Gender, Beliefs, and Coordination with Externalities*

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Abstract

Groups such as committees or boards make many important decisions within organizations. Many of these decisions affect external parties. This paper uses an experimental approach to study how the gender composition of three-person groups affects choices and beliefs in a coordination game with selfish and prosocial equilibria. We find that women are more willing to choose the prosocial option. Both men and women believe that women will make choices that are kinder to external parties, in line with the observed difference in prosocial choices across genders. Analysis of the chat communications reveals that women express more concerns for others’ welfare and mention money less often. These results have implications for public policies intended to increase gender diversity and women’s representation on decision-making committees in the corporate sector, in politics, and in academia.

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1. Introduction

In recent years, there has been a move toward improving gender diversity in both the private and public sectors. In addition to providing opportunities to an underrepresented group, these measures could also potentially help improve decision making. Committees and groups make a large majority of important decisions in most organizations, so it is particularly important to understand how aspects of the group composition affect these decisions. The choices made by such committees are in part determined by the preferences and characteristics of their individual members, with gender an important and salient characteristic. This study therefore investigates how gender composition affects group decisions. Since group decisions often involve coordination, we explore this relationship using a coordination game.

In many situations, the decisions made by committees and groups impose externalities on passive external parties, so our focus is on how the gender composition of a group influences choices that may reflect prosocial or selfish preferences. One prominent example is corporate board composition. Many decisions that are profitable for the board members or the corporations’ shareholders may negatively affect others. For instance, corporate boards make decisions to invest in certain products or enter specific markets that may harm people in the community, and decisions by a board to close or relocate factories or merge with other companies can result in loss of jobs in a community and contribute to the slow decay and abandonment of small towns.¹

The gender composition of groups such as boards is particularly relevant because it is an explicit policy choice. Norway in 2005 took the drastic approach of mandating publicly listed firms to have at least 40 percent women directors or be liquidated (Eckbo et al., 2014). Similar, but less strict policies have since been adopted in Belgium, France, Germany, Iceland, Italy, Malaysia, the

¹ Plant closings by General Motors in Flint, Michigan and by Hershey in Hershey, Pennsylvania are some illustrative cases of how board decisions can affect communities (see Armstrong, 2002).
Netherlands, and Spain, and most recently in California.\(^2\) Such mandates are not limited to the corporate sector, however. In the political arena, eight member states in the EU have legislated electoral gender quotas since 2000, requiring that a certain proportion of candidates be women. A further 14 have party quotas – voluntary commitments that a certain proportion of a party’s candidates be women (Freidenvall and Dahlerup, 2013).\(^3\) In Australia, both the major political parties have adopted proposals to increase the gender diversity in candidates for political office.\(^4\) Many universities, of course, also require diverse perspectives on committees charged with making or implementing important policy decisions.

In spite of this clear policy movement toward gender diversity on committees and other decision-making groups, very little rigorous and causal evidence exists on the relationship between gender composition and group decisions (Azmat and Petrongolo, 2014). This paper investigates whether gender composition has an influence on decisions made in a group setting, and our research strategy relies on laboratory experiments that can help identify causal effects and the mechanisms underpinning this relationship. Other empirical approaches make it difficult to draw a clear link between gender composition and decision-making in groups. For example, data from board or committee meetings may not be publicly available and even if they are, key variables such as precise measures of meeting outcomes and beliefs about others’ decisions are difficult to quantify. Moreover, gender composition is not randomly assigned in organizations, making it

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\(^3\) Burkina Faso, Nepal, the Philippines and Uganda have also included statutory candidate quotas in their constitutions, while Slovenia and Bosnia-Herzegovina have quotas written into their electoral laws [https://aphinktank.eu/2012/10/04/quotas-in-politics](https://aphinktank.eu/2012/10/04/quotas-in-politics) (accessed 22 March 2018). India introduced affirmative action quotas for women in 1992, with one-third of all positions of the head of the village reserved for women.

difficult to isolate and identify the impact of gender composition without confounding selection issues. Our experimental approach assigns participants randomly into groups to more clearly identify the underlying cause and effect of this relationship. Importantly our groups are designed to have a majority and minority gender mix, which is often difficult to observe using observational data as very few women are part of decision-making committees.  

The group decision we implement is a coordination game. Individuals in many coordination games have identical monetary payoffs over the set of possible outcomes, so their material interests are not in conflict and they are motivated solely to coordinate their strategies in order to obtain an outcome that is best for all of them. Many group decisions can be modeled as coordination games and this is therefore a very popular paradigm used in management and economics research (Cooper and Weber, 2017 and Devetag and Ortmann, 2007 survey the relevant experimental literature). Managers seeking to coordinate actions of team members need to understand how the diversity of their groups’ composition affects decisions. A coordination game is therefore particularly useful for our investigation of gender composition, because choices in coordination games depend on beliefs about the choices of others. If individuals believe that men and women make different choices, perhaps due to reliance on stereotypes (Bordalo et al., 2016), their best coordination game choice may depend on their group’s gender composition.

A novel feature of the coordination game we study is that actions have payoff consequences for an agent who is external to the decision-making process. Our game therefore combines the incentive to coordinate with a tradeoff between the decision makers’ own payoff and a desire to

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5 Bagues et al, (2017) examine the impact of higher representation of women in scientific committees and while evaluators are randomly selected, groups are not fully balanced. For instance, they rarely observe committees with a female majority.

6 For example, in many universities hiring and tenure decisions are based on consensus or the unanimity rule, which necessitates the need for coordination.
be prosocial. While significant evidence has accumulated that some individuals care about others’ welfare in addition to their own material payoffs in many social dilemma and bargaining games, less evidence exists for coordination games. Bland and Nikiforakis (2015) is one important exception. They examine if third-party externalities, positive and negative, can affect equilibrium selection in two-player coordination games.

The presence of external parties who are affected by the group’s decisions makes coordination more complex. In our study, three-member groups choose between two options, one of which provides them with a higher payoff but substantially reduces the payoff for the external party. In particular, if all three members choose the selfish option, they all receive a higher payoff but this hurts the external party. If instead they coordinate on a choice that gives them a modestly lower payoff, the external party’s payoff increases by a substantial amount. If the choices of the three members do not match, then they and the external party all receive zero payoffs.\(^7\) As we illustrate using a simple framework in Section 3, even if individuals prefer the selfish option and do not care about the external party, they may still choose the prosocial option if they think that other members of their group will make the prosocial choice. Hence, in addition to their social preferences, individuals’ beliefs about what others might choose help determine the final outcomes in such coordination games.

For example, if men and women have different social preferences, or if members hold the gender stereotype that women are more communal – more selfless and show concern for others (Eagly and Steffen, 1984), then groups with more women may have a higher likelihood of

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\(^7\) For example, if a company is considering options to restructure, board members could choose an option such that they all receive a very high payoff but this hurts the employees in the company as several lose their jobs. If instead they coordinate on retraining their employees, this may give them a modestly lower payoff as compared to the first option, but can increase the employees’ payoffs by a substantial amount.
coordinating on the choice that increases the external party’s payoff.\(^8\) On the other hand, both men and women may also suppress their own social preferences and conform to the beliefs of the other gender’s stereotype if they are keen to avoid coordination failure and a consequent payoff of zero. Bordalo et al. (2019) show that beliefs about gender differences in ability (answering different types of knowledge questions) are biased by stereotypes and this harms group performance when submitting group answers. Our study also documents a stereotype bias in beliefs, but instead of ability, we investigate the relative strength of prosocial preferences across genders.

Our key objective is to examine how the gender composition of the group affects such choices. We therefore exogenously vary the group in different rounds of the coordination game so that participants are matched with different numbers of men and women. In some rounds, they are in mixed groups, with either a majority or minority of men, and in others they are in same-gender groups. This allows us to study if gender composition affects the group’s choices over the selfish and prosocial options. Evidence suggests that women have different preferences as compared to men in the domain of risk and competition, (Niederle and Vesterlund, 2007; Eckel and Grossman, 2008b; Croson and Gneezy, 2009). In terms of social preferences, Croson and Gneezy (2009) indicate that women exhibit more context specific prosociality and that their preferences are more malleable. Aguiar et al. (2009) and Brañas-Garza et al. (2018) show that women are expected to give more in a dictator game as compared to men. Building on this evidence, in our experiment, in most (but not all) rounds, the gender composition of the group is revealed along with information about other individual specific characteristics. In rounds in which this information is provided, as noted above, individuals’ beliefs regarding the likelihood of their fellow group members making

\(^8\) Men are stereotyped as being more agentic, more self-assertive. According to social role theory (see Eagly and Wood, 1999 and Vogel et al., 2003), these stereotypes derive from the different roles women and men traditionally performed in their daily lives.
prosocial choices may depend on those members’ gender.

Coordination failure is commonly observed and is one of the main reasons for the inefficient performance of many groups (Brandts and Cooper 2006). To facilitate coordination, in some sessions we allow group members to communicate with each other at the beginning of each round. Communication is anonymous, free-form, and nonbinding, akin to cheap talk, but it can nonetheless assist groups in reaching an agreement about the option to choose. Communication allows individuals to share their perspectives on the coordination game, including norms about appropriate behavior, and so it could directly affect the relative amount of selfish and prosocial preferences expressed. In addition, as mentioned earlier, in some rounds information is revealed regarding the gender composition of the group. Our decision-making environment hence mirrors real-life situations in which opportunities exist for group members to communicate, consult, and advise each other about the decisions they take, while also observing some individual-specific characteristics of fellow group members. Our treatments overall span two dimensions. The primary focus is on varying the gender composition of the groups (within-session); the secondary line of enquiry concerns the impact of introducing communication in coordination games with externalities (between-sessions). In all treatments, we also elicit beliefs about others’ actions.

We find that, consistent with the stereotype that women are more communal, women more often choose the prosocial option. All-women groups in the coordination game are 15 to 22 percentage points more likely to make the prosocial choice than groups with all men. Women select the prosocial choice more frequently overall than men by 4 to 10 percentage points. This is the “kernel of truth” (Bordalo et al., 2016) that is exaggerated in the beliefs, as women are expected to act prosocially 14 to 15 percentage points more frequently than men. Women’s greater

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9 Communication by a leader is another way that groups can coordinate on desired outcomes (Brandts et al., 2015).
prosociality is also revealed in the chat communications, as they express more concerns for others’ welfare and mention money less often than men. As expected, allowing for communication improves coordination dramatically and also interestingly increases the likelihood that participants choose the prosocial outcome by 19 percentage points.

Our findings have important implications. The beliefs data clearly demonstrates that both men and women expect women to take more prosocial decisions in the presence of external parties. These perceptions can have an effect on the actual decisions taken in committees. Diversity in committees could therefore help lead to decisions that benefit others and perhaps even contribute toward reducing social and income inequality. Greater diversity can also be perceived to lead to lower payoffs for the coordinating members of the group, consistent with the lower average performance observed in correlational studies of corporate board diversity (Adams and Ferreira, 2009). Board members who are critical of diversity policies could use this perception to justify the status quo.

Related Literature. Our research contributes to two main strands of the literature. The first is the emerging literature in economics about the influence of gender composition of groups. The second is the well-established literature on coordination games and communication.

Gender composition of groups has been of increasing interest and has been examined using both experimental and observational empirical approaches. Apesteguia et al. (2012) find that

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10 A recent meta-analysis of 140 studies, however, concludes that women board representation is positively correlated with market performance in countries with greater gender parity, and that women representation is positively associated with financial monitoring (Post and Byron, 2015). A recent report by the Credit Suisse Research Institute (CSRI, 2016) also indicates a positive correlation between diversity and business performance. The authors use data from 3,000 companies worldwide with a total of 27,000 senior managers. They find that in companies in which the majority in the top management are women, financial outcomes are superior (for example, they experience better sales growth, high cash flow returns on investments, and lower leverage).

11 There is a tangentially related literature comparing decisions made by individuals and by groups. For reviews of this literature see Charness and Sutter (2012) and Kugler et al. (2012).

12 A large literature addresses behavioral differences by gender (i.e., risk attitudes, altruism, competitiveness, trust, bargaining). For a review, see Croson and Gneezy (2009).
women-only teams price less aggressively in a business game, invest less in research and development, and consequently earn lower profits than mixed or men-only teams. On the other hand, women-only teams invest more in social sustainability initiatives. Teams in their game however are not exogenously formed as the subjects register their own teams, thus they cannot control for the endogeneity of team formation. Hoogendoorn et al. (2013), instead, randomly assign subjects to groups depending on their genders, and examine group performance (in terms of sales and profits) in a business venture. They find that teams with an equal gender mix perform better than men-dominated teams, although the comparison is less clear for all-women teams. Similarly, Dufwenberg and Muren (2006) find that in dictator games, all-women teams are more altruistic than all-men teams, but mixed-gender teams are the most altruistic.

Born et al. (2018) find that being in a male majority group exacerbates the tendency for women not to want to take on a leadership role. Ivanova-Stenzel and Kubler (2011) find that men perform better than women in an isolated memory task, but only in the presence of women. Grossman et al. (2015) find that woman leaders are more willing to take risks in a three-person investment game when playing in all-women groups. Keck and Tang (2017) show that confidence judgments by groups with at least one woman member are significantly better calibrated than those by all-men groups and this is because groups with one or more woman members had a higher degree of opinion and information sharing. Hence these studies suggest that the success of gender diversity could depend on the outcomes that are being measured. But overall, in addition to bringing different preferences, knowledge base, and viewpoints to the table, the mere presence of women also alters the dynamics and the social sensitivity demonstrated by the group (Williams and Polman, 2015, Woolley et al., 2010).

In contrast to the existing experimental literature on gender composition of groups, our
paper aims to examine decision-making in the context of coordination games. This is of critical interest as many decisions are made by groups and groups are more effective if they can coordinate.

On the empirical front, two recent papers on the impact of board composition on firm performance and governance have exploited data from the natural experiment in Norway, where publicly listed firms were mandated to have at least 40 percent woman directors. They provide mixed results. Ahern and Dittmar (2012) show that this affirmative action policy had a significantly negative impact on firm value and they attribute this to the newly added board members being younger and less experienced. Matsa and Miller (2013), by contrast, find that the policy did not affect corporate decisions in general, with the exception of employment policies. Firms with more woman directors undertook fewer workforce reductions Bagues et al., (2017), examines the role of evaluators’ gender in scientific committees using randomized natural experiments in Italy and Spain. Evaluators are randomly selected from a pool of eligible professors, thus enabling some (though not perfect) gender variation in group composition. Their main focus, in contrast to our research, is on how this gender variation affects the evaluation of female versus male candidates. They find that having more women in the committee does not increase the quantity or quality of successful female candidates. Using data from the U.S, Kim and Starks (2016) show that women directors contribute additional expertise to corporate boards and this results in enhanced firm value by improving board advisory effectiveness. While their main contention is that women bring a diversity of skills, our mechanism importantly is based on the diversity of preferences and the beliefs group members have about these preferences, aspects that cannot be captured using observational data.

To our knowledge, only three studies have examined the effect of gender on outcomes in coordination games. Dufwenberg and Gneezy (2005) compare the performance of all-men and all-
women 6-person groups in a 10-period, repeated play, minimum effort coordination game. There was no preplay communication and the uniform gender composition of the groups was observable. Dufwenberg and Gneezy report no significant difference in chosen effort. Di Girolamo and Drouvelis (2015) compare the performance of single-gender and mixed-gender 3- and 6-person groups in the same game as Dufwenberg and Gneezy. In the single-gender treatments, subjects know the genders of their team members; in the mixed-gender treatment, subjects are unable to discern the gender mix of their team. While Di Girolamo and Drouvelis report no significant difference in chosen effort across the three treatments, it is worth noting that the all-women 3-person teams had the highest effort levels in every period except one. Holm (2000), shows that providing information about the opponent’s gender in coordination games with conflicting interests (such as battle of the sexes) makes subjects coordinate in ways that discriminate against women and decrease their earnings. In particular, both men and women subjects choose the outcome that benefits them more when they know that their opponent is a woman as compared to a man. The coordination game we study differs from these papers in terms of the externalities that coordination causes to passive players.

Our paper also contributes to the literature studying the impact of communication in coordination games. There is overwhelming evidence that preplay communication, even nonbinding cheap talk, can facilitate coordination and affect efficiency in these games (Cooper et al., 1989, 1992; Blume and Ortmann, 2007; and Cason et al., 2012, are some examples). An important advantage of communicating with others is that it can reduce the strategic uncertainty that individuals face about others’ behavior. In our experiment, the choices in the coordination game lead to impacts on others and trigger social preferences to different degrees across individuals, making the uncertainty more acute.
By examining the impact of communication in a coordination game with externalities, we extend the understanding of how groups can influence and resolve conflicting views. Allowing for communication could potentially lead to an increase in normative conflict with some encouraging others to take the selfish option and others publicly favoring the prosocial choice. When the gender composition of the group is known, gender specific beliefs could influence these communications and decisions. This is the focus of our paper.

2. **Experiment Design**

The experiment consists of four parts. In Part 1, players make decisions in a coordination game. In Part 2, players participate in an allocation task; Part 3 assesses individual level risk preferences. Part 4 comprises demographic questions and also elicits beliefs about Part 1 decisions. Preferences and beliefs are separately elicited so as to help us understand behaviour in the coordination game.\(^{13}\) Table 1 presents a timeline of the experiment. We discuss each of these parts in more detail below.

Each session employs 16 players. In the Part 1 coordination game, the 16 players play in groups of four for 12 rounds. Three of the subjects in each group are randomly determined to be decision makers, occupying position C (referred to as type C in the instructions). The remaining subject in a group is in the Z position (referred to as type Z), and does not make a decision that affects payoffs. Subjects are rematched every round, but they retain their C or Z position for the entire experiment.

In each round, position C players individually choose between two actions, $M$ and $J$. As shown in Table 2, a choice of $M$ leads to not just a lower payoff but also a negative payoff for $Z$.

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\(^{13}\) We elicited beliefs in Part 4. Eliciting beliefs prior to Parts 1 and 2, or during Parts 1 and 2 would likely have influenced decisions made in those parts. As there was no feedback in Parts 1 and 2, those earlier decisions should have little impact on beliefs.
so for expository reasons we refer hereafter to this choice as the UNKIND-TO-Z choice. Choice $J$ is in contrast the KIND-TO-Z choice. Players, of course, only saw the neutral labels $M$ and $J$. If all three position C players choose UNKIND-TO-Z, they each receive 7 experimental currency.

**Table 1: Timeline of Experiment**

| Part 0: Initial questionnaire to collect gender and season of birth |
| Part 1: 12 rounds of the coordination game |
| - 4 rounds for each of the 3 payoff configurations (random order) |
| - random rematching of groups |
| - gender composition randomly varied across rounds |
| - gender revealed for 9 of the 12 rounds (random order) |
| - no feedback between rounds |
| - all rounds paid |
| Part 2: 3 individual allocation rounds |
| - based on payoffs used in the 3 coordination games |
| - one round selected at random for payment |
| - one randomly chosen group member’s choice implemented for payment (no feedback) |
| Part 3: Risk preference elicitation (no feedback) |
| Part 4: Survey |
| - (incentivized) belief elicitation concerning coordination game choices for each gender, for each of 3 payoff configurations |
| - sociodemographic questions |
| - payoffs for each stage revealed and paid |

*Note*: 11 total sessions, 8 sessions with communication for 1 minute before each of the 12 coordination game rounds. 176 subjects in total.

**Table 2: ECU Payoffs Earned for Coordination Game**

<table>
<thead>
<tr>
<th>All 3 Position C choices are $M$ (UNKIND-TO-Z)</th>
<th>All 3 Position C choices are $J$ (KIND-TO-Z)</th>
<th>All 3 Position C choices do not match</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position C all earn 7 each</td>
<td>Position C all earn 5 each</td>
<td>Position C all earn 0</td>
</tr>
<tr>
<td>Position Z earns -16</td>
<td>Position Z earns 4</td>
<td>Position Z earns 0</td>
</tr>
</tbody>
</table>
units (ECU). If they all instead opt for KIND-TO-Z, they each receive 5 ECUs. For position C players, UNKIND-TO-Z is the own-money maximising choice. KIND-TO-Z is the prosocial choice; opting for KIND-TO-Z increases Z’s payoff by 20 ECUs at the cost of lowering each position C player’s payoff by 2 ECUs. If the choices of the three Position C members do not match, then all four players in the group receive 0 ECUs for that round.\textsuperscript{14} Since the payoff to the player in position Z is affected by the choices of the position C players, the C players’ decision generates a payoff externality on Z. The position Z player cannot influence this payoff.

Our primary interest is to examine if the gender composition of the position C members of a group and information about the composition of the group affects decision-making. To enable this, we vary the gender composition of the group across rounds, within sessions, so the composition and payoff case ordering varied across rounds randomly and differently in every session. In particular, in some rounds position C players are all men or all women and in others they are mixed: two men and one woman or vice versa.\textsuperscript{15} Players are explicitly told that their decision screen may provide information describing the other two position C individuals in their group, i.e., players’ gender and the seasons in which they were born while still maintaining anonymity. This information is obtained using a short survey at the beginning of the session. Players’ characteristics are displayed using gender and season of birth icons, as illustrated in the experiment instructions in Appendix B. We include information on two player-specific characteristics instead of only focusing on gender to avoid priming gender as an artificially salient

\textsuperscript{14} While the position C players are making their choices, the position Z player indicates what he thinks each of the C players will choose and why, and what he would himself have chosen if he had the role of a position C in the experiment. In addition to providing useful data, this ensures that player role and identity remain anonymous as all subjects are actively engaged on their computer screens during the experiment.

\textsuperscript{15} We made the design decision to use three-person groups because we believed the decisions of men and women may differ depending on whether or not they are in the majority. For example, with a mixed-gender, three-person group, men, as the majority (minority), may be more (less) confident that the women will defer to the preference of men. Gender classification is based on self-identified gender and with this in mind, we refer to our subjects as men and women (gender as the social component), not male and female (which pertains to the biological component).
characteristic. As we do not expect birth season to be correlated with subjects’ choices, birth timing therefore allows for a placebo test to contrast with gender (see Section 4.2). To study the marginal effect of providing information about player characteristics we also include (in random order) some decision rounds in which this information is not revealed. The gender of the participant in position Z is never revealed to the group.

Theoretically, the gender composition of groups and information about the group composition should not influence decisions in the coordination game if men and women have similar preferences and are expected to make similar choices. If, however, men and women have different social preferences, and if players believe that women are more prosocial than men (Aguiar et al., 2009; Brañas-Garza et al., 2018), then it is possible that gender composition can affect equilibrium selection. That is: Do groups with more women have a higher likelihood of coordinating on the KIND-TO-Z choice? This is the main research question we examine.

Players are presented with three different payoff cases. As our objective is to explore situations in which the existence of a severely disadvantaged and powerless (i.e., inactive) external party can influence decision makers, we focus on the payoff case shown in Table 2 in which the position Z player is worst off. In this payoff case, Z receives -16 ECUs if UNKIND-TO-Z is chosen by all the Cs and 4 ECUs if KIND-TO-Z is chosen. The position C players make four choices for

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16 This was apparently successful, since mentions of gender in the chat communication (described later) were extremely rare, occurring in only 10 of the 2,578 lines of chat. While the potential for experimenter demand effects always exists, we believe it does not affect our results because subjects received no cues about how gender (or birth season, for that matter) was related to objectives of the experimental investigation (Zizzo, 2010) until the survey at the end of the experimental session. Responses to the post-experiment survey indicated that many subjects noticed the gender and birth season information; in particular, 61 of the 176 subjects recalled this information when asked about it directly. A smaller number (37 of 176) who mention gender indicated that it affected their decisions and/or expectations about others’ choices. But even if the display of personal characteristics primed some subjects to view gender as a salient aspect of the investigation, they could not determine what behavior was expected of them.

17 We also include two alternative payoff cases, but their results (presented in Appendix A) are less interesting. As we anticipated and as is clear from the literature, prosocial behaviour is rarely observed when the action leads to a disadvantageous inequality for the decision maker. This is precisely what we find and there is also little variation in choices for either gender as perhaps coordination on the UNKIND-TO-Z choice is easier for both men and women when the payoff inequality for self is so big. In one case, Z’s payoff increased from 4 ECU to 24 ECU if the C’s...
each of the three payoff cases in groups with differing and randomly ordered gender composition. Gender (and birth season) of fellow group members is not revealed for one decision in each case.

Evidence from previous experiments suggests that response toward inactive, external parties can be mixed, with some decision makers ignoring the presence of external parties and acting selfishly while others change their decisions to accommodate their concerns for the external parties (Charness and Jackson, 2009; Engel and Rockenbach, 2011; Humphrey and Renner, 2011; Andersson et al., 2014; Delaney and Jacobson, 2014; Blanco, et al., 2018). Bland and Nikiforakis (2015), for example, find that a large majority of subjects choose actions that increase their own payoffs even when external parties are substantially harmed. The mere presence of an external party can make the beliefs about the social preferences of other decision makers less confident (e.g., McDonald et al., 2013). To circumvent this and improve coordination, in 8 of the 11 sessions, decision makers could communicate with each other prior to making their choices in each round. Communication is anonymous, free-form, and nonbinding, and because of this richness we oversampled the communication treatment in order to be able to analyze the chat content. In these sessions, all three position C players have 60 seconds to exchange electronic chat messages and these messages are only visible to the other two position C players in their groups. Although subjects remained anonymous throughout all sessions, gender and birth season labels were automatically shown on all chat statements in the rounds when these characteristics were revealed. Subjects followed some simple rules for this communication: to not identify themselves, be civil to each other, and avoid profanity. Apart from these restrictions, however, they could communicate about anything they wish.

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coordinate on the KIND-TO-Z choice. In the other, Z’s payoff increased from -4 ECU to 16 ECU from the KIND-TO-Z choice. Only 16 percent of the position C choices were KIND-TO-Z for these cases, perhaps due to the disadvantageous inequality in that equilibrium (i.e., Z receives 24 or 16 while the C players receive only 5).
Even though theory suggests that nonbinding, peer communication may not be effective as it is merely cheap talk and does not lead to credible ex-ante commitments (Farrell and Rabin, 1996), communication has been shown to significantly encourage coordination in many different situations. The coordination game in our setting has two clear Pareto-ranked Nash equilibria. UNKIND-TO-Z is payoff dominant for position Cs and if we assume that individuals only care about their own payoffs, we expect that position C decision makers will all choose UNKIND-TO-Z. Evidence from several experiments has, however, shown that at least some proportion of individuals are motivated by equality, efficiency, and other prosocial concerns, which could lead position Cs toward choice KIND-TO-Z. While it can be difficult for each C to predict how other position Cs will choose, we expect that most groups will be able to coordinate either on UNKIND-TO-Z or KIND-TO-Z in sessions in which communication between decision makers is allowed. We therefore hypothesize that in the sessions with communication, decision makers will coordinate more frequently and coordinate more often on the outcome that is better for the Z player.

All players are paid for each of the 12 rounds in Part 1 but only receive feedback about their payoffs at the end of the session. This is intended to reduce learning and belief updating about prosocial concerns of fellow players across rounds. The experiment instructions (Appendix B) informed players that Part 1 consisted of 12 rounds, but players did not receive instructions to the later parts until Part 1 was completed.

In Part 2, players make three simple allocation decisions in order to measure their

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18 For example, in the prisoners’ dilemma: Loomis, 1959; Deutsch, 1960; Swensson, 1967; multiplayer prisoners’ dilemma: Jerdee and Rosen, 1974; Dawes et al., 1977; public-good games using a voluntary-contribution mechanism: Isaac and Walker, 1988; Palfrey and Rosenthal, 1991; Pogrebna et al., 2011; Koukoumelis et al., 2012; Oprea et al., 2014; Jack and Recalde, 2015; trust games: Charness and Dufwenberg, 2006; Ben-Ner et al., 2011.

19 We verified that this effectively limited spillover effects across rounds, even for the treatment with communication. Across all three payoff cases, regressions of the position C players’ choices (controlling for the group gender composition) indicate no significant time trend, with the lowest p-value > 0.22. We nevertheless control for potential cohort effects through robust standard errors in our regressions based on session clustering.
preferences over payoffs without the need to coordinate with others. The choices they face led to payoff distributions that are exactly the same as the choices in Part 1. Similar to Part 1, only position Cs make a decision. The key difference is that in Part 2, players’ individual decisions directly determine their earnings and their earnings are not affected by what others in their group choose (unlike the coordination game in Part 1). Hence, they do not need to consider the actions of other group members when making their decisions. One of the Part 2 decisions made by one position C player is randomly chosen to be implemented for each four-person group at the end of the experiment. In Part 3, we elicit risk preferences using the Eckel and Grossman (2008a) risk task (see Appendix B). Players are asked to choose one out of five lotteries. Each lottery has two possible outcomes, both with an equal (50 percent) chance of occurring, that have increasing variance and expected value.

Part 4 is a questionnaire to elicit sociodemographic characteristics. The questionnaire also elicits from position Z players their beliefs about what percentage of men or women chose UNKIND-TO-Z or KIND-TO-Z for the different payoff cases in Part 1, and from position C players, beliefs about what percentage of men or women (excluding themselves) chose UNKIND-TO-Z or KIND-TO-Z in Part 1. They are paid based on the accuracy of one randomly-chosen belief question.

All sessions were conducted at the Vernon Smith Experimental Economics Laboratory at Purdue University, using z-Tree (Fischbacher, 2007). We collected data from 176 subjects in 11 sessions. Subjects were undergraduate students, recruited across different disciplines at the

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20 We ask the following belief questions: For Position Z players: “What percentage of Men (Women) do you think chose M in the above case (0-100)?” For Position C players: “Not including yourself, what percentage of Men (Women) do you think chose M in the above case (0-100)?” Subjects are paid 25 ECUs if their answer is within 10 percent of the true value; 10 ECUs if it is within 0.01 percent and 20 percent of this value and 0 ECUs otherwise. In three initial sessions, beliefs were not incentivized. As the gender composition of groups varied across multiple decisions in Part 1, the specified belief is not conditioned on any particular composition, or whether or not gender is revealed to others in the group.
university by email using ORSEE (Greiner, 2015). Equal groups of men and women were recruited from the set who indicated a gender on their ORSEE registration. Subjects were only invited if they had not previously participated in any similar coordination or allocation experiment. No subject participated in more than one session.

At the beginning of each experimental session, an experimenter reads the instructions aloud while subjects follow along on their own copies. At the end of the instructions, subjects take a computerized quiz to test and reinforce their understanding of the instructions. If a subject answers a question incorrectly, the computer presents the correct answer on-screen and references the relevant text in the instructions.

Earnings in the experiment are denominated in ECUs, and these are converted to U.S. dollars at a pre-announced 10-to-1 conversion rate. Subjects’ total earnings averaged US$20.50 each, with an interquartile range of $15.50 to $25.00. Sessions usually lasted less than one hour, including the time taken for instructions and payment distribution.

3. Group Composition and Coordination: A Conceptual Framework

A key channel via which information about the group composition could affect choices in the coordination game centers around beliefs that subjects have about others’ actions, so we examine these beliefs more closely. To illustrate how beliefs and group composition can influence outcomes in this coordination game with externalities, consider the following simple framework.

In Figure 1, define the (lowest) solid line as the threshold of indifference for an own-payoff maximizing subject. It highlights that even a selfish subject would prefer the KIND-TO-Z choice if he has a high enough belief that the other two players of the coordination game will also make this choice. This is represented by the region in which KIND-TO-Z is preferred. The next two
dashed lines, moving to the northeast, illustrate indifference thresholds when this decision maker suffers from increasing disutility from imposing a negative externality on the external party. The region of beliefs for which a KIND-TO-Z choice is preferred grows with this increasing disutility, which of course can vary from person to person (i.e., a weakly (strongly) prosocial individual’s indifference threshold would be the dotted (dashed) line). While this disutility can be experienced by both men and women, it is quite possible that there are some gender differences in preferences. Figure 1 thus presents a framework via which group composition can affect choices in this game.

Figure 1: Illustration of Beliefs and Coordination Incentives

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21 This increased disutility is implemented simply by reducing the subject’s payoff of the UNKIND-TO-Z equilibrium from the monetary payoff of 7 to a lower amount. For example, the middle line in the figure corresponds to a utility payoff of 4 rather than 7 from this choice.
We next use the data on beliefs from our experimental sample (176 individuals) to explore if there is suggestive evidence about any differences in beliefs relating to the proportion of men or women who would choose the UNKIND-TO-Z option. The triangles superimposed on the figure highlight the mean beliefs across all subjects that men and women will choose the UNKIND-TO-Z choice (0.715 for men and 0.571 for women) depending on the group composition. In rounds in which subject characteristics are displayed, this difference in beliefs about the choices of men and women can potentially influence subjects’ choices. This is how gender stereotypes and beliefs can affect choices in coordination games as the group gender composition changes. If social preferences are sufficiently strong, and subjects expect women to be kind more often than men, then a KIND-TO-Z coordination game choice is more often optimal in a group with more women. This is highlighted by the “2 Women” beliefs triangle highlighted near the middle of the chart. For example, a subject with prosocial preferences represented by the dashed indifference threshold would be more inclined to choose the KIND-TO-Z (UNKIND-TO-Z) option if the other group members were both women (men). Which gender dominates the group decision is ambiguous. While the literature suggests that in Dictator games women are more prosocial, it is unclear whether this factor will dominate in a group decision-making game. Therefore, we refrain from making a specific directional hypothesis about the impact of group gender composition. Instead we aim to explore behavioral regularities, which is also a strength of the experimental approach we employ. Communication allows for the possibility that group members share their views and update their beliefs about others’ choices, thereby better coordinating on selfish and prosocial choices.

To summarize, we designed our experiment with the following research questions in mind:
1. Does information about the gender composition of the group influence the frequency of KIND-TO-Z choices?

2. Does communication improve coordination on the KIND-TO-Z choices?

3. Do beliefs about the proportion choosing the KIND-TO-Z option vary according to the gender of the C position player?

In the next section, we examine the realized choices in the coordination game for different group compositions, the detailed beliefs of subjects, and investigate if opportunities to communicate influence choices.

4. Results

We present results in four subsections. The first three correspond to the chronological order of subject decisions in the experiment. Section 4.1 reports the choices in the Part 1 coordination games, and Section 4.2 summarizes the unconditional allocation choices in Part 2. Section 4.3 describes the beliefs stated by all subjects toward the conclusion of their experimental session. Section 4.4 reports an analysis of the chat content during the coordination game for the communication treatment, and Appendix A provides more information about choices for the two other payoff cases included in the experiment.

4.1 Coordination Game

Recall that the UNKIND-TO-Z choice maximizes the decision makers’ own payoff (7) but leads to a payoff of -16 for the external party. The KIND-TO-Z choice lowers the decision makers’ payoff by 2, to 5, but raises the external party’s payoff by 20, to 4. Any failure to coordinate by the three position C players results in a payoff of 0 for all four individuals in the group.
Each group plays the coordination game with these payoffs four times: three times with gender and birth season revealed to other group members, and once with this information withheld. In eight of the eleven sessions, the position C players could first communicate in a computer-mediated chat room. This communication, not surprisingly, leads to a very high rate of coordination. In particular, players in the chat condition coordinate on a positive payoff in 122 out of 128 games (95 percent). By contrast, without chat players successfully coordinate on a positive payoff in only 16 out of 48 games (33 percent).

Figure 2 reports the frequency of KIND-TO-Z choices, by gender and by the gender composition of each coordinating group, separately for the communication and no-communication conditions. Overall, women make KIND-TO-Z choices more frequently than men, in both conditions. Panel A displays choices following chat communication, and when gender is revealed (the rightmost six bars) it appears that men may be adapting towards the kinder average choices of women. For both genders, communication leads to more KIND-TO-Z choices, as the no-communication bars (panel B) are generally lower than the communication bars (panel A). As highlighted in the middle of each panel, the all-women groups are 15 to 22 percentage points more likely to make the KIND-TO-Z choice than all-men groups.

We assess the statistical significance of these gender and group composition differences using random effects linear probability models shown in Table 3. These regressions cluster on session to account for correlation arising between subjects due to within-session interaction. Column 1 indicates that the difference between all-men and all-women groups is statistically significant (two-tailed $p$-value=0.04).\footnote{In a separate set of regressions, not reported here, we fail to reject the null hypothesis of a gender difference when gender information is not provided, based on the pooled data ($p$-value=0.58) and the communication ($p$-value=0.45) and no communication ($p$-value=0.81) treatments separately.}
Figure 2, Panel A: Frequency of KIND-TO-Z Choices, with Chat Communication

Figure 2, Panel B: Frequency of KIND-TO-Z Choices, without Communication
Figure 2 also displays a monotonic relationship between the number of women in the group and the frequency of the KIND-TO-Z choice, but only for the choices of men with chat communication. In the chat communication condition, women select the KIND-TO-Z choice more frequently (59 percent) when gender information is observed, regardless of the number of other women in the group, compared to the frequency when gender is unobserved (42 percent). This difference is also statistically significant ($p$-value=0.02), shown in column 3.\(^{23}\) In Section 4.3 we document a systematic belief among both men and women that women will make the KIND-TO-Z choice more often. One interpretation of the increase in KIND-TO-Z choices when gender information is displayed is that some women may act in a manner consistent with women stereotypes when gender is observable to other subjects, but not otherwise.

Column 5 pools across all choices when gender information is revealed. Due to across-session variability, neither the gender of the decision maker nor the gender composition of the group has a statistically significant impact on the likelihood that the KIND-TO-Z choice is selected. Allowing subjects to chat before making their choice leads to a marginally significant increase in the KIND-TO-Z choice (two-tailed $p$-value=0.058), as shown in column 5.\(^{24}\)

All of the above conclusions are robust to including demographic controls and risk preferences measured in Part 3 of the experiment, as indicated in the even-numbered columns of Table 3. They also hold for a random effects logit model specification rather than a linear probability model (not shown).

An advantage of our within-subject design is that the four individual choices made by each position C player can indicate the degree of internal consistency each exhibited. As noted before,

\(^{23}\) The data do not indicate that men are less prosocial if gender is revealed than when not revealed ($p$-value=0.85).

\(^{24}\) Alternative specifications with a gender and communication interaction always indicate insignificant interactions ($p$-values>0.80).
Table 3: Linear Probability Models for Part 1 Coordination Games

Dependent Variable = 1 if Subject Chooses KIND-TO-Z Choice

<table>
<thead>
<tr>
<th></th>
<th>Choices with Uniform Gender</th>
<th>Choices Only by Women (with Comm)</th>
<th>All Choices with Info Revealed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Dummy = 1 if Woman</td>
<td>0.167*</td>
<td>0.163†</td>
<td>0.083</td>
</tr>
<tr>
<td></td>
<td>(0.081)</td>
<td>(0.094)</td>
<td>(0.075)</td>
</tr>
<tr>
<td>Number of Other Women in Group</td>
<td>0.036</td>
<td>0.035</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.051)</td>
<td>(0.052)</td>
<td></td>
</tr>
<tr>
<td>Dummy = 1 if Communication</td>
<td>0.122</td>
<td>0.216*</td>
<td>0.215†</td>
</tr>
<tr>
<td></td>
<td>(0.155)</td>
<td>(0.108)</td>
<td>(0.113)</td>
</tr>
<tr>
<td>Dummy = 1 if Gender Info Provided</td>
<td>0.174*</td>
<td>0.174*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.075)</td>
<td>(0.077)</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.306*</td>
<td>0.351*</td>
<td>0.417**</td>
</tr>
<tr>
<td></td>
<td>(0.138)</td>
<td>(0.178)</td>
<td>(0.063)</td>
</tr>
<tr>
<td>Demographic and Risk Preference Controls</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Observations</td>
<td>132</td>
<td>132</td>
<td>192</td>
</tr>
</tbody>
</table>

Notes: All results based on Payoff Case 1 shown in Table 1. Random effects (individual subjects) regressions with session clustering (robust standard errors in parentheses). **, * and † denote coefficients significantly different from zero at 1%, 5% and 10% levels (all two-tailed tests). Demographic controls include race, religion (importance), self-reported grade point average and year in college, foreign-born, college major and birth season. Risk preference control based on binary classification, separating subjects taking least and most risk.

Subjects faced these choices in a random order. Since chat communication leads to greater coordination, as already noted, not surprisingly individuals changed between the KIND-TO-Z and UNKIND-TO-Z choices at a greater frequency across their four choices in the communication treatment. More interestingly, consistency also differs significantly by gender. Define an individual as “fully consistent” if he or she makes the same choice (either all KIND-TO-Z or all UNKIND-TO-Z) across four Part 1 choices. Without communication 17 of the 18 men are fully consistent, while only 13 of the 18 women are fully consistent. With chat communication, 18 of the 48 men are fully consistent, compared to only 11 of the 48 women. This gender difference is significant (p-value=0.03) based on a linear probability model with session random effects. Thus,
women appear to adjust their choices more often than men based on factors such as the gender composition of the group and communication, consistent with Croson and Gneezy’s (2009) observation that “gender differences in other-regarding preferences … [arise because] women are more sensitive to cues in the experimental context than are men” (p. 463).

4.2 Payoff Preferences without Coordination Incentives

The choices for the coordination game just described reflect subjects’ preferences as well as their beliefs about whether others in their group will make KIND-TO-Z or UNKIND-TO-Z choices. In order to obtain a measure of payoff preferences that is unaffected by these beliefs, we ask subjects, in Part 2 of each experimental session, to make nonstrategic dictator choices. No failure-to-coordinate risk could affect these choices, which are made before any payoff outcomes from Part 1 are revealed. One position C player is chosen at random from each four-person group and her chosen allocation is implemented.

Table 4 displays the mean frequency of KIND-TO-Z choices on this dictator allocation task, separately by gender and communication conditions. Women choose the KIND-TO-Z allocation 17 to 23 percent more frequently than to men. A difference in levels also exists across communication conditions even though no additional communication occurs between subjects before these Part 2 allocation choices. In particular, subjects tend to make KIND-TO-Z choices more frequently in the sessions in which they communicated during Part 1. Table 5 shows that both the gender difference (two-tailed $p$-value=0.018) and the communication treatment difference (two-tailed $p$-value=0.048) are statistically significant, based on a linear probability model with session clustering, although the communication difference is not robust to demographic controls.
(column 2). The gender difference is also statistically significant when considering the communication treatment separately (columns 3 and 4).

Table 4: Frequency of KIND-TO-Z Individual Allocations (Part 2), By Gender

<table>
<thead>
<tr>
<th></th>
<th>Communication Treatment</th>
<th>No Communication Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women (std. error)</td>
<td>0.646 (0.070)</td>
<td>0.444 (0.121)</td>
</tr>
<tr>
<td>Men (std. error)</td>
<td>0.417 (0.072)</td>
<td>0.278 (0.109)</td>
</tr>
<tr>
<td>Gender Difference</td>
<td>0.229</td>
<td>0.166</td>
</tr>
</tbody>
</table>

Table 5: Linear Probability Models for Part 2 Simple Payoff Allocations

Dependent Variable = 1 if Subject Chooses KIND-TO-Z Choice

<table>
<thead>
<tr>
<th></th>
<th>All Choices (1)</th>
<th>All Choices (2)</th>
<th>Choice in Communication Condition (3)</th>
<th>Choice in Communication Condition (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dummy = 1 if Woman</td>
<td>0.212* (0.075)</td>
<td>0.220* (0.092)</td>
<td>0.229** (0.063)</td>
<td>0.207* (0.082)</td>
</tr>
<tr>
<td>Dummy = 1 if Communication (in Part 1)</td>
<td>0.170* (0.076)</td>
<td>0.152 (0.101)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.255** (0.074)</td>
<td>0.480* (0.210)</td>
<td>0.417** (0.045)</td>
<td>0.493* (0.170)</td>
</tr>
<tr>
<td>Demographic and Risk Preference Controls</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.068</td>
<td>0.233</td>
<td>0.053</td>
<td>0.229</td>
</tr>
<tr>
<td>Observations</td>
<td>132</td>
<td>132</td>
<td>96</td>
<td>96</td>
</tr>
</tbody>
</table>

Notes: All results based on Payoff Case 1. Robust standard errors (based on session clustering) shown in parentheses. ***, *, † denote coefficients significantly different from zero at 1%, 5% and 10% levels (all two-tailed tests). Demographic controls include race, religion (importance), self-reported grade point average and year in college, foreign-born, college major and birth season. Risk preference control based on binary classification, separating subjects taking least and most risk.

25 Alternative specifications with a gender and communication interaction always indicate insignificant interaction terms (p-values>0.79).
These Part 2 individual allocations, indicating subjects’ preference without the need to coordinate with others, suggest how group decisions in this payoff environment might differ under alternative decision-making rules. In the Part 1 coordination game, groups had to make a unanimous choice in order to earn a non-zero payoff. For the communication treatment, groups were usually able to reach a consensus, and, as we already noted, they coordinated in 122 out of 128 games (95 percent). This required subjects to make coordination game choices that differed from their Part 2 individual allocation choices. In particular, 33 percent (125 of 384) of the coordination game choices with communication differed from the individual subjects’ Part 2 allocation choices. Without communication, only 12 percent (17 of 144) of the coordination game choices differed from subjects’ Part 2 allocation choices.\(^{26}\)

We implemented a coordination game for the Part 1 group decisions, which captures well groups that make decisions through consensus, and seeking unanimity. Some group decisions, however, ranging from corporate board choices to tenure decisions, are made through majority rule voting rather than consensus. Consider a counterfactual scenario such that majority vote determined the group choice in Part 1 and assume that individuals voted the same as their individual allocation choices made in Part 2. This would lead the fraction of KIND-TO-Z group choices to increase monotonically with the number of women in the group. Our data is consistent with this expectation; KIND-TO-Z choices increase with the number of women in the group ($p$-value<0.01 for linear probability model with random session effects).

Recall that we collected information about subjects’ birth season as well as their gender, mainly to avoid making gender too salient as the only displayed characteristic. We do not expect

\(^{26}\) A small but insignificant gender difference exists in the Part 1 deviation rate from the Part 2 allocation for both treatments, with women making inconsistent choices in 34 and 14 percent of the cases with and without communication, compared to 31 and 10 percent for men.
birth timing to be correlated with subjects’ choices. Birth timing therefore provides a convenient placebo test to contrast with the significant gender difference. In regressions analogous to Table 5, but with a dummy variable for birth during the first two rather than last two seasons of the year replacing gender, we find no birth timing impact ($p$-value=0.38 for all choices as in column (1), and $p$-value=0.76 for the communication condition as in column (3)). Similarly, birth timing does not correlate with Part 1 coordination game choices ($p$-value=0.65 for specification analogous to column (1) of Table 3).

4.3 Beliefs about KIND-TO-Z Choices

Prior to revealing payoffs and any decisions of other subjects, we ask all subjects for their beliefs about the coordination game choices made in Part 1 (see footnote 13). Subjects report different beliefs for men and women. Both the Position C players making choices and the passive Position Z external subjects indicate their beliefs, and for the Position C players we explicitly ask for estimates that exclude themselves. These beliefs are incentivized for the eight sessions with chat communication, but not for the three sessions without communication.

Table 6 shows a systematic difference in beliefs about the likelihood of KIND-TO-Z choices by gender. Subjects expect women to make the KIND-TO-Z choice 14 to 16 percentage points more frequently than men, which actually exceeds the gender difference observed for the Part 1 coordination game decisions shown in the bottom of the table.27 Table 7 provides statistical evidence, using regressions that employ as the dependent variable the difference in individual subjects’ beliefs about the (percentage) frequency that women and men will make the kind choice. The significant belief differential (captured by the intercept terms) in these regressions indicates

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27 Eckel and Grossman (2008a) find a similar (though reversed result) with respect to risk attitudes. Both men and women under predict the risk attitudes of men and women and by similar magnitudes.
that women are expected to make the KIND-TO-Z choice significantly more frequently than men. This belief difference holds for both men and women, and irrespective of communication opportunities.\footnote{The positive, but not statistically significant, estimate on the woman dummy is consistent with Bordalo et al.’s (2019) finding that gender stereotypes are more prone to influence women’s beliefs. The demographic and risk preference controls (columns 2, 4 and 6) indicate that subjects who are among the least risk averse indicate a smaller belief differential than those who are more risk averse.}

The middle part of Table 6 shows that the number of subjects who believe that women will more frequently make the KIND-TO-Z choice (110 overall) is nine times greater than the percentage who believe that men will more frequently make the KIND-TO-Z choice (only 13 overall). The top part of Table 6 shows that subjects also (correctly) indicate a level difference between the chat communication and no communication conditions, believing on average that subjects make fewer KIND-TO-Z choices without communication, but the kindness belief gap across genders is relatively stable. In fact, the difference between expected kindness rates for men and women is 13.8 percent without communication and 14.8 percent with communication, and this small difference in the gap is not significant. Thus, adding belief incentive payments does not seem to affect beliefs about the difference in KIND-TO-Z choices between genders. This gender difference in beliefs is also highly significant when considering only the incentivized beliefs data (two-tailed \(p\)-value<0.01).

One could be concerned that the beliefs are affected by the chat interactions among the Position C players. Although we elicited beliefs before revealing the results of the decisions of others in the experiment, Position C players could calibrate their beliefs based on their communications with other Position C players. Position Z players, however, never had interactions with any other subjects before they were required to report their beliefs, and so their beliefs can be interpreted as similar to outside observers (Babcock et al., 2017). The right side of Table 6 and
Table 6: Beliefs About Percentage of Women and Men Choosing KIND-TO-Z in Part 1

<table>
<thead>
<tr>
<th></th>
<th>Communication Condition</th>
<th>No Communication</th>
<th>Position Z Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Belief KIND-TO-Z Choice (Std. Error of Mean)</td>
<td>30.4 (2.23)</td>
<td>45.2 (2.42)</td>
<td>23.2 (3.96)</td>
</tr>
<tr>
<td>Observations</td>
<td>128</td>
<td>128</td>
<td>48</td>
</tr>
<tr>
<td>Number Believing Women more KIND</td>
<td>86 (67%)</td>
<td>24 (50%)</td>
<td>28 (64%)</td>
</tr>
<tr>
<td>Number Believing Equally KIND-TO-Z</td>
<td>29 (23%)</td>
<td>24 (50%)</td>
<td>15 (34%)</td>
</tr>
<tr>
<td>Number Believing Men more KIND</td>
<td>13 (10%)</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Overall rate of KIND Choice (Std. Error of Mean)</td>
<td>51.0 (3.62)</td>
<td>54.7 (3.60)</td>
<td>29.2 (5.39)</td>
</tr>
<tr>
<td>Observations</td>
<td>192</td>
<td>192</td>
<td>72</td>
</tr>
</tbody>
</table>

Table 7: Comparing Percentage of Women and Men Choosing KIND-TO-Z in Part 1

Dependent Variable = Percentage Women KIND-TO-Z– Percentage Men KIND-TO-Z

<table>
<thead>
<tr>
<th></th>
<th>All Beliefs</th>
<th>Beliefs for Communication Condition Only</th>
<th>Beliefs Position Z Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Dummy = 1 if Woman</td>
<td>3.194</td>
<td>0.758</td>
<td>1.381</td>
</tr>
<tr>
<td>(2.950)</td>
<td>(2.536)</td>
<td>(3.167)</td>
<td>(2.548)</td>
</tr>
<tr>
<td>Dummy = 1 if Communication (in Part 1)</td>
<td>1.037</td>
<td>-1.690</td>
<td>3.289</td>
</tr>
<tr>
<td>(3.303)</td>
<td>(3.851)</td>
<td>(5.643)</td>
<td>(8.113)</td>
</tr>
<tr>
<td>Belief Differential (Intercept)</td>
<td>12.09**</td>
<td>25.59**</td>
<td>14.02**</td>
</tr>
<tr>
<td>(2.957)</td>
<td>(6.538)</td>
<td>(2.929)</td>
<td>(7.655)</td>
</tr>
<tr>
<td>Demographic and Risk Preference Controls</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.007</td>
<td>0.169</td>
<td>0.001</td>
</tr>
<tr>
<td>Observations</td>
<td>176</td>
<td>176</td>
<td>128</td>
</tr>
</tbody>
</table>

Notes: Belief differential measured by intercept estimate. All results based on Payoff Case 1. Robust standard errors (based on session clustering) shown in parentheses. **, *, and † denote coefficients significantly different from zero at 1%, 5% and 10% levels (all two-tailed tests). Demographic controls include race, religion (importance), self-reported grade point average and year in college, foreign-born, college major and birth season. Risk preference control based on binary classification, separating subjects taking least and most risk.
Columns 5 and 6 of Table 7 indicate that Position Z players predict a very similar gap between KIND-TO-Z choice rates for men and women (15.7 percent) as summarized above in the pooled data. This difference is also statistically significant.

4.4 Content of Communication

Position C players could exchange written chat messages for 60 seconds each round before submitting their coordination game choices. In order to quantify the statements made in these chat rooms, we employed three coders to read and classify all 2,578 lines of chat in the 384 chat rooms. The coders were Purdue students who were trained separately and coded statements independently. They were unaware of the research questions addressed in this study and did not know the subjects’ decisions. During their training, they read the experiment instructions in order to understand the implications of the UNKIND-TO-Z and KIND-TO-Z choices the subjects made following the chats. The coders judged whether each individual chat line fit into 15 different specific meaning categories and subcategories that were defined by the authors. Individual chat lines could be assigned to multiple categories. We used Cohen’s Kappa (Krippendorff, 2003; Cohen, 1960) to assess category classification reliability, which nets out the level of coder agreement that can occur simply by chance.

Table 8 summarizes the mean frequency that coders identified different content categories across all chat statements for the categories that met at least the “moderate” agreement threshold (Kappa>0.4). Subjects’ chats tend to focus on the choice between the UNKIND-TO-Z and KIND-TO-Z action, which is not surprising given the zero payoffs from miscoordination in the game. The most common statements mentioned M [UNKIND-TO-Z] or J [KIND-TO-Z], or agreed with previous proposals made to choose a particular action.
Notably, expressions of concern for the external party (Category 1) or statements about being nice or altruistic (2) were relatively infrequent, as were statements mentioning money (3). Some (verbatim) examples of such statements are the following:

**Table 8: Average Frequency of Chat Statement Classifications**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Mean Frequency</th>
<th>Cohen's Kappa</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Concerns expressed for player Z’s earnings/welfare/well-being</td>
<td>0.0240</td>
<td>0.581</td>
</tr>
<tr>
<td>2</td>
<td>Mentions of being nice/altruistic</td>
<td>0.0197</td>
<td>0.470</td>
</tr>
<tr>
<td>3</td>
<td>Mentions of money (generally and with specific goals)</td>
<td>0.0401</td>
<td>0.435</td>
</tr>
<tr>
<td>4</td>
<td>Asks for proposal/advice</td>
<td>0.0224</td>
<td>0.580</td>
</tr>
<tr>
<td>5M</td>
<td>Mentions choice M (agreements with M are 9M below)</td>
<td>0.1501</td>
<td>0.683</td>
</tr>
<tr>
<td>5J</td>
<td>Mentions choice J (agreements with J are 9J below)</td>
<td>0.0778</td>
<td>0.775</td>
</tr>
<tr>
<td>6</td>
<td>Mentions gender</td>
<td>0.0023</td>
<td>0.555</td>
</tr>
<tr>
<td>7</td>
<td>Subject mentions (birth) season</td>
<td>0.0062</td>
<td>0.958</td>
</tr>
<tr>
<td>8</td>
<td>Mentions connection between gender and prosociality/selfishness</td>
<td>0.0016</td>
<td>0.499</td>
</tr>
<tr>
<td>9</td>
<td>Agrees to previous message in the group</td>
<td>0.3496</td>
<td>0.514</td>
</tr>
<tr>
<td>9M</td>
<td>Agrees with M proposal</td>
<td>0.2479</td>
<td>0.558</td>
</tr>
<tr>
<td>9J</td>
<td>Agrees with J proposal</td>
<td>0.1018</td>
<td>0.658</td>
</tr>
<tr>
<td>11M</td>
<td>M either mentioned or agreed to (constructed from 5M and 9M)</td>
<td>0.3973</td>
<td>0.782</td>
</tr>
<tr>
<td>11J</td>
<td>J either mentioned or agreed to (constructed from 5J and 9J)</td>
<td>0.1793</td>
<td>0.834</td>
</tr>
<tr>
<td>10</td>
<td>Other (any statement not fitting into above categories)</td>
<td>0.1907</td>
<td>0.730</td>
</tr>
</tbody>
</table>

Note: Kappa values between 0.40 and 0.60 are considered “moderate” agreement; values between 0.60 and 0.80 are considered “substantial” agreement; and values above 0.80 are considered “almost perfect” agreement (Landis and Koch, 1977).

**Category 1 -- Concerns expressed for player Z’s earnings/welfare/well-being:**

- this is rough for the Z players
- ehh im feeling sorry for type z
- whoever was put in group Z is getting screwed
- Im thinkin the 2 pts isnt that big of adeal. lets give Z something. J [KIND-TO-Z]?

**Category 2 -- Mentions of being nice/altruistic:**
I like being nice
I’m a little surprised how nice people are in this game lol
Altruism and all that jazz
Want to do J [KIND-TO-Z]? Be kind to all?

Category 3 -- Mentions of money (generally and with specific goals):

Trying to get the most money for the group
we make the decisions so we should get the money
we are trying to make money. not give it to someone else. choose m [UNKIND-TO-Z]

Explicit mentions of gender (Category 6) and the potential connection between gender and
social preferences were very rare (only ten of the 2,578 statements), indicating that our
manipulation of gender information did not substantially prime subjects to focus on the gender of
their fellow group members. As indicated in Table 8 (see categories 6 and 7), mentions of gender
are actually less frequent than mentions of birth season, although both are uncommon.

The content communicated in the chat rooms differed significantly by gender. Men
communicated significantly (two-tailed p-value=0.045) more individual lines in each chat room
(2.75 lines) compared to women (2.12 lines).29 Table 9 reports the average frequency that chat
statements were classified for the five categories in which women and men communicated
significantly differently. Women were about twice as likely to mention concerns for player Z, and
they also mentioned or agreed to the KIND-TO-Z choice more frequently than men.30 Women
were also about twice as likely to ask for advice of the others in the chat room, although this was

29 Born et al. (2018) also found that men speak more than women in their mixed gender groups communicating face-
to-face. Men submitted virtually the same number of chat lines in our experiment regardless of whether they were in
mixed or uniform gender groups, but women tended to submit more lines (2.37 on average) in uniform gender groups
than in mixed gender groups (2.01 on average). This difference, however, is not statistically significant. Men in our
experiment also more often submitted the first line of communication in the chat room—59 percent compared to 41
percent for women—but this gender difference is not statistically significant (p-value=0.138 when clustering standard
ing errors on sessions in a linear probability model).
30 Women also mentioned or agreed to the kind choice at significantly higher rates than men in the mixed gender
groups separately (p-value=0.019 for groups with one woman and p-value=0.080 for groups with two women).
coded relatively infrequently and the statistical significance is marginal. Men were significantly more likely to mention money, compared to women. The average number of statements about money increases monotonically from 0.42 for 0 men in the group, to 0.58 for 1 man, 1.29 for 2 men, and 1.42 for 3 men in the group ($p$-value=0.01 for regression with random session effects). This gender difference for statements about money is also statistically significant for uniform gender groups ($p$-value=0.008), groups with two men and one woman ($p$-value=0.003) and even for groups in which information about gender is not provided ($p$-value=0.019).

Table 9: Differences in Chat Statement by Gender

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Men Freq.</th>
<th>Women Freq.</th>
<th>$p$-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Concerns expressed for player Z’s earnings/welfare/well-being</td>
<td>0.0215</td>
<td>0.0410</td>
<td>0.054</td>
</tr>
<tr>
<td>3</td>
<td>Mentions of money</td>
<td>0.0581</td>
<td>0.0221</td>
<td>0.001</td>
</tr>
<tr>
<td>4</td>
<td>Asks for proposal/advice</td>
<td>0.0145</td>
<td>0.0287</td>
<td>0.081</td>
</tr>
<tr>
<td>5J</td>
<td>Mentions choice J [KIND-TO-Z] (other than J [KIND-TO-Z] agreements)</td>
<td>0.0840</td>
<td>0.1556</td>
<td>0.004</td>
</tr>
<tr>
<td>11J</td>
<td>J [KIND-TO-Z] either mentioned or agreed to</td>
<td>0.2380</td>
<td>0.3374</td>
<td>0.027</td>
</tr>
<tr>
<td>Ave lines</td>
<td>Average number of lines of chat within each chat room</td>
<td>2.75</td>
<td>2.12</td>
<td>0.045</td>
</tr>
</tbody>
</table>

Note: Two-tailed $p$-values based on Poisson count regressions, with standard errors clustered on individual subjects. Frequencies based on main payoff case 1 only.

5. Conclusion

In organizations, many of the most important decisions are made by groups. Coordination and communication are often critical for groups to make effective decisions. In this paper we focus on decisions that can affect group members as well as a passive external party. We examine if the gender composition of three-person groups affects choices and beliefs in a coordination game with selfish and prosocial equilibria and we allow for opportunities to communicate. We also investigate individuals’ prosocial preferences independent of their beliefs about others’ choices.
We find that women are more likely than men to make the prosocial choice. In the coordination game, we find that the all-women groups are significantly more likely to make the KIND-TO-Z choice as compared to all-men groups.31 Both men and women strongly believe that women will make choices that are kinder to external parties, in line with the observed difference in prosocial choices across genders. Analysis of the chat communication prior to coordination game choices reveals that women more frequently express concerns for the external party’s welfare, are more likely to agree to choose the KIND-TO-Z option, and less frequently mention money. Communication leads to much higher rates of coordination as expected, but more importantly it leads to more kind choices by both genders.

Our findings suggest that the gender composition of the group and the beliefs that individuals have about others in the group can have important impacts on the outcomes not just for group members but also for others in society. Policies that encourage gender diversity in organizations could therefore have the additional (in some cases unintended or unplanned) impacts on social outcomes and inequality. Firms seeking to promote Corporate Social Responsibility initiatives, for example, may see greater success if women participate in greater decision-making roles. These spillovers of gender diversity policies should be considered when advocating for or against such policies and when evaluating their effectiveness.

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31 This finding, in conjunction with the results from the literature (Fearon and Humphreys, 2017; Greig and Bohnet, 2009), provides credence to policies directing development funds in poor communities through women’s groups.
References:


Azmat, G. and B. Petrongolo. 2014. “Gender and the labor market: What have we learned from field and lab experiments?” Labour Economics 30, 32-40.


CSRI, 2016. “The CS Gender 3000: The reward for change.” Credit Suisse Research Institute, edited by Urs Rohner, Tidjane Thiam and Iris Bohnet.


Appendix A: Summary of Results for All Payoff Cases

The main body of the paper presents results for payoff case 1, with monetary payoffs shown in Table 1 and reproduced in Table A.1. This appendix summarizes the choices made for the two other payoff cases shown on the lower rows of Table A.1.1 Although the absolute magnitude of the externality imposed on the Position Z subjects (20 Experimental Currency Units, or ECUs) is the same for all payoff cases, in cases 2 and 3 subjects were more inclined to impose the externality and maximize their own material payoffs. The disadvantageous relative payoff position of choice J in payoff cases 2 and 3 may have dissuaded a majority of Position C subjects from the KIND choice. The KIND choice J was considerably more common in payoff case 1 when the alternative (M) led to a -16 payoff for the Position Z subject.

Table A.1: Payoff Cases and Frequency of KIND Choices by Gender

<table>
<thead>
<tr>
<th>Payoff Case</th>
<th>J (KIND) payoffs</th>
<th>M (UNKIND) payoffs</th>
<th>Part 1 Coordination Game</th>
<th>Part 2 Dictator Allocations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C position</td>
<td>Z position</td>
<td>C position</td>
<td>Z position</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>4</td>
<td>7</td>
<td>-16</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>24</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>16</td>
<td>7</td>
<td>-4</td>
</tr>
</tbody>
</table>

Notes: 48 men and 48 women made a single dictator allocation choice for each payoff case in Part 2, and in Part 1 they made 4 coordination game choices (with differing gender compositions of the group, and a no-information control, in each of the 4 choice).

For payoff case 2, virtually no subjects of either gender were willing to sacrifice 2 ECU to raise the Z position’s payoff from 4 to 24. A modest fraction of 25 to 30 percent of subjects would

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1 These alternative payoff cases were included only for the 8 sessions (128 subjects) in which the Position C subjects had the opportunity to communicate through chat during Part 1 before submitting their coordination game choices.
Appendix A

incurs this cost of 2 in order to raise the Z position payoff from -4 to 16. In both cases, the Part 1 coordination game choices are similar overall to the nonstrategic Part 2 allocations.

Table A.2 reports linear probability models for all payoff cases that are analogous to the Part 1 coordination game choices shown in Table 3 of the paper. The results are similar to payoff case 1 (column 1), indicating no significant difference in the frequency of the KIND choice J between men and women, or depending on the number of other women in the group.

Table A.2: Linear Probability Models for Part 1 Coordination Games

Dependent Variable = 1 if Subject Chooses KIND Choice J

<table>
<thead>
<tr>
<th></th>
<th>Payoff Case 1</th>
<th>Payoff Case 2</th>
<th>Payoff Case 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dummy = 1 if Woman</td>
<td>0.075</td>
<td>-0.026</td>
<td>0.041</td>
</tr>
<tr>
<td></td>
<td>(0.089)</td>
<td>(0.023)</td>
<td>(0.055)</td>
</tr>
<tr>
<td>Number of Other Women in Group</td>
<td>0.038</td>
<td>-0.038</td>
<td>0.035</td>
</tr>
<tr>
<td></td>
<td>(0.071)</td>
<td>(0.025)</td>
<td>(0.053)</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.473**</td>
<td>0.116</td>
<td>0.205*</td>
</tr>
<tr>
<td></td>
<td>(0.139)</td>
<td>(0.077)</td>
<td>(0.083)</td>
</tr>
<tr>
<td>Observations</td>
<td>288</td>
<td>288</td>
<td>288</td>
</tr>
</tbody>
</table>

Notes: All results based on rounds with gender information revealed. Random effects regressions with session clustering (robust standard errors in parentheses). **, *, and † denote coefficients significantly different from zero at 1%, 5% and 10% levels (all two-tailed tests).

Table A.3 presents the same cross-sectional regressions for the Part 2 allocation choices as reported in Table 4 of the paper. The small differences in the KIND choice frequency between men and women are not statistically significant for payoff cases 2 and 3. A gender difference is only evident for payoff case 1 (column 1), in which a more substantial proportion of C position subjects exhibit sufficient concern for the Z position and make the KIND choice that is not own-payoff maximizing.
Table A.3: Linear Probably Models for Part 2 Simple Payoff Allocations

Dependent Variable = 1 if Subject Chooses KIND Choice J

<table>
<thead>
<tr>
<th></th>
<th>Payoff Case 1 (1)</th>
<th>Payoff Case 2 (2)</th>
<th>Payoff Case 3 (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dummy = 1 if Woman</td>
<td>0.229**</td>
<td>-0.093</td>
<td>-0.042</td>
</tr>
<tr>
<td></td>
<td>(0.063)</td>
<td>(0.070)</td>
<td>(0.069)</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.417**</td>
<td>0.125</td>
<td>0.292**</td>
</tr>
<tr>
<td></td>
<td>(0.045)</td>
<td>(0.069)</td>
<td>(0.061)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.053</td>
<td>0.011</td>
<td>0.002</td>
</tr>
<tr>
<td>Observations</td>
<td>96</td>
<td>96</td>
<td>96</td>
</tr>
</tbody>
</table>

Notes: Robust standard errors (based on session clustering) shown in parentheses. **, * and † denote coefficients significantly different from zero at 1%, 5% and 10% levels (all two-tailed tests).

In spite of these null results in the choice data, significant gender differences for payoff cases 2 and 3 are evident for the incentivized beliefs, indicated in Tables A.4 and A.5. These tables provide information similar to that shown in Tables 5 and 6 of the paper, with the additional cases shown in the middle and right columns. In all three payoff cases, subjects believe that women are more likely to make the KIND choice in the Part 1 coordination game, and the belief differences are large in magnitude. The lower part of Table A.4 shows that between 4 times (payoff case 2) and 13 times (payoff case 3) as many subjects believe women will be more kind than men than believe men will be more kind that women. Overall only 5 to 10 percent of subjects indicate a belief that more men make the KIND choice than women.

Table A.5 shows that these differences in beliefs are highly significant for all three payoff cases. This is based on individual differences (the paired women minus men difference in predicted beliefs for each subject), with the significant intercept term indicating that women are expected to systematically make the KIND choice at a higher rate than men. The significant woman dummy
variable for payoff case 2 indicates that women expect a smaller difference than men for payoff case 2, which had by far the lowest overall rate of the KIND choice. For the other two payoff cases, no significant difference exists between men and women regarding beliefs about gender differences in kindness.

Table A.4: Beliefs Regarding Percentage of Women and Men Making KIND Choice in Part 1

<table>
<thead>
<tr>
<th>Table A.4: Beliefs Regarding Percentage of Women and Men Making KIND Choice in Part 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payoff Case 1</td>
</tr>
<tr>
<td>Men</td>
</tr>
<tr>
<td>Mean Belief KIND Choice</td>
</tr>
<tr>
<td>(Std. Error of Mean)</td>
</tr>
<tr>
<td>Observations</td>
</tr>
<tr>
<td>Number Believing Women more KIND</td>
</tr>
<tr>
<td>Number Believing Equally KIND</td>
</tr>
<tr>
<td>Number Believing Men more KIND</td>
</tr>
</tbody>
</table>

Table A.5: Comparing Percentage of Women and Men Making KIND Choice in Part 1

Dependent Variable = Percentage Women KIND Choice – Percentage Men KIND Choice

<table>
<thead>
<tr>
<th>Table A.5: Comparing Percentage of Women and Men Making KIND Choice in Part 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payoff Case 1</td>
</tr>
<tr>
<td>(1)</td>
</tr>
<tr>
<td>Dummy = 1 if Woman</td>
</tr>
<tr>
<td>(3.167)</td>
</tr>
<tr>
<td>Belief Differential</td>
</tr>
<tr>
<td>(Intercept)</td>
</tr>
<tr>
<td>R-squared</td>
</tr>
<tr>
<td>Observations</td>
</tr>
</tbody>
</table>

Notes: Robust standard errors (based on session clustering) shown in parentheses. **, *, † denote coefficients significantly different from zero at 1%, 5% and 10% levels (all two-tailed tests).
Experiment Instructions – Part 1

Introduction

This experiment is a study of group and individual decision making. The amount of money you earn depends partly on the decisions that you make and thus you should read these instructions carefully. The money you earn will be paid privately to you, in cash, at the end of the experiment. A research foundation has provided the funds for this study.

You will first be asked to complete a short survey. Then you will participate in the experiment. The experiment is divided into three parts. Parts 1 and 2 will have many decision “rounds.” These are the instructions for Part 1. You will be paid based on your cumulative earnings across all rounds of this part. Each decision you make is therefore important because it affects the amount of money you earn.

You will receive further instructions for Parts 2 and 3 once Part 1 is completed. Please note that your decisions in Part 1 will in no way affect your earnings (or the earnings of others) in Parts 2 or 3.

In each decision round you will be grouped with some of the other people who are sitting in this room. You will make decisions privately, that is, without consulting other group members. Please do not attempt to communicate with other participants in the room during the experiment except when explicitly allowed. If you have a question as we read through the instructions or at any time during the experiment, raise your hand and an experimenter will come by to answer it.

Your earnings in the experiment are denominated in experimental dollars, which will be exchanged at a rate of 10 experimental dollars = 1 U.S. dollar at the end of the experiment. At the beginning of the experiment, 75 experimental dollars have been added to your earnings account. Depending upon the decisions you and the others in your group make in Part 1, the amount in your earnings account may increase or decrease.

Roles in the Experiment

Individuals have different roles in the experiment. The roles are determined by the number you drew when entering the laboratory. Participants will retain their roles throughout both parts of the experiment.

At the start of each round during Part 1, you will be placed in a group with three other individuals. That is, you will be in a group of 4. Each group consists of three Type C individuals and one Type Z individual.

If you are assigned the role of Type C, you will be asked to make decisions in every round of the experiment. The details of the decisions are explained on the next page.
If you are assigned the role of Type Z, you do not have a decision to make in either Parts 1 or 2 of the experiment, however you will be asked to answer questions relating to the rounds. Apart from the initial 75 experimental dollars, your earnings will depend only on the choices made by the Type C individuals. You will be informed of the earnings that you received during Part 1 at the end of the experiment and during the rounds you will view the choices that were available to the Type C individuals for each round.

Anonymity

Participants will never be informed about the identity of the other members in their group or the types that others have been assigned. Once the experiment is completed, individuals will receive their payment privately and will be able to leave without further interacting with other participants.

Type C choices in Part 1

In this part, individuals assigned the Type C roles will make decisions in 12 different “rounds.” In each round, the Type C individuals will have to choose one of two actions, $M$ or $J$. Before each new round the Type C individuals will be re-grouped with randomly-determined individuals (2 other Type C and one Type Z). Your decision screen will provide some information describing the other two Type C individuals in your group while still maintaining anonymity. This information will be obtained from you using a short survey at the beginning of the session. This is illustrated in the example decision screen shown on the next page.

Earnings in each round will depend on the decisions made by you and the other two Type C members of your group. If all three Type C members choose action $M$, then each Type C member receives a specific payment and the Type Z group member receives another payment. If all three Type C members choose action $J$, then each Type C member receives another specified payment and the Type Z group member receives another payment. Whenever the choice of all three Type C members does not match, then all 4 people in the group (including yourself) receive a payment of 0 (that is, no earnings) for the round.

An example of these payments is given in Example 1 and illustrates how your choices affect your earnings (the example payments shown here will not be used in the experiment). The actual payment amounts will differ from this example and will be different in the different rounds.

As shown in Example 1: if all 3 Type C choices are $M$, Type C players will earn 9 experimental dollars, the Type Z will earn 5 experimental dollars. If all 3 Type C choices are $J$, Type C players will earn 6 experimental dollars, the Type Z will earn 12 experimental dollars. If any Type C choices do not match, all players will earn 0 experimental dollars.

Prior to making their $M$ or $J$ choice, all 3 Type C players will have an opportunity to exchange electronic chat messages privately for 60 seconds, as illustrated on the right side of Example 1. Although we will record the messages that are sent and all the 3 Type C players in the group can
observe these messages, no Type Z group members or other participants in this experiment can observe these messages. Note, in sending messages back and forth we request that Type C players follow two simple rules: (1) Be civil to each other and use no profanity and (2) Do not identify yourself.

Example 1: Decision Screen and Chat Window

As shown below in Example 2, in some rounds you will not receive information about the other Type C individuals in your group. Note that negative values denote losses, which will be deducted from an individual’s earnings account. Example 2 provides an illustration, again for some payoff numbers that will not be used in the experiment. In this example, the Type Z individual in the group would have 8 experimental dollars deducted from his/her earnings account this round if all 3 Type C choices are $J$. 
Example 2: Decision Screen with No Information Shown about Others in Group

Participants assigned as Type Z do not have a decision to make in Part 1, but will answer questions relating to different scenarios in the experiment during the time Type C participants are making decisions.

Earnings in Part 1

As explained above, in Part 1 if you are a Type C participant, you will make choices of $M$ or $J$ in each of 12 rounds. If you are a Type Z participant, you will answer questions and your earnings will depend on the choices made by the Type C participants in your group. The outcome from all 12 rounds will be added to (or subtracted from) your earnings account. You will be re-grouped with new, randomly-determined individuals before the start of each round.

Please note that no feedback about the choices of the other individuals will be given between rounds. Note also that none of the participants will be informed about their earnings from Part 1 until the end of the experiment.

Do you have any questions? If you do, please raise your hand to attract the attention of an experimenter. Otherwise, please proceed to answer the comprehension questions on your computer.
Experiment Instructions – Part 2

These are your instructions for Part 2 of the experiment. Part 2 will in no way affect your earnings (or the earnings of others) in the final Part 3.

In Part 2, each participant will retain the same type he or she was assigned at the beginning of Part 1. Therefore, each group will consist of 3 Type C individuals and 1 Type Z individual.

The individuals assigned as Type Z do not have a decision to make in Part 2, but will answer questions relating to different scenarios in the experiment during the time Type C participants are making decisions.

The Type Z individuals’ earnings depend only on the choices made by the Type C individuals. The Type Z individuals will be informed of the earnings that they received during Part 2 at the end of the experiment together with the choices that were available to the Type C individuals.

Type C choices in Part 2

In Part 2 the Type C individuals will be presented with 3 different “cases.” Each case will consist of a different pair of earnings’ allocations. Each allocation specifies the earnings of 3 Type C individuals and 1 Type Z individual.

If you are in the role of a Type C participant, your task in Part 2 will be to select one of the allocations in each case.

Example 3

<table>
<thead>
<tr>
<th>Allocation A</th>
<th>Allocation B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type C earn 5 each</td>
<td>Type C earn 7 each</td>
</tr>
<tr>
<td>Type Z earn 8</td>
<td>Type Z earn 0</td>
</tr>
</tbody>
</table>

Which allocation would you like to choose?

- Allocation A
- Allocation B

Continue
Example 3 provides an example of one case in Part 2. (These example numbers will not be used in the experiment). You are asked to choose between Allocation A and Allocation B. Each allocation will determine the earnings of all four individuals in the group. If Allocation A is chosen, you and the other two Type C individuals will each earn 5 experimental dollars, and the Type Z individual will earn 6 experimental dollars. On the other hand, if Allocation B is chosen, then you and the other two Type C individuals will each earn 7 experimental dollars, and the Type Z individual will earn 8 experimental dollars.

If you are in the role of a Type Z participant, you will not make a decision in this part, but you will answer questions relating to the three different cases.

**How are my earnings determined in Part 2?**

For Type C participants: As explained above, you will make 3 decisions for 3 different cases in this part. After all participants complete Part 2, the computer will randomly select one of the 3 cases. Each case will be equally likely to be selected. Once a case has been selected by the computer, the decisions made by one of the three Type C participants in your group, in that particular case, will be randomly selected and implemented for all four participants in the group.

For Type Z participants: earnings depend on the choices made by the Type C participants.

**Information about earnings**

Participants in the experiment will not be informed about their earnings from Part 2 until the end of the experiment. As in Part 1, the Type Z individuals are presented with a description of the task and will know the choices that were available to Type C participants. Individuals will be re-grouped before they make decisions in the 3 cases. This means that each Type C will be matched with a different Type C and a different Type Z in each case.

Do you have any questions? If you do, please raise your hand to attract the attention of an experimenter. Otherwise, please proceed to answer the questions below.
Experiment Instructions – Part 3

This is an individual task. Each of you will take part in a Gamble Selection Task. You will be shown five gambles, and will be asked to choose the one you prefer. Each gamble has two possible outcomes, both with equal (50%) chance of occurring. Your earnings from this task will depend on which gamble you choose, and which outcome occurs.

The gambles are as follows:

<table>
<thead>
<tr>
<th>Gamble</th>
<th>Random numbers 1-50 (50% chance)</th>
<th>Random numbers 51-100 (50% chance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>You earn $4</td>
<td>You earn $4</td>
</tr>
<tr>
<td>2</td>
<td>You earn $6</td>
<td>You earn $3</td>
</tr>
<tr>
<td>3</td>
<td>You earn $8</td>
<td>You earn $2</td>
</tr>
<tr>
<td>4</td>
<td>You earn $10</td>
<td>You earn $1</td>
</tr>
<tr>
<td>5</td>
<td>You earn $12</td>
<td>You earn $0</td>
</tr>
</tbody>
</table>

After you have chosen one of these gambles, the computer will randomly draw a whole number between 1 and 100 (inclusive). If the random number is 50 or less, your earnings from this task are as shown in the middle column of the table. If the random number is 51 or more, your earnings from this task are as shown in the right column of the table. The random number drawn for you may be different from the ones drawn for other participants.

Once everyone has chosen a gamble, you will proceed to a short exit questionnaire.

At the end of the experiment, you will be informed of the results of this task: your choice of gamble, your random number, and your earnings from this part.