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Hirofumi Kurokawa
(School of Economics, Kwansei Gakuin University)
Hiroko Okudaira
(Business School, Doshisha University)
Yusuke Kinari
(Hirao School of Management, Konan University)
Fumio Ohtake
(Center for Infectious Disease Education and Research, The University of Osaka)

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KWANSEI GAKUIN UNIVERSITY

1-155 Uegahara Ichiban-cho
Nishinomiya 662-8501, Japan

The Impact of Gender and Group Identity on Willingness to Compete*

Hirofumi Kurokawa[a], Hiroko Okudaira[b], Yusuke Kinari[c], Fumio Ohtake[d]

Abstract

Gender gaps in willingness to compete are widely recognized as a key factor contributing to disparities in labor market outcomes. While much attention has been paid to gender identity, individuals also belong to social groups that influence how they engage in competitive environments. The decision to compete often occurs within complex identity contexts, yet the combined effect of gender and group identity on competitive behavior remains less well understood. This study investigates how group identity shapes tournament entry decisions in mixed-gender environments. We conducted a laboratory experiment in which participants were randomly assigned to minimal groups and then paired with an opposite-gender partner. They were informed that their opponent was either from the same group (ingroup), a different group (outgroup), or received no group information (control). Participants completed a real-effort task and then chose between non-competitive and competitive payment schemes. The results showed that participants—particularly men—were less likely to choose the competitive option when facing an ingroup opponent. In contrast, women were slightly more likely to compete against outgroup opponents. While previous research has suggested that men may be more willing to compete to elevate their social status within a group, our findings reveal the opposite pattern when the ingroup opponent is female. These findings suggest that the interaction between gender and group identity can produce nuanced, non-additive effects on competitive behavior.

Keywords: competitiveness, gender identity, group identity, multiple identities

JEL Classification: C91, C92, J16

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[a] School of Economics, Kwansei Gakuin University. 1-155 UegaharaIchiban-cho, Nishinomiya, Hyogo, 662-8501, Japan. E-mail: kurokawa@kwansei.ac.jp

[b] Business School, Doshisha University. Karasuma-Imadegawa, Kamigyo-ku, Kyoto, 602-8580 Japan. E-mail: hokudair@mail.doshisha.ac.jp

[c] Hirao School of Management, Konan University. 8-33 Takamatsu-cho, Nishinomiya, Hyogo, 663-8204, Japan. E-mail: kinari@konan-u.ac.jp

[d] Center for Infectious Disease Education and Research, The University of Osaka. 1-7 Machikaneyama-cho, Toyonaka 560-0043 Japan. E-mail: ohtake@cider.osaka-u.ac.jp

Corresponding author: Hirofumi Kurokawa

1. Introduction

Gender wage gaps persist worldwide, even in societies in which women have higher levels of education. Traditional economic explanations attribute these gaps to gender differences in ability or discrimination, whereas behavioral economics emphasizes psychological factors, such as differences in risk attitudes and willingness to compete (Croson and Gneezy, 2009; Niederle, 2016; Niederle and Vesterlund, 2011). A growing body of research using the experimental paradigm developed by Niederle and Vesterlund (2007) consistently show that women are less likely to enter competitive environments than men. Even high-ability women tend to avoid competition, which is troubling from a societal perspective, as it may contribute to persistent gender disparities in career advancement and earnings. To address this issue, some studies suggest that institutional interventions can help narrow the gender gap in competitiveness. For instance, affirmative action policies (Balafoutas and Sutter, 2012; Niederle et al., 2013) and team-based tournament structures (Dargnies, 2012; Healy and Pate, 2011) have been shown to increase women's willingness to compete.

Another contextual factor that influences competitive behavior is the gender composition of the competitive environment. Some studies find that men are more willing to compete in mixed-sex settings than in single-sex settings, whereas women's willingness to compete is unaffected by gender composition (Dariel et al., 2017; Datta Gupta et al., 2013; Sutter and Glätzle-Rützler, 2015). In contrast, Booth and Nolen (2012) found that women were more likely to enter competition in single-sex settings than in mixed-sex settings, highlighting the complex and sometimes contradictory effects of gender salience on competitive behavior. More recently, researchers have begun to explore how group identity, beyond gender, affects competitive behavior. Using a minimal group paradigm (Tajfel et al., 1971), Cornaglia et al. (2019) demonstrated that individuals were more likely to participate in a tournament when paired with an opponent who shared a group identity, particularly female participants. Their findings suggest that reducing social distancing through shared identities encourages competition.

However, most previous experiments have focused on the influence of a single identity dimension, typically examining either gender identity or group identity in isolation. In contrast, real-world settings such as workplaces involve multiple salient identities, and individuals are usually aware of both the gender and group affiliations of those with whom they interact. Considering multiple identities can enhance the generalizability of experimental findings to real-world competitive contexts. This raises an important question: does group identity influence the willingness to compete when gender identity is made salient?

Cornaglia et al. (2019) addressed a related question using a minimal group paradigm in which participants were not informed of their opponents' gender. They proposed two competing mechanisms through which group identity might affect the willingness to compete. On the one hand, being paired with an ingroup partner could increase tournament entry, as outperforming a member of one's group may enhance one's social image and status within the group. On the other hand, being paired with an outgroup partner might also boost competitiveness, as defeating an outgroup member could elevate the status of one's group in intergroup comparisons. Their results supported the former, showing higher tournament entry rates under the ingroup condition.

When gender identity becomes salient, group identity could theoretically push behavior in either direction. Following Cornaglia et al. (2019), we preregistered the hypothesis that participants would be more willing to compete against an ingroup partner than against an outgroup partner. This question addresses a key gap in the literature. If group identity exerts a robust effect even in the presence of gender cues, this would support the idea that fostering group identity could help close the gender gap in competitive participation. Conversely, if gender identity overrides group identity, interventions must be tailored to the gender dynamics in competitive settings.

To investigate this question, following the design of Niederle and Vesterlund (2007), we conducted a laboratory experiment that incorporated both gender and group identity manipulations. The participants were randomly assigned to minimal groups using a color-coding scheme. They then engaged in a group-bonding task to strengthen their group affiliation. After being matched in male-female pairs, they were asked to choose between a piece-rate and a tournament-based payment scheme in a real-effort task. We implemented three conditions: (1) a control condition, in which participants were unaware of their opponent's group identity; (2) an ingroup condition, in which the opponent belonged to the same group; and (3) an outgroup condition, in which the opponent belonged to a different group. Importantly, participants were explicitly informed that their opponents were of the opposite gender under all conditions.

Our results revealed that group identity interacts with gender to shape competitive behavior. Contrary to previous findings, participants, particularly males, were less likely to participate in the tournament when paired with an ingroup member. In the ingroup condition, men showed a significant drop in tournament entry compared with both the outgroup and control conditions. This pattern appeared to be driven by lower confidence when competing against ingroup female partners. Among female participants, tournament entry rates increased from the control to the ingroup and then to the outgroup condition, although the differences were statistically insignificant. These findings suggest that the effect of shared group identity on willingness to compete may be reversed when gender identity is salient, particularly for men.

Our findings complement prior work on group identity and competitiveness. It reveals that the effects of shared group membership vary depending on the presence of other salient identities. Cornaglia et al. (2019) found that participants, particularly women, were more likely to participate in a competition when paired with an ingroup partner in a setting where gender identity was not revealed. While their study allowed for the possibility that group identity might influence competitive behavior in either direction, our experiment introduced a new condition in which participants were informed of their opponents' gender. In this mixed-gender context, we found that shared group identity reduced willingness to compete, particularly among males. This suggests that group identity effects may not be uniform, but rather depend on which other identity dimensions are simultaneously salient. Our results extend the literature by clarifying how interacting identity dimensions—such as group and gender—can shape economic decision-making.

Our study contributes to the literature on the impact of individual and gender differences on the willingness to compete. While previous research has examined these differences through the lenses of environmental (Niederle et al., 2013; Okudaira et al., 2015), cultural (Booth and Nolen, 2012; Gneezy et al., 2009), and biological factors (Buser, 2012; Kurokawa et al., 2020; Wozniak et al., 2014), little attention has been paid to how the identity of one's opponent shapes competitive behavior. Existing studies isolate the effects of gender identity (Booth and Nolen, 2012; Dariel et al., 2017; Datta Gupta et al., 2013; Sutter and Glätzle-Rützler, 2015) or group identity (Cornaglia et al., 2019), but rarely explore the interaction between multiple identities. Our study advances this literature by experimentally testing the combined influence of gender and group identity on tournament entry decisions. Our finding that men are less willing to compete against ingroup female opponents is both novel and unexpected. Studies focusing on gender identity (e.g., Dariel et al., 2017; Datta Gupta et al., 2013; Sutter and Glätzle-Rützler, 2015) show that men are more likely to participate in mixed-gender competitions than in single-gender ones. Studies focusing on group identity (Cornaglia et al., 2019) find that people are more willing to compete against ingroup than outgroup members. Combining these findings suggests that male competitiveness should increase in mixed-gender ingroup pairings; however, we find precisely the opposite. To our knowledge, our study is the first to demonstrate that competitive behavior may depend critically on who the ingroup member is. This reveals that group identity effects can vary depending on the identity of the counterpart. Moreover, because our experiment reflects a more realistic competitive environment in which participants are aware of both the gender and group membership of their peers, our study moves beyond stylized laboratory settings and provides new insights into how multiple salient identities shape economic decision-making.

Our study also contributes to the growing field of identity economics, which emphasizes the role of identity in shaping economic preferences and behavior. While identity influences prosocial behavior (Chen and Chen, 2011; Chen and Li, 2009; Eckel and Grossman, 2005; Ockenfels and Werner, 2014) as well as economic outcomes such as education, labor supply, and consumption (Akerlof and Kranton, 2002, 2005; Kranton, 2016), most of this work has focused on the effects of a single salient identity. In reality, however, individuals simultaneously belong to multiple social groups—based on gender, race, political affiliation, and more, which makes it increasingly essential to understand how these identities jointly shape economic decisions. Recent work has begun to examine the effects of multiple identities (Hong et al., 2022; Uğurlar et al., 2025; Krupka et al., 2023). For example, Hong et al. (2022) studied contexts in which individuals share two distinct group identities with a partner. They found that cooperation is strongest when both identities are shared, weakest when neither is shared, and intermediate when only one is shared. Our findings demonstrate that identity dimensions do not continually reinforce one another; instead, they may interact in non-additive, and even countervailing, ways—complicating the psychological and strategic implications of identity salience.

The remainder of this paper is organized as follows. Section 2 describes the experimental design. Section 3 presents our results, and Section 4 discusses and concludes the paper.

2. Experimental Design

The experiment consisted of two main parts. In Part 1, we induced group identities among participants. In Part 2, we measured their willingness to compete using a task based on Niederle and Vesterlund's (2007) design. Participants were matched in male-female pairs: an ingroup condition, where the partner belonged to the same group; an outgroup condition, where the partner belonged to a different group; or a control condition, where the partner's group identity was not revealed. This enabled us to investigate how experimentally induced group identity influences competitive behavior when gender identity is explicitly known.

2.1. Part 1: Inducing Group Identity

We adopted the minimal group paradigm (Tajfel et al., 1971) to induce group identity. At the beginning of each session, participants were asked to draw a chopstick from a box. Each chopstick had either a red or a white tip, and accordingly participants were randomly assigned to the "red team" or "white team."

To strengthen the participants' attachment to their assigned group, we implemented a group-bonding task adapted from Chen and Li (2009). Participants were shown two paintings and asked to identify which of the two anonymous artists created each painting. (The artists were Paul Klee and Wassily Kandinsky, although their names were not disclosed to the participants.) Each correct answer received ¥100. Before attempting the quiz, the participants individually studied five sample paintings by each artist for three minutes to learn about the differences in style. They then engaged in a 10-minute text-based group chat with their team members to share their impressions of the paintings and gather clues for the upcoming quiz. Finally, each participant answered a quiz by indicating which of the two paintings they believed was created by a particular artist. At this stage of the experiment, the participants were not informed of their pair's group identity in the subsequent competition task, which was applied uniformly across all the conditions. The disclosure of the competitor's group membership occurred only later, depending on the assigned treatment conditions in Part 2.

2.2. Part 2: The Competition Experiment

After inducing group identity, the participants took part in a competition experiment based on the design by Niederle and Vesterlund (2007). At this stage, the participants were matched in male-female pairs, and the information they received about their partner's group identity varied depending on the randomly assigned experimental condition. In the *ingroup* condition, participants were informed that their partners belonged to the *same group*. For example, if the participant was on the red team, the partner was also from the red team. In the *outgroup* condition, participants were told that their partner belonged to a *different group*; that is, if the participant was in the red team, the partner was from the white team, and vice versa. In the control condition, no information regarding the partner's group identity was revealed.

The participants completed four tasks. All tasks were based on a "counting zeros" task (Apicella et al., 2017, 2020; Charness et al., 2022), in which participants were shown a 5×5 grid of digits and asked to count how many times the digit "0" appeared. Each correct answer earned one point, and participants had 90 seconds to complete as many grids as possible.

In Task 1 (piece-rate), the participants performed the task under a noncompetitive piece-rate scheme, earning ¥50 per correct answer. Task 2 (tournament) involved performing the same task under a competitive scheme: only the higher scoring participant in each pair earned ¥100 per correct answer, while the lower scoring participant received nothing. Unlike the piece-rate scheme, in which a participant's performance did not affect their partner's earnings, the tournament scheme created a competitive environment in which rewards determined not only one's own performance but also the performance for the partner.

In Task 3 (choice), the participants chose between piece-rate and tournament schemes before performing the task again. If they selected the piece-rate scheme, they earned ¥50 per correct answer regardless of their partner's performance. If they chose the tournament scheme, they earned ¥100 per correct answer only if their score exceeded that of their partner; otherwise, they earned nothing. The participants' choices in Task 3 served as the primary measure of their willingness to compete.

In Task 4, participants did not perform the task but were instead asked to choose whether they would prefer to be paid under a piece-rate or tournament scheme based on their actual performance in Task 1.

After completing Tasks 1–3, the participants were asked to guess their rank within their group. For instance, the participants may guess that they ranked first if they were highly confident in their performance. These estimates were used to construct a measure of relative performance beliefs. Unlike Niederle and Vesterlund (2007), the participants were not incentivized for rank estimations.[1]

Following the main experiment, participants completed a post-experiment questionnaire to collect psychological measures. These included risk attitude, which was assessed using a standard 11-point scale (Dohmen et al., 2011); and beliefs about gender-based task performance, which were measured by asking participants to indicate whether they thought that men or women generally

[1] This is because some participants chose a strategy of earning 0 points in the counting task and picked Rank 2 in our previous experiment.

performed better on the counting task (Charness et al., 2022; Coffman et al., 2021). Following Charness et al. (2022), we rescaled the original 1–10 responses to a -4 to +4 scale. These variables were later used as control variables in the regression analyses to account for individual differences and isolate the treatment effects of the group identity manipulation.

2.3. Procedures

The experiment was conducted at the Experimental Economics Laboratory of the Institute of Social and Economic Research, The University of Osaka, between winter 2022 and spring 2023. Twenty sessions were conducted with 268 participants. Each session included equal number of male and female participants. Eight participants were excluded from the analysis because of programming or behavioral issues.[2] The final sample comprised 106 participants in the ingroup condition (53 men and 53 women), 102 in the outgroup condition (51 men and 51 women), and 52 in the control condition (25 men and 27 women). The experiment was programmed using z-Tree (Fischbacher, 2007), and participant recruitment was managed using ORSEE (Greiner, 2015). All participants received a ¥1,000 show-up fee and were additionally compensated based on the number of correct answers in the quiz task and the outcome of one randomly selected task from the competition experiment. Each session lasted approximately 60 minutes, and the average total payment was ¥1,700 (approximately USD 15).

3. Results

3.1. Main Results

Figure 1 shows the proportion of participants who chose the tournament scheme in Task 3 across the three conditions. Contrary to the findings of Cornaglia et al. (2019), we observed that 44% of the participants in the outgroup condition selected the tournament scheme compared to 27.4% in the ingroup condition. This difference is statistically significant (χ^2 test, $p = 0.012$). In the control condition, 34.6% of the participants chose the tournament, but the differences between the control condition and the outgroup ($p = 0.257$) and ingroup ($p = 0.348$) conditions were statistically insignificant.

[Insert Figure 1]

Figure 2 shows the tournament entry rates by gender for the three conditions. Among male participants, 64% in the control condition chose the tournament scheme, compared to 39.6% in the ingroup condition and 64.7% in the outgroup condition. The difference between the control and

[2] (1) One participant experienced an unexpected computer shutdown during the session; thus, their partner was also excluded; (2) four participants were not matched with a proper partner, due to a programming error, resulting in inconsistencies between what was shown on the screen and the actual pairing; and (3) two participants were found to have gamed the system by rapidly entering the same number without counting the digit “0” to artificially inflate their scores.

outgroup conditions was statistically insignificant (p = 0.952); however, the difference between the control and ingroup conditions was significant (p = 0.044), as was the difference between the ingroup and outgroup conditions (p = 0.010). These results suggest that tournament entry was lower in the ingroup condition than in the outgroup condition because men were less willing to compete when paired with an ingroup female partner. Among female participants, tournament entry was generally low across all conditions; 7.4% chose the tournament scheme in the control condition compared to 15.1% in the ingroup condition and 23.5% in the outgroup condition. Compared with the control condition, female participants in the ingroup and outgroup conditions were more willing to compete, though none of these differences reached statistical significance (χ^2 test: control vs. ingroup, p = 0.326; control vs. outgroup, p = 0.078; ingroup vs. outgroup, p = 0.275). These findings suggest that the effect of shared group identity on willingness to compete may be reversed when gender identity is salient, particularly for men.

[Insert Figure 2]

Before proceeding to the main regression analyses, we examined whether there were any systematic differences across the treatment conditions in participants' performance and rank beliefs. As shown in Table 1, there were no significant differences in the average performance in either Task 1 or Task 2 across the conditions for either men or women. One exception was found among women in Task 1, where performance in the ingroup condition was significantly higher than in both the control and outgroup conditions (Mann-Whitney test (MWT): p < 0.05). Similarly, there were no statistically significant differences in participants' beliefs about their relative performance (i.e., self-predicted rank) across conditions, although men in the ingroup condition were somewhat less likely to predict that they would rank first than those in the control condition (MWT: p = 0.057). We also examined gender differences in maleness scores. The mean maleness scores were 0.438 for men and 1.075 for women, with a statistically significant difference (t-test, p < 0.01). This indicates that female participants were more likely to perceive the zero-counting task as male-dominated.

[Insert Table 1]

Table 2 presents the results of the linear probability model that examined the determinants of tournament entry in Task 3. Columns (1) and (2) use the control condition as the baseline, whereas Columns (3) and (4) use the outgroup condition as the baseline. Columns (1) and (3) show the results for controlling female and performance measures, and Columns (2) and (4) include a full set of covariates, such as risk ranking, beliefs about relative performance, tournament choice in Task 4, and maleness. In all specifications, the coefficient of the female dummy was negative and statistically significant, confirming prior findings that women are less likely to participate in tournaments. While the ingroup condition was significantly associated with lower tournament entry than the outgroup condition in the baseline specification (Column 3; $p < 0.01$), the effect became statistically insignificant once covariates such as risk preferences, beliefs, and choice in Task 4 were included (Column 4; $p = 0.103$). This attenuation suggests that the effect of group identity may be partially mediated or confounded by individual characteristics. Nevertheless, the direction and magnitude of the effect remained consistent, and the results support the interpretation that shared group identity can suppress competitive behavior when gender identity is salient.

[Insert Table 2]

Table 3 presents the results of the linear probability models estimated separately for male and female participants to examine potential gender differences in the effects of group identity on tournament entry in Task 3.[3] Columns (1)–(4) use the control condition as the reference category, whereas Columns (5)–(8) use the outgroup condition as the baseline. Odd-numbered columns include only performance measures, whereas even-numbered columns include a full set of controls, including risk-taking, beliefs, tournament choice in Task 4, and maleness. Among male participants, the ingroup condition was significantly associated with a lower likelihood of tournament entry than the outgroup condition in the baseline specification (Column 5; $p = 0.023$). This effect becomes statistically insignificant when the covariates are included (Column 6; $p = 0.109$), although the coefficient remains negative and sizable. This pattern suggests that the in-group effect among men may be partially mediated by individual characteristics such as confidence and risk preferences. In contrast, for female participants, the ingroup condition had no statistically significant effect on tournament entry in any specification (Columns 3–4 and 7–8), and the coefficients were small in magnitude. This indicates that group identity does not meaningfully affect women's competitive choices, regardless of whether their opponent is an ingroup or outgroup member. Together, these results reinforce the interpretation that shared group identity can suppress men's willingness to compete, particularly when paired with an ingroup female opponent, whereas women's behavior is less sensitive to group identity cues in this setting.

[Insert Table 3]

[3] As preregistered, we planned to explore potential interactions between treatment conditions and maleness. However, the maleness variable did not show a statistically significant main effect on tournament entry in our main specifications. Given this limited explanatory power, we report the interaction analyses in Table A.1 for transparency.

3.2. Heterogeneous Effects: Group Attachment

We next examined whether the effect of group identity on willingness to compete depended on the participants' level of group attachment. To capture group attachment, we used the number of messages the participants received during the group-bonding task. Since the chat took place within the same-color teams (i.e., ingroup members) before participants being informed of their subsequent group identity condition (control, ingroup, or outgroup) in the competition experiment, the number of messages reflected spontaneous engagement within the ingroup setting, independent of the treatment assignment. Participants who spoke more frequently in the chat may be viewed as more actively engaged in their group and thus more attached to the ingroup. On average, participants in the ingroup condition sent 3.63 messages, while those in the outgroup condition sent 3.05 messages. This difference was not statistically significant (MWT: $p = 0.103$).

To analyze the heterogeneity in treatment effects, we split the sample into the median number of messages (three) and estimated the tournament entry regressions[4] (Table 4). In the below-median group, the ingroup condition was significantly associated with a lower probability of tournament entry among all participants (Column 1, $p < 0.01$), particularly among men (Column 3, $p < 0.01$). This suggests that for participants who were less actively engaged in their group, the salience of competing against an ingroup member may have dampened their willingness to compete. In contrast, in the above-median group, the ingroup condition shows no statistically significant effect overall (Column 2) or within the male or female subsamples (Columns 4 and 6). Interestingly, among women in the above-median group (Column 6), the coefficient of the ingroup condition was positive, albeit not significant. This suggests that greater group attachment neutralizes, or even slightly reverses, the ingroup suppression effect, especially among female participants.

[Insert Table 4]

Taken together, these results suggest that ingroup identity reduces willingness to compete, particularly among those with weaker group engagement, while participants with stronger group attachment may be less susceptible to the suppressive effector potentially even respond positively to shared identity.

4. Discussion and Conclusion

[4] In our preregistration, we indicated that we would estimate heterogeneous treatment effects using both the control and outgroup conditions as baselines. While we originally planned to present both sets of results in the main text, we focused on specifications using the outgroup condition as the reference category for parsimony and clarity. The full set of results using the control condition as the baseline is reported in Appendix Table A.2.

This study investigated how group identity influences the willingness to compete when gender identity is salient. We conducted a laboratory experiment in which participants were randomly assigned to minimal groups and paired with a mixed gender. Our central research question asked whether shared identity increases or suppresses an individual's willingness to compete when the gender of their opponent is known. Contrary to previous findings (Cornaglia et al. 2019), our results show that a shared group identity reduces tournament entry, particularly among male participants. This ingroup suppression effect was most evident in the baseline specifications and remained directionally consistent across models. This effect was particularly pronounced in men with weaker group attachment.

Our findings offer new insights into how intersecting identities affect competitive behavior. In particular, we observed that male participants were less likely to participate in tournaments when paired with ingroup female partners. Considering prior work (e.g., Cornaglia et al., 2019), this pattern may reflect the psychological costs of such matchups: competing against an ingroup member—especially a woman—may offer limited reputational gains but increase the emotional discomfort of potential failure. This reluctance to compete was most pronounced among men with weaker group engagement, as indicated by lower participation in the group-bonding task. For these individuals, group identity may have lacked the affiliative strength needed to buffer against the interpersonal tension triggered by socially close opponents. Rather than enhancing motivation through shared identity, ingroup pairings in mixed-gender settings may have activated social comparison aversion, contributing to both lower confidence and reduced willingness to compete.

These findings contribute to the growing literature on identity and economic behavior. Earlier studies have emphasized the positive effects of shared group identity on cooperation and competition. However, our results suggest that the interaction of multiple salient identities—here, gender, and group—can produce non-additive and even countervailing effects. This highlights the importance of identity intersections in competitive decision-making analyses. From a policy perspective, our findings suggest that interventions to foster group cohesion may not always boost participation in competitive environments. In mixed-gender contexts, emphasizing shared identity may inadvertently dampen the willingness to compete, especially among men who are sensitive to social comparisons within their group. Conversely, shared identity may protect or motivate individuals with stronger group attachment. These insights could inform the design of workplace policies, such as team assignments or mentorship programs, by emphasizing not only group belonging but also the nuanced dynamics of identity salience.

This study had several limitations. First, although our experiments were carefully controlled, they may not have fully captured the complexity of real-world competitive environments. Second, we focused on minimal group identities induced in the lab; future research could explore how deeply rooted social identities (e.g., ethnicity, religion, and political affiliation) interact with gender in shaping competitive choices. Finally, the effects of group identity may depend on task characteristics such as whether a task is perceived as masculine, neutral, or feminine, which we did not manipulate directly.

Despite these limitations, our study provides novel evidence that group identity does not uniformly encourage competitive behavior, particularly when gender identity is salient. Future studies should examine other identity intersections such as race or explore how identity salience interacts with incentives, social norms, and institutional contexts. In conclusion, our findings challenge the assumption that a shared identity uniformly enhances competitive engagement. Instead, they revealed that when gender identity is salient, shared group identity can suppress the willingness to compete, particularly among men. Understanding how individuals navigate intersecting identities in competitive settings is critical for developing effective policies to reduce gender disparities in the economic and social domains.

Data availability statement: The experimental program, data, and analysis code are available on the Open Science Framework (OSF) at https://osf.io/u7zb5/.

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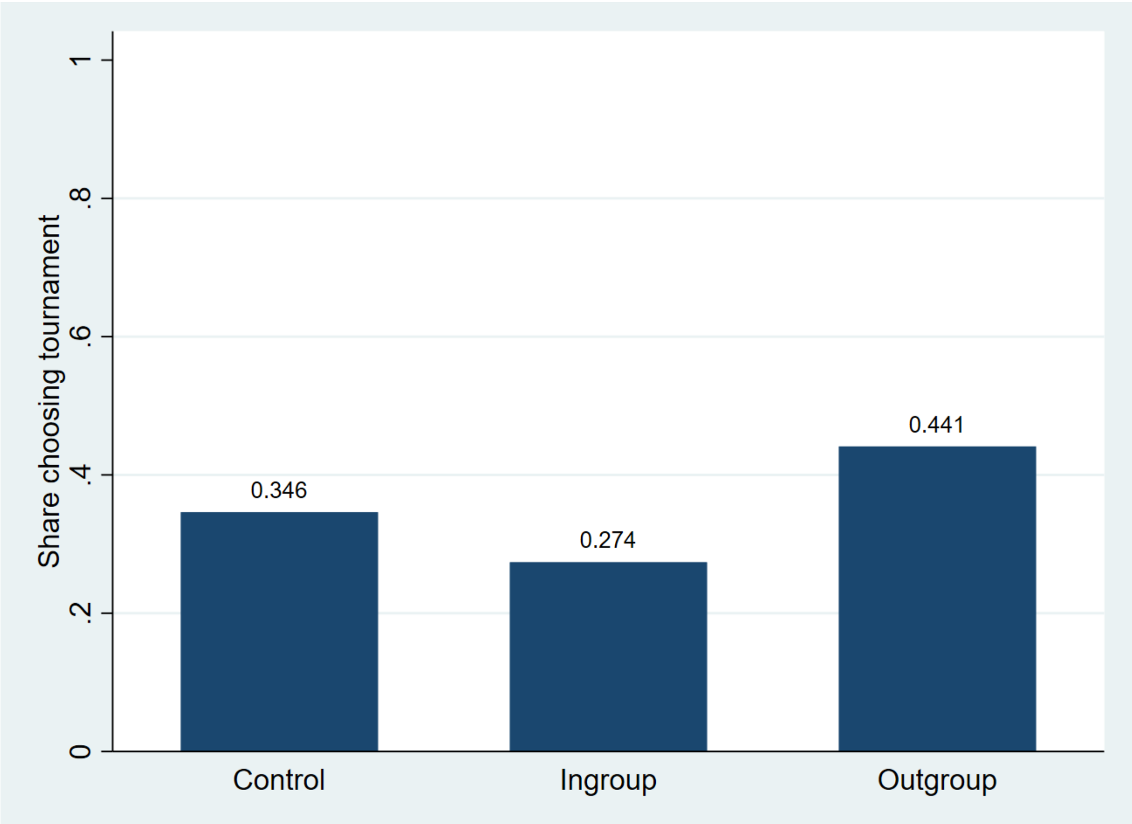


Figure 1 Proportion of participants who chose the tournament scheme in Task 3

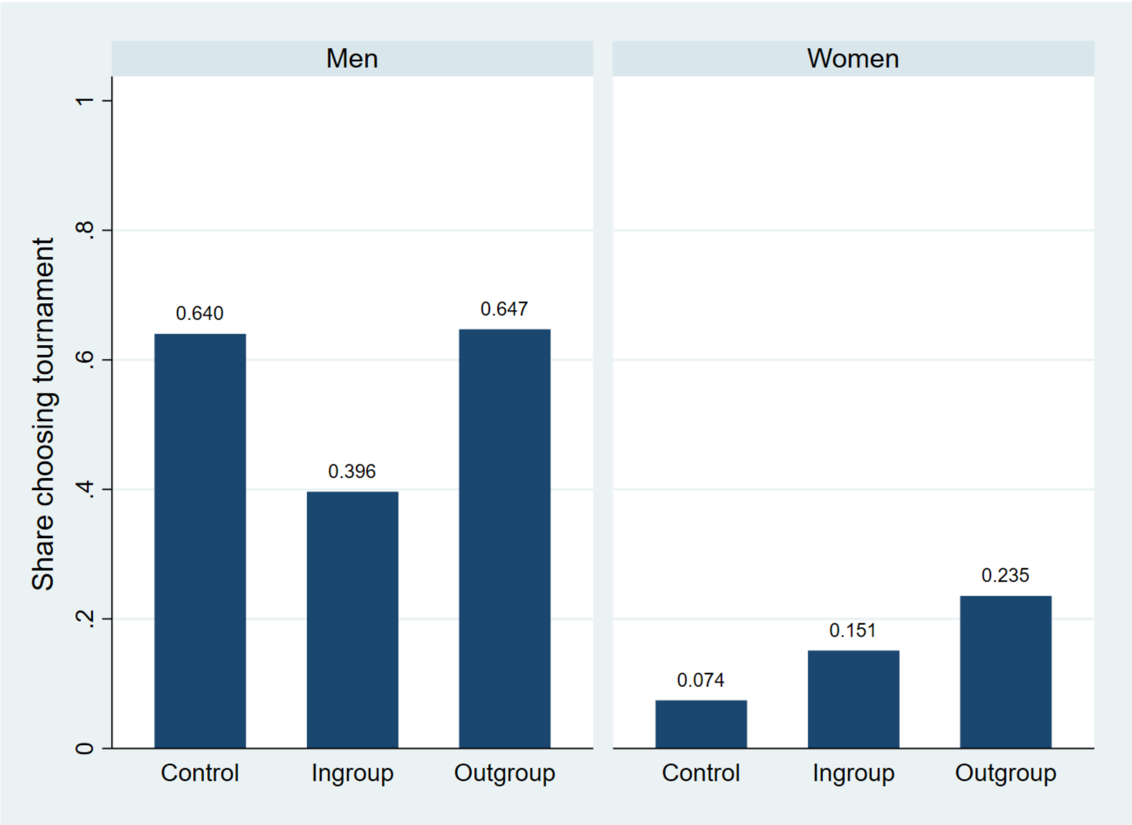


Figure 2 Proportion of participants who chose the tournament scheme in Task 3 by gender

Table 1. Summary statistics of performances in Tasks 1 and 2 and estimated rank in Task 2

Measure	Control	Ingroup	Outgroup	p-values (test)
Performance in Task 1				
All	8.29	8.65	8.09	control vs ingroup: 0.366 (MWT) control vs outgroup: 0.933 (MWT) ingroup vs outgroup: 0.243 (MWT)
Men	9.04	8.58	8.37	control vs ingroup: 0.374 (MWT) control vs outgroup: 0.570 (MWT) ingroup vs outgroup: 0.701 (MWT)
Women	7.59	8.27	7.51	control vs ingroup: 0.028 (MWT) control vs outgroup: 0.798 (MWT) ingroup vs outgroup: 0.032 (MWT)
Performance in Task 2				
All	9.94	10.28	10.15	control vs ingroup: 0.680 (MWT) control vs outgroup: 0.680 (MWT) ingroup vs outgroup: 0.965 (MWT)
Men	10.31	10.26	10.53	control vs ingroup: 0.658 (MWT) control vs outgroup: 0.628 (MWT) ingroup vs outgroup: 0.312 (MWT)
Women	9.59	10.3	9.76	control vs ingroup: 0.277 (MWT) control vs outgroup: 0.878 (MWT) ingroup vs outgroup: 0.265 (MWT)
Guess win in Task 2				
All	0.57	0.45	0.54	control vs ingroup: 0.165 (χ^2 tests) control vs outgroup: 0.143 (χ^2 tests) ingroup vs outgroup: 0.742 (χ^2 tests)
Men	0.72	0.49	0.62	control vs ingroup: 0.057 (χ^2 tests) control vs outgroup: 0.424 (χ^2 tests) ingroup vs outgroup: 0.160 (χ^2 tests)
Women	0.44	0.42	0.47	control vs ingroup: 0.802 (χ^2 tests) control vs outgroup: 0.826 (χ^2 tests) ingroup vs outgroup: 0.569 (χ^2 tests)

Table 2. Tournament choice in Task 3

Baseline	Control condition		Outgroup condition	
	(1)	(2)	(3)	(4)
Ingroup condition	-0.254	-0.020	-0.166***	-0.094
	(0.188)	(0.165)	(0.063)	(0.057)
Outgroup condition	-0.087	0.080		
	(0.185)	(0.160)		
Female	-0.355***	-0.233***	-0.310***	-0.191***
	(0.053)	(0.055)	(0.060)	(0.061)
Performance in Task 2	0.046***	0.027**	0.047***	0.024*
	(0.011)	(0.011)	(0.013)	(0.013)
Difference in performance between Tasks 2 and 1	-0.002	0.011	0.001	0.016
	(0.015)	(0.016)	(0.016)	(0.018)
Risk-taking		0.053***		0.055***
		(0.012)		(0.014)
Guess win in Task 2		0.136**		0.163**
		(0.059)		(0.068)
Tournament choice in Task 4		0.255***		0.253***
		(0.072)		(0.081)
Maleness		-0.003		-0.017
		(0.014)		(0.017)
Constant	0.143	-0.201	0.014	-0.124
	(0.186)	(0.158)	(0.166)	(0.155)
Observation	260	260	208	208

Note: The dependent variable is the tournament choice dummy (1 = tournament, 0 = piece rate) in Task 3. The estimates are based on the linear probability model, with robust standard errors shown in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 3. Tournament choice in Task 3 by gender

Baseline:	Control condition				Outgroup condition			
Sample:	Men		Women		Men		Women	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ingroup condition	-0.402	-0.171	-0.087	0.139	-0.225**	-0.147	-0.087	-0.020
	(0.295)	(0.270)	(0.234)	(0.176)	(0.097)	(0.091)	(0.090)	(0.077)
Outgroup condition	-0.177	-0.017	-0.008	0.162				
	(0.296)	(0.270)	(0.223)	(0.159)				
Performance in Task 2	0.069***	0.054***	0.011	0.001	0.071***	0.048**	0.020	0.001
	(0.017)	(0.019)	(0.018)	(0.015)	(0.020)	(0.022)	(0.020)	(0.017)
Difference in performance between Tasks 2 and 1	-0.015	-0.006	0.010	0.028	-0.012	0.006	0.004	0.024
	(0.025)	(0.029)	(0.022)	(0.023)	(0.027)	(0.032)	(0.025)	(0.027)
Risk-taking		0.069***		0.024		0.068***		0.033
		(0.020)		(0.017)		(0.022)		(0.022)
Guess win in Task 2		0.098		0.120*		0.141		0.149*
		(0.118)		(0.071)		(0.141)		(0.083)
Tournament choice in Task 4		0.088		0.468***		0.137		0.462***
		(0.105)		(0.104)		(0.115)		(0.124)
Maleness		-0.010		-0.018		-0.024		-0.025
		(0.026)		(0.017)		(0.033)		(0.020)
Constant	-0.059	-0.379	0.060	-0.148	-0.259	-0.378	-0.017	0.001
	(0.283)	(0.260)	(0.248)	(0.179)	(0.276)	(0.267)	(0.209)	(0.193)
Observation	129	129	131	131	104	104	104	104

Note: The dependent variable is the tournament choice dummy (1 = tournament, 0 = piece rate) in Task 3. The estimates are based on the linear probability model, with robust standard errors shown in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table 4. Tournament choice in Task 3 by the number of messages

	All		Men		Women	
	Below	Above	Below	Above	Below	Above
	(1)	(2)	(3)	(4)	(5)	(6)
Ingroup condition	-0.195***	0.057	-0.363***	-0.017	-0.063	0.110
	(0.074)	(0.087)	(0.094)	(0.191)	(0.119)	(0.105)
Female	-0.137	-0.217**				
	(0.088)	(0.088)				
Performance in Task 2	0.044**	0.012	0.080***	0.047	0.013	-0.015
	(0.019)	(0.017)	(0.026)	(0.041)	(0.028)	(0.023)
Difference in performance between Tasks 2 and 1	-0.018	0.044	-0.029	0.016	-0.012	0.089*
	(0.023)	(0.030)	(0.036)	(0.056)	(0.035)	(0.050)
Risk-taking	0.079***	0.044**	0.103***	0.054	0.042	0.026
	(0.019)	(0.021)	(0.027)	(0.043)	(0.040)	(0.033)
Guess win in Task 2	0.111	0.233**	-0.074	0.262	0.155	0.082
	(0.104)	(0.108)	(0.115)	(0.317)	(0.147)	(0.132)
Tournament choice in Task 4	0.188**	0.315**	0.162	0.134	0.349*	0.580*
	(0.093)	(0.139)	(0.104)	(0.267)	(0.197)	(0.284)
Maleness	-0.051**	-0.019	-0.090***	-0.029	-0.041	0.011
	(0.024)	(0.030)	(0.033)	(0.069)	(0.042)	(0.057)
Constant	-0.339*	0.152	-0.662**	0.108	-0.143	0.124
	(0.183)	(0.273)	(0.292)	(0.413)	(0.266)	(0.396)
Observation	120	88	64	40	56	48

Note: The dependent variable is the tournament choice dummy (1 = tournament, 0 = piece rate) in Task 3. The estimates are based on the linear probability model, with robust standard errors shown in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Online Appendix A: Appendix Tables

Table A.1. Cross term of maleness

Baseline:	Control condition		Outgroup condition	
	(1)	(2)	(3)	(4)
Ingroup condition	-0.103	0.145	-0.124	-0.036
	(0.284)	(0.181)	(0.100)	(0.098)
Outgroup condition	0.028	0.186		
	(0.281)	(0.163)		
Performance in Task 2	0.052***	0.003	0.047**	0.001
	(0.019)	(0.015)	(0.022)	(0.017)
Difference in performance between Tasks 2 and 1	-0.004	0.025	0.006	0.023
	(0.030)	(0.024)	(0.032)	(0.027)
Risk-taking	0.071***	0.026	0.068***	0.033
	(0.019)	(0.018)	(0.022)	(0.023)
Guess win in Task 2	0.121	0.123*	0.152	0.146*
	(0.120)	(0.073)	(0.137)	(0.085)
Tournament choice in Task 4	0.085	0.466***	0.137	0.460***
	(0.105)	(0.105)	(0.113)	(0.126)
Maleness	0.022	0.008	-0.006	-0.031
	(0.040)	(0.024)	(0.050)	(0.028)
Maleness × ingroup condition	-0.064	-0.027	-0.042	0.013
	(0.057)	(0.037)	(0.065)	(0.041)
Maleness × outgroup condition	-0.024	-0.041		
	(0.066)	(0.034)		
Constant	-0.391	-0.166	-0.358	0.011
	(0.267)	(0.181)	(0.270)	(0.201)
Observation	129	131	104	104

Note: The dependent variable is the tournament choice dummy (1 = tournament, 0 = piece rate) in Task 3. The estimates are based on the linear probability model, with robust standard errors shown in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table A.2. Tournament choice in Task 3 by the number of chat messages

	All		Men		Women	
	Below	Above	Below	Above	Below	Above
	(1)	(2)	(3)	(4)	(5)	(6)
Ingroup condition	-0.131	0.326	-0.386	0.558**	0.210	0.284
	(0.242)	(0.223)	(0.295)	(0.229)	(0.192)	(0.326)
Outgroup condition	0.068	0.277	-0.024	0.583*	0.285	0.186
	(0.240)	(0.232)	(0.293)	(0.287)	(0.184)	(0.295)
Female	-0.213**	-0.250***				
	(0.082)	(0.074)				
Performance in Task 2	0.042**	0.018	0.074***	0.066*	0.026	-0.016
	(0.017)	(0.014)	(0.024)	(0.035)	(0.025)	(0.018)
Difference in performance between Tasks 2 and 1	-0.016	0.037	-0.037	-0.008	-0.012	0.098***
	(0.021)	(0.026)	(0.036)	(0.048)	(0.031)	(0.035)
Risk-taking	0.065***	0.042**	0.092***	0.051	0.022	0.010
	(0.018)	(0.019)	(0.029)	(0.036)	(0.031)	(0.024)
Guess win in Task 2	0.065	0.226**	-0.082	0.241	0.119	0.055
	(0.093)	(0.092)	(0.115)	(0.228)	(0.130)	(0.109)
Tournament choice in Task 4	0.196**	0.344***	0.105	0.089	0.344*	0.632***
	(0.089)	(0.119)	(0.106)	(0.222)	(0.179)	(0.160)
Maleness	-0.020	-0.008	-0.057	-0.015	-0.027	-0.001
	(0.022)	(0.025)	(0.037)	(0.056)	(0.035)	(0.032)
Constant	-0.348	-0.147	-0.524	-0.596*	-0.493	0.026
	(0.266)	(0.177)	(0.315)	(0.325)	(0.298)	(0.226)
Observation	148	112	78	51	70	61

Note: The dependent variable is the tournament choice dummy (1 = tournament, 0 = piece rate) in Task 3 The estimates are based on the linear probability model, with robust standard errors shown in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Table A.3. Tournament choice in Task 4

Baseline:	Control condition		Outgroup condition	
	(1)	(2)	(3)	(4)
Ingroup condition	-0.254	-0.050	-0.166***	-0.119**
	(0.188)	(0.165)	(0.063)	(0.059)
Outgroup condition	-0.087	0.073		
	(0.185)	(0.162)		
Female	-0.355***	-0.267***	-0.310***	-0.221***
	(0.053)	(0.055)	(0.060)	(0.062)
Performance in Task 2	0.046***	0.036***	0.047***	0.033**
	(0.011)	(0.011)	(0.013)	(0.013)
Difference in performance between Tasks 2 and 1	-0.002	-0.012	0.001	-0.007
	(0.015)	(0.015)	(0.016)	(0.016)
Risk-taking		0.064***		0.064***
		(0.012)		(0.014)
Guess win in Task 2		0.155**		0.177**
		(0.060)		(0.069)
Maleness		0.005		-0.012
		(0.015)		(0.018)
Constant	0.143	-0.219	0.014	-0.142
	(0.186)	(0.161)	(0.166)	(0.161)
Observation	260	260	208	208

Note: The dependent variable is the tournament choice dummy (1 = tournament, 0 = piece rate) in Task 4. The estimates are based on the linear probability model, with robust standard errors shown in parentheses. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table A.4. Tournament choice in Task 4 by gender

Baseline:	Control condition				Outgroup condition			
Sample:	Men		Women		Men		Women	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ingroup condition	-0.231	-0.114	-0.179	-0.094	-0.107	-0.079	-0.103	-0.097
	(0.271)	(0.257)	(0.199)	(0.175)	(0.093)	(0.093)	(0.072)	(0.071)
Outgroup condition	-0.125	-0.049	-0.090	-0.008				
	(0.278)	(0.261)	(0.204)	(0.179)				
Performance in Task 2	0.072***	0.062***	0.008	0.007	0.066***	0.060***	0.022	0.015
	(0.017)	(0.016)	(0.016)	(0.016)	(0.019)	(0.020)	(0.017)	(0.017)
Difference in performance between Tasks 2 and 1	-0.123***	-0.126***	-0.054***	-0.065***	-0.116***	-0.118***	-0.064***	-0.071***
	(0.018)	(0.019)	(0.019)	(0.020)	(0.020)	(0.021)	(0.021)	(0.023)
Risk-taking		0.039**		0.049***		0.028		0.042**
		(0.017)		(0.018)		(0.020)		(0.020)
Guess win in Task 2		0.061		0.074		0.020		0.066
		(0.109)		(0.069)		(0.127)		(0.076)
Maleness		0.031		0.024		0.029		0.024
		(0.026)		(0.020)		(0.033)		(0.022)
Constant	-0.038	-0.198	0.148	-0.113	-0.112	-0.176	-0.047	-0.156
	(0.257)	(0.259)	(0.268)	(0.224)	(0.245)	(0.240)	(0.157)	(0.173)
Observation	129	129	131	131	104	104	104	104

Note: The dependent variable is the tournament choice dummy (1 = tournament, 0 = piece rate) in Task 4. The estimates are based on the linear probability model, with robust standard errors shown in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.

Online Appendix B: Experimental Instruction (English Translation)

Introduction

In this experiment, you will complete two types of simple tasks: a **Painter Identification Task** and a **Counting Task**. In the Painter Identification Task, you will be shown two paintings, each by a different artist, and asked to guess which painting was created by which artist. In the Counting Task, you will count how many zeros are displayed among a grid of 25 digits shown on your computer screen. The number of correct responses you give within a time limit will determine your score.

The Counting Task is performed in **mixed-gender pairs**. You will not be informed of your partner's location in the room.

In addition to a participation fee of ¥1,000, your final earnings will be determined based on your performance in both the Painter Identification Task and the Counting Task.

Painter Identification Task

In the Painter Identification Task, you will be shown two paintings, each by one of two different artists. You will be asked to guess which artist created each painting. You will receive a reward of ¥100 for each correct answer.

Before the task begins, you will have three minutes to study sample paintings by the two artists and learn their styles.

Next, you will be placed into a **group with others who drew a chopstick of the same color**. You will then participate in a 10-minute discussion with your group. Using the chat function on the computer, you may request or offer assistance to other members of your group. Please refrain from disclosing personally identifiable information or making offensive comments.

Counting Task

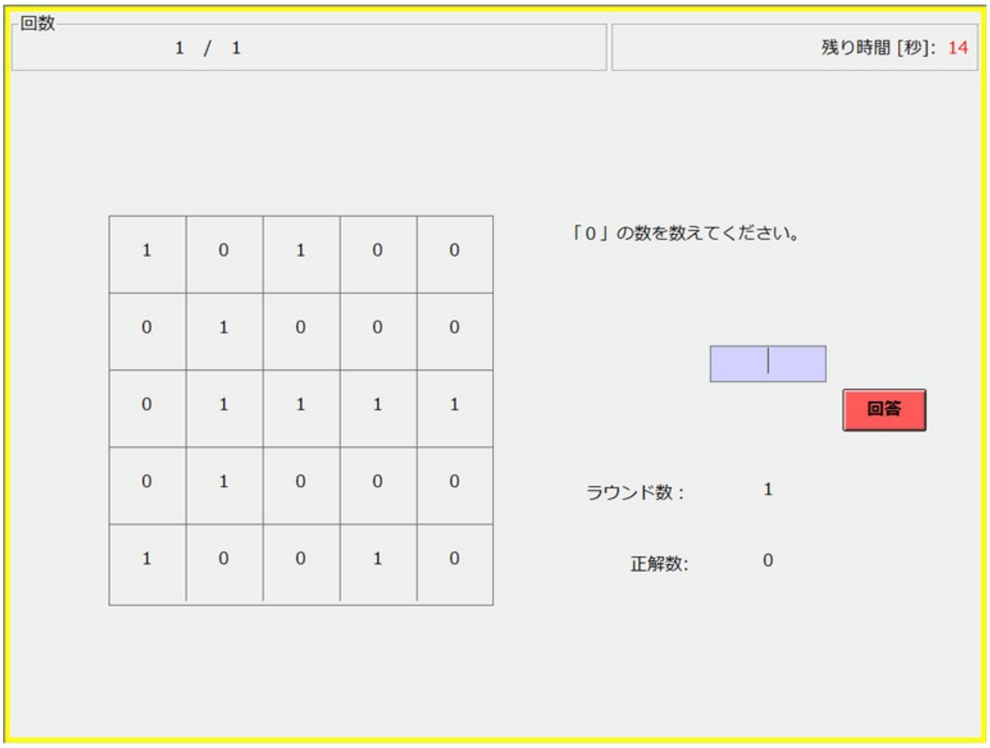
In the Counting Task, participants are paired in **male–female pairs**.

[If in the in-group or out-group condition: Your partner will either belong to the same group (same chopstick color) or to a different group.]

As shown in the image, your computer screen will display 25 digits (each either 0 or 1).

Your task is to **count the number of zeros** and input the total in the response box on the right. Click the "Submit" button to proceed. Once you submit your answer, a new grid will appear, and you will repeat the process.

You will have **90 seconds**, and the number of correct answers will determine your score.



Overall Procedure

1. **Painter Identification Task**

   You will first study artist styles for three minutes individually, then engage in a 10-minute group discussion with others who have the same chopstick color. You will then guess the artists of two paintings.

2. **Counting Task**

   You will perform the Counting Task in male–female pairs. There will be **four rounds (games)**. You will be paired with the **same partner** across all four games.

3. **Post-Task Questionnaire**

   You will complete a questionnaire after finishing the Counting Task.

4. **Payment**

   After the questionnaire, you will receive your payment.

Payment Details

All participants will receive a **¥1,000 participation fee**.

In addition to this, your final payment will be based on your performance in both the Painter Identification Task and the Counting Task.

- **Painter Identification Task**: ¥100 per correct answer
- **Counting Task**: One of the four games will be randomly selected, and your payment will be

based on your performance in that round.

- **Final Payment = ¥1,000 (participation fee)** + (Number of correct answers in Painter Task × ¥100) + Earnings from one randomly selected Counting Task game

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Counting Task: Reward Structures Across Games

Each game uses either a **piece-rate scheme** or a **tournament scheme**.

· **Game 1: Piece-Rate Scheme**

Your reward is determined by your own performance. Each correct answer is worth ¥50. Your partner's performance does not affect your reward.

Example: 2 correct answers = ¥100 (2 × ¥50)

After Game 1, you will be asked to guess your **rank** within your pair.

· **Game 2: Tournament Scheme**

Only the **higher-performing participant** in the pair earns a reward: ¥100 per correct answer. The lower-performing participant receives nothing.

In case of a tie, the computer will randomly assign ranks.

Example: 3 correct answers and outscoring your partner = ¥300; otherwise = ¥0

After Game 2, you will be asked to guess your rank again.

· **Game 3: Choice Between Schemes**

Before performing the task, you must choose whether to be paid under the **piece-rate** or **tournament** scheme. Your reward will then be calculated accordingly.

The details of the reward scheme for Game 4 will be explained before the game is conducted.

· **Game 4: Retrospective Scheme Choice**

You will not perform a task in this round. Instead, you will choose whether you would prefer your Game 1 results to be paid under the **piece-rate** or **tournament** scheme.

Your Game 1 score will be shown on the left side of the screen. Choose your preferred reward scheme by clicking the corresponding circle.

This concludes Game 4. Your reward for this game will be calculated based on your Game 1 performance and the scheme you selected in Game 4.