few exceptions, generated results consistent with the general pattern outlined above (Forsythe et al 1994; Roth et. al 1991; Cameron 1995; Henrich et al 2004). Some studies have also tested for effects related to the anonymity of the subjects with respect to the experimenter. The results for the dictator game indicate an attenuation effect when anonymity is introduced with a mean allocation of about 10%, or about half the typical offer in dictator games (Hoffman et. al 1994). However this result has not been replicated in other studies (see Bolton and Zwick 1995).

Of great importance for our work are studies that examine demographic variation in the pairings of offerers and receivers. The most commonly issue has been the effect of gender

---

4 There is however a formal difference between the approaches: by withholding information about Player A’s actions until Player B moves, the game is formally a simultaneous move game, rather than a sequential game as typically assumed. We thank James Fearon for pointing out this feature of the MAO game to us. There are however good reasons to expect that players play as if the game were played sequentially. First, although formally there is an infinity of subgame perfect Nash equilibria to this game, playing 0 in the stage game is a weakly dominant strategy for Player B and a choice of Player A’s ideal is, strictly, Player A’s unique best response to this strategy; second, it is a common result that, contrary to game theoretic predictions, order of play matters even if actions are not communicated (see for example Cooper et al. 1993 and research on “virtual observability” such as Weber and Camerer 2002).
on offers and rejection rates in ultimatum games. Overall small differences have been noted, with women accepting more offers (Eckel and Grossman 1993); receiving higher offers, especially from men (Dufwenberg and Muren 2002; Eckel and Grossman 2001); and being more likely to be classified as “Rawlsian,” despite average offers being similar to males (Andreoni and Vesterlund 1998). With respect to race, Eckel and Grossman (1993) find that black students offer more and reject more often. Glaeser et al (2000) find that white students do not repay the trust of Asian students. And Fershtmann and Gneezy (2001) find that Ashkenazic Jews, whose identities are signaled by their names, receive lower offers in the trust game from all subjects. A number of recent studies have combined variation in both gender and race and find that these two factors are crucial for the initiation and reciprocation of trust (e.g., Burns 2003, Eckel and Wilson 2004; Buchan, Croson and Solnick 2003).

Other variations include age of subjects, levels of development of market institutions, academic major, and the effects of beauty. In general, students studying economics or business make lower offers. The explanation for this appears to be a selection argument, as older students in these degree programs are no different from those starting out. Very young participants typically make lower offers suggesting that socialization is at the root of altruistic behavior.

In this study, we manipulate yet another parameter: the information that players have about each other. In contrast to completely anonymous games, the introduction of information introduces the possibility for players to make judgments about the players with whom they are matched, and these judgments can affect their behavior. As the level of information that players have about each other varies, so too should the strength of these judgments. Many studies find that information held by offerers about recipients increases the level of offers made (Roth 1995, Radner and Schotter 1989). The simplest explanation for this is Schelling’s (1968): “the more we know, the more we care.” However, players may have other-regarding preferences that depend on the identity or characteristics of recipients. So, paraphrasing Schelling, the more we know, the more we discriminate. Information held by receivers about the identity of the offerers may also matter, but in a very different way: it can introduce strategic effects through the invocation of shared norms and social conventions. We test these for effects by varying the level of information that players have about each other across four levels (none, information on offerers only, information on receivers only, information on both).

The closest study to ours in this regard are those of Hoffman et al (1996, 1999) and Bohnet and Frey (1999), in which dictator games are played with experimental manipulation of the information that recipients have about and offerers have about each other. Bohnet and Frey find that when offerers have some information about recipients but recipients have no information about offerers, and when offerers and recipients both have information about each other, the mean allocation is about 50% compared to 26% when offerers have no information about recipients. Contrary to claims in Hoffman et al (1996), they argue that other-regarding preferences (what they term “identifiability-based other regardedness”) and not strategic behavior (what they call “reciprocity-based other regardedness”) are what explain the increased levels of offers in games with higher levels of information. They do note, however, that the invocation of reciprocity norms appear to produce more even splits of the pie.

---

5 One feature of recipients that has been studied in some detail is their attractiveness (as in Andreoni et al, Eckel and Wilson (2003a)). In these games some gender effects have also been discerned.
To our knowledge no study has considered settings in which only one way information about the offerer is employed – a design that allows us to test whether social conventions are triggered even when other-regarding preferences are not. Nor, to our knowledge, has any work been done with these games that simultaneously controls for membership in both ethnic and gender groupings to distinguish between preference-driven and strategy-driven behavior.

IV  Experimental Design

IV.1  Recruitment

Subjects were recruited in two phases from the undergraduate student populations at the University of California, Los Angeles (UCLA) and the University of Southern California (USC).

In the first phase, subjects were explicitly recruited from four ethnic groups: African Americans, Latino/as, Arabs, and Persians. We also invited students from three additional groups (Caucasians, Asians, and Indians/South Asians) to join the project. The leaders of ethnic student organizations from each of these communities (e.g., the Black Students’ Association, El Centro Chicano, the United Arab Society, etc.) were contacted and asked to help recruit subjects from their groups for our experiment. They were told that the experiment brought together students from a number of California-based universities to play interactive games with each other over a computer network. Interested students were instructed to go to a specially designed web site to register for the experiment. At the web site, they were asked to provide their email address, indicate their university affiliation from a pull-down menu, and sign-up for the first session of the experiment.

The second phase of recruiting was added (at UCLA only) because the first phase fell short of meeting our target subject pool. In the second phase, students who had signed up for other experiments at the UCLA-based California Social Science Experimental Laboratory (CASSEL) were asked to fill out a short screening questionnaire as they waited for their experiment to begin. The questionnaire included a question about their ethnic background. Students from our four target groups were then contacted by email and invited to visit our web site to register for the project. Subjects were given the same information about the project as those in the first phase.

A total sample of 120 students was recruited from two campuses in the two phases.6

Neither the subjects nor the group leaders who aided us in recruiting participants in the first phase were told that the purpose of the experiment was to analyze the effects of ethnic group membership. They were told that the purpose of the experiment was to investigate how individuals interact with one another in the context of everyday economics interactions. The student organization leaders were told that they were being contacted because we were interested in recruiting subjects from communities that were traditionally under-represented

---

6 Four of the subjects who originally signed up to participate in the project dropped out.
in experimental research. All communications with the subjects and the student organization leaders referred to the experiment by the deliberately non-leading name “The Human Interaction Project.” In addition, subjects were not informed that the only two universities from which subjects were recruited were UCLA and USC. As noted, they were told that the project involved students from multiple California-based colleges and universities, and the pull-down menu from which they chose their university affiliation when they registered to participate in the project on our web page listed several other universities in addition to UCLA and USC.

There are two primary concerns associated with the sampling procedure. Firstly, membership of student groups could be associated with greater concern for other in-group members or for other individuals in general. Secondly, the CASSEL pool includes players with more dictator/ultimatum game experience. This, we find, has an impact on play; a result that differs from some of the earlier studies looking at the effects of experience on play (Roth et al 1991). In order to address these concerns, a series of covariates were collected from the students during the sign up sessions to enable us to control for observable attributes.

In all, we were able to generate large samples of Asians, Caucasians, and Latino/as. These three groups represent two thirds of our sample and constitute the core set of groups studied when we turn to examine cross-group effects. The remaining one third of the sample was drawn from the African-American, Arab, Indian, and Persian groups. Characteristics of our sample are provided in Table 1 below.

<table>
<thead>
<tr>
<th>Ethnic Group</th>
<th>Asian</th>
<th>Caucasian</th>
<th>Latino</th>
<th>African-American</th>
<th>Arab</th>
<th>Indian</th>
<th>Persian</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UCLA</td>
<td>20</td>
<td>27</td>
<td>19</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>7</td>
<td>83</td>
</tr>
<tr>
<td>USC</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>10</td>
<td>8</td>
<td>1</td>
<td>5</td>
<td>41</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12</td>
<td>18</td>
<td>7</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>47</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>15</td>
<td>18</td>
<td>12</td>
<td>5</td>
<td>4</td>
<td>10</td>
<td>77</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>33</td>
<td>25</td>
<td>14</td>
<td>9</td>
<td>6</td>
<td>12</td>
<td>124</td>
</tr>
</tbody>
</table>

Table 1: Information on the ethnicity, gender and school of subjects

Before the experiment, we collected three different digital images of each subject: a headshot, a brief video clip in which the subject greeted the camera and said “Hello, I am looking forward to playing the game with you,” and another brief video clip in which the subject again greeted the camera, but this time also gave his/her full name (e.g., “Hello, I am looking forward to playing the game with you. My name is John Doe.”). While we allowed some variation in the exact wording of these statements, the meaning conveyed in each of these videos is generally uniform, and no other information other than the way in which the subjects delivered these messages is contained in the video files. All images were collected using the same background, and care was taken to ensure that subjects were not wearing any apparel indicating their school.7 Waiting students were asked to fill in a questionnaire.

---

7 These clothing items included caps and sweatshirts. A few subjects were dropped from the sample as a result of this.
collecting a standard set of socio-economic variables. We are confident that the questions asked (which included ethnic affiliation) did not prime the subjects to ethnicity. Surveys that elicit socio-economic information including ethnicity are relatively common on college campuses.

Because the games were played across different campuses, with UCLA players matched with USC players, and because the students did not know what other university the other players were from, we are quite confident that the use of actual names does not violate any human subject concerns related to post-experiment interactions. One way that the experiment design deals with this is that many different front ends are played in any given session, which implies that individuals see about 9-10 different individuals per session. In addition, subjects do not know the exact offer a particular offerer makes. Rather they know the sum of all offers made by their matched offerers and they only find this out after the second session, which is typically one week later.

IV.2 Protocols

All the games were played on computers in two labs on both campuses. At UCLA the games were played at CASSEL, while at USC, games were played in the law school library computer room. Subjects were asked to sign up for a series of game sessions a week before play. The games were programmed using CASSEL’s multi-stage platform, although substantial modifications had to be made to accommodate the fact that games could not be played simultaneously and would be played across different campuses. The multi-stage platform developed included a facility to store game information, which would be used by matched players on the other campus at different times. The advantage of this was that the scheduling of games was more flexible thereby potentially reducing attrition. The dictator and ultimatum games were played over two sessions, with the offers and minimum acceptable offers being made in the first session and the back end aspects such as guessing of offers being completed in the second session. Playing games over more than one session leads to potential attrition bias as the players that do not show up for the second session are likely to be different in important ways from those that complete their games. In addition, for players that do not show up, game incompletion and the accompanying loss of observations leads to imprecise estimates.

In order to control for pre-game acquaintance, we include a check box for “know this person.” While play across two campuses reduces the likelihood of this sort of contamination, the possibility of cross-campus acquaintances is high in a sample including ethnic minorities.

A particular innovation to the multistage platform was the inclusion of a public information box that contains information about each of the players in that matching (see Figure 1; also see the proctor’s explanation of the public information box, reproduced in Appendix B). The game begins with the player clicking on the messages “meet player 1” and

---

8 Approval for the experiments was secured from the Human Subjects Review Boards at both USC and UCLA.
9 Lack of access to the network on one of the campuses made simultaneous play impossible.
10 For some of the back-end games that involved using information about matched players that did not show up at the second session, the sample average offer/MAO was used and players were informed that their matched counterpart had not shown up.
“meet player 2,” following which either a still photograph would appear, a brief video of the player greeting them would play, or a message would indicate that “no information is available for this player for this round.” The public information box makes the interaction much more realistic by increasing the credibility of the existence of the other player. Its most important effect however is that because both individuals playing observe the exact same information, the public information boxes produces common knowledge. Hence, if we use the public information box to provide information about the identity of the offerer only, it is not simply the case that we provide information to the receiver about the offerer; we also, simultaneously, tell the offerer that the receiver has this information, and the offerer that the receiver knows that the offerer has this information, and so on.

Each session was run by one of the co-authors in conjunction with the programmer. A set of instructions was read out at the beginning of every session with a PowerPoint illustration of the features of the games to be played (see Appendix B). Players were identified for each session with the e-mail address given during the sign-up. The multistage platform would authenticate each player session and games would only begin when the subjects present had all been successfully authenticated. Players were matched with other players using a randomized group-block based matching matrix that ensured that subjects played two games with co-ethnics and four with non-co-ethnics. While it was possible for a subject to be matched with another subject more than once, care was taken to ensure that the information level of the matchings were not all high.

![Figure 1: Front End of the Dictator Game](image)
IV.3 Dictator Game

In the dictator game, (a screenshot of which is shown in Figure 1), both the dictator and receiver are given varying (but common) levels of information about the identities of their partners. Players are informed that they have been given one dollar and that they have the opportunity to choose any allocation of this dollar between themselves and their partner. After meeting the two players, the dictator is asked to enter an integer between 0 and 100 cents representing the amount of the dollar that they wanted to keep. As the dictator enters her offer, the amount that she and her partner will receive is automatically calculated on the screen. After submitting her allocation, the player then sees a new screen corresponding to the next matching. This is repeated until the dictator completes 12 matchings.

As noted, the levels of information used in these games range from no information (shown for player 1 in Figure 1) to a still photo of the player (shown for player 2 in Figure 1) to a video file in which the subject states their name and a greeting (not shown).

IV.4 Ultimatum Game

The ultimatum game is similar to the dictator game described above except that this time offerers are informed that recipients will have the opportunity to accept or reject their offers. They are informed that rejection of the offer implies that both parties will each receive nothing. Offerers then make six offers having observed information in the public-information dialogue. Recipients are asked to state a minimum acceptable allocation of the dollar. Recipients see the same public information box that the matched offerer sees. Figure 2 provides a screenshots of this game.

Figure 2: Front and Back Ends of the Ultimatum Game
v Results

V.1 Other-Regarding Preferences

Consistent with previous work on dictator games, we find evidence that players make strictly positive offers to recipients, contrary to the predictions obtained from a model of selfish income maximizers. The distribution of offers is similar for the case where neither player has information on the identity of the other and the case where only the offerer has information on the identity of the receiver. In both cases, the median offer is positive. Furthermore, consistent with previous results on other-regarding preferences, such as Frey and Bohnet (1997), average offers rise (by 6 percentage points) when offerers have information on the identity of receivers.

This evidence supports the claim that offerers have other-regarding preferences and that these preferences are more pronounced when players know the identity of receivers. We now ask whether these effects depend on the ethnic or gender identities of offerers and receivers – that is, whether players give more to some receivers whose identities are known to them than others. Table 2 presents the average offers for each offerer-receiver ethnic pairing.

Figure 3: Offers in the Dictator Game
The left hand panel shows the case where neither player has information about the other player; the right panel shows the case where the identity of the receiver is common knowledge.
We find evidence of ethnic “main” effects, but little evidence of cross-group effects. Strikingly we find that the group that gives the most (Arabs) also received the least, while the group that gave the least (Indians) also received the most. These main effects are stronger on the offerer side than on the receiver side (compare the marginals in Table 2). Of the three larger groups studied, Caucasians gave significantly less than the other two. Nonetheless, despite these main effects, there is little evidence for overall discrimination by one group in favor or against another. At a somewhat higher level of aggregation there is, contrary to our expectations, no evidence for differences in preferences for in-group versus out-group members. These results are confirmed through regression analysis in which we estimate coefficients for each group-by-group pairing.

<table>
<thead>
<tr>
<th>Receiver's Ethnicity</th>
<th>African-American</th>
<th>Arab</th>
<th>Asian</th>
<th>Caucasian</th>
<th>Indian</th>
<th>Latino/a</th>
<th>Persian</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>African-American</td>
<td>34.38</td>
<td>30</td>
<td>32.5</td>
<td>30.42</td>
<td>27.86</td>
<td>30.07</td>
<td>(7.03)</td>
<td>(3.94)</td>
</tr>
<tr>
<td>Arab</td>
<td>(4.89)</td>
<td>45.67</td>
<td>49.5</td>
<td>47.22</td>
<td>43.75</td>
<td>46.41</td>
<td>(7.50)</td>
<td>(3.86)</td>
</tr>
<tr>
<td>Asian</td>
<td>48.08</td>
<td>31.82</td>
<td>35.76</td>
<td>35.29</td>
<td>29.59</td>
<td>25.75</td>
<td>(7.90)</td>
<td>(6.87)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>(7.39)</td>
<td>(10.66)</td>
<td>(4.21)</td>
<td>(9.13)</td>
<td>(6.34)</td>
<td>(7.99)</td>
<td>(13.73)</td>
<td>(13.73)</td>
</tr>
<tr>
<td>Indian</td>
<td>22.52</td>
<td>18.33</td>
<td>19.63</td>
<td>23.8</td>
<td>25.71</td>
<td>31.11</td>
<td>(9.71)</td>
<td>(9.71)</td>
</tr>
<tr>
<td>Latino/a</td>
<td>(4.95)</td>
<td>(5.73)</td>
<td>(3.08)</td>
<td>(9.13)</td>
<td>(6.34)</td>
<td>(7.99)</td>
<td>(13.73)</td>
<td>(13.73)</td>
</tr>
<tr>
<td>Persian</td>
<td>37.5</td>
<td>28.33</td>
<td>33.31</td>
<td>30</td>
<td>37.75</td>
<td>34.54</td>
<td>(9.13)</td>
<td>(9.13)</td>
</tr>
<tr>
<td>Total</td>
<td>(11.18)</td>
<td>(10.64)</td>
<td>(4.96)</td>
<td>(3.34)</td>
<td>(3.11)</td>
<td>(3.77)</td>
<td>(1.48)</td>
<td>(1.48)</td>
</tr>
</tbody>
</table>

Table 2: Average Offers by Ethnic Group of Offerer and Receiver When Only the Offerer has Information on the Receiver
(Standard errors in parentheses)

The evidence for group-specific other-regarding preferences is even weaker for gender groupings (see Table 3). We see that men and women give about equally on average and, at least in the case where their actions are not observed by the receiver, give no more to either sex. Although Table 3 suggests that men give more to men and women give more to women, but these differences are not statistically significant.

<table>
<thead>
<tr>
<th>Offerer's Gender</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>29.86</td>
<td>28.07</td>
<td>29.24</td>
</tr>
<tr>
<td>(1.48)</td>
<td>(2.00)</td>
<td>(1.18)</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>28.93</td>
<td>32.7</td>
<td>30.46</td>
</tr>
<tr>
<td>(2.32)</td>
<td>(2.73)</td>
<td>(1.76)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>29.51</td>
<td>30.1</td>
<td>29.73</td>
</tr>
<tr>
<td>(1.27)</td>
<td>(1.64)</td>
<td>(1.00)</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Average Offers (and Standard Deviations) by Gender of Offerer and Receiver When only the Offerer has Information about the Receiver
Despite the weak evidence we find for other-regarding preferences among ethnic and gender groups, we do find strong evidence for a gender-specific co-ethnic effect. Men, we find, increase their offers substantially (by an average of about 4.5 cents) if they have information that they are playing with a co-ethnic. This effect occurs whether they are playing with a male or a female partner, and across all groups (although it is weakest among Caucasians). Women on the other hand do not exhibit preferences favoring co-ethnics, and indeed there is weak evidence that they disfavor co-ethnics. See Table 4.

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Offer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offerer knows he is playing with a co-ethnic</td>
<td>-3.375</td>
</tr>
<tr>
<td></td>
<td>[1.21]</td>
</tr>
<tr>
<td>Offerer is Male</td>
<td>1.665</td>
</tr>
<tr>
<td></td>
<td>[1.09]</td>
</tr>
<tr>
<td>Male offerer knows he is playing with a co-ethnic</td>
<td>7.81</td>
</tr>
<tr>
<td></td>
<td>[2.22]</td>
</tr>
<tr>
<td>Observations</td>
<td>1242</td>
</tr>
<tr>
<td>Adjusted R2</td>
<td>.17</td>
</tr>
</tbody>
</table>

**Note:** Absolute value of t statistics in brackets. Controls include the ethnicity of the receiver, all types of information levels, the age, school, religiosity of the offerer and information about their exposure to media and the education levels of their fathers.

Table 4: Offers in the Dictator Game

V.2 Two Way Information

Our results provide little evidence that other-regarding preferences vary within or between gender groups but some evidence of preferences varying as a function of group membership, with men in particular more likely to favor in-group members over out-group members. What about strategic considerations? Is there evidence of reciprocity norms operating along gender or ethnic lines? We study this question by considering the marginal effect of information about the offerer in the dictator game.

Table 5 presents the basic results. We find that adding information regarding the identity of the offerer to the situation in which the offerer is anonymous results in a large increase in the size of offers made. This increase cannot be due to the offerer conditioning her actions on attributes of the receiver, since she has no information in either case on which to condition her actions. Rather, the effect is more easily ascribed to the anticipation of punishment by the receiver for ungenerous offers. The magnitude of the increase that we attribute to this effect (which we interpret as adherence to social conventions against stinginess) is about 30 cents. This is approximately equal to the increase that we attribute to the triggering of other-regarding preferences (compare the average offers in Table 5 with no information, information on receiver only, and information on offerer only). Importantly
however, these effects are not cumulative. The average offers with two-way information are approximately equal to the offers with either type of one-way information. The implication is that our design, which estimates the marginal effect of information on the offerer in situations with no information and situations with information on the receiver, is capable of picking up an effect of reciprocity-based other regardedness that is missed by a design, such as Bohnet and Frey’s (1999), that only estimates the marginal impact of information on the offerer conditional upon the offerer having information on the receiver.

<table>
<thead>
<tr>
<th>Offerer’s Ethnicity</th>
<th>Asian</th>
<th>Caucasian</th>
<th>Latino/a</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Information</td>
<td>22.83</td>
<td>17.05</td>
<td>31.69</td>
<td>21.85</td>
</tr>
<tr>
<td></td>
<td>(3.30)</td>
<td>(2.43)</td>
<td>(5.19)</td>
<td>(1.93)</td>
</tr>
<tr>
<td>Information on Receiver only</td>
<td>33.21</td>
<td>23.85</td>
<td>33.85</td>
<td>29.4</td>
</tr>
<tr>
<td></td>
<td>(2.20)</td>
<td>(1.88)</td>
<td>(2.76)</td>
<td>(1.29)</td>
</tr>
<tr>
<td>Information on Offerer only</td>
<td>25.31</td>
<td>30.43</td>
<td>32</td>
<td>29.35</td>
</tr>
<tr>
<td></td>
<td>(5.66)</td>
<td>(5.16)</td>
<td>(5.91)</td>
<td>(3.12)</td>
</tr>
<tr>
<td>Two-way information</td>
<td>35.57</td>
<td>26.41</td>
<td>29.04</td>
<td>29.92</td>
</tr>
<tr>
<td></td>
<td>(3.04)</td>
<td>(2.24)</td>
<td>(3.03)</td>
<td>(1.57)</td>
</tr>
<tr>
<td>Total</td>
<td>31.61</td>
<td>23.49</td>
<td>31.86</td>
<td>28.02</td>
</tr>
<tr>
<td></td>
<td>(1.53)</td>
<td>(1.21)</td>
<td>(1.83)</td>
<td>(0.86)</td>
</tr>
</tbody>
</table>

Table 5: Average Offers (and Standard Errors) for Asians, Caucasians and Latino/as as a Function of Information Levels

We observe another feature in Table 5: the effects of the different information environments vary according to the ethnic identity of the offerer. The table suggests that Asian offerers are particularly sensitive to preference effects, Caucasians are particularly sensitive to reciprocity effects, and Latino/as are not sensitive to different information levels. Table 5 suggests that for Caucasian and Asian subjects the introduction of information on the offerer increases offers relative to the case where there is information on the receiver only. In Table 6 we look to see whether these effects are more pronounced within co-ethnic pairings. The table suggests that Asians and Caucasians groups do give more to their own group once common knowledge is introduced. However, restricting attention only to co-ethnic pairings reduces the number of observations substantially and the differences reported in Table 6 are not statistically significant.

<table>
<thead>
<tr>
<th>Offerer’s Ethnicity</th>
<th>Asian</th>
<th>Caucasian</th>
<th>Latino/a</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Way (Information on Receiver only)</td>
<td>31</td>
<td>23.8</td>
<td>34.54</td>
<td>28.67</td>
</tr>
<tr>
<td></td>
<td>(3.64)</td>
<td>(3.08)</td>
<td>(6.11)</td>
<td>(2.27)</td>
</tr>
<tr>
<td>Two-way information</td>
<td>38.62</td>
<td>29.29</td>
<td>33.63</td>
<td>32.97</td>
</tr>
<tr>
<td></td>
<td>(6.22)</td>
<td>(4.15)</td>
<td>(6.05)</td>
<td>(2.98)</td>
</tr>
<tr>
<td>Total</td>
<td>31.09</td>
<td>25.13</td>
<td>30.32</td>
<td>28.15</td>
</tr>
<tr>
<td></td>
<td>(2.64)</td>
<td>(2.07)</td>
<td>(3.59)</td>
<td>(1.49)</td>
</tr>
</tbody>
</table>

Table 6: Average Offers (and Standard Errors) Within Co-ethnic Pairs for Asians, Caucasians and Latino/as as a Function of Information Levels
If the introduction of common knowledge does not significantly affect the actions of co-ethnics (relative to out-group members), this is not, we believe due simply to the experimental design. We find, in fact, that this added information does matter systematically for gender pairings. Recall from the discussion of the results in Table 3 that we discerned no evidence of preferences based on gender: women neither offered nor received more, nor did either men or women condition the size of their offers on the gender of their receivers. In Table 7 we reproduce these results alongside the corresponding offers for the case of two-sided information.

The differences in the results are striking: at the higher information level (i.e., the three columns on the right), women offer somewhat less than men (30.76 cents versus 32.76 cents) but receive substantially more (34.42 cents versus 27.09 cents). Both men and women give less to men. But men are more responsive to informational effects than are women: they raise their offers by roughly 2.5 cents in the high information games, whereas women raise their offers by just 1.5 cents. Indeed one gendered convention observed by others (e.g., Eckel and Grossman 2001) receives strong support: “chivalry” – the convention by which men give more especially to women. Note that the effect is not driven by player preferences: we find evidence of chivalry only when men know that women can observe them making their offers. When men make offers to women anonymously, their chivalry disappears. Indeed, when playing anonymously, we observe an anti-chivalry effect: men make lower to women than they do to fellow men. These chivalry and anti-chivalry effects among men are significant at the 95% level and remain strong even after we account for other determinants of subjects’ offers.

<table>
<thead>
<tr>
<th>Offerer has information on receiver but receiver has no information on offerer</th>
<th>Offerer has information on receiver and receiver has information on offerer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offerer</td>
<td>Receiver is Female</td>
</tr>
<tr>
<td>Female</td>
<td>29.86</td>
</tr>
<tr>
<td>(1.48)</td>
<td>(2.00)</td>
</tr>
<tr>
<td>Male</td>
<td>28.93</td>
</tr>
<tr>
<td>(2.32)</td>
<td>(2.73)</td>
</tr>
<tr>
<td>Total</td>
<td>29.51</td>
</tr>
<tr>
<td>(1.27)</td>
<td>(1.64)</td>
</tr>
</tbody>
</table>

Table 7: Average Offers by Gender of Offerer and Receiver When Only the Offerer has Information on the Receiver (Standard Errors in Parentheses)

V.3 Thresholds and Consistency

We turn now to the strategies played in the ultimatum game. In this game, receivers have the option to punish offerers—at a cost to themselves—during the play of the game. Our expectation is that (i) punishment norms are more salient in contexts consistent with repeated play; (ii) punishment strategies are consistent with the enforcement of conventions (such as the gender conventions identified in Section 1), and (iii) ethnic groups are more
likely to possess conventions governing the play of in-group members and to apply more stringent punishment norms with respect to their own members than they do with respect to out-group members. The results of our experiment provide support for the first and second hypotheses but not for the third. The main results can be seen in Figure 4, where we show differences in MAOs between in-group and out-group pairs, broken down by gender combinations and information levels.

We find, first, as suggested in Section 1, that punishment norms (indicated by high MAOs) are more consistent with settings in which players are likely to invoke repeat play considerations than those in which they do not. In particular we observe from the right hand panel of Figure 4 that receivers are more likely to punish mean offerers in situations where the identities of receivers are common knowledge than in situations where there is no information about offerers or receivers. Punishment rates are highest in cases where there is information about both the offerer and the receiver.

Second, we observe a use of punishment strategies across gender combinations consistent with the norms identified in Section 1: MAOs by men are particularly low in cases where women are offerers. There is not a single case of coordination failure in games where women offer first and men then declare MAOs. Women, meanwhile, are especially punishing of mean male offerers, independent of their ethnicity. This effect is especially strong when there is two-way information. These effects are all significant at conventional levels.

![Figure 4: Minimum Acceptable Offers, Broken Down by Gender Pairings and by Information Levels](source:HIP 2004)
Third, if punishment strategies are consistent with solutions to the embedded collective action problem, we do not observe, contrary to our expectations, these strategies employed to a greater extent by in-group members. Indeed minimal acceptable offers are typically lower among in-group pairings than they are among out-group pairings. This lack of within-group punishment leads to less collective action failure in the plays that take place between co-ethnics: on average co-ethnics offer slightly more to co-ethnics and demand less, increasing the chances that offers will be compatible. As indicated in Table 8, whereas out-group pairs had failure rates of 14%, in-group pairs had failure rates of only 6%. This behavior is more consistent with an aversion for failure of collective action within the group than with more rigorous application of a punishment norm.

<table>
<thead>
<tr>
<th>Was the Ultimatum Offer Rejected?</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out-group Pair</td>
<td>14%</td>
</tr>
<tr>
<td>(n=353)</td>
<td></td>
</tr>
<tr>
<td>In-group pair</td>
<td>6%</td>
</tr>
<tr>
<td>(n=96)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>12%</td>
</tr>
<tr>
<td>(n=449)</td>
<td></td>
</tr>
</tbody>
</table>

Pearson chi2(1) = 3.8513  Pr = 0.050
gamma = -0.4049  ASE = 0.188
Kendall’s tau-b = -0.0926  ASE = 0.038

Table 8: Rejection rates in the ultimatum game

We end this section noting that while there was a tendency for offerers to be higher and MAOs lower within co-ethnic pairs, there was still greater consistency between offers and MAOs within co-ethnic pairings. The simple correlation of offer and MAO among out-group pairings is -.01 (p=.84), while that for in-group pairings is .18 (p=.10).\(^{11}\) This indicates that norms of coordination exist, and that they are independent of either ethnic preferences or of punishment strategies. Such norms are the subject of subsequent experiments undertaken in this project.

\(^{11}\) These results are for the sample of cases where at least one player has information.
VI Conclusion

Our experimental design allows us to distinguish between two rival explanations for why groups succeed in achieving successful collective action: preference-based explanations and strategy-based explanations. We employ two well-known experimental games – the dictator game and the ultimatum game – adding in each case a number of innovations. One key innovation is the use a full set of controls over the information combinations that offerers and receivers have about each other. This allows us to discern evidence for strategic motivations that exists independent of preference-driven motivations, and that are masked in designs that do not allow for the possibility that offerers do not observe, but know that they are observed by, receivers. A second innovation is to extend the study of preferences and strategies to examine how these relate to membership of ethnic and gender groups.

Our results suggest that strategic considerations play a more prominent role than preferences in explaining variation across gender and ethnic groups in the choices that players make – at least among our sample of university student subjects. Although we find that males have stronger preferences for co-ethnics than for non-co-ethnics, we find only weak evidence that preferences are structured ethnic lines. Strikingly, we find no evidence that preferences are structured along gender lines: when unobserved, neither gender treats the other gender substantively differently. Nonetheless, strategic action can be observed, especially within gendered pairings. We find that co-ethnics are more successful in achieving efficient outcomes and that this is not due to more stringent punishment behavior but rather because of greater consistency in strategies. We find stronger evidence that gender conventions structure the behavior of our subjects. Men, we find, act “chivalrously” towards women, but only when they can be seen to be acting chivalrously. Women expect this better treatment from men, and punish men that fail to treat them well.
References


Gil-White, Francisco J. 2004. “Ultimatum Game with an Ethnicity Manipulation: Results from Bulgan Sum, Mongolia.” In Joseph Henrich et al., Foundations of Human Sociality:


Appendix A (Proof of Claims in Section 2)

Proof of Claim 1: We want to show that \( \gamma = \hat{\gamma} \) if \( \theta = \phi \), and \( \gamma > \hat{\gamma} \) if \( \theta > \phi \).

Assume first that \( \theta = \phi \). In this case it is easy to check that
\[
\frac{.5\theta^0 \phi^0 + \theta^0 \phi^0}{(\theta + \phi)^{\phi + \phi}} - .5^0 = \frac{.52\theta^0 \theta^0}{(2\theta)^{2\theta}} - .5^0 = 0
\]
Assume next that \( \theta > \phi \) but that \( .5\theta^0 \phi^0 + \theta^0 \phi^0 \geq .5^0 \).

Note that \( .5\theta^0 \phi^0 + \theta^0 \phi^0 \geq 0 \) implies \( .5\theta^0 \phi^0 + .5\theta^0 \phi^0 \geq (.5\theta + .5\phi)^{\phi + \phi} \)

Now, from strict concavity \((\theta+\phi<1)\), we have: \( (.5\theta + .5\phi)^{\phi + \phi} > .5(\theta)^{\phi + \phi} + .5(\phi)^{\phi + \phi} \)

Together, these imply \( .5\theta^0 \phi^0 + .5\theta^0 \phi^0 > .5(\theta)^{\phi + \phi} + .5(\phi)^{\phi + \phi} \) and so:
\( \theta^0 (\phi^0 - \phi^0) - \phi^0 (\phi^0 - \phi^0) > 0 \). But, with \( \theta > \phi \) we have \( \phi^0 - \phi^0 < 0 \) and hence:
\( \theta^0 - \phi^0 < 0 \). But, since \( \theta > \phi \) we have \( \theta^0 - \phi^0 > 0 \). This provides a contradiction.

Proof of Claim 2. The key condition to check is that a player does not have an incentive to provide \( \alpha < .5 \) in any round in which no player A has provided \( \alpha < .5 \) in the past. This condition is given by \( \frac{\gamma}{1-\delta} \geq u_A^* + \frac{\delta \gamma}{1-\delta} \). Note that if \( \theta = \phi \) (and hence \( \gamma = \gamma \)) this condition holds with equality for all \( \delta \). If however, \( \theta > \phi \), then, using the fact that \( \gamma < u_A^* \), the condition is satisfied for \( \delta \geq \frac{u_A^*-\gamma}{u_A^* - \gamma} \).

Proof of Claim 3. We first check that Player B has an incentive to reject some offer, \( \alpha < .5 \), made by player A in order to restore the equilibrium. Observe that
\[
\frac{\hat{\gamma}}{(2\hat{\gamma} - \gamma)} \iff \hat{\gamma} - \gamma \geq \gamma (1 - \delta) \iff 0 + \frac{\delta}{1-\delta} \geq \gamma \iff 0 + \frac{\delta}{1-\delta} \frac{\hat{\gamma}}{(2\hat{\gamma} - \gamma)} \iff 0 + \frac{\delta}{1-\delta} \hat{\gamma} > \alpha^0 (1-\alpha)^0 + \frac{\delta}{1-\delta} \gamma
\]

But since, \( \alpha < .5 \) implies \( \hat{\gamma} = .5^0 (5)^0 > \alpha^0 (1-\alpha)^0 \), we then have that for any \( \alpha < .5 \):
\[
\frac{\hat{\gamma}}{(2\hat{\gamma} - \gamma)} \iff 0 + \frac{\delta}{1-\delta} \hat{\gamma} > \alpha^0 (1-\alpha)^0 + \frac{\delta}{1-\delta} \gamma
\]

This means that a player would rather receive 0 this period and receive the cooperative payoff in all future rounds than to receive the "sucker payoff" \( \alpha \) and receive the stage game
payoffs in all future rounds. In other words, the receiver will be willing to take a hit in order to enforce the norm.

For this equilibrium, the condition for Player A not to deviate is easier: in particular it must be that \( \hat{\gamma} + \frac{\delta}{1 - \delta} \hat{\gamma} \geq 0 + \frac{\delta}{1 - \delta} \gamma \), which is true for all \( \delta \).

The condition that \( \delta \geq \frac{\hat{\gamma}}{2\hat{\gamma} - \gamma} \), although it can always be satisfied for high \( \delta \), is more strict than the condition that \( \delta \geq \frac{u_A^* - \hat{\gamma}}{u_A^* - \gamma} \). This follows from the observation that

\[
u_A^* \leq 2\hat{\gamma} \iff \frac{u_A^* - \hat{\gamma}}{u_A^* - \gamma} \leq \frac{\hat{\gamma}}{(2\hat{\gamma} - \gamma)}.
\]

**Appendix B (Proctor Instructions)**

Welcome to the Human Interaction Project. You are about to participate in a series of experiments on decision-making. Students from a number of other colleges and universities in California will be participating. All interaction between you and your partners in each experiment will take place through the computer terminals.

We will start with a brief instruction period.

Today, you will be participating in several different types of games. Before each one begins, we will provide a description of the main features of the game.

**The Public Information Box**

Before we explain the specific rules for each game, we will first go over a central feature of our experiment that you will see in all the games you will play.

In every game, you will be playing with one or two other players, and we will provide you with some information about who they are. Please look up at the screen.

[Show slide of public information box with the images unopened, indicating that “in this round you are player 1.”]

This is called the public information box. Both you and the person you are playing with will see exactly the same box with exactly the same information in it. The first thing you will do is click on the buttons to “meet player 1” and then “meet player 2.” Sometimes, “player 1” will be you, and sometimes “player 2” will be you.

In this particular round, you are player 1. After you click “meet player 1” a box will appear. The box will contain one of several things. Sometimes, it will contain a message that says: “No information about this player has been provided for this round.”
This means that neither you nor your partner has any information about the player (of course, since the player in this example is you, you know who you are – but the other player does not). Sometimes, when you click “meet player 1” you will see a picture of player 1 (in this case, a picture of yourself, since you are player 1).

And sometimes you will see a brief video clip of player 1 greeting you (in this case, since you are player 1, you would see a brief video clip of yourself).

Of course, to hear what the person is saying, you will need to put on headphones. This is why there is a pair of headphones in front of you.

After you have met player one, you will click “meet player 2.” Again, you will see one of three things: a message telling you that “no information about this player has been provided for this round,” a picture of the player, or a short video clip of the player greeting you. Make sure that you wait until the video clip of player 1 is finished before clicking on “meet player 2.” Otherwise, both videos will play simultaneously and the two players will talk over each other.

The important thing to remember about the public information box is that both you and the person you are playing with will see exactly the same thing. If you see a picture of the other player and a picture of yourself, they will also see a picture of you and a picture of themselves. If you see “no information” about yourself and a video clip of them, they will see a video clip of themselves and a message telling them that they have no information about you.

Also, remember that this is the only information that you will have about them and that they will ever have about you. With only a handful of exceptions, you will only be playing with players from other colleges and universities.

One last thing: after meeting the players you will be asked to indicate whether you know your partner. By this we mean, do you know your partner personally, outside of the context of this experiment. If you know the other player, check the box labeled “I know the other player.”

Does anyone have any questions about the public information box?

**Dictator Game Instructions (Front End)**

Game 1 is very simple. At the beginning of the game, you will be given one dollar and asked to divide that dollar between yourself and your partner. We will implement whatever choice you make. Your decision about how to divide the dollar is final and will be reflected in the ultimate payoffs that you will receive at the end of the third session.
Before you make this decision, you will be asked to meet both players, just as we have discussed. In some versions of this game, your partner will not be given information about you, but you will be given information about them. In other versions, you will be given information about your partner, and they will be given information about you.

Remember: if you know the other player, be sure to check the box indicating that you know the other player.

After you have met the players, you will be asked to enter the amount of the dollar that you wish to keep. The computer will calculate what you and your partner will get, based on what you enter.

Are there any questions?

Chris will monitor the progress of each player from the central server. After everyone enters a response, he will allow you advance to the next round. Please take as much time as you need. Chris will only begin the next round when everyone has finished making their decision. But you should not feel that you have to rush. Please take as much time as you need to think through how much money you would like to keep and how much you would like to give your partner. There will be twelve rounds to Game 1.

The game will begin when you are asked to enter your client information. Where it says name, please enter your email address. Please be sure to use the email address printed on the card that was given to you, which should be the same email address that you signed up with. And be careful to enter it correctly as the computer network does not handle typing errors very well! We will use your email address to keep track of your responses and to calculate your payoffs.

Now please put on your headphones. If you need to adjust the sound level, there is a volume control on the headphone cord. Let’s begin.

Ultimatum Game Instructions (Front End)

In Game 2, you will again be given one dollar and asked to divide it between yourself and your partner.

This game has a very important difference from the earlier one, however. In the earlier games, we implemented whatever proposal you made. In this game, your partner can accept or reject your offer. If she accepts the offer, then whatever division you proposed is implemented. If she rejects your offer, both of you receive nothing.

Are there any questions?

Chris will start the game. You will be asked to log in again with your email address, and we will play a total of six rounds. Remember that the rules of this game are different from the two earlier one. Take the time to think through your decision.

Now please put on your headphones. Let’s begin.
Dictator Game Instructions (Back End)\textsuperscript{12}

Today, you will be participating in several different types of games. You have played each of these games before, although today you will be participating in a different role. Whereas before you were making offers to your partners, this time you will be on the receiving end. Your job will be to decide how to respond to the offers that other players have made to you. As before, each game will be slightly different. Before each game begins, we will provide a brief description of its main features.

As in the games last week, each game has a public information box. As you will recall, the key feature of the public information box is that both you and the person you are playing with will see exactly the same box with exactly the same information in it. As you did last week, you will want to click to “meet player 1” and to “meet player 2” before you begin each game.

In this game, your partner was given one dollar and asked to decide how much to give to you. Whatever choice she made is final. What we ask you to do is guess how much your partner decided to give you. In addition to whatever your partner decided to give you, you will receive an extra 50 cents at the end of the game if your guess falls within five cents above or below what your partner actually offered you.

In this game, your partner may or may not have had information about, and you may or may not be given information about them. So when you go to “meet the players,” you may see a photo or a video clip of yourself and your partner, or you may see a message that you have no information about them (or yourself).

Are there any questions?

There will be twelve rounds to this game. As last week, Chris will monitor the progress of each player from the central server. After everyone enters a response, he will allow you advance to the next round.

The game will begin when you are asked to enter your client information. Where it says name, please enter your email address. Please be sure to use the same email address printed on the card that was given to you, which should be the email address that you signed up with. And, again, be careful to enter it correctly.

Now please put on your headphones and, if necessary, adjust the volume. Let’s begin.

Ultimatum Game Instructions (Back End)

This game has a more fundamental difference from the last one. In this game, your partner was given one dollar and asked to divide it between the two of you, just as in the other games. This time, however, you have the opportunity to accept or reject her offer. If you accept the offer, then whatever division she proposed is implemented. If you reject the offer, both of you receive nothing.

You accept or reject the offer by entering a number, what we call the “minimum” amount of the dollar that you are willing to accept from your partner.

\textsuperscript{12} The back ends of the games were played approximately a week after the front ends of the games.
If your partner offered you more than this minimum amount, then her division is implemented. If, however, your partner offered you less than the minimum amount you are willing to accept, your partner's offer is rejected and both of you receive nothing.

For example, you might decide that the minimum amount that you are willing to accept is 50 cents. In this case, if your partner offered you more than 50 cents, whatever division of the dollar she proposed would be implemented. If, she offered you less than 50 cents, her offer would be rejected and you would both receive nothing.

This game also has a public information box. Please be aware of the information that has been provided to you and your partner. Sometimes information will be provided about both you and them. In other situations, it will not be.

Are there any questions?

Chris will start the game. You will be asked to log in again with your email address, and we will play a total of six rounds.

Now please put on your headphones. Let's begin.