Opportunity Cost and Gender Identity Loyalty

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February 10, 2026

Abstract

People place real value on the identities that they hold and membership in groups of people that hold the same or similar identities. While not easily quantifiable, individuals consciously and subconsciously take actions to signal membership and loyalty to specific identity groups over others. At times, the required signals may come at a personal cost that prevents opportunities for improved individual outcomes, such as deciding between staying in a small community that you grew up in and moving away to attend a high-ranked university or for job opportunities. In an experimental setting, we examine group identity loyalty using parallel public goods games with two teams of homogeneous gender identities. We give participants opportunities to switch teams, leaving their identity group, to increase their earnings. There is some loyalty to identity groups in the early stages of the game, particularly among women. We find that the biggest positive determinants of group-oriented contribution behavior are communication and identity priming, respectively.

JEL classification: D91, C92, D71.
Keywords: Group Identity, Public Goods Game, Gender Bias, Opportunity Cost.

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1 Introduction and Background

Group identity has become more prominent in behavioral economics as a key determinant of individual behavior and decision-making (Akerlof and Kranton, 2000; Chen and Li, 2009). In educational settings, group identity has been suggested to have impacts on individual utility functions where the respective individuals consider how they signal membership to their identity group and weigh those behaviors against individual long-term utility-maximizing behavior, often resulting in personal sacrifices to appease their group identity (Akerlof and Kranton, 2002; David and Fryer, 1995; Fryer and Torelli, 2010). This project will test the opportunity cost threshold of preexisting group identities by using a team-based public goods game where participants have the ability to switch teams for a higher potential payout with varying levels of peer pressure and knowledge that their leaving their team will adversely affect their team.

The motivating setting behind this approach is drawn from the real-life trade-offs observed by high-performing members of lower or limited-opportunity communities. The limited opportunity nature of one of these communities does not necessarily imply a lack of skill or priority but could be a range of possibilities from a lack of opportunities due to changing markets such as West Virginia's coal communities in the modern age or perhaps an area that specializes in a particular market or trade, such as an agricultural community in Arkansas that specializes in rice or soy production. Through a combination of economic and cultural factors, individuals may find themselves strongly identifying with a certain place where they grew up or the community they grew up in. This is also found to be true in many areas with cohesive minority and/or immigrant communities. A commonly understood dilemma is the story of a high-achieving community member applying to universities. They have to negotiate the internal trade-off between going to a high-ranking university or perhaps one that just offers something that is not available in their local area to develop their personal human capital and staying in their community for reasons including identity loyalty, not

contributing to a local brain drain, etc. This decision carries risk if they do decide to leave their community or even just apply to leave their community. In this context, there are two points where there is a probability of failure, which carries the weight of failing on personal goals and negatively signaling identity membership. The first is when the student applies to the given university and has to wait for an admissions decision, and the second is when the student actually attends the school and has to maintain an academic standard and manage to integrate into a new group identity. In our experimental setting, these two points of potential failure are collapsed into a single decision point.

This motivating example is of a specific decision for a student leaving their community and identity group to engage in higher-level human capital accumulation opportunities. Though this is the original motivation for the design, this type of decision-making process is repeated across many different scenarios, not all requiring a large geographic move. Another scenario to consider is the team member in a multi-department organization that wants to switch to another team or department, whether it is to increase pay, benefits, or for personal utility. In work environments, there are often subgroup identities, such as gaining utility from being a member of the sales team or working in research and development. Even if financial compensation across opposing teams is equal, individual utility from the type of work or preferences over work environment or conditions may make one more attractive to the individual decision maker than the other, while being at odds with their group signaling preferences.

In this paper, we use an experimental approach using a virtual experiment. Participants were put into two parallel, gender-homogeneous teams to participate in standard public goods games with the ability to see the opposite team's contributions and payouts and the opportunity to switch teams, subject to being approved by a vote, every three rounds. We find that women are more likely to stay loyal to their identity group than men, by way of not trying to switch teams as often as men when there is more money to be made by switching. We also find that there is a significant impact on contribution decisions based on

how well participants can coordinate. Regardless of gender, participants increase their team contributions when they have the ability to chat with each other. We also find that people are more likely to make their switching decisions in the first half of the experiment, with attempted and successful switches dropping off after the third opportunity to switch out of the scheduled six.

The rest of this paper follows in this fashion: Section 2 literature looking at previous work, Section 3 going over the experimental design, Section 4 presenting and discussing our estimation results, and Section 5 going over our conclusions and directions for future work.

2 Literature Review

Much of the work that economics has done regarding group identity has been predicated on a wealth of social psychology literature. While economics does not make as significant a distinction between identity theory and social identity theory, social psychologists have been working between these parallel identities since the 1970s. While social identity theory focuses more on how the individual behaves as part of a group in group processes and intergroup behavior (Hogg and Abrams, 1988; Hogg and Turner, 1985; St Claire and Turner, 1982; Tajfel, Turner, Austin and Worchel, 1979; Turner, Hogg, Oakes, Reicher and Wetherell, 1987). Identity theory has been more focused on the individual's role-related behaviors and reflexive sense of self. (Burke, 1980; McCall and Simmons, 1968; Turner, 1978). Stets and Burke (2000) argues that the integration of the social identity and the reflexive view of the "self" identity helps to make the complete sense of self that a person identifies with and presents themselves. Previous literature had already shown that self-identity is impacted by social identity and affects the way intention and behavior are constructed. This is especially true when it comes to group norms and behaving within a set group expectation (Terry, Hogg and White, 1999).

Early work in economics laid the foundation for identity in economic models, which was initiated by Akerlof and Kranton (2000), which introduced identity as a way to explain some group-conforming individual behaviors by gender, socioeconomic class, and the way tasks are distributed in the household. This work is built upon by the same authors in different field-focused papers, including education Akerlof and Kranton (2002), labor-based organizations (Akerlof and Kranton, 2005), and the workplace dynamic between employees and supervisors (Akerlof and Kranton, 2008). The field of education has had great insights into understanding how identity impacts race-based learning outcomes beyond Akerlof and Kranton's 2002 paper. One of the more notable analyses is from Austen-Smith and Fryer Jr (2005), which breaks down the social pressures on Black and Hispanic students to avoid being seen as "acting white". The "acting white" problem has been discussed in sociology (Horvat and Lewis, 2003; Tyson, Darity Jr and Castellino, 2005), anthropology (Fordham and Ogbu, 1986; Ogbu, 2004), and education circles. This follows from the social psychology theory of social identity that prescribes the idea that individuals will adjust their behavior to match group norms. In the case of the "acting white" burden, Black and Hispanic students signal group membership by avoiding certain behaviors in the school setting that may inadvertently signal them to want to be accepted by their white peers. In a follow-up to their analysis paper, Fryer and Torelli (2010) does an empirical study to measure which activities were avoided to maintain popularity under this burden, including high levels of continuous academic effort and certain extracurricular activities. Others have found that there is a limited amount of empirical basis to justify weighting so much explanatory power towards a negative framing of Black culture the underlying identity value is generally supported (Horvat and Lewis, 2003; Wildhagen, 2011).

Gender identity has been studied as a determinant of behavior and habit formation. Previous literature has found that there is an aversion by women to certain roles within the household that is attributed to gender identity norms, particularly pertaining to earning potential relative to their husband's income (Bertrand, Kamenica and Pan, 2015). A strong

sense of gender norms also impacts how women signal their attributes on the marriage market and the probability that they are found to be desirable, particularly with respect to income and how household labor is distributed (Bertrand et al., 2015; Greenstein, 2000; Salland, 2018). These identity norms also impact happiness in married couples after the marriage market (Akerlof and Kranton, 2000; Booth and Van Ours, 2009) and the kind of behavior that households engage in based on who is the breadwinner (Ke, 2021).

Experimental work in economics has been very useful in detecting group identity impacts on public goods and production, where identity cooperation is a factor. Our experimental design is motivated by the previous experiment that Charness, Cobo-Reyes and Jimenez (2014) used to examine identities in the public goods setting. Charness et al. (2014) uses a public goods game with a 2x2 design with endogenous group formation. The primary treatment dimensions vary depending on whether participants participate in a team-building exercise and whether some participants receive an endowment twice as much as other participants. Where the authors allowed for endogenous group formation alongside natural identities, in our experiment, we are isolating only natural identities (men and women), and our priming reinforces those natural identities, while the authors of this previous experiment are inducing subtle endogenous identities through priming. Another notable difference is that our experimental design limits the number of team members in a way that it is impossible for anybody to ever be a singleton. We also put everyone through a team-building exercise before the public goods game starts to promote team behavior. The results of Charness et al. (2014) have a lot of focus on the impacts of the endogenous group identity aspect and how it positively impacts group cooperation. In particular, the word task that the authors used to induce group behavior was highly effective.

3 Experimental Design

The goal of our experiment is to address two primary objectives: Evaluate participants' willingness to maintain their group identity through contributions to the group and evaluate participants' loyalty to their groups when facing opportunity costs to identity loyalty.

Our experiment consists of a 2x2 between-subject treatment factorial design in which we change the salience of gender identity through identity prime on the one hand and the possibility of communication during the public goods game on the other (Table 1). All treatments contain two parts: a pre-game anagram challenge to enhance the gender-team identity in Part I and a 20-period public goods provision game with the possibility of switching groups in Part II.

Table 1. Treatment Participation

Treatments	Part I	Part II	# of Sessions
Identity: Salient Communication: Yes	Identity prime questions Anagram challenge	Team communication	2 sessions; 16 participants
Identity: Salient Communication: No	Identity prime questions Anagram challenge	Without communication	2 sessions; 16 participants
Identity: Not Salient Communication: Yes	Anagram challenge	Team communication	2 sessions; 16 participants
Identity: Not Salient Communication: No	Anagram challenge	Without communication	2 sessions; 16 participants

3.1 Participants

Participants were recruited from the University of Arkansas undergraduate population. Recruitment was done using a combination of Sona Systems subject pool recruitment within the College of Business and recruiting from large principle/intro level classes from the Colleges of Liberal Arts & Science, Engineering, Business, and Education. Participants were 50% female and 50% male. The experiment was conducted online using oTree (Chen, Schonger and Wickens, 2016). Participants accessed the experiment through their web browsers on their personal internet-connected devices using participant-specific dedicated links. They

logged into a Zoom call with their cameras on and microphones muted so they can see all other participants in their session. Participant links were given to participants upon joining the Zoom call.

3.2 Part 1: Anagram Game

All sessions are gender balanced with 8 participants each, 4 men and 4 women. Each session starts with participants being assigned to two gender-homogeneous teams. The all-women team is named Team A and is assigned the color purple, and the all-men team is named Team B and is assigned the color green. The colors are only used when displaying the team names "Team A" and "Team B" at the top of each page of the experiment. This is done so that the team name stands out, and the individual's current team is salient on each page. The participants are made aware of the team names and the initial team gender compositions.

In the treatments with the salient gender identity, participants are asked to enter their gender information and answer several questions that are designed to prime and make salient their gender identity.[1] These questions include asking participants about the gender composition of their living arrangements and preferred living arrangements. Participants continue to the Anagram challenge after answering these questions. In the treatments without the salient gender identity, participants proceed to the Anagram challenge without the gender prime questions[2].

In all the treatments, every session starts with participants engaging in an incentivized pre-game anagram challenge. Each participant is given 20 anagrams to solve, and they receive a bonus for each correctly solved anagram. The anagrams are all five to seven letters long, with the first 10 being five letters, the next five being six letters, and the last five being seven letters. All payouts and bonuses in the experiment are expressed in points, and the participants are paid using a conversion of 600 points= \$1 or $\$0.0017 per point$. Each anagram is worth a bonus of 50 points for a total potential bonus of 1000 points. During this

[1] Appendix B
[2] Appendix C

pre-game, participants must submit their own responses for grading, but have the ability to use a chat function to communicate with their teammates and help each other. Participants self-report their team sentiment—attachment to their gender team at the end of the anagram challenge. This is to instill a sense of team identity in the participants before moving on to the public goods game part of the experiment. All teammates have the exact same anagrams in the exact same order, and all participants are aware of this in order to make coordination easier. Participants are told that they can coordinate with their teammates for assistance in successfully completing the anagrams and are encouraged to communicate with each other. The payoffs of Part I were not revealed to participants until the end of the experiment, after the survey.

3.3 Public Goods Game with Team Switching

Part II, the public goods games, consists of 20 total periods, which are broken down into 6 segments of 3 periods and 2 rounds of end game play. In each period, participants decide how much to contribute to a public goods game within their respective teams. The main differences between our study and a standard public goods game are asymmetric endowment distributions across the two teams, the possibilities of team switching, and the dependence of MPCR on the team size, as detailed below.

3.3.1 Asymmetric Distributions of Endowment

Teams A and B are each randomly assigned to a uniform distribution of endowment, $E_i \sim Uniform(a_g, b_g)$, where a and b indicate the upper and lower bounds of the endowment range, and g indicates the team, with one distribution being better than the other.[3] At the beginning of each period, each team member receives a random draw from the predetermined team endowment range of their respective uniform distribution. The two distribution ranges

[3]Whether $\{a_1, b_1\}$ or $\{a_2, b_2\}$ is a better endowment range is predetermined by a pre-randomized schedule at the session level.

overlap by $\frac{1}{4}$, i.e., there is a 75% chance that a member from the "wealthier" team receives a higher endowment than a member from the "poorer" team.

The endowment range stays fixed for each team throughout the experiment once it is randomly assigned at the beginning of the public goods game. However, all the participants receive a fresh endowment draw from their respective range in each period and decide how much to keep in their private accounts and how much, c_{ig}, to contribute to their respective team account. The total contributions to their team account, $\sum_i c_{ig}$, is multiplied by the team's MPCR M_g and shared equally by all team members. M_g is positively correlated with team size as presented in Table 2. Individual's payoff per period is $\pi_{ig} = E_{ig} - c_{ig} + (M_g \sum_i c_{ig})/T_g$, where T_g is the number of people on Team g. At the end of each period, participants receive a reminder on their individual endowment, contribution, the number of their team members, and the associated MPCR. They also receive feedback information on their team's contributions, the portion of their earnings from their team's public good account, and their individual total earnings in that period. In addition, they are also given information on the other team, including their endowment range, total contributions to their public account, the number of team members, the associated MPCR, and each team member's portion of earnings from their team's public account (see the screenshot in the Appendix). The feedback information on the other team is provided to facilitate one's decision-making in possible team switching.

3.3.2 Teams and Switching

As mentioned above, Teams A and B start as all-men and all-women teams, respectively, with one team randomly receiving a better range of endowment distribution than the other. After every three rounds of public goods contribution decisions, participants will have an opportunity to stay or switch teams. For example, after playing the public goods game in periods 1-3, participants will be given a chance to switch teams at the end of the third period. With the new (or original) teams if some participants (don't) successfully switch

teams, participants will continue to play the public goods game in periods 4-6 and will be given another chance to switch teams at the end of the sixth period. This cycle repeats with team switching and voting occurring after public goods contribution decisions in periods 9, 12, 15, and 18. Periods 19 and 20 only contain contribution decisions without team switching and voting occurring anymore. All these rules are public information to participants before the public goods games start. If a participant chooses to switch teams, the desired team will see her average contributions, in tokens and as a percentage of her endowment, to her team account during (the previous three periods?) and will then vote on the acceptance. If the votes do not reach a majority, the requester is not accepted and will stay with the original team, but her team members will know, by the ID number, she tries to leave but fails. After each period with possible team switching, the MPCR will be updated to reflect the team size according to Table 2 before the next period of team switching. No team is allowed to have fewer than two or more than six members.

Table 2. MPCR by Team Size

n (Team Members)	1	2	3	4	5	6
Multiplier Factor	1.000	1.250	1.500	1.750	2	2.25
MPCR	1.000	0.625	0.500	0.438	0.400	0.375

In the treatments with communication, team members can use the built-in chat program to communicate at the public goods contribution stage and at the voting stage.

Overall, 96 participants participated in 12 sessions on the one-hour-long online experiment from April 2021 to December 2021. All participants participated in the experiment only once. They received payments based on their cumulative earnings in the public goods games plus their earnings in the anagram challenge and a $5 participation fee. The exchange rate was 600 points for $1. The average earnings were $21.08 per participant including the anagram, public goods game, and $5 participation fee.

The experimenter read the experimental instructions aloud through the beginning of the public goods games while participants were able to follow along on their personal devices.

Participants were given practice questions for comprehension checks. After the games and before the payoff, participants filled out a post-experiment survey that gathered information on demographics, strategy, and background.[4]

3.4 Treatments and Hypotheses

This experiment has two primary treatments: chat and prime. Sessions with the chat treatment have the ability to chat during all contribution decisions as well as during voting on a new member to join a team. Sessions with the *prime* treatment receive a priming survey before the anagram stage.

3.4.1 H_1 (Chat and Priming): When team members are able to communicate, there will be an increase in contributions and a decrease in attempts to switch teams.

Both the chat and prime treatments are expected to have similar directional effects on participant behavior with respect to their contribution decisions. More specifically, previous experiments have found that chat improves coordination and efficiency in public goods games (Haruvy, Li, McCabe and Twieg, 2017; Oprea, Charness and Friedman, 2014; Palfrey, Rosenthal and Roy, 2017; Palfrey and Rosenthal, 1991). In a similar fashion, we expect that priming will improve the desire to coordinate among group members through the mechanism of increasing the value of their identity signaling and therefore increasing the cost of signaling "selfish" behavior to the identity group by holding on to more of one's endowment each round.

[4]Survey question list is outlined in Appendix A.

3.4.2 H_2 (Team Switching by Round): Participants will be more likely to switch in earlier rounds of play.

The primary incentive for individuals to switch groups is centered around the improved returns from being on a higher-endowed team. It is not expected that many individuals will want to switch to the lower-endowed team since initial play is more likely to have higher returns within the higher-endowed team. At the beginning of each session, the teams are balanced at 4 each but the experimental design restricts the number of team members to 6, which also leads to a much higher team multiplier. The individuals on a team with 6 members are highly incentivized to stay on that team due to much higher potential earnings.

3.4.3 H_4 (Feedback): Participants will be more likely to switch teams when they see the opposing team with higher levels of contributions.

One of the key aspects of our experiment is the transparency of the success of each team between teams. This improves the information set that participants make their decisions with and lets participants know whether their team is higher endowed or lower endowed quickly. The feedback information also informs participants of the relative cooperation levels between their team and the opposing team. This improved information about the potential advantages of the opposing team for individual gain will increase incentives to switch if the other team is doing better than if they did not have the feedback information and had to develop an information asymmetry guessing strategy.

3.4.4 H_5 (Female): Females will have a higher contribution level than male participants.

Based on previous literature studying the behavior of different genders in public goods games, we expect females to contribute a higher portion of their endowment in the earlier rounds of the public goods game (Cadsby and Maynes, 1998; Charness et al., 2014; Nowell and Tinkler, 1994). There is also supporting work previously done showing women more likely to

be voluntarily cooperative in a variety of different settings even at their own risk of receiving a lower benefit than the rest of the group (Babcock, Recalde, Vesterlund and Weingart, 2017; Charness and Rustichini, 2011; Goeree, Holt and Smith, 2017).

4 Results

4.1 Contribution Behavior

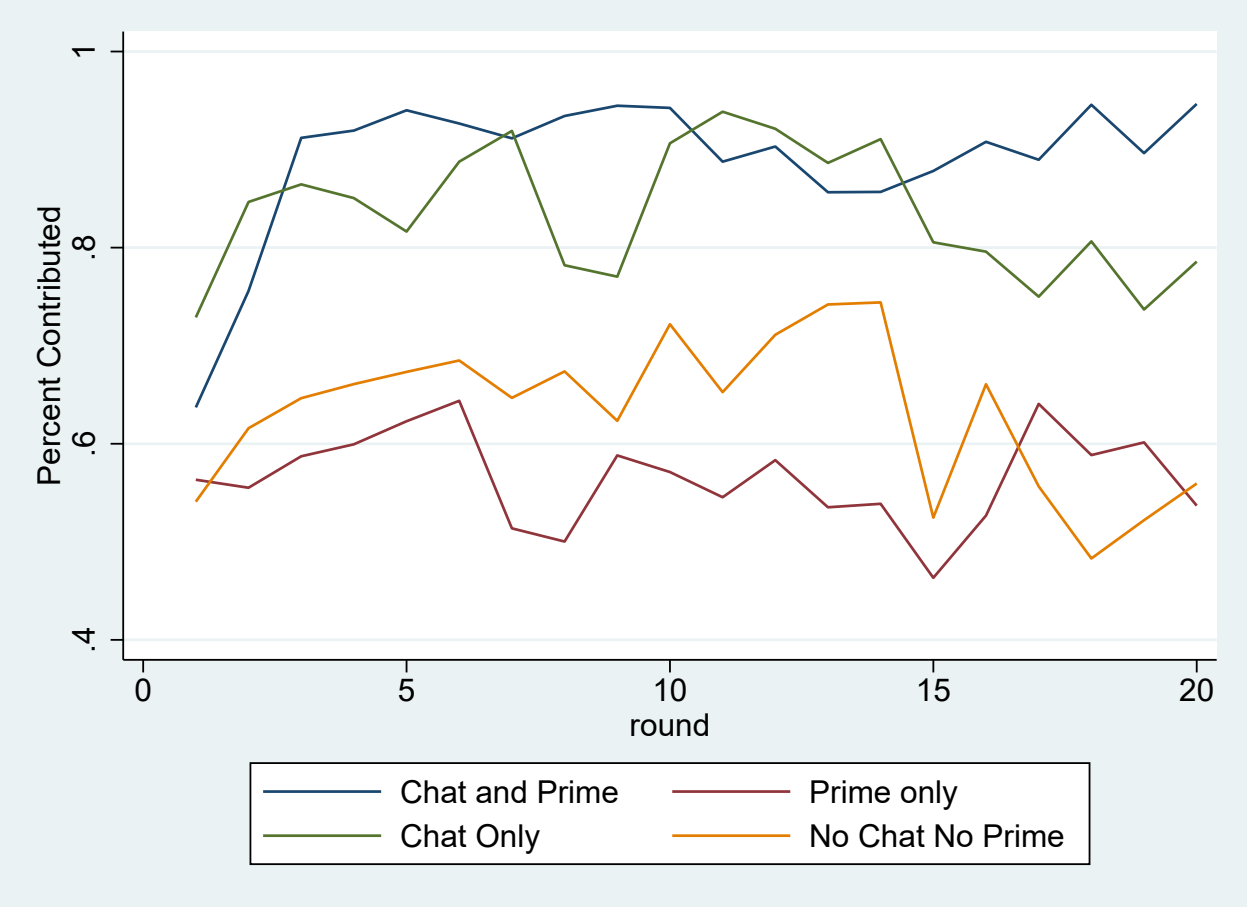
Contribution behavior is measured using the random effects tobit model where the contribution is measured as a percentage of an individual's endowment sorted by which round the contribution decision was made. The dependent percentage of contribution is censored to the range $C_{i,t} = [0, 1]$ where C is the percent of endowment contributed by individual i in round r. This is expressed by the model

$$C_{i,t} = \beta_0 + \beta_{1,i} Chat_s + \beta_{2,i} Prime_s + \beta_{3,i} Chat_s * Prime_s + \beta_{3i} female_i + \beta_{4i} zEndowment_{i,t} + \psi_{t-1} + \theta_i + \mu_i \tag{1}$$

where Chat and Prime describe the 2x2 treatment design categories, $zEndowment_{i,t}$ describes the standardized endowment an individual, i, receives in round r, while ψ_{t-1} describe the vector of effects caused by the vector of feedback variables presented to individuals in the previous round including the other team's contribution and the other team's individual returns from the team account. Finally, θ_i is the vector of demographic controls.

The baseline estimation between contribution behavior and the treatments indicates that only chat has a significant impact on the percentage of an individual's endowment that they contribute to their team accounts. Having access to chat increases an individual's contribution percentage by 20.3 percentage points ($p < .01$), while priming has no statistically

Figure 1. Contribution Behavior by Treatment Group



significant effect, nor does the interaction between priming and chat as illustrated in Figure 2. When consideration is added for feedback variables regarding the other team's performance, the effect of chat is reduced from .203 to .155 ($p < 0.01$) This result does not show any statistically significant changes for gender, same as the simpler specifications, implying that an individual's gender does not greatly influence their contribution strategy. This is at odds with other literature on public goods games that have found that women tend to have higher initial contribution levels that taper off over multiple rounds (Cadsby and Maynes, 1998) or have an aptitude to participate in public goods in the field (Greig and Bohnet, 2009) but is not unique in this regard (Brown-Kruse and Hummels, 1993) different time horizons and settings have found. While not statistically significant, there is a negative effect from priming on the percentage of endowment contributed.

One interesting result is that the standardized endowment consideration has a negative impact on the percentage of the gross endowment that an individual contributes (-0.0274, $p < 0.01$). The implication of this result is that for every experimental unit that a participant is endowed with, they will reduce their average contribution to the team account by 2.7 percentage points of their gross endowment. This is not completely surprising and can be simply understood when considering that even though the percentage of their endowment is decreasing, we observe that their gross contribution is rising, and due to the higher endowment, participants can rationalize providing a higher total amount while retaining a larger portion of their points. This is similar to someone who is wealthy emphasizing the total amount of money they contribute to taxes or charity rather than the percentage of their wealth.

There is a statistically strong but practically insignificant result for understanding how seeing the other team's feedback impacts a participant's decision-making. Notably, in the fourth specification, we observe highly significant ($p < .01$) estimates for the impact of seeing the other team's individual payouts ($\beta = 6.99e^{-5}$) and the total amount contributed to their group account ($\beta = 1.77e^{-4}$). Both of these have an average impact on percentage points of less than 0.0018 percentage point increase of endowment contributed in a given round. The behavior here suggests that when participants are unhappy with their team's contributions, they may consider switching teams rather than trying to convince their own team to change contribution strategies after just a few rounds.

Further, the feedback that participants get each round informs the individual about the opposing team's performance, which may impact the way they think about their own contribution strategy. The specification that controls for this does observe strong statistical significance around the contributions of the other team in the previous round but the effect is a small, albeit tightly estimated, nearly 0 effect of 0.00007 ($p < .01$). This is a similar effect as displayed by the lagged impact of the individual's own group contribution from the previous round of 0.00018 ($p < .01$). This implies that the impact of an individual's

Table 3. Percent of Endowment Contributed

VARIABLES	(1) % Contributed	(2) % Contributed	(3) % Contributed	(4) % Contributed
Chat	0.203***	0.202***	0.203***	0.155***
	(0.0567)	(0.0571)	(0.0561)	(0.0505)
Prime	-0.0670	-0.0699	-0.0601	-0.0378
	(0.0567)	(0.0571)	(0.0562)	(0.0502)
Chat×Prime	0.121	0.125	0.115	0.0804
	(0.0802)	(0.0807)	(0.0794)	(0.0711)
female		0.00718	0.00482	0.0137
		(0.0404)	(0.0397)	(0.0353)
Endowment		-0.0166**	-0.0244***	-0.0274***
		(0.00669)	(0.00682)	(0.00686)
MPCR			0.135***	-0.00276
			(0.0275)	(0.0427
OtherTeamCont$_{t-1}$ [a]				0.0699***
				(0.0267)
OwnTeamCont$_{t-1}$ [b]				0.177***
				(0.0239)
Constant	0.632***	0.630***	0.378***	0.445***
	(0.0401)	(0.0451)	(0.0676)	(0.0910)
Observations	1,920	1,920	1,920	1,824
Number of id	96	96	96	96

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

[a] in thousands of points
[b] in thousands of points

own group and the opposite group have a predictable but nearly 0 positive impacts on contribution decision-making.

4.2 Team Switching Behavior

Team switching behavior is measured using a random effects logit model estimating the log odds that an individual attempts to switch teams. This is specific to whether an individual selects to try to switch teams during a voting period and does not imply that they are

successful in making the switch. This is measured by the model

$$S_{i,t} = \beta_0 + \beta_{1,i}Chat_s + \beta_{2,i}Prime_s + \beta_{3,i}Chat_s * Prime_s + \beta_{3i}female_i + \beta_{4i}HE_{g,t} + \psi_{t-1} + \theta_i + \mu_i \quad (2)$$

where $H_{g,t}$ indicates if an individual is in the higher endowment group during a given round.

Table 4. Logit estimating attempts to switch

VARIABLES	(1) wantswitch	(2) wantswitch	(3) wantswitch	(4) wantswitch	(AME) wantswitch
Chat	3.023**	2.726**	2.705**	2.965**	0.029
	(1.410)	(1.145)	(1.122)	(1.171)	(0.061)
Prime	3.100**	2.734**	2.706**	2.656**	0.007
	(1.413)	(1.147)	(1.124)	(1.161)	(0.060)
Chat×Prime	-5.679***	-5.193***	-5.141***	-5.147***	
	(2.032)	(1.635)	(1.605)	(1.658)	
Female		-5.610***	-5.504***	-5.717***	-0.499***
		(0.919)	(0.908)	(0.941)	(0.063)
High Endowment			0.449	-0.392	-0.029
			(0.486)	(0.679)	(0.050)
OtherTeamCont$_{t-1}$				-1.16*	-0.086*
				(0.645)	(0.047)
Constant	-2.486**	0.499	0.226	1.51	
	(0.974)	(0.890)	(0.920)	(1.196)	
Observations	576	576	576	576	
Number of id	96	96	96	96	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Unlike contribution strategies, team switching behavior shows to be influenced by both chat coordination and priming treatments, making the desire to switch 2.810 and 2.541 times more likely, respectively. This is counter to the expected outcomes outlined in hypotheses 2 and 4 since coordination via chat and priming make individuals more likely to attempt team switching when one or the other is present. Testing the interaction between the two

delivers an opposite effect with a coefficient of -5.079, significant at the 1% level. This makes the combined effect of both chat and prime lower than the individual treatments but still positive at 0.272.

Table 6 shows the likelihood of a successful switch given an attempt to switch.[5] Endowment showed to have strong impacts on the contribution behavior of individuals but at the same time, there is no statistical evidence that endowment impacts an individual's decision to stay with their team, specifically whether the individual was a member of the high endowment team during a given round. Gender does have a very strong impact on switching behavior. That is, females in the study demonstrated that they were over five times less likely (-5.311) to switch teams, robust to whether they were in a high-endowment team or not. This result was also robust across treatments. This result was further tested by round to understand the switching behavior by gender identities over the experimental time horizon as displayed in Table 5.

Across specifications, it is clear that the likelihood that an individual participant attempts to switch teams is inversely related to how many rounds have passed. Again, this is expected since each team starts with 4 members, but a maximum possible team size of 6. It would be expected that those who are going to switch would attempt to in the earlier part of the experiment, which, by Table 5, is shown to be in the first half of the experiment. By the second half of the experiment, there were still people wanting to switch teams, but the opposite team would be full, and participants would be aware of that, discouraging them from even indicating that they wanted to switch teams. This is even more likely when considering that with only 2 members in a public goods game, retaliation for trying to switch teams can be applied directly compared to when there are $n \geq$ members and retaliation cannot be well directed since defection play would signal general uncooperative action taking that would adversely impact the entire team.

MPCR and feedback variables did not have enough power to show any statistically sig-

[5]To see the effects of total switchers leaving one group for another, see Table 7 in Appendix E.

nificant results.

4.3 Voting Behavior

Voting behavior in this experiment is only observed every third round, meaning there are six voting periods that participants will engage in. Whether or not a given individual will have to vote or be voted on in any voting period is dependent on whether they are trying to switch teams or someone is trying to join their team, and whether there is a vacant slot on the respective team to vote on. Votes were made one participant at a time and were cast in a binary fashion. This means that if two participants were both trying to switch into a team with only one vacant opening, any individual already on that team would be allowed to vote "yes" for both participants trying to join the team. In other words, votes were not exclusive between participants trying to join a given team with insufficient openings, and a tie would be resolved by a random pick from the experimental application.

The outcome of a respective participant's attempt to switch teams was designed as a simple binary where they either were successfully voted into the new team ($switch = 1$) or were rejected by the new team ($switch = 0$). Voting success is modeled in this binary fashion. [6] This outcome is modeled as:[7]

$$logit(switch_{i,t}) = \beta_0 + \beta_{1,i} female_i + \beta_{2,i} t + \beta_{3,i} Chat_s + \beta_{4,i} Prime_s + \beta_{5,i} Chat_s * Prime_s + \theta_i + \mu_i \tag{3}$$

It is important to note that the round an individual attempts to switch teams needs to be controlled for due to the inverse relationship between switching and round number. In later rounds of the experiment, teams tend to stabilize due to one of the teams reaching the

[6] If there are adequate slots available, a participant is successfully voted in by a simple majority. If there are more participants voted in than there are spots available, the participants with the highest number of votes are voted in first, and then any ties are decided by a random number drawn from a uniform distribution.

[7] The odds of a successful switch are conditional on an individual attempting to switch in the first place, such that $logit(switch_{i,t}) = \{logit(switch_{i,t}) | wantswitch_{i,t} = 1\}$.

maximum number of members and MPCR being sufficiently large to discourage anyone from leaving, as shown in Table 5.

Table 6 gives the results of the logit models estimating the outcomes of an attempt to switch teams. We start with a simplified model in specification (2) to test for a difference between male and female participants attempting to switch. The log odds of a female participant trying to switch teams are slightly better than those of a male participant (1.068 vs a constant of -1.842), but no detectable significance based on the percent of the contribution that the participant has given in previous rounds. In the preferred specification (3), we see a slightly stronger advantage of women vs men in trying to gain access to a new group, with log odds of success increasing by 1.153 for women compared to the baseline of -1.269. The likelihood of success does not appear to be strongly differentiated by treatments other than the joint treatment when participants are primed and have the ability to chat, which shows marginal significance in improving the log odds of a successful switch (1.937) over the baseline constant when neither treatment is employed (-1.269).

5 Discussion and Conclusion

The purpose of this experiment was to explore how group identity impacts an individual's decision to stay with their team and improve their team's overall position when faced with the opportunity cost of their individual payout. This was achieved by setting up an environment where participants were participating in two separate public goods games in respectively gender-homogeneous teams. The two teams can see each other's performances and were given 6 opportunities to switch teams. Through this process, we are able to see what kind of patterns there are in contribution strategies within identity homogeneous teams, the preferences of identity groups to accept out-group members, and the impacts of chat and identity priming.

Chat was found to be one of the biggest contributors to team account contribution

strategies and this was robust across genders. This is consistent with previous literature and matches the intuition that improved coordination capabilities between team members would lead to more group-centered behavior to everyone's benefit. The effect of gender priming is not as clear and statistically insignificant as the interactive effect between priming and chat capabilities. Of note, however, is that MPCR does have a positive impact on the percentage of endowment contributed, meaning participants were more likely to give on average 13.5 percentage points more of their endowment for each increase in the MPCR. In other words, people give more when they get more out of it. Other specifications of the model from 3 show MPCR being insignificant when we looked at lagged effects on feedback from the opposing team. This does not discount the importance of the MPCR in contribution strategies though due to the set of the experiment creating a negative correlation between a team's MPCR and the other team's individual payouts. That is, since the number of participants in a given session is capped at 8, then the higher a team's MPCR is, the lower the MPCR of the other team and thus lower individual payouts. Overall, these results match what previous public goods games experiments have found, save the other team impacts.

Identity played a much bigger role in the decision to stay or leave a given team rather than how much to contribute. Participants contribute what they will contribute regardless of their gender identity but their strategy with respect to loyalty to their identity-based team is a separate decision. We see that while chat still has a strong effect on a participant's decision to attempt a team switch, it is in the opposite direction than expected, the same with priming. The idea here is mostly based on how participants deal with defection. When chat is enabled, participants are able to more quickly and surely ascertain if their teammates playing a "selfish" strategy was just optimization or defecting from a team-focused plan. When identity priming alone is introduced we see a similar impact where participants are more likely to switch and this can be partially attributed to "betrayal" from their team. The interaction between priming participants' gender identity and allowing them to chat with each other essentially counteracts the additive effects of chat and prime on average inducing

switching for men. Women in the experiment still show a five times less likely chance to try and switch teams, leaving us with our conclusion that women are more affected by their identity group, regardless of the priming.

Even though women were less likely to try to switch teams during this experiment, they had a slight advantage in being successful at switching when they did attempt from 6. This result has two potential mechanisms. One is that women made themselves more attractive candidates when they decided to switch. This is possible because participants are aware of what information is portrayed to the opposing team when voting on potential switchers and the participants know the schedule of switching opportunities. This mechanism is not favorable because it does not hold up without evidence that females at any point contribute a higher percentage on average. The randomization of endowment ranges also guarantees that there is an even split between high-endowment females and males across sessions. The other mechanism to explain the marginally higher female success is the behavior of men in the experiment. Rather than the assumption that women make themselves more attractive via their contributions, men may be more willing to take on additional team members in order to increase their team account multiplier.

The results of this experiment at the current stage warrant further investigation into the role that identity plays in public goods games and using this experimental design to continue exploring the effect of group loyalty. This work contributes to the existing literature by demonstrating how gender identity has value in a multiple time period setting when considered against the individual monetary gain. In particular, women demonstrate a much lower likelihood to try and change teams even when they are on a lower-endowed team. We also find that there is an interesting consideration that participants, when given the ability to switch teams, do not necessarily try to improve their own team's cooperation through action if they get feedback that the opposing team is doing better at cooperation. Rather, they continue at their current endowment levels, waiting for an opportunity to switch.

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Table 5. Switching Attempts by Round and Gender

VARIABLES	(1) wantswitch	(2) wantswitch	(3) wantswitch	(4) wantswitch
round 3		1.284**	3.638***	3.977***
		(0.553)	(0.888)	(0.926)
round 6		1.284**	3.638***	3.802***
		(0.553)	(0.888)	(0.893)
round 9		1.147**	2.433***	2.586***
		(0.551)	(0.806)	(0.816)
round 12		0.150	0.803	0.824
		(0.549)	(0.742)	(0.743)
round 15		-0.153	0.269	0.197
		(0.553)	(0.734)	(0.729)
female			-4.807***	-4.675***
			(1.265)	(1.249)
round 3*female			-5.402***	-5.290***
			(1.361)	(1.335)
round 6*female			-5.402***	-5.311***
			(1.361)	(1.349)
round 9*female			-2.799**	-2.816**
			(1.181)	(1.187)
round 12*female			-1.577	-1.546
			(1.162)	(1.181)
round 15*female			-1.043	-0.919
			(1.155)	(1.171)
round	-0.110***			
	(0.0322)			
highendowment				1.168*
				(0.608)
Constant	0.227	-1.570**	0.981	0.221
	(0.659)	(0.725)	(0.882)	(0.950)
Observations	576	576	576	576
Number of id	96	96	96	96

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6. Likelihood of Successful Switch

VARIABLES	(1) switch	(2) switch	(3) switch	(4) switch
Female	1.069**	1.068**	1.153**	1.179**
	(0.522)	(0.489)	(0.547)	(0.570)
Round	-0.100**	-0.0996**	-0.0926*	-0.0933*
	(0.0495)	(0.0487)	(0.0504)	(0.0507)
Chat			-1.043	-1.018
			(0.715)	(0.730)
Prime			-1.249	-1.358
			(0.762)	(0.842)
Chat×Prime			1.937*	2.103*
			(1.098)	(1.228)
% Contributed		0.185		-0.373
		(0.778)		(1.080)
Constant	-1.842***	-1.916**	-1.269**	-1.008
	(0.674)	(0.786)	(0.645)	(0.991)
Observations	261	261	261	261
Number of id	63	63	63	63

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

A Appendix A: Post-Experiment Questionnaire

1. How close do you feel to your team from the anagram task?
    - Very Close
    - Somewhat Close
    - Neutral
    - Somewhat Distant
    - Very Distant
2. Why did you choose to switch or not switch teams?
3. How did you choose how much to contribute?
4. How old are you?
5. What is your gender?
6. What year are you?
7. Are you a varisty athlete? If so, which team are you on?
8. Are you a member of a Greek Life Organization? If so, which one?
9. Which college are you matriculated in?
    - Dale Bumpers College of Agricultural, Food and Life Sciences
    - Fay Jones School of Architecture and Design
    - J. William Fulbright College of Arts and Sciences
    - Sam M. Walton College of Business
    - College of Education and Health Professions
    - College of Engineering
    - School of Law
10. What is your major?
11. Are you a first generation college student?

- Yes
- No

12. Are you of latinx/e descent?

13. If so, which do of the following do you ethnically identify with:

    - Mexican
    - Central American
    - South American
    - Caribbean

14. Which racial categories do you identify with:

    - Black
    - White
    - Asian
    - Native American/Alaska Native

15. What was your childhood zipcode?

B Appendix B: Priming Questionnaire

1. Do you normally live on campus or off campus?
    - Off Campus
    - On Campus
2. Do you normally have a roommate?
    - I do not have a roommate
    - I have a roommate
3. Is your floor single sex or co-ed?
    - Single Sex
    - Co-ed
4. Do you prefer a single sex floor or co-ed?
    - Single Sex
    - Co-ed
5. Why is this your preference?

6. Is your living environment single sex or co-ed?
    - Single Sex
    - Co-ed
7. Why is this your preference?

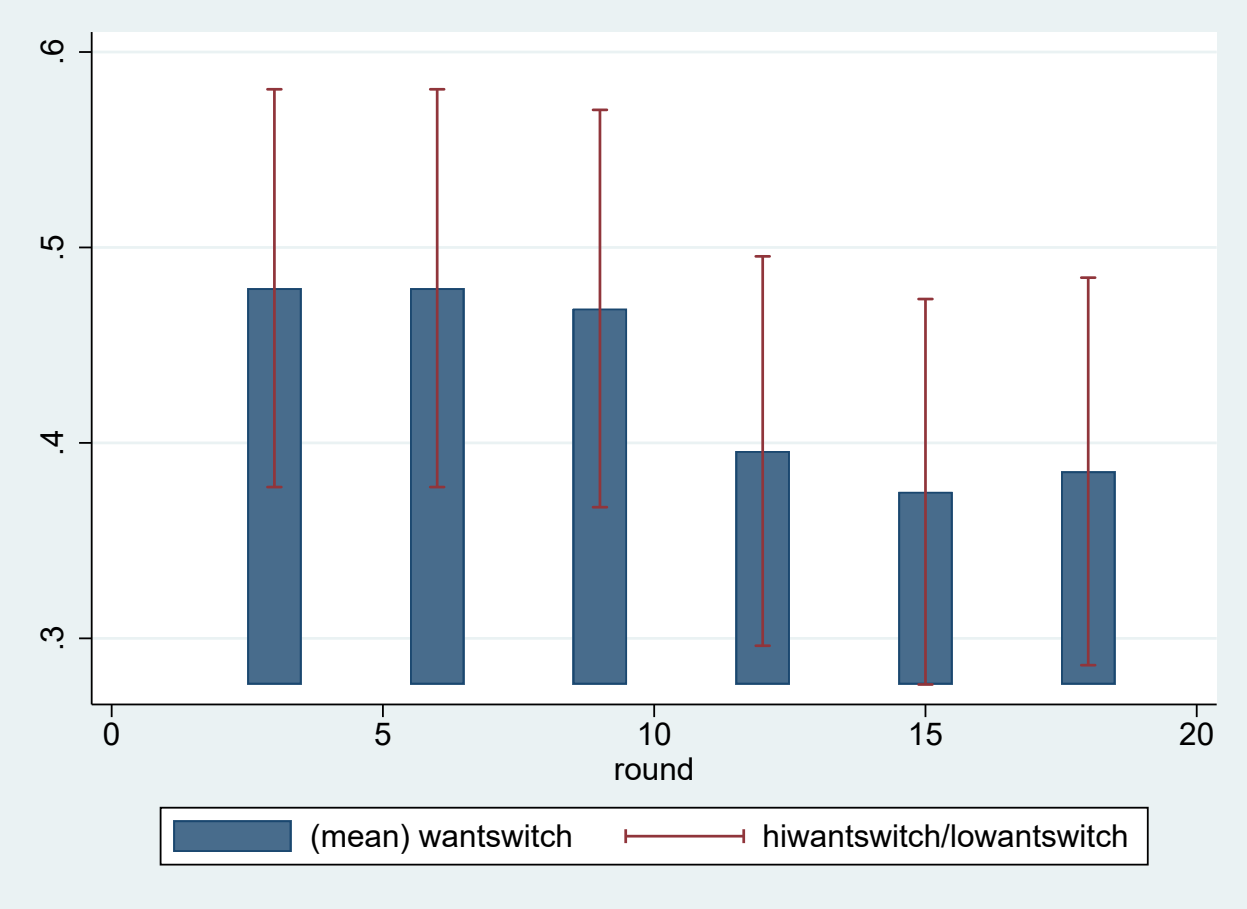
8. Do you prefer a single sex living environment or co-ed?
    - Single Sex
    - Co-ed
9. Why is this your preference?

C Appendix C: Identity-Neutral Questionnaire

1. Which smartphone operating system do you prefer?
    - Android
    - iPhone
2. Do you prefer voice calls or video calls?
    - Voice calls
    - Video calls
3. Do you prefer using a laptop computer or a desktop computer?
    - Laptop computer
    - Desktop computer
4. Do you prefer a mobile app or a mobile website?
    - Mobile app
    - Mobile website
5. Do you prefer using a keyboard/keypad or a touchscreen?
    - Keyboard/keypad
    - Touchscreen
6. Do you prefer using a remote control or your smartphone to control smart devices such as a smart TV?
    - Remote control
    - Smart device

D Appendix D: Rate of Switching Requests by Round

Figure 2. Rate of Switching Requests by Round



E Appendix E: Total Switching by Group

Table 7 measures how many individuals leave a team clustering on the session level. The interpretation should be how many individuals leave the indicated team, on average, in a given session.

Table 7. Number of Switchers Leaving the Team

VARIABLES	(1) Switchers	(2) Switchers	(3) Switchers	(4) Switchers
Female Team	-0.308**	-0.308**	-0.308**	-0.308***
	(0.122)	(0.121)	(0.119)	(0.118)
High Endowment Team	-0.240***	-0.240***	-0.246***	-0.248***
	(0.0554)	(0.0554)	(0.0553)	(0.0552)
Chat			-0.260	-0.275*
			(0.169)	(0.167)
Prime			-0.379**	-0.375**
			(0.169)	(0.167)
Chat×Prime			0.394*	0.385
			(0.239)	(0.236)
%Contribution		0.0693		0.0717
		(0.0540)		(0.0544)
Constant	0.766***	0.716***	0.992***	0.947***
	(0.0924)	(0.100)	(0.138)	(0.141)
Observations	1,920	1,920	1,920	1,920
Number of id	96	96	96	96

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1