Department of
Economics

University of Pittsburgh
Kenneth P. Dietrich School of Arts and Sciences

WORKING PAPER SERIES

15/005

Breaking the Glass Ceiling with "No": Gender Differences in Accepting and Receiving Requests for Non-Promotable Tasks

Lise Vesterlund, Linda Babcock, Maria Recalde and Laurie Weingart

May 2015

Breaking the Glass Ceiling with "No": Gender Differences in Accepting and Receiving Requests for Non-Promotable Tasks[1]

Lise Vesterlund, University of Pittsburgh, Economics, and NBER
Linda Babcock, CMU, Heinz College and Department of Social and Decision Sciences
Maria Recalde, IFPRI
Laurie Weingart, CMU, Tepper School of Business[2]

Abstract: Gender differences in task allocations may help sustain vertical gender segregation in labor markets. If women hold more non-promotable tasks then they may progress more slowly than men in organizations. Examining environments where a volunteer must be found for a task that everyone prefers be completed by someone else (writing a report, serving on a committee, etc.) we find that, relative to men, women more frequently volunteer, more frequently are asked to volunteer, and more frequently accept requests to volunteer. These differences are consistent with the belief that women, less than men, say 'No' to request to perform non-promotable tasks.

[1] We thank David Tannenbaum, Craig Fox, Noah Goldstein, and Jason Doctor for giving us permission to use their data. We thank David Klinowski, Rachel Landsman, Conor Lennon, and Amanda Weirup for superb research assistance. Participants at seminars and conferences at the University of Zurich, Stanford, Harvard, UCSB, UCLA, CMU, Monash University, University of Adelaide, University of Pittsburgh, and Stockholm School of Economics are thanked for their helpful comments. Finally we thank the Carnegie Bosch Institute and the NSF (SES-1330470) for generous financial support.

[2] In accordance with the norms in psychology, we order the authors' names according to their contributions.

1. Introduction

Despite significant female educational advances, we continue to see gender differences in labor market outcomes (Goldin, Katz and Kuziemko, 2006; Bertrand, Goldin, and Katz, 2010). Particularly striking is the persistent vertical gender segregation (Altonji and Blank, 1999; Bertrand and Hallock, 2001). To better understand the process by which men and women advance in the workplace, researchers have begun to examine whether there are differences in the tasks that men and women hold at work, and how such differences contribute to differences in advancement.

Of particular interest is whether relative to men, women spend less time on tasks that can influence their performance evaluations ("promotable tasks") and more time on tasks that, while benefitting the organization, are unlikely to affect their evaluation and career advancement ("non-promotable tasks"). Recent survey evidence from academia suggests gender differences in the allocation of time on promotable and non-promotable tasks. In a survey of 349 faculty at the University of Amherst, Misra, Hickes, Lundquist and Templer (2012) find that relative to male faculty, female faculty spent 2.45 fewer hours per week on research. Mitchell and Hesli (2013) find, in a sample of 1,399 political science faculty in the US, that women advised more undergraduate students and participated in more department and college level committees. They conclude that women more than men provide "token" service. Finally, Porter (2007) finds in the National Survey of Postsecondary Faculty (NSOPF) that female faculty spend 15 percent more hours on committee work than do men. Task assignments outside of academia are also shown to differ by gender. Benschop and Doorewaard (1998) find that women employees of a large bank performed fewer developmental tasks than men, and Ohlott, Ruderman and McCauley (1994) find, in a sample of professionals, supervisors, middle managers and upper level managers, that women had fewer challenging and developmental opportunities (high stakes, managing diversity and external pressure). Finally a study of mid-level jobs by De Pater, Van Vianen, and Bechtoldt. (2010) shows that men, more than women, evaluate their individual task assignments as challenging, and find that these differences partially result from managers being more likely to assign challenging tasks to their male rather than to their female subordinates.

The standard explanations for gender differences in labor market experiences likely help explain differences in task allocations. Differences in ability and preferences as well as discrimination may cause men and women to hold a different portfolio of tasks in the work place (e.g., Polachek, 1981; Goldin and Rouse, 2000; Black and Strahan, 2001). Other explanations for gender differences in promotable tasks may be that women are more reluctant than men to negotiate (Babcock and Laschever, 2003) and to compete (e.g., Gneezy, Niederle and Rustichini, 2003; Niederle and Vesterlund, 2007) and thus fail to 'lean-in' for promotable tasks (Sandberg, 2013).

While recent work has emphasized factors that can distort the allocation of promotable tasks, the objective of the present paper is to examine the allocation of non-promotable tasks. The central questions examined are whether men and women differ in their response to requests to perform non-promotable tasks, whether there are differences in the frequency by which men and women face such requests, and what factors likely contribute to such differences.

Our interest is in non-promotable tasks for which the worker has some discretion and can decide whether or not to perform the task. Consider for example an untenured assistant professor at a research university. She knows that to be promoted, the best use of her time is to focus on her research. What will she do when asked by her Dean to be a member of the University Faculty Senate? She knows that this will take a lot of her time, take her away from her research, and be unlikely to produce any real rewards for her. Yet, important faculty matters are debated in the faculty senate and the institution is important to the well-functioning of the University. Will her response differ from that of a male colleague with comparable credentials? Is she more likely than a comparable male colleague to receive such requests?

Gender differences in the frequency of requests and in the acceptance of requests for non-promotable tasks may help explain why women advance at a slower rate than men in the work place. Unless women spend more time at work than do men, working on more non-promotable tasks means that they spend less time on promotable tasks. The career consequences of accepting a discretionary and non-promotable assignment may however extend beyond the opportunity costs of the assignment itself. In particular such assignments may generate lower job satisfaction and in turn reduce the worker's commitment and investment in her job.[3]

Gender differences in the allocation of non-promotable tasks may result both from demand and supply.[4] On the demand side, men and women may differ in the frequency by which they receive requests to perform non-promotable tasks. On the supply side, men and women may differ in the extent to which they accept requests to perform such tasks. In particular women may be more likely than men to agree to requests to perform non-promotable tasks if they are more other-regarding and more concerned for the welfare of others (e.g., Eckel and Grossman, 1998; Andreoni and Vesterlund, 2001), if they are more agreeable and have a greater desire to be liked by the requestor (Braiker, 2001), and if they have a greater desire to conform to a norm of accepting such requests (e.g., Santee and Jackson, 1982; Eagly, Wood, and Fishbaugh 1981). Essential when deciding whether to decline a request is also the assessment of the consequences of doing so. In particular women will be more likely than men to accept the request if they are more risk averse (e.g., Eckel and Grossman, 2008) and more concerned about the consequences from declining the request (Heilman and Chen, 2005), or if they are less confident that others will undertake the task in their place.[5]

[3] Finding that career interruptions and differences in weekly hours explain differences in salaries for male and female MBAs (Bertrand, Goldin, and Katz, 2010) need not imply gender equality if differences in labor market attachment result from differential task allocations.

[4] In discussing both the demand and supply of non-promotable work-related tasks we are considering tasks for which there is a request and some discretion over the acceptance of the request. Thus it may be argued that we examine tasks that lie between those considered in the psychology literature on "organizational citizenship behaviors" (OCBs), where individuals on their own initiate tasks that benefit the organization (e.g., Organ, 1988), and those considered in the organizational psychology literature's examination of task allocation, where the employee must accept an assigned task (e.g. De Pater et al 2010).

[5] See Croson and Gneezy (2009) for a review of the economics literature on gender differences.

In trying to understand what may give rise to different allocations of non-promotable tasks we examine tasks that individuals prefer that others do in their place, examining first whether men and women differ in their 'supply' of such tasks and second whether the 'demand' for such tasks differs by gender.

Examining the response to requests to perform non-promotable tasks we report on survey and field evidence that suggest that men and women differ in their perception of such requests and that women more than men accept requests to perform such tasks. Since these findings may result from men and women having different preferences for the tasks in question, we next explore this gender differential in a controlled laboratory setting. Specifically we conduct three experiments where participants in a group are presented with a task that only one person can undertake. The return from performing the task is such that the individual will only undertake it if no one else is willing to do it. Our design captures the incentives members of a group face when asked to volunteer for a task that each member prefers that another member of the group undertakes (such as writing a report, serving on a committee, organizing an event, etc.).

In our first experiment men and women come to the lab and are anonymously paired in groups. All members are treated equally and face the same incentives to perform a task. Despite facing the same incentives we find that women volunteer twice as often as men. As the differential is not explained by individual characteristics such as risk and altruism, we conduct a second experiment to examine if it is instead influenced by beliefs. This second experiment deviates from the first only by having all participants in the lab be of the same sex and thus securing that participants know that they are grouped only with members of their own sex. Results from this same-sex experiment reveal that men and women are equally likely to volunteer. This response to the gender composition of the group shows that the willingness to volunteer is not fixed, and it suggests that the documented gender gap in volunteering likely results from the belief that women are more likely than men to volunteer. Our third experiment further explores the role of beliefs and examines whether women more frequently are asked to volunteer. Specifically we add an outside requestor to our initial design, and charge this requestor with the task of asking one group member to volunteer. Consistent with the belief that women are more likely than men to accept requests, we find that requestors more frequently ask female rather than male group members to volunteer. Confirming this belief we find that women more than men agree to volunteer when asked to do so.

We argue that these gender differences in the propensity to say `no' to requests to volunteer and in the frequency by which one receives such requests likely contribute to gender differences in task allocations, and that they can create barriers to the advancement of women in organizations and in society as a whole.

2. Response to Volunteer Requests

We begin by examining whether women more than men volunteer to perform non-promotable tasks. Finding evidence that men and women differ in their perceptions of requests to perform non-promotable tasks, and that they differ in the frequency by which they volunteer for such tasks in the

field, we proceed to examine volunteering behavior in the laboratory where we can control and manipulate the incentives individuals face for volunteering.

2.1. Field Evidence

To assess whether men and women have the same perception of requests to perform non-promotable tasks, we conducted along with Amanda Weirup a number of pilot surveys (Weirup, Weingart, Babcock and Vesterlund, 2013). Respondents were asked to describe undesirable work-related requests that are outside their job duties, and had to report the factors that affected their response to the request and the emotions they felt while making the decision about whether to agree to the request. One survey used a small sample of MBA students (n=47) and asked them to describe a request they would have preferred to decline but agreed to do. Two other surveys used mTurk U.S. based participants; one asking participants to recall five work-related requests (n=212); the other asking participants about a work-related request that they wished they had not received (n=201).[6] These survey data consistently show that in thinking about accepting the request women more than men experience negative emotions (stress, anxiety, guilt), and that they are more likely to think of the negative consequences of saying `no'. That is, women more than men see acceptance of the request as a way of avoiding the negative consequences of `no'.

While these pilot surveys suggest that men and women perceive requests to perform non-promotable tasks differently, data from two field studies suggest that these differences translate into men and women differing in their response to such requests.

The first set of data is from a field study we conducted where, for a week, participants would keep a record of the requests to do non-promotable tasks (Weingart, Babcock, Vesterlund, Weirup, 2014). With the endorsement of the Pittsburgh Human Resources Association, we emailed 539 of their members to request participation in our study. One can see our request to participate in our study as a request to do a non-promotable task since it takes time away from work and provides no real benefit to the individual. Interestingly, 10.3 percent of men and 18.7 percent of women agreed to participate in this study (a Fisher's exact yields $p < .01$).

The second set of data is on the decisions to volunteer for committees at a large public university. Each year the University in question sends an email from the Chair of the Faculty Senate to all faculty members asking them to volunteer to serve on a Faculty Senate committee. These committee assignments can largely be viewed as "non-promotable" tasks. While the university benefits from faculty serving on committees, individual benefits are more limited. The assignment takes time away from research and teaching, and plays a negligible role at time of promotion.

[6] mTurk (Mechanical Turk) is a service platform provided by Amazon that allows researchers to post various tasks for workers to do on their computer for payment.

Manipulating these email requests, Professors Tannenbaum, Fox, Goldstein and Doctor conducted an experiment to determine how the language in the email affects the probability that a faculty member agrees to serve on a committee. These researchers kindly gave us access to their data for the 2012-2013 academic year, consisting of email requests to a total of 3,271 faculty members, 24.7 percent of whom were female. Faculty responded to the email in one of three ways: did not respond; declined the request; or volunteered to join a committee.[7] As these data contain both the faculty member's response to the email and their demographic characteristics, we can determine whether, when presented with a request to do the same task, men and women differ in their willingness to perform the task.

As an indication that most faculty do not view it as desirable to serve on a faculty senate committee we see across all faculty that 3.7 percent volunteered to serve, 4.3 percent responded to the email but indicated that they did not wish to serve, and 92 percent ignored the email. There are however significant gender differences in the response. Female faculty are found to be 2.7 times as likely as male faculty to volunteer to be on a committee (7.0 percent versus 2.6 percent, a Fisher's exact test yields $p < .001$).[8]

Looking at the results of a probit model for the probability of volunteering, we see in Table 1 that this gender difference is robust to controlling for faculty rank (assistant professor is the excluded category), as well as to controlling for being in the medical school and to being in a STEM related field.[9]

Table 1: Probability of Volunteering to join a Committee (probit)

	Coefficient (p-value)	Coefficient (p-value)
Female	0.034	0.034
	(0.000)	(0.000)
Associate Professor	-0.005	-0.004
	(0.629)	(0.621)
Full Professor	-0.016	-0.015
	(0.057)	(0.058)
Emeritus Professor	-0.033	-0.030
	(0.000)	(0.000)
Other Rank	-0.016	-0.014
	(0.516)	(0.563)
Medical School		0.040
		(0.000)
STEM		-0.024
		(0.013)

Dependent variable: Individual decision to volunteer (1-volunteer, 0-don't volunteer). The table presents marginal effects. Assistant professor is the excluded category. P-values are reported in parenthesis. 3,271 participants.

[7] Failure to respond will be treated as declining the request.

[8] We can also examine gender differences in whether or not the faculty member responded to the email if they were not going to volunteer. We think of this as being "polite" and not just ignoring the email: 6.1% of female faculty who did not want to volunteer explicitly declined the request while only 4% of male faculty did so, $p<.05$.

[9] Note that faculty at the medical school also are in a STEM related field.

While previous studies document greater female representation on University committees, the data presented here shed light on what gives rise to differential committee participation rates. In documenting differential task assignments it is not possible to determine whether differences result from differences in demand and/or supply. Assignments may differ because of differences in the frequency with which one is asked to serve on committees, and/or because of differences in the frequency with which one accepts requests to serve on committees. Because all faculty members are asked to volunteer in this study, our findings demonstrate that differential task assignments can be partially attributed to women being more likely than men to accept requests to perform such non-promotable tasks.

What is not clear from our two sets of field data is why women are more likely to accept requests for these tasks. One explanation may be that men and women differ in their preferences for performing non-promotable tasks. Women may simply have a stronger preference for helping with a research study or for serving on a Faculty Senate Committee. To further understand this differential response to requests we next move to the laboratory where we can better control and manipulate the incentives associated with volunteering and thus can begin to understand why men and women differ in their response to such requests.

2.2. Experiment 1: Do Men and Women Differ in Their Response to Requests?

To study differences in the propensity by which men and women accept requests to perform a non-promotable tasks, we conduct a laboratory experiment mirroring the incentives that a small group faces when it is asked to find a volunteer for a task that everyone is reluctant to undertake (writing a report, serving on a subcommittee, planning a holiday party, etc.). The setting we have in mind is one where every member of a committee or group prefers that the task be undertaken, yet everyone prefers that it be undertaken by someone other than themselves. With the request for a volunteer being made to the group, every member waits for a volunteer to step forward, fully aware that an excessive delay increases the likelihood that an inferior outcome will result (such as the task not being completed in time or not completed at all). As no explicit request is made of any one individual, the request is implicit and arises through time pressure.[10]

2.2.1. Design

Capturing the incentives described above, our experimental design is as follows. In each of ten rounds participants are randomly and anonymously assigned to groups of three. Members of the group are then given 2 minutes to make an investment (volunteering) decision. Individual earnings are $1 in the event that no one invests before the end of the 2 minutes. If one group member makes the investment, the round ends, and the individual making the investment secures a payment of $1.25, while the other

[10] While delay does not carry a monetary cost it may carry a psychological cost. Bliss and Nalebuff (1984) develop a model with costly delay where individuals decide whether to secure the provision of a binary public good.

two group members each receive $2. The investor is randomly determined in the event that multiple parties simultaneously invest.

With no cost of waiting, investments will be made in the last second of the round and the game reduces to one of simultaneous moves. Accounting for the possibility of ties, the game gives rise to three types of equilibria: Pure strategy asymmetric Nash equilibria where one individual invests and the others do not; a mixed strategy symmetric equilibrium where each player invests 23.2% of the time; and a mixed strategy asymmetric equilibrium where one person does not invest and the two others invest 40 percent of the time. Depending on the equilibrium selected the probability that an investment occurs is 100%, 54% or 64%, respectively.[11]

2.2.2. Participants and Procedures

The experiment was conducted at the Pittsburgh Experimental Economics Laboratory (PEEL) at the University of Pittsburgh. Participants were recruited from introductory economics classes and were only informed that they would participate in a study on decision making. None of the participants had prior experience with studies at PEEL. The experiment lasted slightly less than an hour. Average earnings from the ten decision rounds were $16.50.[12]

Nine sessions were conducted, with between 12 and 21 participants per session, for a total of 150 participants (82 males and 68 females). Sessions were roughly gender balanced with the share of women participating in a session ranging between 33 percent and 53 percent.[13] The population was rather homogeneous. The average age was 18.9 years, with 18 and 19 year olds accounting for 76 percent of the participants, 74 percent were Caucasian, 87 percent were born in the US, and 83 percent were either freshmen or sophomores. None of these characteristics differed significantly by gender.[14]

[11] The payoff structure corresponds to that of a 3-player game of chicken, Hawk-Dove game (Maynard Smith and Price, 1973), Dragon-Slayer Game (Bliss and Nalebuff, 1984), or Volunteer's Dilemma (Diekmann 1985). Note that any participant's decision to cooperate immediately solves the coordination problem. Existing experimental work of the static volunteer's dilemma focuses on the theoretical predictions of the rate of volunteering decreasing with group size and the probability that no member of the group volunteers decreasing with group size (Diekmann, 1993; Franzen, 1975; Goeree, Holt, and Moore, 2005; Healy and Pate, 2009; Murnighan, Kim, and Metzger, 1993).

[12] Including a $6 show-up fee and payment of an incentivized risk elicitation secured average earnings of $22.80.

[13] There is no evidence that this small variation in gender composition of the session affects behavior. The likelihood that individuals invest is not affected by this degree of variation in gender composition. Clustering on the individual and controlling for round a probit of the individual's propensity to invest on the share of women in the session reveals a marginal effect of 0.031 (p=0.921). If we eliminate the rather unusual session 7 the marginal effect on the share of women in the session is of 0.016 (p=0.959). Furthermore, the marginal effects reported in our central results are not affected by the share of women in the session (the coefficient on female is 0.144 rather than the 0.141 seen in Table 3), nor is the coefficient on the session share of women significant (p=0.574).

[14] The mean age of men and women is not significantly different (18.98 vs. 18.78, two-sided t-test p=0.319). Similarly using a Fisher's exact test there is no significant gender difference in the distribution of age (p=0.824), race (p=0.681), number of years in the US (p=0.587), years in college (p=0.292) or in choice of major (p=0.681).

Upon entering the lab, participants were seated in a pre-marked cubicle, and were asked to provide informed consent to participate in the study. We then distributed instructions and read them aloud. The instructions explained all procedures of the study, the payoff structure, the random matching protocol, and what information participants would receive during the study. Using a computerized interface (z-Tree, Fischbacher, 2007) we then began the ten round decision phase of the experiment.[15] In each round participants were anonymously matched in groups of three, with the stipulation that no one could be paired with the same person twice in a row. Each group member was shown an individual computer screen that displayed the seconds remaining in the round and a button that could be clicked if the individual wanted to invest. The round ended the instant someone in the group clicked the investment button. Participants waited until all groups had either made an investment decision or the two minutes passed without an investment being made. Participants were again randomly matched into groups of three with the constraint that participants could not be matched with the same participant two rounds in a row.

At the end of the ten rounds, participants answered a number of questions to assess individual preferences and characteristics. A demographic questionnaire elicited gender, age, nationality, year in college, and college major. Gender was not mentioned until the very end of the experiment.

2.2.3. Results

To characterize behavior in the experiment we first ask whether groups succeeded in making investments and what the timing was of such investments. We then examine whether men and women were equally likely to make the investment. After documenting a substantial gender difference, we determine whether it can be explained by differences in individual characteristics (risk aversion, altruism, conformity, and agreeableness).

Group Investments

Over the course of the ten rounds groups succeed in investing 84.2 percent of the time (std. error =1.63). With two thirds of these investments being made within the last two seconds of a round, participants largely treated the environment as one of a war of attrition.[16]

Behavior in one session (session 7) differed substantially from the other eight sessions. Rather than delaying investments until the end of the round, participants in session 7 appeared to compete to invest first.[17] 35 percent of investments in session 7 were made in the first second of a round, by comparison this share did not surpass 7 percent in any one of the other sessions (session 1-6, 8, 9). Similarly no

[15] See Appendix A for the instructions and a sample decision screen.

[16] Note that these numbers differ from those reported in Table 1 as session 7 is excluded, absent session 7 the mean is 82.05 percent (std. error=1.832).

[17] Investments in session 7 were made so quickly that z-tree reported the time of investment as 99999. This type of error results from the investment button being pressed before the clock can begin (see e.g. Duffy and Smith, 2014).

investment was ever made in the last second in session 7, whereas the percent of investments made with less than one second remaining ranged between 11 and 23 percent in the other eight sessions.[18] To assess the response to the intended war of attrition environment we opt to exclude session 7 from our analysis. In Appendix B we first demonstrate how behavior in session 7 differs from behavior in the other sessions and then show that our results are robust to the inclusion of these data.

Eliminating session 7 from the analysis, we are left with eight sessions and a sample of 72 males and 60 females.[19] With ten rounds and three people per group we examine a total of 440 group decisions. Common among these decisions is that investments are delayed until the end of a round, and that this delay becomes more prominent over the ten rounds. The rows in Table 2 report the number of seconds remaining at the time when an investment decision was made, the columns report how the distribution of decision times changes over the course of the experiment. Looking at the last two columns we see that the share of investments made in the last two seconds of a round increases from 63.3 percent during the first half of the experiment (Rounds 1-5) to 90.6 percent during the second half (Rounds 6-10). The bottom row of Table 2 shows the likelihood that a group succeeded in making an investment before the end of the two minutes. Looking across the columns we note that the likelihood that a group succeeds in investing decreases from 86.8% during the first half to 77.3% during the last half. The per round decrease in the investment rate is significant, starting at 93 percent in round one and ending with a 73 percent success rate in round ten.[20]

[18] Similarly, in session 7 only 43 percent of investments were made in the last five seconds. Looking at each of the remaining eight sessions we note that in no session does the share of investments which were made in the last 5 seconds fall below 62 percent, with the share reaching 88 percent in one session.

[19] Session 7 is eliminated from our analysis for the remainder of the paper.

[20] Treating the group as the unit of observation, a probit regression of the probability that a group invests on round number yields a marginal effect of -0.02 (p=0.001).

Table 2: Distribution of investment times (Experiment 1)

Seconds remaining at time of investment	Relative Frequency of investments		
	Round 1-10	Round 1-5	Round 6-10
Less than 1	14.4	5.2	24.7
1	49.0	37.2	62.4
2	12.7	20.9	3.5
3-10	5.8	9.9	1.2
11-20	0.3	0.5	0.0
21-30	0.3	0.0	0.6
31-40	0.8	1.6	0.0
41-50	0.8	1.6	0.0
51-60	0.8	1.0	0.6
61-70	0.8	1.6	0.0
71-80	0.3	0.5	0.0
81-90	0.8	1.0	0.6
91-100	1.9	3.1	0.6
101-110	3.0	4.2	1.8
111-120	8.0	11.5	4.1
Percent of groups investing	82.0	86.8	77.3
Total number of group decisions	440	220	220

Note: Session 7 excluded from the sample.

Individual Investments: Gender Difference

With four out of five groups securing an investment, the group's rate of success exceeds that predicted by the symmetric mixed strategy Nash equilibrium. This raises the question of whether certain members of the group more frequently make the mutually beneficial investment, and in particular whether the likelihood that the individual invests differs by gender. Figure 1 reveals that women are systematically more likely than men to undertake the investment.[21] Starting in round one the investment rate by women surpasses that of men. With a sustained differential over the ten rounds, this results in a substantial difference in the total number of times men and women invest over the ten rounds. Women on average invest in 3.5 of the ten rounds, whereas men invest in 2.1 of the ten rounds. This 67 percent difference in total investment is statistically significant (two-sided t-test $t = 3.68$, $p<.001$). Figure 2 shows by gender the distribution of total investments over the ten rounds. The distribution for women first order stochastically dominates that for men, and the difference in the two is significant (a Fisher's exact test yields $p = 0.095$).[22] While 65 percent of men invest two or fewer units over the ten rounds, only 35 percent of women fall in this lower contribution range.

[21] As we only observe the individual making the investment we cannot compare the individual investment rate with the equilibrium prediction.

[22] The median contribution is 2 for men and 4 for women (WMW rank-sum $z=-3.29$ $p = 0.001$).

Figure 1: Probability of investing (Exp 1)

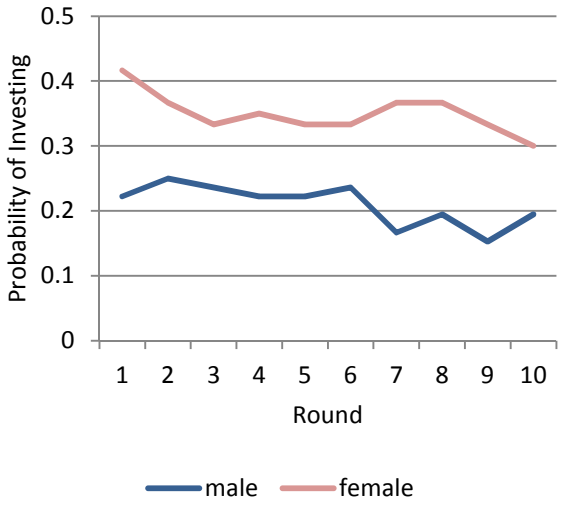
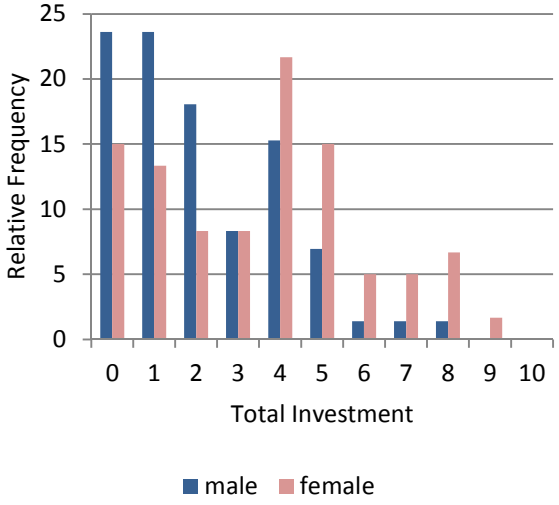


Figure 2: Distribution of total investment (Exp 1)



In Table 3 below we estimate the probability that men and women invest in a given round. Standard errors are clustered on the individual to account for the lack of independence. The reported marginal effects confirm the insights from Figure 1 and 2. Pooling the data from all ten rounds we see in column 1 that participants become less likely to invest over the course of the experiment and that women are significantly more likely to invest than are men. The average investment rate for men is 21 percent and that for women is 14 percentage points higher. Columns 2 and 3 confirm that these results hold both for the first and second half of the experiment.[23]

Table 3: Probability of Investing (probit) (Experiment 1)[24]

	(1) All rounds	(2) Rounds 1-5	(3) Rounds 6-10
Female	0.141	0.129	0.151
	(0.000)	(0.001)	(0.002)
Round	-0.007	-0.010	-0.010
	(0.046)	(0.405)	(0.319)

Dependent variable: Individual investment decision (1-invest, 0-don't invest). The table presents marginal effects. Standard errors are clustered on the individual. P-values are reported in parentheses. 132 participants.

[23] The likelihood that a man invests is 21 percent over the ten rounds, 23 percent during the first five rounds, and 19 percent during the last five rounds, with the investment rate for women being 14, 13 and 15 percentage points greater, respectively.

[24] Including a (female x round) interaction results in a small but insignificant increase in the gender gap over the course of the experiment. The marginal effect of the interaction is 0.003 (p=0.660).

Individual Investments: The Role of Preferences and Attitudes

To understand the cause of the substantial gender gap in investment rates, we ask whether it may be accounted for by differences in individual preferences or attitudes. Conditional on the individual's belief that others invest, we expect participants to be more likely to invest if they are more risk averse, altruistic, agreeable or conforming. We used both a survey (Dohmen et al. 2011) and an incentivized measure (Eckel and Grossman, 2002) to elicit the individual's willingness to take risk. To elicit a measure of agreeableness we used the 9-item agreeableness subscale of the Big Five Personality Scale (John and Srivastava, 1995). Our measure of altruism uses the three item principle of care construct by Wilhelm and Bekkers (2010). The Weber, Blais, and Betz (2002) social risk measure was used to elicit a measure of non-conformity.

While we find significant gender differences in some of our individual measures (risk-taking and non-conformity), these differences do not account for the observed gender gap in investments. In Table 4 we estimate the probability that men and women invest in a given round with and without controls for these individual characteristics. Standard errors are clustered on the individual and the reported coefficients are marginal effects. Looking at column 2 we see that none of the elicited measures predict the individual's propensity to invest. Furthermore when controlling for individual characteristics the coefficient on female remains significant, and the comparison between columns 1 and 2 reveals that the magnitude is largely unchanged.[25]

Table 4: Probability of investing (probit) (Experiment 1)

	(1)	(2) [26]
Female	0.141	0.125
	(0.000)	(0.004)
Round	-0.007	-0.007
	(0.046)	(0.042)
Non-conform		-0.023
		(0.338)
Risk-seeking		-0.011
		(0.585)
Altruism		0.005
		(0.843)
Agreeable		-0.031
		(0.329)

Dependent variable: Individual investment decision (1-invest, 0-don't invest). The table presents marginal effects. Standard errors are clustered on the individual. P-values are reported in parentheses. 132 participants.

[25] Inclusion of other personal characteristics (age, race, years in school, etc.) does not affect the coefficient on female, and none of these factors are statistically significant.

[26] The risk measure included in column (2) refers to our survey measure of risk. Our incentivized risk measure was not elicited in sessions 1 and 2 of Experiment 1. In the reduced sample of 102 participants the incentivized risk measure is not significant, nor does it affect the coefficient on female. In the reduced sample the coefficient on female is 0.143 (p=0.005) when using the survey measure of risk and it is 0.148 (p=0.004) when using the incentivized risk measure.

Our measures of individual preferences and attitudes do not help explain the gender gap in the propensity to invest. One factor we have not investigated, however, is the role of beliefs. Do beliefs about the likelihood that men versus women will invest differ and can such a difference explain the gender difference in investment? We investigate this possibility in our second experiment.

2.3. Experiment 2: Does the Response to Requests Depend on the Gender Composition of the Group?

One way of investigating the role of beliefs about the likelihood that men and women will invest is to manipulate beliefs by changing the visible gender composition of the group.[27] If women are believed to more frequently invest than men, then the role of beliefs can be examined by determining whether the sex of the other group members influences the individual's decision to invest.

To manipulate beliefs we conducted a single-sex version of Experiment 1. That is, instead of inviting close to equal proportions of men and women to our laboratory for each session, we conducted sessions where only men or only women participated. The purpose of the single-sex experiment was to determine whether gender differences in investments are robust to the group's gender composition or if they are instead influenced by beliefs. If gender differences are constant across environments, we would expect to see higher investment rates in all-female session than in all-male sessions.[28] However, if behavior is influenced by beliefs about who else is in the group and the likelihood that other group members will invest, then we would expect the rate of investments to change in single-sex groups. If the investment rate for women is believed to be higher than that for men then the investment rate by men should increase in single-sex groups relative to mixed-sex groups, while that by women should decrease. That is, when a man moves from what is likely a mixed-sex trio to knowing that his fellow group members are all men, he will see his decision to invest as more critical and will increase the probability that he invests. By contrast when a woman moves from what is likely a mixed-sex trio to knowing that her fellow group members are all female, she will see her decision to invest as less critical and will decrease the probability that she invests.

2.3.1. Participants and Procedures

The recruitment method, instructions and procedures of these single-sex sessions were identical to those of the mixed-sex sessions of Experiment 1. 117 undergraduate students were recruited from

[27] Examining coordination in the battle-of-the-sexes game, Holm (2000) points to the role of a gender based focal point. He finds that when males and females are paired with a female, they are more likely to select the action associated with their preferred equilibrium. This 'hawkish' behavior implied that coordination more frequently was achieved in mixed-sex pairing – thus securing higher average earnings. In our setting the investment can only be made by one individual. Hence coordination issues are resolved when investing, and the decision not to invest cannot be justified on the grounds that it reduces the chance of mis-coordination.

[28] In our first experiment participants did not know the gender composition of the group they were in. However, with women being more likely to invest than men we find an insignificantly larger chance that investments are secured in all-female groups than in groups with at least one male (All-female mean = 0.926, Not-all-female mean = 0.814, a two-sided Fisher's exact test yields p=0.196).

introductory economics classes at the University of Pittsburgh and the characteristics of this pool of participants were similar to those of Experiment 1. Participants were on average 18.7 years old, with 18 and 19 year olds accounting for 81 percent. 74 percent were Caucasian, 91 percent were born in the US, and 85 percent were either freshmen or sophomores.

We conducted three sessions with all women (n=66) and three sessions with all men (n=51). Sessions consisted of between 15 and 24 participants. With ten rounds we have a total of 390 group decisions. Average individual earnings from the ten decision rounds were $16.06.[29]

Following the procedures of Experiment 1 we did not mention gender at any point during the instruction or decision making phase. Participants were only asked to report their gender on the survey at the end of the experiment. Although gender was not mentioned, by looking around the room participants could see the population from which members of their anonymously drawn groups would be drawn. Hence, the gender composition of the room had the potential of influencing the participants' beliefs about the likelihood that other members of their group would invest.

2.3.2. Results

Looking first at the aggregate results we pool the data from the all-male and all-female sessions. Aggregate behavior and investment times were similar to those of Experiment 1. Comparable to the 82 percent investment rate in the mixed-sex sessions of Experiment 1, we find an investment rate of 80.8 percent in the single-sex sessions of Experiment 2. As seen in Table 5 the timing of the investments is also similar. Investments were primarily made within the last two seconds of a round, with this share increasing from 69.4 percent during the first half of the experiment (Rounds 1-5) to 82.8 percent during the second half (Rounds 6-10). Furthermore, over the course of the experiment the likelihood that a group invests decreases from 90.3 percent in the first half to 71.3 percent in the second half. A probit regression reveals that this decrease in investments over time is significant.[30]

[29] Including a $6 show up fee and payment for the incentivized elicitation of risk secured average earnings of $22.
[30] Treating the group as the unit of observation a probit regression of the likelihood that a group invests on round number yields a marginal effect of -0.038 (p=0.001).

Table 5: Distribution of investment times (Experiment 2)

Seconds remaining at time of investment	Frequency of investments		
	Round 1-10	Round 1-5	Round 6-10
Less than 1	13.0	6.3	21.6
1	43.8	40.9	47.5
2	18.4	22.2	13.7
3-10	5.4	8.5	1.4
11-20	0.0	0.0	0.0
21-30	1.3	0.6	0.0
31-40	1.3	1.1	2.2
41-50	0.6	1.1	1.4
51-60	1.0	1.7	0.0
61-70	1.0	1.1	0.7
71-80	0.3	0.6	0.0
81-90	0.6	1.1	0.0
91-100	1.3	1.7	0.7
101-110	1.9	2.3	1.4
111-120	10.2	10.8	9.4
Percent of groups investing	80.8	90.3	71.3
Total number of group decisions	390	195	195

Individual Investments: Gender Difference

The likelihood and timing of investments in Experiment 2 is very similar to that in Experiment 1. Next we ask whether these aggregate results mask differences between the all-female and all-male groups. Of interest is whether the gender gap in the probability of investing is sensitive to the single-sex setting.

Figure 3 displays by gender the probability that an individual invests in a given round. In sharp contrast to our results from Experiment 1 we do not find that women are more likely to invest than men. The average number of investments over the ten rounds does not differ by gender (Men mean = 2.67, Women mean = 2.71, two-sided t = -0.104, p=0.918).[31] When the gender composition of the group is known to the participants there is no evidence that all-female groups fare better than all-male groups. The success rate is 81 percent for female groups and 80 percent for male groups.

[31] The median contribution is 2 for men and 3 for women (WMW rank-sum z= -0.198, p = 0.843).

Figure 3: Probability of investing (Exp. 2)

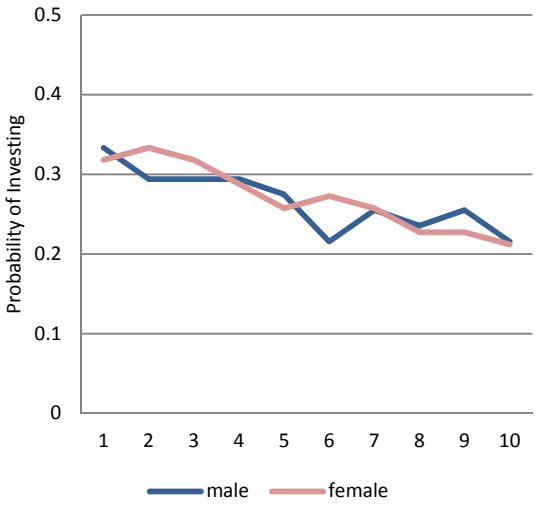


Figure 4: Distribution of total investment (Exp. 2)

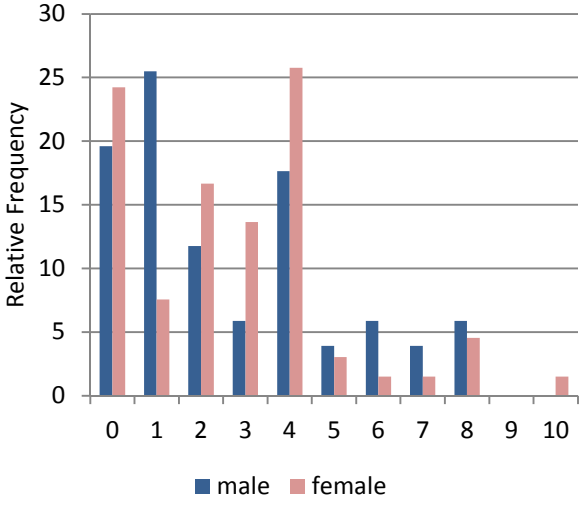


Figure 4 shows the distributions of total investments over the ten rounds by gender. It is interesting to note that although the aggregate investment rates are independent of gender, the two groups secure these investment rates in two very different ways. More than half of the women select a 'fair' investment rate and invest two to four times over the ten rounds. Men on the other hand are more likely to not invest (zero or one time) or to invest very often (five or more times over the ten rounds).[32] Despite the similarity in aggregate investment rates, the burden of these investments is more unequally distributed among the men than among the women.[33]

Verifying the results of Figure 3 we see from the probit models in Table 6 that in single-sex sessions the decision to invest does not depend on the sex of the participant. Across all ten rounds, the first five rounds, and the last five rounds, we find that men and women are equally likely to invest. The coefficient on Female is small in magnitude and imprecisely estimated.

Table 6: Probability of Investing (probit) (Experiment 2)

	(1) All rounds	(2) Rounds 1-5	(3) Rounds 6-10
Female	0.004	0.005	0.004
	(0.920)	(0.916)	(0.935)
Round	-0.012	-0.015	-0.009
	(0.000)	(0.251)	(0.391)

Dependent variable: Individual investment decision (1-invest, 0-don't invest). The table presents marginal effects. Standard errors are clustered on the individual. P-values are reported in parentheses. 117 participants.

[32] While the absence of women does not affect the share of men who rarely invests (0-1 times) it does cause some men to become very generous.

[33] A Fisher's exact test for equality of distributions yields a p = 0.158.

The finding that there is no gender difference in the probability of investing when participants make decisions in single-sex groups helps explain why differences in individual characteristics did not explain the gender difference in investing seen in the mixed-sex experiment. The changes in investment rates between Experiment 1 and 2 demonstrate that the individual's behavior is not fixed, but rather a function of the population from which group members are drawn. This response to gender pairing is consistent with beliefs about the behavior of others playing a central role when deciding whether to volunteer. In contrast to Experiment 1 we see in Table 7 that an individual's attitude toward risk is predictive of behavior in the single-sex setting when there are less tangible attributes to coordinate on.

Table 7: Probability of Investing (probit) (Experiment 2)[34]

	(1)	(2)
Female	0.004	-0.002
	(0.920)	(0.962)
Round	-0.012	-0.013
	(0.000)	(0.000)
Non-conform		0.038
		(0.188)
Risk-seeking		-0.050
		(0.044)
Altruism		0.035
		(0.295)
Agreeable		0.020
		(0.614)

Dependent variable: Individual investment decision (1-invest, 0-don't invest).The table presents marginal effects. Standard errors are clustered on the individual. P-values are reported in parentheses. 117 participants.

Individual Investments: Sensitivity to Single-Sex Group Composition

Figure 5 summarizes the results of the two group compositions in Experiments 1 and 2. The group's rate of success is independent of the group being drawn from a single- or mixed-sex population, and in the single-sex sessions it is independent of whether the group is all-male or all-female.[35]

As demonstrated in Figure 6 the individual's propensity to invest is sensitive to the group's gender composition. Single_m and single_f refer to the all-male and all-female sessions (Experiment 2), respectively. Mixed_m and mixed_f refer to males and females in the mixed-sex sessions (Experiment 1), respectively. Relative to the mixed-sex results the investment rate decreases for women and increases for men in single-sex sessions.[36]

[34] To be consistent with Table 4 we rely on the survey measure of risk. Using instead the incentivized measure of risk the coefficient on female would be -0.014 (p=0.762) and on risk -0.027 (p=0.134).

[35] Treating the group decision as the unit of observation we see in Experiment 2 that controlling for round a probit of group investment on all female generates a marginal effect of 0.016 (p=0.679). Similarly pooling the data from Experiment 1 and 2 and including a dummy for Experiment 2 we get a marginal effect of 0.036 (p=0.294).

[36] The average total investment by women is 3.5 in Experiment 1 and 2.7 in Experiment 2 (two-sided t-test=1.854 p = 0.067). While one may be concerned that this differential results from 3.5 surpassing the level achievable in

Figure 5: Probability group invests

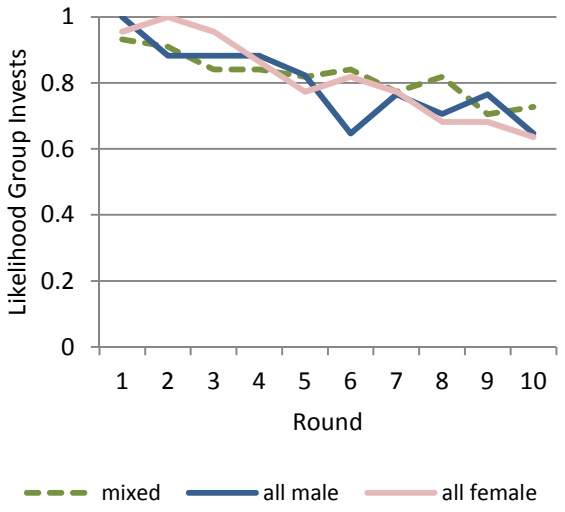
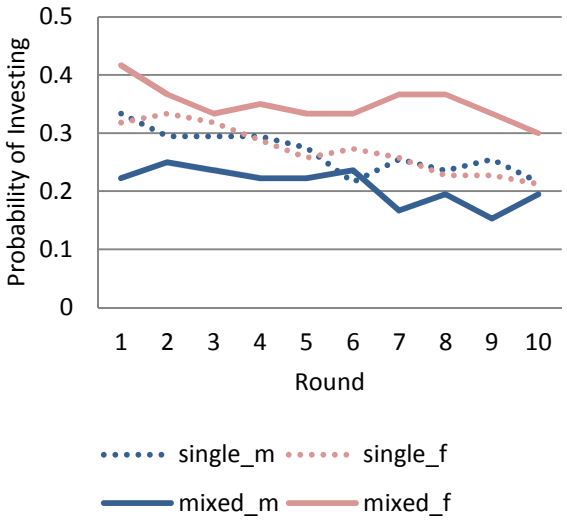


Figure 6: Individual propensity to invest



The changes in behavior between Experiment 1 and 2 demonstrate that the frequency of investments changes when participants realize their group consists solely of members of their own sex. To summarize we examine in Table 8 the effect of gender composition on the gender gap in investments. While women are significantly more likely to invest in mixed-sex sessions, this gender gap is eliminated in single-sex sessions, and this differential arises both in the first and the second half of the experiment.[37]

Experiment 2 we note that the standard error on the 2.7 average total investment is 0.28. The average total investment by men is 2.1 in Experiment 1 and 2.7 in Experiment 2 (two-sided t-test t=-1.460, p = 0.147). Separating the sample by gender a probit regression of the decision to invest on a dummy for Experiment 2 and round, yields a marginal effect on Experiment 2 of -0.079 (p=0.064) for women. For the subsample of men we see instead an increase in the likelihood that an investment is made with the marginal effect on the Experiment 2 dummy being 0.057(p= 0.153). Standard errors in both regressions are clustered on the individual.

[37] Interestingly the results are consistent with the predictions of evolutionary game theory, as it predicts in a two player hawk-dove game that a mixed strategy Nash Equilibrium will be selected within a single population, whereas a pure strategy equilibrium is predicted when the two players are drawn from different populations (Maynard Smith, 1982). Oprea, Henwood, and Friedman (2011) confirm this prediction. Examining investments in a two-person Hawk-Dove game they find that play converged to the symmetric mixed Nash equilibrium under a one-population matching protocol, while it moves toward an asymmetric and inequitable pure Nash equilibrium when the participants are assigned either to be row or column players and thus interacted in a two-population environment.

Table 8: Probability of Investing (probit) (Experiments 1 and 2) [38]

	(1) All rounds	(2) Rounds 1-5	(3) Rounds 6-10
Female	0.139	0.129	0.147
	(0.000)	(0.001)	(0.002)
Round	-0.010	-0.012	-0.009
	(0.000)	(0.162)	(0.188)
Single-sex	0.061	0.071	0.051
	(0.152)	(0.117)	(0.299)
FemalexSingle	-0.136	-0.124	-0.147
	(0.021)	(0.041)	(0.034)

Dependent variable: Individual investment decision (1-invest, 0-don't invest). The table presents marginal effects. Standard errors are clustered on the individual. P-values are reported in parentheses. The coefficient and standard error on the interaction is corrected to account for the nonlinear nature of the estimation. 249 participants.

The results regarding gender differences in investing in mixed- and single-sex groups are intriguing—they not only document that men and women differ in the propensity by which they agree to implicit requests to volunteer in mixed-sex groups, but also provide suggestive insights on what drives these differences. When women move from a mixed-sex environment to a single-sex one, they see a decrease in the need to volunteer as they believe that their contribution is less critical. In contrast, when men move from a mixed-sex environment to a single-sex one, they see an increase in the need to volunteer as they believe that their contribution is more critical. Next we explore whether participants anticipate these gender differences in volunteering to the extent that these beliefs are incorporated when deciding whom to ask to volunteer.

3. Experiment 3: Are Women Asked to Volunteer more than Men?

De Pater et al. (2010) show that managers more frequently assign non-promotable tasks to their female subordinates. While differential assessment of ability may explain this result, an alternative explanation may be that women more than men are expected to accept such task assignments. To further investigate the role of beliefs and to examine whether differences in assignments can arise when there are no gender differences in ability, we conduct a third experiment where we extend our initial design to include an outside requestor, who after seeing the other group members must ask one of them to invest. Based upon our findings in the first two experiments, we expect that when a particular group member can be asked to volunteer, participants will be more likely to ask a woman than a man.

[38] There is no significant gender difference in mean decision time. Clustering the standard errors on the individual a regression of decision time on female and round reveals a coefficient on female of 2.10 (p=0.735) in Experiment 1 and of -6.67 (p=0.272) in Experiment 2. Looking at the differential in decision times for women between Experiment 1 and 2 we find an insignificant decrease in decision time, with the coefficient on an Experiment 2 dummy being -3.16 (p=0.595). For men we see instead an insignificant increase in decision time, with the coefficient on an Experiment 2 dummy being 5.591 (p=0.383).

3.1. Design

The central modification to our initial experiments is that the group is increased to include a fourth group member, a requestor, who prior to the two minute investment round is charged with the task of asking one of the three members of the investment group to invest. While unable to personally invest, the requestor benefits from the group's investment. Specifically the requestor receives $1 if no one invests and receives $2 if any member of the investment group invests before the end of the two minute round. The choices and payoffs of the three members of the investment group are, as in our first two experiments, $1 if no one invests and if one person invests then the investor receives $1.25 while non-investors receive $2.

3.2. Participants and Procedures

We conducted four sessions of Experiment 3. With 20 participants per session we have choices from a total of 80 participants (37 males and 43 females). Sessions were roughly gender balanced with the share of women participating in a session ranging between 40% and 60%. Participants were recruited from introductory classes in the social sciences (economics, political science, and anthropology) and none of the participants had prior experience with studies at PEEL.[39] As for Experiments 1 and 2 the population was rather homogeneous. The average age was 19.4 years, with 18 and 19 year olds accounting for 68 percent of participants, 74 percent were Caucasian, 94 percent were born in the US, and 76 percent were either freshmen or sophomores. With the exception of age none of these characteristics differed significantly by gender.[40] Average earnings from the ten decision rounds were $17.60.[41]

To test whether there are differences in the likelihood of asking a female versus a male participant to invest, photos were secured one by one as participants entered the lab, and taken on the count of three. After obtaining photos, participants were seated in a pre-marked cubicle, asked to provide informed consent, and were then given instructions.

Participants were informed that in each round, one person of the 4-person group would be designated the role of "red" player while three individuals would be designated the role of "green" players. The red player was unable to make the investment but was tasked with asking one of the other three green players to invest. Requests by red players were solicited using the strategy method. After assignment to a group of four, and before learning who was assigned the role of red or green player, each participant was shown the photos of the three other group members and asked which group member they would

[39] Experiment 3 was conducted during the Spring term while Experiments 1 and 2 were run at the beginning of the Fall term, increasing slightly the average age of participants. In recruiting participants with no prior PEEL experience we extended the invitation beyond economics to include introductory classes in the social sciences.

[40] The mean age of men is significantly larger than for women (19.89 vs. 18.95, two-sided t-test p=0.0045). There are minor, but not significant differences in other characteristics. Fisher's exact tests reveal no significant gender difference in the distribution of age (p=0.168), race (p=0.148), number of years in the US (p=0.343), years in college (p=0.131) or in choice of major (p=0.936).

[41] Including a $6 show up fee and two incentivized preference elicitation tasks secured average earnings of $26.70.

like to ask to invest in the event that they were assigned the role of a red player. Each member of the group saw the photos of the potential investment group members simultaneously on the computer screen with the order of photos being different for each participant. Once all four members of the group submitted their requests, photos of the four group members appeared on the screen indicating the selected role and associated request. The photo of the selected red player appeared at the top of the screen, photos of the selected three green players in a row at the bottom of the screen, clearly indicating which green player was asked by the red player to invest. The green player who was asked to invest saw a message below his or her photo stating "The red player asked you to invest," while the two other green players saw the photos with the message "The red player asked this group member to invest" below the photo of the selected green player.[42] After all participants acknowledged the role assignment and request, the two minute investment period began and any green player could choose to invest—both the green player who was explicitly asked as well as the other green players who were not asked to invest. Mirroring Experiment 1 and 2, participants learned if an investment was secured, but did not learn the identity of the person who invested.

For each of the ten rounds, participants were matched in groups of four, using an algorithm that maximized the number of rounds for which participants were matched with new participants in each round. Starting in round six participants were re-matched with participants that they had previously been paired with. While participants for rounds 6-10 can be characterized as 'non-strangers' it is important to keep in mind that they never learn the investment decisions of any other participants.

Following the ten rounds of decision making individual characteristics were elicited.[43] Finally individuals were asked to indicate whether they knew any of the other participants in the lab. Seeing photos of all the participants in the session they first had to click on photos of the people they knew or had seen before, then from this subset indicate whom they had communicated with, and from this remaining subset whom they were friends with.[44]

[42] See the Appendix A for sample instructions and screen shots.

[43] The incentivized risk elicitation was modified to capture the risk associated with the decision in the study. Participants were asked to choose between $1.25 for certain and a gamble with a probability p of $1 and a probability (1-p) of $2. Decreasing the probability p in increments from 1 to 0 in a multiple price list participants had to indicate at what value of p they preferred the gamble ($1,p; $2,1-p) over $1.25 for certain. The average switch point was decision 5.95 for the first switch and 6.49 for the second switch, corresponding to participants switching from $1.25 to the gamble when p=.60 or .50. As a measure of altruism we added an incentivized multiple price list to identify the belief at which a participant preferred not to invest and instead receive the expected value that someone else invests. Participants chose between a fixed option (option A) securing the decision maker $1.25 and the three other group members $2 each, and an option B which started off with $1 earnings for each of the four group members and then increased the probability in 20% increments that another group member invests from 0% to 100%, with the final payoffs being $2 for the decision maker and for two other group members, while being $1.25 for a fourth group member. On average participants preferred someone else investing when the probability of them doing so was 60 percent or larger (of the six decisions the average decision for the first switch is 3.31, and 3.86 for the last switch).

[44] 52.5 percent of subjects knew at least one other participant in the session. On average participants knew one other person in the lab (mean 1.34), and did not communicate and were not friends with other participants in the lab (the mean number of participants individuals report having communicated with and being friends with is 0.13 and 0.11 respectively).

3.3. Results

To characterize behavior in Experiment 3 we first examine whether the opportunity to ask influences the timing of investments and the likelihood that a group invests. We then determine whether there are systematic differences in the likelihood that men and women are asked to invest, and whether requests vary with the requestor's gender. Finally we examine if the response to requests varies by gender and what the net effect is on the investment rates by men and women.

Decision Time and Group Investments

Table 9 shows the timing of investments in Experiment 3 and clearly demonstrates that requests cause investments to occur earlier. In Experiment 1 and 2 we saw, respectively, that 8 and 10 percent of investments were made in the first ten seconds, and that 76.1 and 75.2 percent of investments were made in the last two seconds of a round. In sharp contrast, in Experiment 3, 33.2 percent of investments are made in the first ten seconds and only 40.1 percent are made in the last two seconds of the round. The share of early investments is not sensitive to whether group members are `strangers' (rounds 1-5 where participants had not yet been paired with each other) or 'non-strangers' (rounds 6-10 where participants had been paired with each other in previous rounds).

Table 9: Distribution of investment times (Experiment 3)

Seconds remaining at time of investment	Relative frequency of investments		
	Round 1-10	Round 1-5	Round 6-10
Less than 1	1.6	1.1	2.2
1	23.5	16.0	31.2
2	15.0	14.9	15.1
3-10	10.7	11.7	9.7
11-20	1.1	2.1	0.0
21-30	1.6	2.1	1.1
31-40	0.0	0.0	0.0
51-60	0.5	1.1	0.0
61-70	1.1	1.1	1.1
71-80	1.6	1.1	2.2
81-90	2.7	3.2	2.2
91-100	4.3	6.4	2.2
101-110	3.2	5.3	1.1
111-120	33.2	34.0	32.3
Percent groups investing	93.5	94.0	93.0
Total number of group decisions	200	100	100

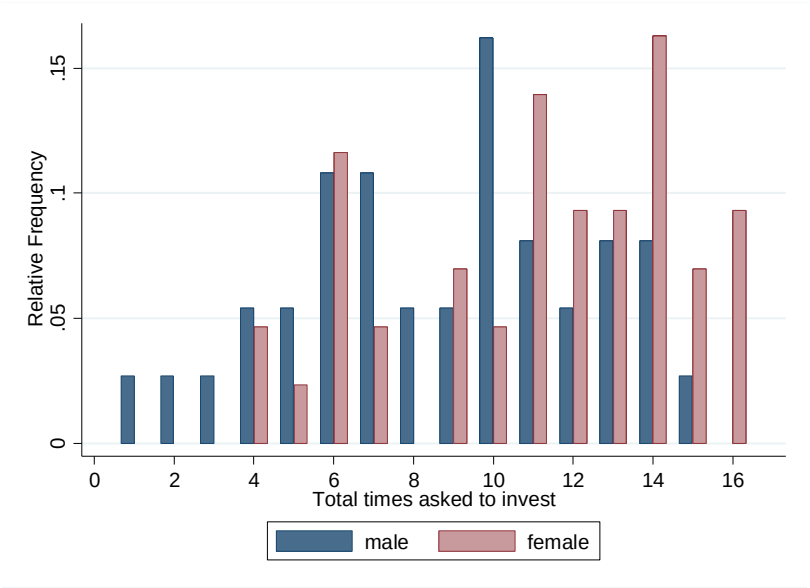
We also find that requests improve coordination and increase the likelihood that the group succeeds in investing. In Experiment 1 and 2 group investment rates were 82 and 80.8.percent, respectively. By contrast, with an investment rate of 93.5 percent, we find in Experiment 3 that almost all groups succeed in investing.[45]

The Requestor's Choice: Who is Asked?

The central question of Experiment 3 is whether men and women are equally likely to receive requests from a requestor. That is, when a potential requestor sees photos of the three potential investment group members, does a group member's gender help predict whether they are asked?

In using the strategy method to elicit requests, over the ten decision rounds an individual can at most receive 30 'strategy method' requests. Our data reveal substantial heterogeneity in the number of 'strategy method' requests participants receive, ranging between 1 to 16 requests. Consistent with participants holding the belief that women are more likely to invest, an individual's gender is predictive of the number of 'strategy method' requests. Figure 7 shows how the distribution of the total number of requests for women first order stochastically dominates that for men (Kolmogorov-Smirnov p=0.017). The mean and median number of requests for men are 8.7 and 9 respectively, while that for women are 11.1 and 12, respectively (two-sided t-test t=-2.925, p<0.01; Wilcoxon Mann Whitney Rank-sum test z= -2.785, p<0.01)

Figure 7: Distribution of requests received in a session: strategy method (Exp. 3)



[45] Treating the group decision as the unit of observation and pooling the Experiment 1, 2 and 3 data we see that controlling for round a probit of group investment on a dummy for being in Experiment 3 secures a marginal effect of 0.115 (p<0.001). A two-sided Fisher's exact test yields p<0.001.

The differences in the number of requests received by men and women are confirmed in Table 10 when we control for other observable characteristics. Across all rounds gender is predictive of the number of requests an individual receives. Controlling for observable characteristics such as being Caucasian and being someone whom participants in the lab are familiar with, we find that on average females receive 2.5 more requests than males over the ten rounds of the experiment.[46] This gender difference in requests increases over the course of the experiment. Females receive on average 0.9 more requests than males during the stranger rounds (rounds 1-5), while they receive 1.6 more requests than males during the non-stranger rounds (rounds 6-10).

Table 10: OLS regression of requests received via the strategy method (Exp. 3)[47]

	Rounds 1-10		Rounds 1-5		Rounds 6-10	
	(1)	(2)	(3)	(4)	(5)	(6)
Female	2.476	2.521	0.863	0.889	1.613	1.631
	(0.016)	(0.040)	(0.073)	(0.080)	(0.074)	(0.096)
Non-Caucasian	-1.307	-1.196	-0.677	-0.610	-0.630	-0.585
	(0.185)	(0.241)	(0.176)	(0.221)	(0.219)	(0.276)
N communicate with in session		2.880		1.709		1.171
		(0.032)		(0.035)		(0.037)
Constant	9.012	8.599	4.714	4.469	4.298	4.130
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Dependent Variable: Total requests received. N communicate with refers to the number of subjects who reported the subject as someone they communicate with. P-values are in parentheses. 80 participants.

Another way of summarizing the differences in requests is to examine groups where both men and women could be asked to invest. Table 11 reports the likelihood that a woman or a man was asked in these mixed-sex groups. If men and women are equally likely to be asked then they should be asked a third of the time. Instead we see a 39 percent chance that a woman is asked and a 27 percent chance that a man is asked. This 12 percentage point difference is statistically significant across all rounds and when differentiating between stranger and non-stranger rounds.[48]

The finding that women are asked to invest more than men is consistent with the belief that they are more likely to accept such requests. However, for beliefs to be driving the response to group composition documented between Experiments 1 and 2 it must be a commonly held belief. We see in Table 11 that both male and female requestors are more likely to ask female rather than male group members to invest. When a male requestor has the option of asking either a man or woman to invest,

[46] Given the small age variation and participant's likely limited ability to distinguish participants by age we do not control for age. However, adding this control does not affect the coefficient on the Female dummy.

[47] The effect of gender is similar if we instead control for the number of people who reported that they know or are friends with the participant. Only the coefficients on "N communicate with in session" and "N friends with in session" are statistically significant.

[48] Two-sided session level paired t-test $t=5.21$, $p=0.014$ for rounds 1-10, and $t=2.262$ ($p=0.108$) and $t=2.77$ ($p=0.069$) for rounds 1-5 and 6-10 respectively. Two-sided subject level t-tests provide $t=3.497$, $p<0.001$ for rounds 1-10, and $t=2.2612$ ($p=0.011$) and $t=3.585$ ($p<0.001$) for rounds 1-5 and 6-10 respectively.

we see that the chance that a woman is asked is 39 percent, while that of a man is 29 percent.[49] The choices made by female requestors are quite similar as the likelihood that they ask a woman is 39 percent, and the likelihood that they ask a man is 26 percent.[50]

Table 11: Requests made by subjects in mixed gender groups (Exp. 3)

	Probability of asking a female			Probability of asking a male		
	Rounds 1-10	Rounds 1-5	Rounds 6-10	Rounds 1-10	Rounds 1-5	Rounds 6-10
All	0.388	0.364	0.413	0.274	0.286	0.262
Male requestor	0.390	0.351	0.427	0.287	0.309	0.267
Female requestor	0.387	0.375	0.399	0.263	0.268	0.258
N Obs.	618	309	309	618	309	309

Note: Requests made by subjects are normalized by the number of other females/males in the group.

Response to Requests

Next we examine if requests influence the likelihood that an individual invests, and second whether this response differs by the gender of the respondent. The first row of Table 12 shows that requests have a substantial impact on the individual's decision to invest. Participants who are asked to invest have an investment rate of 65.5 percent, while the investment rate is only 14 percent for those who are not asked to invest. Thus a requestor can by asking someone to invest significantly increase the likelihood that they do invest.[51]

Table 12: Probability of investment (Exp. 3)

	Not asked to invest			Asked to invest			All green players		
	Rounds 1-10	Rounds 1-5	Rounds 6-10	Rounds 1-10	Rounds 1-5	Rounds 6-10	Rounds 1-10	Rounds 1-5	Rounds 6-10
All	0.140	0.145	0.135	0.655	0.650	0.660	0.312	0.313	0.310
Male	0.143	0.116	0.168	0.506	0.476	0.538	0.249	0.226	0.271
Female	0.137	0.171	0.101	0.756	0.776	0.738	0.365	0.387	0.344
N Obs.	400	200	200	200	100	100	600	300	300

Looking at the first panel of Table 12, absent a request, the investment rate does not differ by gender (both men and women invest 14 percent of the time). The response to a request does, however, differ by gender, as the investment rate increases to 51 percent for men and to 76 percent for women (second

[49] Pooling over groups with two women and one man (2W1M) and groups with one woman and two men (1W2M), the sum of frequencies depend on the share of times a particular group composition was encountered. For 2W1M groups the chance that a woman is asked is 35.6 for male requestors and 38.7 for female requestors (with the chance a man is asked being 0.287 and 0.226 respectively). For 1W2M groups the chance that a woman is asked is 42.6 percent for male requestors and 38.7 percent for female requestors (with the chance a man is asked being 0.287 and 0.307 respectively).

[50] Controlling for round and clustering standard errors at the subject level a probit regression of asking a female to invest on the gender of requestor provides a marginal effect on female requestor of 0.024 ($p=0.262$).

[51] A probit regression of investment which controls for round and clusters standard errors at the subject level, indicates that being asked to invest increases the probability of investment by 0.515 ($p<0.001$).

panel of Table 12). A probit regression in Table 13 confirms that the response to requests is significant and that the response by women is significantly greater than the response by men.[52]

The net result of women more frequently being asked to invest and more frequently accepting such requests is of course that the investment rate for women exceeds that for men. Looking at the third panel of Table 12 we see an aggregate investment rate of 37 percent for women and 25 percent for men.[53] These investment rates are quite similar to those seen in the mixed-sex Experiment 1 where the investment rates were 35 percent for women and 21 percent for men.

Below we further explore the differential response to investment requests by men and women. Table 13 shows that gender differences in investments are robust to controls for the round and that it does not change when controls for individual characteristics are included. Neither survey (column 2) nor incentivized measures (column 3) of individual characteristics alter the gender difference in response to requests. The belief that women are more likely than men to accept the request to invest is confirmed by the data and may explain why women more than men are asked to invest.

Table 13. Probability of investing (probit): All green players (Exp. 3)

	(1)	(2)	(3)
Asked to invest	0.382	0.380	0.376
	(0.000)	(0.000)	(0.000)
Female	-0.010	0.001	-0.020
	(0.882)	(0.982)	(0.741)
Female X asked to invest	0.258	0.258	0.258
	(0.002)	(0.002)	(0.002)
Round	-0.003	-0.003	-0.004
	(0.643)	(0.639)	(0.578)
Non-conform		0.025	0.018
		(0.597)	(0.663)
Risk-seeking		-0.001	-0.021
		(0.979)	(0.147)
Altruism		0.042	0.046
		(0.356)	(0.115)
Agreeable		-0.017	0.009
		(0.726)	(0.838)
N	600	600	600

Dependent variable: Individual investment decision (1-invest, 0-don't invest). The table presents marginal effects. Column 2 uses survey measures of non-conformity, risk-seeking, altruism, and agreeableness. Column 3 replaces risk seeking and altruism with measures from incentivized decisions tasks. The coefficient and standard error of the interaction is corrected to account for the non-linear nature of the estimation. Standard errors are clustered on the individual. P-values are reported in parentheses. 80 participants.

[52] Results are similar over the first 5 and last 5 rounds of the experiment.

[53] A probit regression of investment on round and gender with standard errors clustered at the subject level provides a marginal effect on female of 0.116 (p=0.028).

4. Conclusion

A great deal of research has been conducted to help understand gender differences in the labor market. We add to this literature an understanding of the role played by gender differences in the propensity to agree to perform tasks that while helping the group, places the individual performing the task at a relative disadvantage.

We use several studies to examine these potential gender differences in saying 'no' to non-promotable tasks. Using field data from two studies we show that relative to men, women are 2 to 3 times more likely to respond favorably to requests to undertake such tasks. While this field evidence helps motivate our research question, it cannot tell us why a gender gap in willingness to engage in non-promotable tasks exists. Turning to the laboratory we conduct three experiments to determine whether gender differences in propensity to volunteer arise when incentives are better controlled, and to determine what may give rise to such gender differences.

Our experimental design mirrors the incentives that group members face when asked to find a volunteer for a task that they prefer another member of the group undertakes. In our first two experiments all group members face the same implicit request to volunteer. In Experiment 1 when both men and women are present in the lab we find that women are almost twice as likely to volunteer, and this gender difference in volunteering is not explained by differences in preferences or in individual characteristics. To explore whether these differences result instead from beliefs, our Experiment 2 uses a single-sex rather than a mixed-sex subject pool. Interestingly, the gender gap in volunteering is eliminated when participants know that they are paired only with members of their own sex. Thus, an individual's willingness to volunteer is not fixed and responds to the gender composition of the group.

We interpret the differential response to the single-sex environment as evidence that the gender gap documented in Experiment 1 results from men and women holding different beliefs about the likelihood that others will invest. An increase in the share of women in the group decreases the likelihood that both men and women invest. This response to gender composition is consistent with a commonly held belief that women more than men find it difficult to say no and thus undertake the investment.[54] An alternative explanation for the results is that both men and women are more altruistic toward men. That is, both men and women are more generous when the members of their group are more likely to be men. While such an explanation is consistent with women giving less in all-female groups, and consistent with men giving more in all-male groups, there is no evidence in the literature suggesting that men and women are more altruistically inclined toward men than women. Perhaps the cleanest demonstration of the absence of such an effect is that of Boschini, Muren and Persson (2012).

[54] In addition to shedding light on why men and women differ in their response to the mixed-sex sessions, the results from experiment 1 and 2 point to the environment in which we may expect differences in willingness to volunteer to be severe. In particular, women may be more likely than men to volunteer in male-dominated environments.

Conducting dictator games in both mixed- and single-sex groups they find, in an environment similar to ours, that the transfers by both men and women are insensitive to the sex of the recipient.[55]
Our third experiment further investigates the role of beliefs by examining the demand side of the problem. That is, whether women are more frequently asked to volunteer than men. Using the same decision environment as our two first experiments, but adding a requestor who can ask one other participant to volunteer, we show that, consistent with the belief that women more than men accept requests, women more frequently are asked to invest than men. In addition, both men and women requestors are more likely to ask a woman than a man. Further confirming the role of beliefs we find that women respond more favorably to these directed requests than do men. While requests increase the investment rates for both men and women, the increase for women is substantially larger.

The evidence that women are more likely to volunteer; more likely to be asked to volunteer; and more likely to accept direct requests to volunteer suggest that the allocation of non-promotable tasks may differ even when there are no differences in ability between men and women. Such differences in task allocations can create barriers to the advancement of women in organizations and in society as a whole. While the gender difference in willingness to undertake such tasks is disturbing, it is promising that the differential appears to be influenced by beliefs and that simple mechanisms may help reduce the differences in allocations of non-promotable tasks. To the extent that beliefs can be perturbed by awareness and changes in behavior, it may be possible to improve the equity of task allocation. By documenting gender differences in saying 'no' we hope to encourage managers to account for these differences when allocating non-promotable tasks. Rather than asking for volunteers, it may be preferable to encourage turn-taking or to enforce random assignment.[56] In acknowledging the differential it may be possible to alter beliefs and the mechanisms we use to assign non-promotable tasks, and this in turn may help improve the advancement of women.

[55] Evidence that participants are not more altruistic toward men than women can also be seen in Experiment 3 where the gender of the requestor has no effect on the likelihood that individuals invest (controlling both for the individual's gender, group composition, and whether the individual was asked to invest). The insensitivity to the requestor's gender is also seen in single-sex groups of Experiment 3. In all-male groups a probit of investing on a dummy for female requestor secures a coefficient of 0.100 (p=0.722) for those asked to invest and of -0.050 (p=0.791) for those not asked to invest. The results are similar for the all-female groups where the coefficient on a dummy for female requestor is -0.079 (p=0.599) for those asked to invest and of -0.032 (p=0.661) for those not asked to invest. Further evidence that participants are not more altruistic toward men than women is seen from the gender of the person who is asked to invest not influencing the decision to invest early by other group members. That is, when a man rather than a woman is asked to invest the remaining participants are no more likely invest within the first 10 second of a round (coefficient on Female is -0.008, p=0.581) or within the first 20 seconds of a round (coefficient on Female -0.001, p=0.943).
[56] See Leo (2014) for a recent study on turn taking.

References

Altonji, J., & Blank, R. (1999). Chapter 48 race and gender in the labor market. In Handbook of Labor Economics, Vol 3, Part C, 3143-3259.

Andreoni, J., & Vesterlund, L. (2001). Which is the fair gender: Gender differences in altruism, Quarterly Journal of Economics, 116(1), 293-312.

Babcock, L., & Laschever, S. (2003). Women don't ask: Negotiation and the gender divide. Princeton, NJ: Princeton University Press.

Benschop, Y., & Doorewaard, H. (1998). Covered by equality: the gender subtext of organizations. Organization Studies, 19:5, 787-805.

Bertrand, M., Goldin, C., and Katz, L. (2010) Dynamics of the Gender Gap for Young Professionals in the Financial and Corporate Sectors, American Economic Journal: Applied Economics, Vol. 2, No. 3, pp. 228-255

Bertrand, M., & Hallock, K. (2001.) The gender gap in top corporate jobs, Industrial and Labor Relations Review, 55:1, 3-21.

Black, S.E., & Strahan, P.E. (2001). The division of spoils: Rent-sharing and discrimination in a regulated industry, American Economic Review, 91:4, 814-831.

Bliss, C., & Nalebuff, B. (1984). Dragon-slaying and ballroom dancing: The private supply of a public good, Journal of Public Economics, 25:1, 1-12.

Boschini, A., Muren, A., & Persson, M. (2012). Constructing gender differences in the economics lab. Journal of Economic Behavior & Organization, 84:3, 741-752.

Braiker, H. B. (2001). The Disease to Please: Curing the People-Pleasing Syndrome. New York: McGraw-Hill.

Croson, R., & Gneezy, U. (2009). Gender differences in preferences, Journal of Economic Literature, 47:2, 448-474.

De Pater, I., Van Vianen, A., & Bechtoldt, M. (2010). Gender differences in job challenge: A matter of task allocation, Gender, Work, and Organization, 17:4, 433-453.

Diekmann, A. (1993). Cooperation in an asymmetric volunteer's dilemma game theory and experimental evidence. International Journal of Game Theory, 22:1, 75-85.

Diekmann, A. (1985). Volunteer's dilemma. Journal of Conflict Resolution, 605-610.

Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G. G. (2011). Individual risk attitudes: Measurement, determinants, and behavioral consequences. Journal of the European Economic Association, 9:3, 522-550.

Duffy, S., & Smith, J. (2014). Cognitive load in the multi-player prisoner's dilemma game: Are there brains in games?.Journal of Behavioral and Experimental Economics, 51, 47-56.

Eagly, A.H., Wood, W., & Fishbaugh, L. (1981). Sex Differences in Conformity: Surveillance by the Group as a Determinant of Male Nonconformity. Journal of Personality and Social Psychology, 40:2, 384-394.

Eckel, C., & Grossman, P. (1998). Are men less selfish than women: Evidence from dictator experiments, The Economic Journal, 108(448), 726-735.

Eckel, C. C., & Grossman, P. J. (2002). Sex differences and statistical stereotyping in attitudes toward financial risk. Evolution and human behavior, 23:4, 281-295.

Eckel, C., & Grossman, P. (2008). Differences in the economic decisions of men and women: Experimental Evidence, Handbook of Experimental Economics Results, 1, 509-519.

Franzen, A. (1995). Group size and one-shot collective action. Rationality and Society,7:2, 183-200.

Fischbacher, U. (2007). z-Tree: Zurich toolbox for ready-made economic experiments. Experimental Economics,10:2, 171-178.

Gneezy U, Niederle M, Rustichini A. (2003). Performance in competitive environments: gender differences. Quarterly Journal of Economics. 118, 1049–74

Goeree, J. K., Holt, C. A., & Moore, A. K. (2005). An Experimental Examination of the Volunteer's Dilemma. Working paper.

Goldin, C., Katz, L., & Kuziemko, I. (2006) The Homecoming of Amercian College Women: The Reversal of the College Gender Gap, Journal of Economic Perspectives, 20: 4, 133-156.

Goldin, C., & Rouse, C. (2000). Orchestrating impartiality: The impact of 'blind' auditions on female musicians, American Economic Review, 90:4, 715–41.

Healy, A., & Pate, J. (2009). Cost Asymmetry and Incomplete Information in a Volunteer's Dilemma. Working paper.

Heilman, M., & Chen, J. (2005). Same behavior, difference consequences: Reactions to men's and women's altruistic citizenship behavior, Journal of Applied Psychology, 90:3, 431-441.

Holm, H. J. (2000). Gender-based focal points. Games and Economic Behavior, 32:2, 292-314.

John, O., & Srivastava, S. (1995). The big five trait taxonomy: History, measure, and theoretical perspectives, in Handbook of personality: Theory and Research (2nd ed.) (L. Pervin and O. John Eds). New York: Guilford.

Leo, G. (2014). Taking Turns, UCSB Working paper.

Maynard Smith, J. (1982). Evolution and the Theory of Games. Cambridge University Press.

Maynard Smith, J., and Price, G. R. (1973). The Logic of Animal Conflict. Nature, 246, 15.

Misra, J., Hickes, J., Lundquist, J. H.& Templer, A. (2012). Gender, Work Time, and Care Responsibilities Among Faculty, Sociological Forum, Vol. 27, No. 2, June 2012

Mitchell, S. M., & Hesli, V. L. (2013). Women don't ask? Women don't say no? Bargaining and service in the political science profession.PS: Political Science & Politics, 46:2, 355-369.

Murnighan, J. K., Kim, J. W., & Metzger, A. R. (1993). The volunteer dilemma. Administrative Science Quarterly, 515-538.

Niederle, M., & Vesterlund, L. 2007"Do women shy away from competition? Do men compete too much?" Quarterly Journal of Economics, August 2007, 122:3, 1067-1101.

Ohlott, P. J., Ruderman, M. N., & McCauley, C. D. (1994). Gender differences in managers' developmental job experiences. Academy of Management Journal, 37:1, 46-67.

Oprea, R. , Henwood, K. and Friedman, D. (2011). "Separating the Hawks from the Doves: Evidence from Continuous Time Laboratory Games." Journal of Economic Theory, 146:6, 2206-2225.

Organ, D.W. (1988). Organizational citizenship behavior: The good soldier syndrome. Lexington, MA: Lexington Books.

Polachek, S.W. (1981). Occupational self-selection: A human capital approach to gender differences in occupational structure, The Review of Economics and Statistics, 63:1, 60-69.

Porter, S. R. (2007). A closer look at faculty service: What affects participation on committees?.The Journal of Higher Education, 78:5, 523-541.

Sandberg, S. (2013). Lean In: Women. Work, and the Will to Lead, Alfred A. Knopf.

Santee, R. T., & Jackson, S. E. (1982). Identity implications of conformity: Sex differences in normative and attributional judgments. Social Psychology Quarterly, 121-125..

Weber, E. U., Blais, A., & Betz, E. N. (2002). A domain-specific risk-attitude scale: measuring risk perceptions and risk behaviors. Journal of Behavioral Decision Making, 15, 263-290.

Weirup, A., Weingart, L., Babcock, L., and Vesterlund, L. (2013). Favors Feel Different for Females: Gender Differences in the Cognitive and Affective Processes of Favor Deliberation, unpublished manuscript.

Weingart, L., Babcock, L., Vesterlund, L., and Weirup, A. (2014). Can You Do Me a Favor? A Diary Study Responding to Requests in the Workplace, unpublished manuscript

Wilhelm, M. O., & Bekkers, R. (2010). Helping behavior, dispositional empathic concern, and the principle of care. Social Psychology Quarterly, 73:1, 11-32.

Appendix A. Instructions

Experimental Instructions and Screen Shot of the Decision Phase [Experiments 1 and 2]

Introduction

Thank you for participating in our study. This is an experiment about decision making. The other people in this room are also participating in the experiment. You must not talk to them or communicate with them in any way. If you have a question please raise your hand and one of us will come to where you are sitting to answer it.

The experiment consists of ten rounds. In each round you are randomly paired with two other participants to form a group. You will never be paired with the same participant twice in a row. Your decisions are anonymous; no one will be able to determine which decisions were made by you. Your round earnings depend on the decisions made by you and by your group members. At the end of the experiment you will be paid, in private and in cash. Your total earnings will equal the sum of your earnings from the ten rounds plus $6 for showing up to the experiment.

Decisions

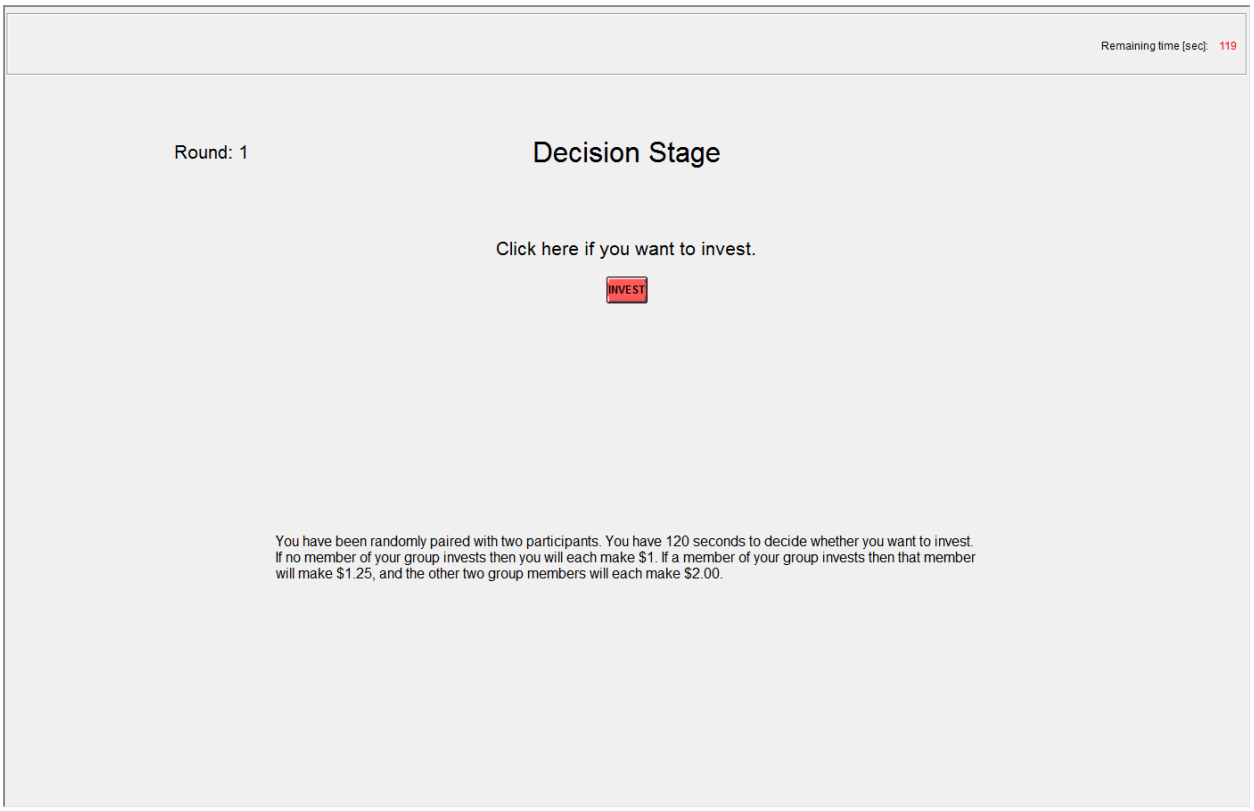
In each round you and the two other group members will have an opportunity to invest in a group account. You and your group members will have 120 seconds to individually decide whether you want to invest in the group account. The round ends when the 120 seconds are up or when the first group member invests in the group account.

Earnings

If no investment is made in the group account, all members of the group will earn $1 for the round. If one group member invests in the group account before the 120 seconds are up, then that individual earns $1.25 for the round and the other two group members each earn $2 for the round. If two group members simultaneously decide to invest, then it is randomly determined which of the two earns $1.25 versus $2 for the round.

Decision Screen

Below you can see a screen shot of the decision screen you will be given to make your investment decision. Listed in the upper right corner is the number of seconds that remain of a round. To the left you can see the round number. The red button in the center of the screen is used to make your investment decision. Please click this button if you wish to invest. The round ends and the decision screen disappears as soon as you or a member of your group invests in the group account.



Summary

1. In each round you are randomly paired with two other people in this room. You are never paired with the same person twice in a row.
2. A round lasts 120 seconds.
3. During each round you and your group members may invest in the group account. If no one invests you and the two other group members each earn $1 for the round. If one person invests then that person earns $1.25 and the other two group members each earn $2.
4. The round ends once someone invests or when the 120 seconds are up

Please raise your hand if you have any questions before we begin.

Instructions [Experiment 3]

Introduction

Thank you for participating in our study. This is an experiment about decision making. The other people in this room are also participating in the experiment. You must not talk to them or communicate with them in any way. If you have a question please raise your hand and one of us will come to where you are sitting to answer you in private.

During the experiment you will make decisions in 10 rounds. In each round you will be randomly matched with three other people to form a group of four. Your earnings will depend on the decisions made by you and by your group members. At the end of the experiment you will be paid in private and in cash. Your payment will equal the sum of your earnings from each of the 10 rounds plus $6 for showing up to the experiment.

Identity and roles

We will use a photo of you to identify you. In each round we will show you the photos of the three other people you are matched with. At the beginning of each round you and your group members will be randomly assigned roles. One member of the group will be assigned the role of red player and the remaining three members of the group will be assigned the role of green players. Green players form an investment group and can make an investment. The red player cannot make an investment. The earnings of all four group members depend on the investment choices made by the three green players.

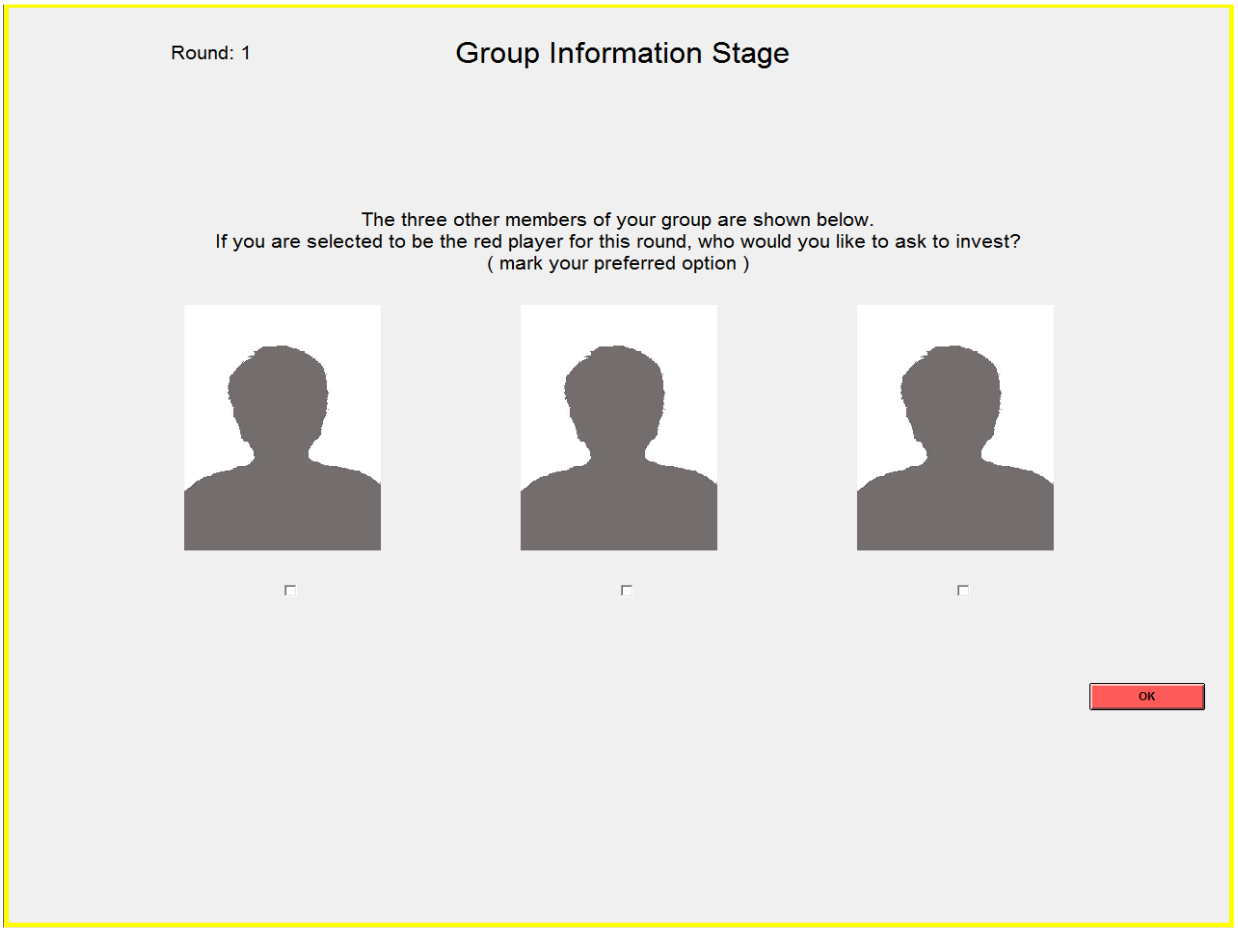
Decisions and Earnings

In each round the three green players form an investment group and have 120 seconds to individually decide whether to invest in the group account. The round ends when the 120 seconds are up or when someone invests. If no one invests each group member earns $1 for the round. If a green player invests before the 120 seconds are up, then that individual earns $1.25 for the round and the other group members each earn $2 for the round. If multiple green players invest at the exact same time, then it is randomly determined which player's investment choice counts and therefore which player earns $1.25.

If you are selected to be a red player you earn $2 if a green player invests, and you earn $1 if no green player invests. As a red player you cannot invest. However, as the red player you can ask a green player to invest. You indicate which player you would like to ask before it is determined whether you are the red player. That is, prior to knowing your role, all members will indicate which green player they would like to ask to invest. When the round begins, one group member is randomly selected to be the red player, and it is revealed which green player the red player asked to invest.

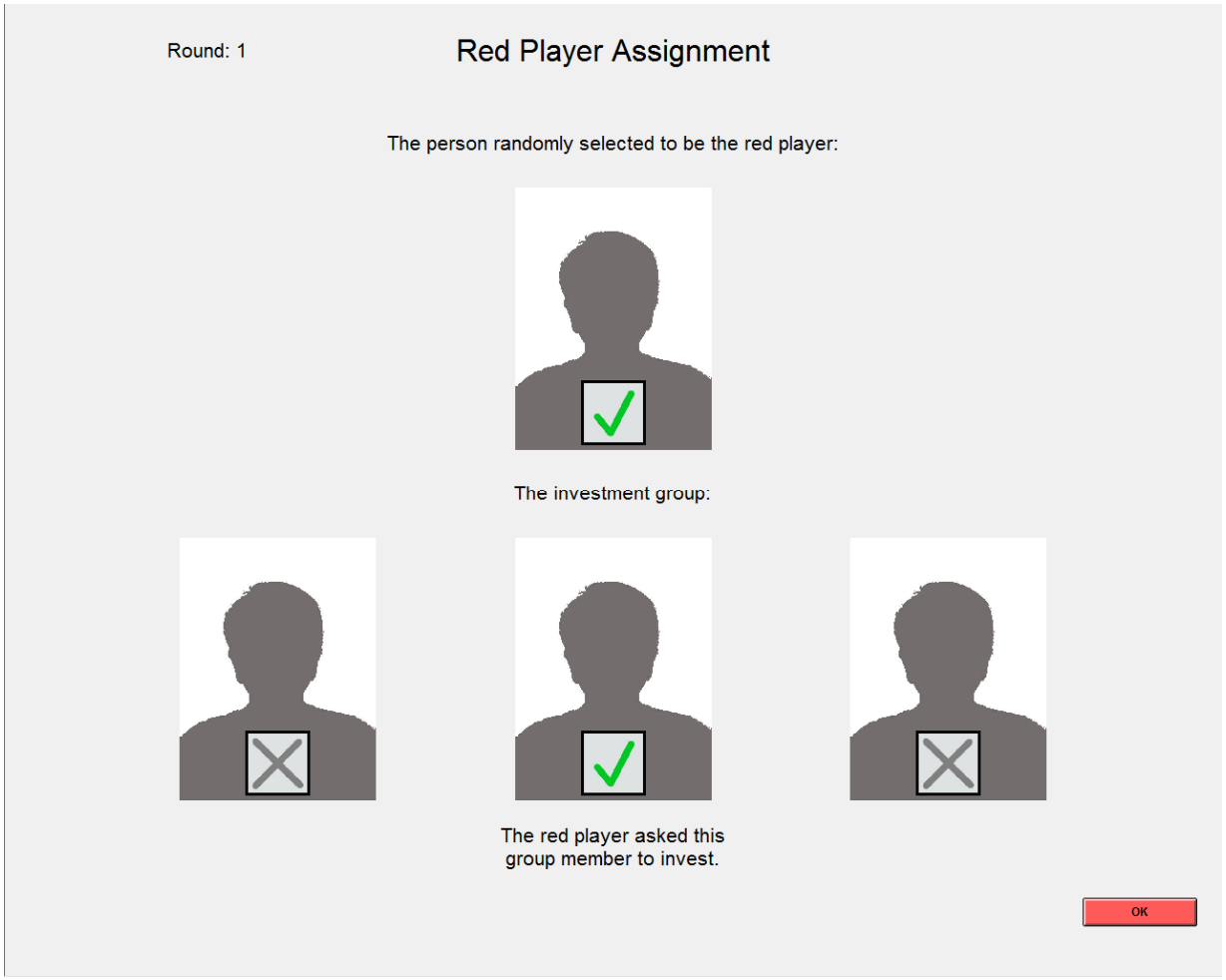
Group Information Screen

Below you see a screenshot of the group information screen. In the upper left corner you see the round number. Photos of the three other members of your group are shown below. The order of photos differs within the group. You can indicate who you would like to ask to invest by marking your preferred option. Your choice is only revealed to the other members of your group if you are randomly assigned the role of red player.



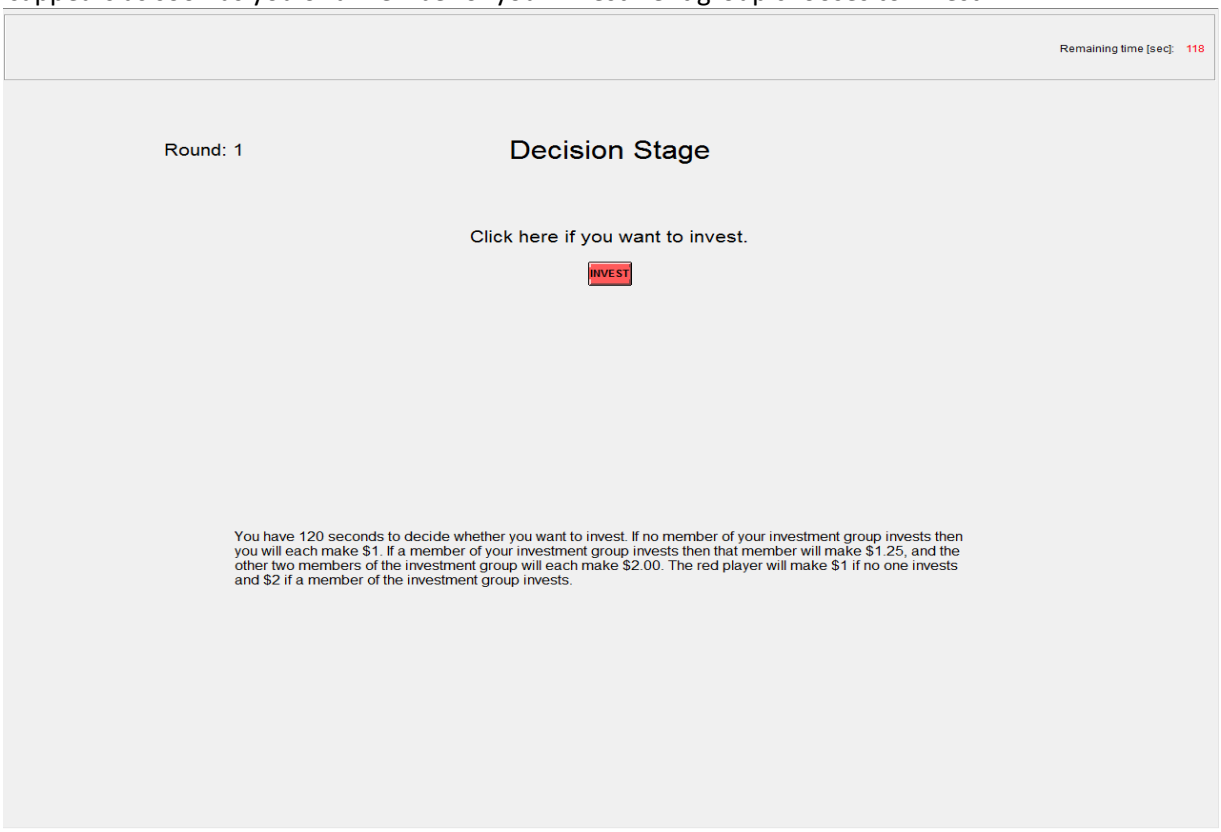
Red Player Assignment Screen

The computer randomly selects one group member to be assigned the role of red player. The remaining three group members are assigned the role of green players. A sample of the screenshot revealing this information is shown below. The red player's photo is shown on the first row and photos of the three green players forming the investment group are shown on the second row. Investments can only be made by green players, who form the investment group. Any member of the investment group may invest. The screen also reveals which green player the red player asked to invest in the round.



Decision Screen

The decision screen records your investment decision. Listed in the upper right corner is the number of seconds that remain in a round. The button in the center of the screen is used to make your investment decision. Please click this button if you want to invest. The round ends and the decision screen disappears as soon as you or a member of your investment group chooses to invest.



Summary

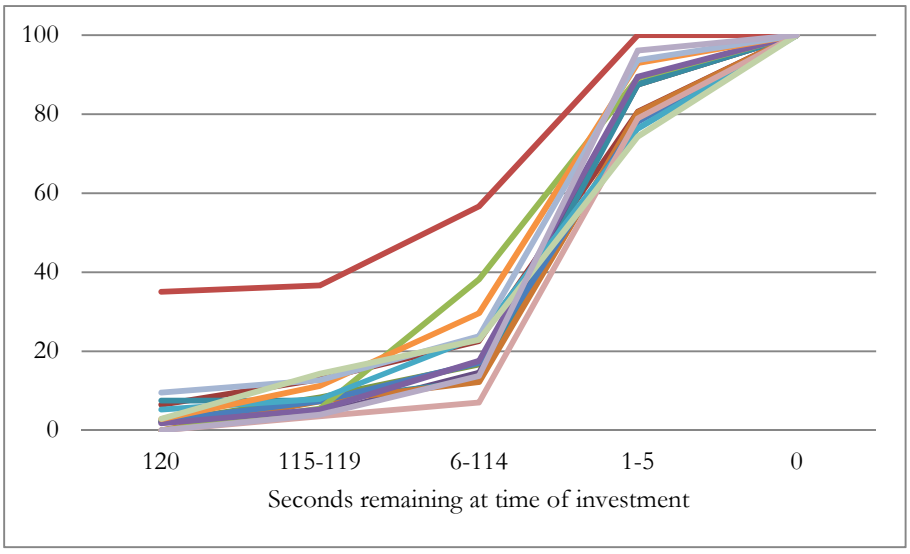
1. The experiment consists of 10 rounds.
2. At the beginning of each round you see photos of the three other members of your group.
3. One group member is randomly assigned the role of red player and the three others are assigned the role of green players.
4. Green players form an investment group and any green player can invest. The red player cannot invest. All group members are affected by the green players' investments.
5. Members of the investment group have 120 seconds to decide whether to invest. The round ends once someone chooses to invest or when the 120 seconds are up.
6. If no one invests each group member earns $1 for the round. If someone invests, that person earns $1.25 and the three other group members each earn $2.
7. Before selecting which member is assigned the role of red player everyone must indicate which group member they want to ask to invest if they are selected to be the red player.
8. Before each round the computer reveals which group member was randomly selected to be a red player and which group member was asked by the red player to invest.
9. When the round ends you learn whether an investment was made. However, you do not learn the investment choices of your investment group members.

Please raise your hand if you have any questions before we begin.

Appendix B: Session 7 of Experiment 1

Examining decision time across the 15 sessions (Experiment 1 and 2) it is transparent that session 7 is an outlier. Participants in this session were more likely to invest in the first second (i.e., when 120 seconds remained of a session) and less likely to invest in the last second of a round. Figure B1 demonstrates for each session of Experiment 1 and 2 the share of investments that were made by the number of second remaining in a round. While the session 7 distribution of decision times as shown below differs significantly from the other 14 distributions, none of the other sessions are found to differ from the remaining 14. A two-sample Kolmogorov-Smirnov test for equality of distribution functions over the decision time bins shown below yields a p-value of 0.003 when comparing the session 7 distribution with all others, whereas the tests of the remaining distributions differing yields p-values in excess of 0.422 (with the remaining 13 sessions securing p-value in excess of 0.744).

Figure B1 Seconds Remaining at Time of Investment (Experiment 1 and 2, 15 sessions)



The stark differences in decision times suggest that participants in session 7 were playing a different game than that observed in the other sessions, we therefore opted to exclude session 7 from our central analysis. As demonstrated in the following tables the central results of the table are, however, robust to the inclusion of the data from Session 7.

Table B1: Probability of Investing, n=150, Probit
(Experiment 1, incl. Session 7)

	All rounds	Round 1-5	6-10
Female	0.111	0.107	0.115
	(0.003)	(0.005)	(0.013)
Round	-0.006	-0.009	-0.009
	(0.056)	(0.409)	(0.349)

Dependent variable: Individual investment decision (1-invest, 0-don't invest). The table presents marginal effects. Standard errors are clustered on the individual. P-values are reported in parentheses. 150 participants.

Table B2: Probability of Investing, 150 participants (Experiment 1, incl. Ses 7)

	(1)	(2)
Female	0.111	0.087
	(0.003)	(0.042)
Round	-0.006	-0.006
	(0.056)	(0.054)
Non-conform		-0.019
		(0.446)
Risk-seeking		-0.024
		(0.236)
Altruism		0.022
		(0.397)
Agreeable		-0.014
		(0.653)

Dependent variable: Individual investment decision (1-invest, 0-don't invest). The table presents marginal effects. Standard errors are clustered on the individual. P-values are reported in parentheses. 150 participants.

Table B3: Probability of Investing (probit) (Experiment 1 and 2, incl. Session 7)

	All rounds	Round 1-5	Round 6-10
Female	0.109	0.106	0.111
	(0.003)	(0.005)	(0.013)
Round	-0.009	-0.011	-0.009
	(0.000)	(0.164)	(0.204)
Single-Sex	0.038	0.054	0.022
	(0.373)	(0.237)	(0.646)
FemalexSingle-Sex	-0.106	-0.102	-0.111
	(0.032)	(0.046)	(0.049)
p-value of test of Female+FemalexSingle=0	0.919	0.916	0.935

Dependent variable: Individual investment decision (1-invest, 0-don't invest). The table presents marginal effects. The coefficient and standard error on the interaction is corrected to account for the non-linear nature of the estimation. Standard errors are clustered on the individual. P-values are reported in parentheses. 267 participants.