

Productivity under Hostility

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Abstract

Workplace culture is a well-established driver of long-term organizational success. Using a controlled experiment, we explore whether hostile work environments impact individual and group performance. Participants are randomly assigned to groups with varying gender composition, where they complete rounds of quizzes. In each round, group members decide whether to nominate their own performance to count toward the group's payoff. The work environment is manipulated to be either friendly or unfriendly through pre-specified messages that group members can send to one another after each round. Our results show that individuals who work in a hostile and majority-men team earn less. While we find suggestive evidence that women perform below their team average under hostility, payoff differences are explained by gender differences in nomination decisions. Men tend to make suboptimal nomination decisions under hostility, in particular by being over-confident in their own nomination. Using an incentive-compatible choice experiment, we find that the experience of hostile interactions increases the willingness-to-pay for other non-wage amenities for male respondents.

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1 Introduction

Workplace culture is a well-established driver of long-term organizational success. Employees benefit from better psychological well-being, higher engagement, and more motivation, which ultimately translates into better performance (Ostroff, 1992; Judge et al., 2001; Housman and Minor, 2015; Srivastava et al., 2018; Guadalupe, Kinias and Schloderer, 2020; Castro, Englmaier and Guadalupe, 2022). Firms, in turn, benefit from higher employee retention, productivity, and innovation (Edmans, 2011; Boyce et al., 2015; Guiso, Sapienza and Zingales, 2015; Graham et al., 2016, 2022). A growing body of work has linked positive cultural attributes—such as psychological safety—to learning and team performance (Edmondson, 1999; Nembhard and Edmondson, 2006; Alan, Corekcioglu and Sutter, 2023).

Far less attention has been paid to the negative side. Hostile work environments are pervasive and costly: in prior work, we document that workplaces free from hostility are highly valued by workers (Collis and Van Effenterre, 2023). But whether hostility actually impairs individual and group performance—and if so, through what mechanisms—remains an open question. Because workers sort across industries and firms endogenously and team formation is not random, there is no causal evidence on whether and how workplace hostility affects performance.

This paper provides causal evidence on this question. We conduct an experiment in a tightly controlled laboratory environment with 812 undergraduate students at a large public university. Participants complete a baseline cognitive ability assessment, are randomly assigned to four-person groups varying in gender composition (one woman with three men, or three women with one man), and complete five rounds of paired quizzes in which they decide whether to nominate their own performance to count toward the group’s payoff. We exogenously vary the work environment—friendly or hostile—through pre-specified messages that can be exchanged among group members, with occasional miscommunication in the form of computer-selected messages. After the main task, participants complete an incentive-compatible choice experiment revealing their willingness-to-pay for different working conditions.

On average, we find that working in a hostile environment does not significantly affect individual or team performance. However, this null result masks important heterogeneity: workers in

hostile, male-majority teams earn \$1 less than their counterparts in other conditions, equivalent to 14 percent of final earnings—an effect that holds regardless of gender. Women are marginally more likely to perform below their team members under hostility, with no such effect on men. However, men make suboptimal nomination decisions under hostility, in particular by being overconfident in their own contributions: conditional on being below team average, men are more likely to nominate themselves in hostile environment. Lastly, we find asymmetric effects of the experience of hostile interactions on preferences for remote work and individual payment: hostile environments create gender gaps in WTP over these attributes, with men valuing them more than women in the hostile condition, while no gaps exist in the friendly condition.

Taken together, this paper contributes to several strands of the literature. First, we contribute to the literature on workplace culture and productivity (Ostroff, 1992; Judge et al., 2001; Housman and Minor, 2015; Guiso, Sapienza and Zingales, 2015; Graham et al., 2016; Srivastava et al., 2018; Guadalupe, Kinias and Schloderer, 2020; Castro, Englmaier and Guadalupe, 2022; Graham et al., 2022; Guadalupe, Pollenne and Snellman, 2025). To the best of our knowledge, this is the first study to provide causal evidence on the relationship between workplace hostility and individual and team performance. We show that hostile work environments reduce team earnings by approximately 14 percent, with effects concentrated in male-majority teams. Importantly, this effect operates not through reduced individual performance but through suboptimal contribution decisions—specifically, men’s overconfidence in self-nomination under hostility. This complements Alan, Corekcioglu and Sutter (2023), who document the benefits of improving relational atmosphere, by identifying the costs of its deterioration and the behavioral channel through which those costs arise.

Second, we contribute to the growing literature on interpersonal dynamics and labor market inequality (Burbano et al., 2022; Linos, Mobasser and Roussille, 2023; Folke and Rickne, 2022; Alan, Corekcioglu and Sutter, 2023; Cullen and Perez-Truglia, 2019) and to the literature on remote work (Barrero, Bloom and Davis, 2021, 2023; Emanuel and Harrington, 2023; Cullen, Pakzad-Hurson and Perez-Truglia, 2025). Our contribution here is to document asymmetric preference formation: while women consistently value hostility-free environments more than men, hostile environments create new gender gaps in willingness-to-pay for remote work and

individual payment structures, with men valuing these attributes more in the hostile condition. Finally, we contribute to the literature documenting gender differences in psychological attributes such as competitiveness and confidence (Niederle and Vesterlund, 2008, 2007; Gneezy, Leonard and List, 2009; Coffman, 2014*a,b*; Coffman, Collis and Kulkarni, 2019; Exley and Kessler, 2022; Exley and Nielsen, 2024). Our results highlight that these gender differences are not fixed traits but are modulated by the interpersonal environment. The overconfidence in self-nomination that drives earnings losses under hostility is specific to men in male-majority teams—a setting where gender norms around assertiveness may be amplified. This suggests that contextual factors can both activate and attenuate well-documented gender gaps in economic behavior.

The remainder of the paper proceeds as follows. Section 2 presents the overall experimental design. We present our empirical strategy and specifications in Section 3. Section 4 provides descriptive results and summary statistics of the experimental sample. The main results of the experiment are presented in Section 5. Section 6 concludes.

2 Experimental Setting and Design

To investigate these questions, we study behaviors in a contribution game. The experimental flow is summarized in Figure 1. The experimental instructions are in Appendix B.

Experimental Flow This study is organized around two sessions. The first session is the main experiment of this study. Only a few randomly selected participants are invited to participate in the second session, which takes place upon the completion of data collection. Our focus is on the first session because it provides repeated observations of a set of outcomes without attrition.

The first session consists of three parts. After participants are provided with informed consent, they complete Part 1 which is a quiz that consists of 10 multiple-choice questions and measures baseline cognitive ability (cube test). It takes approximately five minutes. Part 2 is the main portion of the experiment for which individuals are randomly assigned into groups of four. Each group will complete five rounds together. Each round consists of two brief quizzes (4.5

minutes each) on a topic that can be labelled as either male-typed or female-typed. Each of the two quizzes consists of 10 multiple choice questions. The assignment of quizzes for each of the five rounds is assigned at the group level. The order of those two quizzes within a given round is randomized at the individual level. Once the participants completed these five rounds, they complete Part 3 which involves an incentive-compatible choice experiment. Finally, they are asked to answer a follow-up questionnaire containing socio-demographic questions and questions about the quality of their experience working together.

Contribution Decisions In Part 2 of the main study, we track five rounds of contribution decisions in which all individuals take part. In each round, each group member decides whether they want to nominate one of their quiz performances for the group payoff. Once every group member has made their nomination decision, one of the nominated quiz performances is randomly selected to count as the round payoff for every group member. If no group member nominates themselves for the group payoff in a given quiz, the payoff for every group member is zero for the given quiz. Participants will learn the average group performance per quiz, who nominated which quiz performance and which performance has been selected to be the payoff-that-counts for the given round. Participants will not learn what their individual performance was and will not learn what the group payoff would be.

Treatments

Our experiment has two levels of randomization:

- 1. Random Group Assignment** After completing Part 1—the baseline performance measurement—individuals are randomly assigned to a group of 4. The gender composition of the group varies accordingly to two treatments: 1F3M, 3F1M. In case we couldn't accommodate these numbers during a session, we allowed for gender-balanced teams. Each member picks a gender neutral nickname at the group formation stage. The group stays the same for the remainder of the experiment.
- 2. Work Environment Treatment** The quality of the work environment in the experiment is randomized to be either *friendly* or *unfriendly* and is randomized at the group level. Partici-

pants are able to communicate with their team members and the variation in work environment is introduced by the content of messages.

Selection of Messages and Validation We pre-specified ten messages (Table A1), developed through an iterative process involving five undergraduate research assistants and a LLM.¹ The goal was to create communication content that conveyed interpersonal chemistry, emotional support, team confidence, or disengagement. To avoid confounding the treatment with individual feedback, we manually excluded messages tied to individual performance. The resulting set of messages was reviewed and refined with the research assistants.

We then piloted these messages with respondents on CloudResearch Connect (see Section 5.1). Our objective was to select messages that varied in friendliness and hostility within the respective treatment conditions, while remaining plausible for participants to send, even in the hostile condition.

Participants were able to select one or more messages among these ten pre-specified messages. They could also decide not to send any messages. These messages are noisy in the sense that a computer sometimes augments a group member and sends a message on their behalf. Practically, this can be thought of as miscommunication. We implement this with a decision rule where there is a computer rule that may accidentally send one of a message on the participant’s behalf. This can happen whether the participant has selected a message or not, with a 15% probability. If the participant decides to send a message and the computer sends a message too, the participant’s message will be sent with a 50% probability.

Manipulation Checks We use several manipulation checks during the experiment to ensure that the treatment is salient enough. We first remind participants of each team member’s gender by showing pronouns during the nomination decision stage. Second, in the follow-up questionnaire, we ask participants to predict each team member’s gender, as well as their major and their level of education, to avoid priming. In our sample, 70% are able to predict the gender of teammates at the end of the game. For treatment regarding the quality of the

¹We used Claude.ai and the following prompt: "For an ethics-approved research project, I need to develop 20 1-sentence long messages which one could send to their work team where the sentence could be read as exclusionary or even hostile. Could you focus less on exclusionary and more on hostile? For each of the 20 sentences, please create an equivalent sentence with a neutral and friendly tone, respectively."

work environment, we also measure their perception of the quality of the work environment in the follow-up questionnaire by asking them whether they enjoyed working with each team member. Finally, we ask how much participants enjoy working with their group members overall.

Incentive-Compatible Choice Experiment In Part 3 of the main experiment, participants are asked about their preferences regarding the experimental format for the follow-up session should they be invited back. The follow-up session is almost identical to the first session. It may vary on three dimensions in Part 2: payoff scheme (individual vs. group), quality of exchange (friendly vs. unfriendly), and location (laboratory vs. online). The purpose of Part 3 is to elicit their willingness-to-pay for these three dimensions. The default format is a follow-up experiment where the group performance counts, unfriendly exchanges happen, and the session takes place in the lab. We ask participants how much of a fixed endowment of \$15 they would be willing to give up in order to switch to the alternative format. The more participants are willing to give up, the higher the chance that their follow-up session will be run in the corresponding format. The experiment is incentive-compatible because one of the decisions of the few selected participants chosen at random who are invited again to return for the follow-up session will be implemented in the follow-up session.

Incentives We design incentives such that participants are willing to perform well both at the individual and group level. For the first part (Cognitive skills test), they receive \$0.5 per correctly answered question. For Part 2, two of the total 10 quizzes they solve throughout the five rounds are randomly selected to count towards their additional payment.² They receive \$0.50 for every correctly solved question. For each of the three selected quizzes, we are randomly determined whether we use their individual performance or the group performance, which equals to the nominated-and-selected group member's performance for a given quiz. Participants receive a flat \$1.50 for completing Part 3 of the experiment. The follow-up session resembles the same incentive structure, except that the Part 2 payoff scheme depends on their stated preferences (individual versus group payoff) and the completion award is doubled (from

²We initially planned to select three quizzes instead of two, but decided after three sessions to change the payment scheme for budget reasons. In our specifications, we control for a dummy variable equal one for the three sessions with a different payment scheme (payoff calculated from performance for 3 random rounds to payoff calculated from performance for 2 random rounds).

\$15 to \$30).

Second Session The second session takes place in order to maintain incentive-compatibility. It is identical to Session 1, except for that the completion award is doubled (from \$15 to \$30) and that three dimensions (payoff scheme for Part 2, quality of exchange, location of experiment) depend on their stated preferences in the choice experiment completed in Session 1, Part 3.

Outcomes We first look at the impact of treatments on contribution decisions and individual performance. Contribution decisions correspond to individual's decisions to nominate their answer to be the group answer. Individual performance corresponds to individual quiz scores, standardized by topic. Our measure of ability in a category (female-typed and male-typed quizzes) for each individual is the average probability of answering a question correctly across all questions seen in the category. We next measure group performance, as measured the sum of scores of quiz that were selected through nomination game across rounds. We use final financial payoff to measure the gender wage gap. Gender is measured from the baseline questionnaire. We measure the level of endogenous hostility proxied by the number of hostile messages sent and received by team members. Finally, we measure individual's self-reported stress level with a scale from "very low" to "very high", and how much you enjoyed the teamwork with a scale from "not at all" to "very much". To measure individual's self-reported likelihood of participating in the experiment again, we use a five-item Likert scale. Our baseline measure of performance is based on the first cognitive skills task assigned to participants to reduce measurement error of performance. In the second part of the experiment (incentive-compatible choice experiment), we measure individuals' self-reported willingness-to-pay for each game attribute.

3 Econometric Specifications

3.1 Effect of hostile work environments on contribution decisions and performance

ITT specifications. To test whether hostile work environments (treatment *hostility*) affect individuals' contribution decisions, individuals' performance, and group performance, we use the following specification:

$$Y_{ijt} = \gamma_j + X_i' \pi + Y_{i1} \psi + \delta_t + \alpha_1 \text{treat_hostility}_{ij} + u_{ijt} \quad (1)$$

where Y_{ijt} denotes individual i 's contribution decision and performance at round t in group j , X_i' is a vector of control variables that includes observable characteristics and Y_{i1} corresponds to first-round (baseline) performance. Round fixed-effects δ_t control flexibly for time-specific factors that are common to the treated and control groups (such as fatigue, experience). In theory, by virtue of randomization, the results should not be sensitive to the addition of round fixed-effects, but we use them in robustness checks. We test the sensitivity of the results to the inclusion of γ_j that controls for the gender composition of the group j (3F1M, 3M1F), and explore heterogeneity along this dimension. The variable $\text{treat_hostility}_{ij}$ is a dummy variable equal to one if the group was randomized into the *hostility* treatment. The coefficient of interest is α_1 which measures the impact of being assigned to a hostile work environment on contribution decision and individual performance (ITT). We also use an alternative of Equation (1) to measure total contribution decisions and individual performance across rounds in which the outcome Y_{ij} denotes individual i 's overall contribution decisions and performance in group j for the entire session. Standard errors are clustered at the group-level.

To test whether the effect of hostility on individuals' contribution decisions and performance varies by gender, we use the following specification

$$\begin{aligned} Y_{ijt} = & \gamma_j + X_i' \pi + Y_{i1} \psi + \delta_t + \alpha_3 \text{treat_hostility}_{ij} \\ & + \alpha_4 \text{treat_hostility} \times \text{female}_{ij} + \alpha_5 \text{female}_i + u_{ijt} \end{aligned} \quad (2)$$

The coefficient of interest is α_4 which measures the differential impact of being assigned to a hostile work environment on individual contribution decision and performance by gender. Standard errors are clustered at the group-level.

We further test whether the effect of hostility on contribution decisions and individual performance varies by gender and domains. We also explore whether it varies by team gender composition.

We use the following specification:

$$\begin{aligned} Y_{ijt} = & \gamma_j + X_i' \pi + Y_{ij1} \psi + \delta_t + \alpha_1 \text{treat_hostility}_{ij} \\ & + \alpha_8 \text{male_team}_{ij} + \alpha_9 \text{treat_hostility} \times \text{male_team}_{ij} + u_{ijt} \end{aligned} \quad (3)$$

The coefficient of interest is α_9 which measures the impact of being assigned to a hostile work environment in a male-dominated team on individual performance. We also estimate the same equation but separately by gender of the participant. Standard errors are clustered at the group-level.

2SLS specifications. The effect on performance varies by level of friendliness/hostility, proxied by the number of friendly/hostile messages received, we estimate treatment effects (LATE) separately by gender using 2SLS:

$$Y_{ij} = \gamma_j + X_i' \pi + Y_{ij1} \psi + \alpha_1 \text{hostility}_{ij} + u_{ij} \quad (4)$$

$$\text{hostility}_{ij} = \gamma_j + \text{treat_hostility}_{ij} + \eta_{ij} \quad (5)$$

The variable $\text{treat_hostility}_{ij}$ is the treatment assignment dummy variable equal to one if the individual was randomized into the *hostility* treatment. The variable hostility_{ij} is a continuous variable measuring the number of hostile messages received by individual i in group j . Figure A1 presents the distribution of this variable.

3.2 Effect of hostile work environments on continuation outcomes

To test whether hostile work environments affect individual’s self-reported stress level, perception of the quality of the work environment, and likelihood of participating in the experiment again, we use Equation (1) for which Y_{ij} corresponds respectively to individuals’ self-reported stress level, perception of the work environment, and retention decision respectively.

Finally, we use data from our incentive-compatible choice experiment conducted at the end of the game to explore gender differences in willingness-to-pay to avoid future game conditions across hostile and friendly environment treatments.

4 Summary Statistics

The experiment was run at the University of Toronto, one of the largest public universities in North America, during the Spring-Fall 2025. Students were directly invited to participate via the TEEL Lab mailing list, after they were encouraged to sign up for it. Table 1 presents summary statistics. Our experimental sample is by designed balanced by gender, and comprises 49 percent of men. It is racially diverse, with 41 percent of participants reporting being Chinese, 21 percent white, 5 percent Latino, and 3 percent Black. Our sample covers a wide range of majors. The majority of students are in social sciences including economics (31 percent), business management (17 percent), physical and mathematical sciences (16 percent), life sciences (16 percent), arts and humanities (10 percent) and engineering (9 percent). The average earnings for the sample were CAD\$13.17. A fraction of participants (56; 6.7 percent of the sample) received higher average compensation (CAD\$15.46 vs CAD\$13) as we changed payment scheme after the first three sessions from a payoff calculated from performance for 3 random rounds to a payoff calculated from performance for 2 random rounds. This however doesn’t change participants’ incentives for the overall participation. However, we control for differences in payment schemes in robustness checks.

Table 2 reports gender differences in covariates and experimental outcomes. Column 3 reports the gender-specific means of different characteristics of our sample, and the third column reports the p-value of a difference in means test. Relative to men, women in our sample are more likely to be Black, Chinese and Latino, less likely to have a graduate degree, and less likely to

be in traditionally male-dominated majors, such as engineering or physical and mathematical sciences. In line with existing evidence, we find that women also report significantly more liberal views than men on both economic and social issues.

We find no gender differences in the baseline performance measure (the cube task). However, on average, men perform better than women in the quiz part, with a quizz payoff of CAD\$6.95 and CAD\$7.36 for women and men respectively; Men outperform women on all topics (-0.106 versus 0.111 average standardized score by topic for women and men respectively, equivalent to a 22 percent gap), but particularly for male-type quizzes (-0.165 versus 0.172 average standardized score by male-type topics for women and men respectively, equivalent to a 33 percent gap). Men and women have comparable average total self-nominations (6.3 for women, and 6.4 for men), but consistent with Coffman (2014a), we find that they are more likely to nominate their answers in gender-congruent domains. The average earnings for men were CAD\$13.39, and for women were CAD\$12.9; the p-value for a test of the equality of the average earnings across gender is 0.403.

Table A2 presents a balance test by regressing respondent characteristics on indicators for the main randomized treatment (hostility treatment) and confirms that the randomization was successful. Table A3 further shows similar balancing test by gender composition of the team. Overall, these tests confirm the validity of our experimental design.

5 Results

5.1 Are the Messages Changing the Work Environment?

Before turning to the effects of hostility on performance and preferences, we ask whether our treatment actually changes the work environment as intended. We assess this along three dimensions: external validation of the messages themselves, participants' messaging behavior during the experiment, and self-reported experience.

We first validate the messages used in the experiment. In a separate sample of CloudResearch Connect participants, respondents rated each message on a hostility-friendliness scale and reported how likely they would be to send it. Figure A4 in the Appendix shows that the

two sets of messages are perceived as intended: hostile messages cluster on the negative end of the scale, while friendly messages cluster on the positive end. Importantly, respondents report that they would be very unlikely to send the hostile messages themselves, confirming that these messages represent plausibly exogenous shocks to the communication environment rather than messages participants would naturally choose to send.

Turning to behavior during the experiment, we find clear treatment effects on messaging patterns. Figure 2 shows that conditional on treatment assignment, there are no gender differences in the average hostile or friendly content of messages sent (Panel A). However, men send significantly more messages than women in the hostile treatment (2.4 versus 1.9, p -value=0.028, Panel B). Figure 3 reveals an interesting dynamic: both male and female participants send fewer messages across rounds (Panel A), but the messages they do send become more polarized over time (Panel B)—suggesting that the treatment intensifies rather than fades as the experiment progresses.

Finally, we examine whether the hostile treatment affects participants’ subjective experience. Table 3 shows that assignment to the hostile treatment significantly reduces the likelihood that participants report enjoying teamwork (columns 1 and 2), with a decrease ranging from 30 to 38 percentage points, equivalent to 8 to 10 percent of the sample mean. We find no differential effects by gender or team composition. Participants do not report significantly lower levels of focus, consistent with the null effects on overall performance that we document below. The work environment does not affect their reported likelihood of participating in the experiment again.

Taken together, these results confirm that our treatment successfully shifts the quality of workplace interactions: participants in the hostile condition experience a meaningfully different work environment, one they enjoy less, even if it does not affect their willingness to return or their reported focus.

5.2 Hostility Treatment on Earnings

We first discuss the impact of being assigned to a hostile or friendly environment on individuals’ contribution decisions, performance and payoffs. This corresponds to the ITT estimation of Equation (1). Table 4 shows that, overall, the hostility treatment doesn’t noticeably affect

average nomination decisions, with a positive not statistically significant coefficient on total nominations. In columns 2 and 3, we find that the hostility treatment is associated with a negative noisy coefficient on standardized quiz score by topic. Finally, it doesn't seem to significantly affect payoff. This is true whether we look only at the payoff of the five rounds of quiz completion or if we look at the final earned amount. We find consistent results when we use the number of hostile messages received, with the 2SLS estimation of Equation (4).

Next, we turn to heterogenous effects by gender and by gender composition of the team, as part of our pre-registered hypothesis. Table 5 shows the impact on earnings. When we look only at the payoff of the five rounds of quiz completion, men earn 52 cents more than women (p-value = 0.003). This is partly driven by teams where 75 percent or more of the team members were men. Column 2 of Table 5 shows that majority-men teams earn 60 cents more, when compared to teams in which men are in the minority (p-value=0.049). What seems to have a significant negative influence on payoff of the five rounds of quiz completion are team configurations in which the environment is hostile and the majority of team members are men. Those hostile, men-dominated teams earn 98 cents less, when compared to friendly and women-dominated teams (p-value = 0.036). These factors don't seem to affect the overall earned amount of participants, which consists of individual performance pay for a baseline ability quiz and a fixed payoff to complete a choice experiment.

5.3 Mechanisms: Impacts on Score and Nomination Decisions

To understand the mechanisms behind the negative impact of hostile men-dominated teams on quiz payoff, we disaggregate these overall payoff outcomes and look at the scores of the individual quizzes. Recall, that participants complete five rounds of two quizzes per round, of which one quiz is based on a female-typed topic and the other quiz is based on a male-typed topic. This results in a total of 10 quizzes completed per participant.

Impact on Performance Table 6 presents the effect of hostile work environments on these quiz scores. We again find that hostile work environment per se do not noticeably affect quiz scores, regardless of whether the participant works in a majority-men or majority-women team. Overall, men perform better on quizzes when compared to women. This is particularly true for quizzes that are based on male-typed topics: men score 0.14 points more than women and

for male-typed quizzes, men score, on average, 0.26 points higher. The interaction coefficient $\text{hostility} \times \text{Man}$ is positive and noisy, and becomes marginally significant when we add baseline controls (columns 3 and 6), suggesting some heterogenous impact by gender. Such pattern is visible on Figure A3 that suggests that for women, the distribution of scores shifts to the left under the hostile environment (Panel A), particularly for male-type quizzes (Panel C), while the patterns are reversed for men.

Consistent with this result, we find suggestive evidence that hostility affects women’s relative performance with respect to their team members. Figure 4 shows that women are 3.87 pp more likely to perform worse than their team average under hostility (p-value = 0.071). In contrast, these effects are muted for men (-0.02, p-value = 0.202).

Impact on Nomination Decisions However, we show that hostile environments have differential impact in terms of nomination decisions. We define an optimal opt-in decision as a situation in which a participant performed better than their team average for a given question, and nominated themselves. Conversely, an optimal opt-out decision corresponds to a situation in which a participant performed worse than their team average for a given question, and chose not to nominate themselves.

$$\begin{aligned} \text{Optimal Opt-in:} & \quad \text{nominating when } Y_i \geq \bar{Y}_j \text{ with } i \neq j \\ \text{Optimal Opt-out:} & \quad \text{not nominating when } Y_i < \bar{Y}_j \text{ with } i \neq j \end{aligned}$$

Figure 5 shows that hostility has differential impact in terms of optimal opt-in and opt-out decisions for men and women: men are significantly less likely to make optimal opt-out decisions in hostile environments, while their optimal opt-in decisions are unchanged. The effects is consistent across ITT and 2SLS specifications. Although we see a negative noisy point estimate for optimal opt-in decisions for women, their overall nomination decisions are not statistically different across work environments.

5.4 Impact of Hostile Work Environments on Follow-up Choices

Turning to future participation, we next explore whether hostile environments affects participants’ willingness-to-pay (WTP) for game conditions using our incentive-compatible choice

experiment. We asked participants how much of a fixed endowment of CAD\$15 they would be willing to give up in order to switch to the alternative format. Participants had the option to choose between payoff scheme (individual vs. group), quality of exchange (friendly vs. unfriendly), and location (laboratory vs. online). We look at average WTPs after having experienced the hostile and friendly treatments. Results are presented in Figure 6.

Our analysis uncovers important gender disparities. We first look at the WTP for the quality of exchange. Figure 6a shows that there is a significant gender gap in WTP for participants randomly assigned to the friendly work environment, with women valuing this game condition more than men (CAD\$3.12 for women vs CAD\$2.67 for men, equivalent to 21 and 18 percent of the final endowment), that persists for participants assigned to the hostile work environment.

In contrast, we find that while there are no gender differences in WTP for individual payment versus group payment when these participants were assigned to the friendly environment, a significant gender gap emerges for participants assigned to the hostile condition (see Figure 6b). Men’s WTP for individual payment is 84 pp. higher in the hostile compare to the friendly work environments ($p\text{-value}=0.000$), while women’s WTP remains unchanged across environments.

Lastly, Figure 6c shows that men’s WTP for a remote experiment is 62 pp. higher in the hostile compare to the friendly work environments ($p\text{-value}=0.046$), generating a significant 57 pp. gender gap in WTP for participants assigned to the hostile work environment.

Taken together, our results that participants’ experience of hostile work environments significantly affects men’s WTPs for game attributes, while women’s WTPs remain constant across environment.

6 Discussion and Conclusion

This paper investigates whether hostile work environments affect individual and team performance, retention and workplace preferences, and whether these effects differ by gender. These questions address a significant gap in our understanding of the negative dimensions of workplace culture. While our previous work established that workers highly value hostility-free workplaces, whether hostility affects actual performance and team outcomes remained an open question.

Our findings reveal a nuanced picture. On average, working in a hostile environment does not significantly affect individual or team performance. However, this null result masks important heterogeneity. Workers in hostile, male-majority teams earn \$1 less than their counterparts in other conditions, equivalent to approximately 14 percent of their final earnings—an effect that holds regardless of gender. When examining performance, we find that women are marginally more likely to perform below their team average under hostility. Moreover, men tend to make suboptimal nomination decisions under hostility, in particular by being over-confident in their own nomination. These findings suggest that hostility interacts with team gender composition and task characteristics in ways that aggregate analyses may obscure.

Our analysis also uncovers notable gender differences in how workers value hostility-free environments. Women’s willingness to pay for such workplaces remains relatively stable across conditions. For men, however, preferences appear to be shaped by experience: their willingness to pay for individual (versus team-based) compensation structures and remote work increases after exposure to hostility.

These findings carry practical implications for managers, particularly in male-dominated settings. Our results indicate that workplace culture is not merely a matter of employee satisfaction but a meaningful contributor to performance outcomes. Organizations seeking to optimize productivity should attend not only to team composition but also to the interpersonal climate in which work occurs.

Tables and Figures

FIGURE 1. Experimental Flow

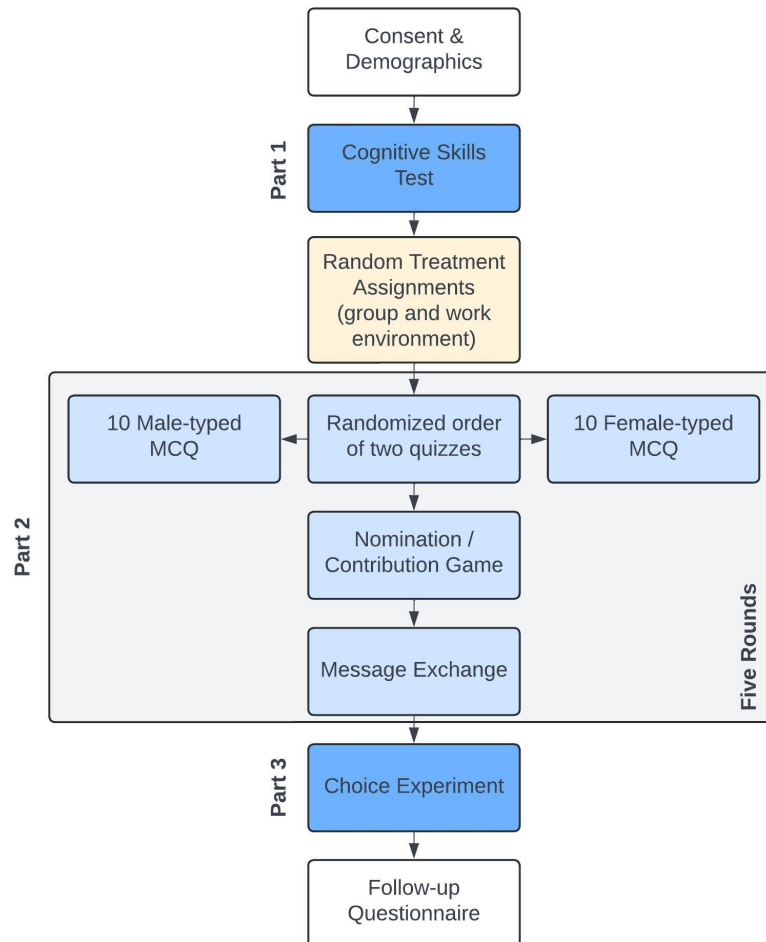
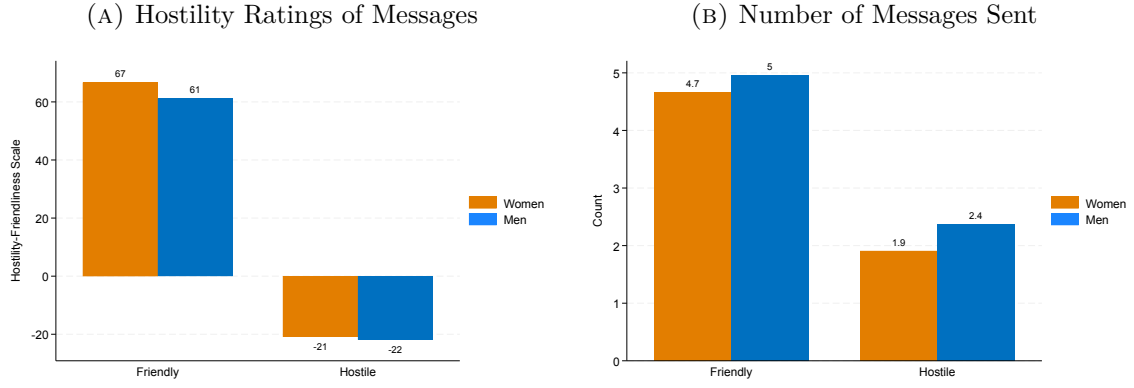
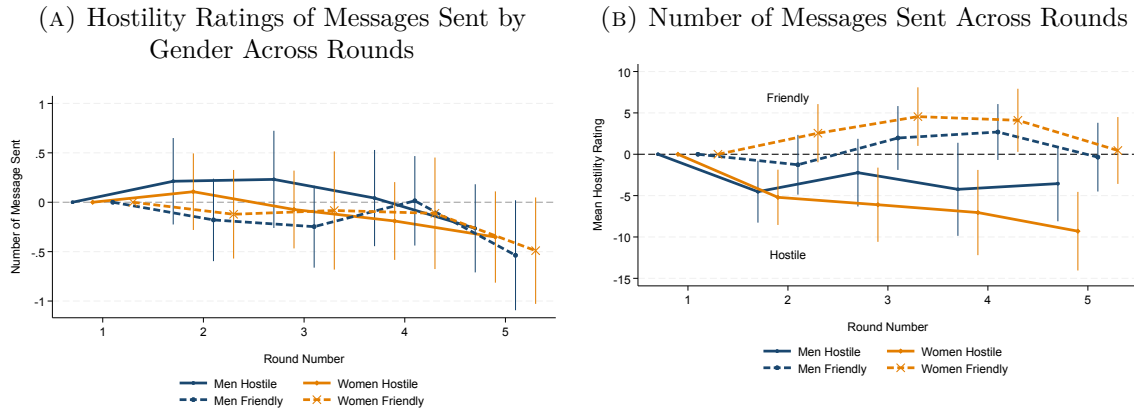


FIGURE 2. Messages Sent by Gender and Hostile Treatment



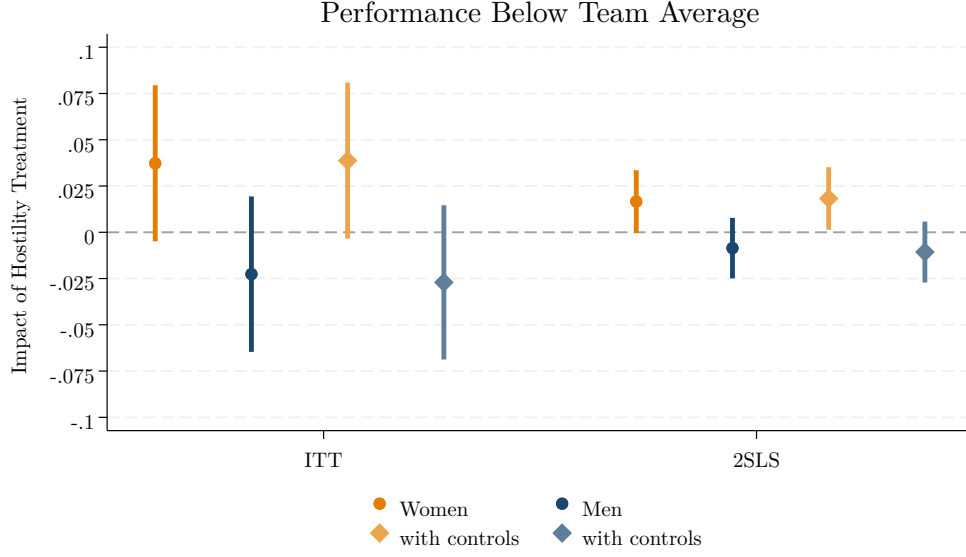
Notes: This figure shows the average number of messages sent (Panel A) and the average hostility of messages sent (Panel B) by gender and across the hostile and friendly treatment.

FIGURE 3. Messages Sent by Gender and Hostile Treatment Across Rounds



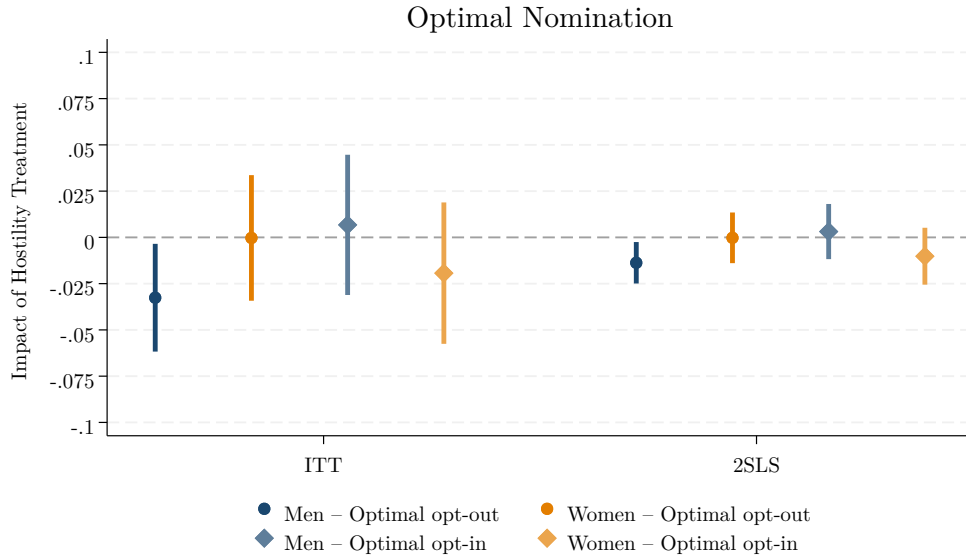
Notes: This figure shows the evolution of the number of messages sent (Panel A) and the average hostility of messages sent (Panel B) across rounds by gender and across the hostile and friendly treatment.

FIGURE 4. Effect of Hostile Treatment on Relative Performance



Notes: This figure shows the impact of the hostility treatment on the probability of performing below other team members by gender. The outcome of interest is a dummy variable equal to one if the individual performs strictly worse than team members for a given round. Coefficients are obtained from separate linear regressions of the hostility treatment on each optimal nomination decisions, separately by gender, for the ITT estimates from Equation (1) and the 2SLS estimates from Equation (4), with the additional of baseline controls (race, major, educational level, baseline cube score performance and political views). Standard errors are clustered at the group level.

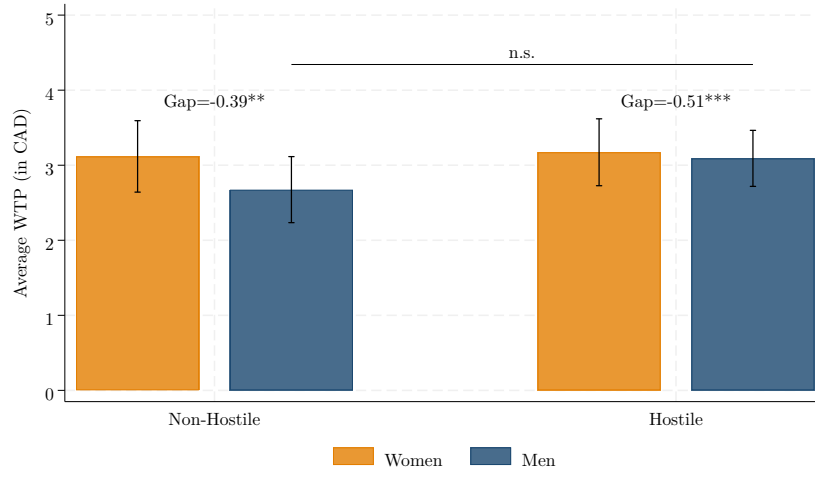
FIGURE 5. Effect of Hostile Treatment on Optimal Nomination Decisions



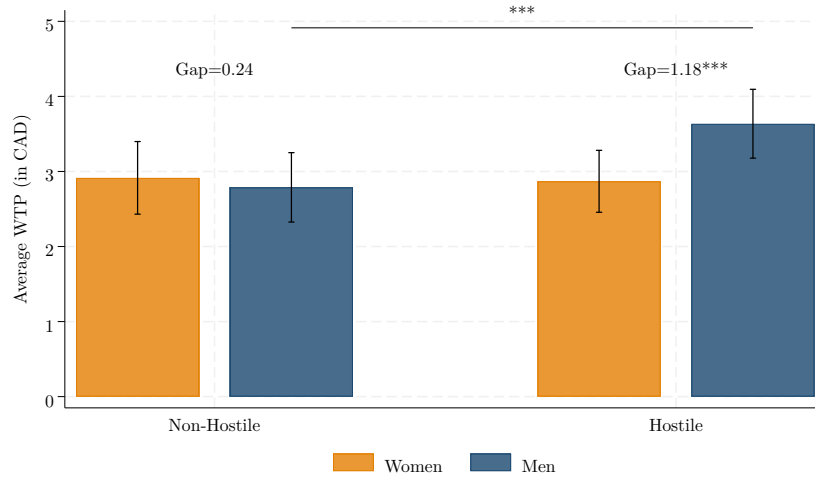
Notes: This figure shows the impact of the hostility treatment on optimal nomination decisions by gender. We define an optimal opt-in decision as a situation in which a participant performed better than their team average for a given question, and nominated themselves. Conversely, an optimal opt-out decision corresponds to a situation in which a participant performed worse than their team average for a given question, and chose not to nominate themselves. Coefficients are obtained from separate linear regressions of the hostility treatment on each optimal nomination decisions, separately by gender, for the ITT estimates from Equation (1) and the 2SLS estimates from Equation (4). Standard errors are clustered at the group level.

FIGURE 6. Effect of Hostile Treatment on Willingness-to-Pay

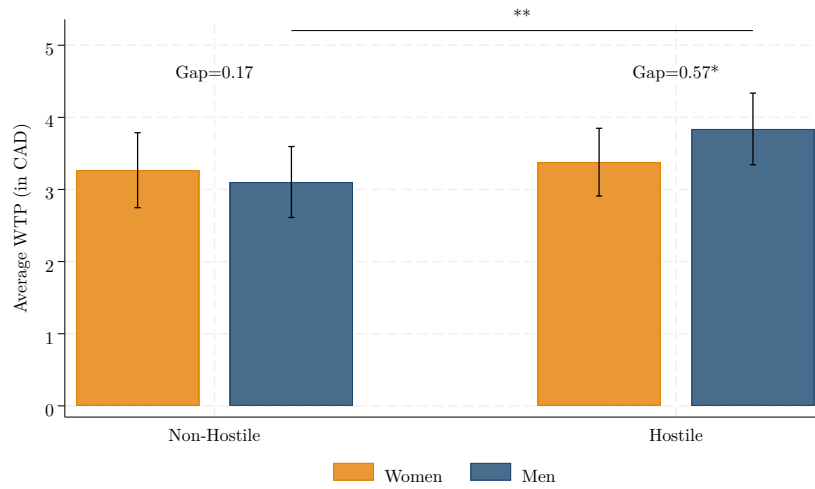
(A) WTP for Friendly Environment



(B) WTP for Individual Payment



(C) WTP for Remote



Notes: This figure shows the average incentive-compatible willingness-to-pay for friendly work environment (Panel A), for individual payment (Panel B) and remote work (Panel C) in CAD\$ by gender, collected at the end of the experiment across the hostile and friendly treatment.

TABLE 1 – SUMMARY STATISTICS

Variables	Mean	S.D	Min	Max	N
Sociodemographic characteristics					
Men	0.489	0.500	0	1	812
Race:					
arab	0.021	0.143	0	1	812
South Asian	0.188	0.391	0	1	812
South East Asian	0.068	0.251	0	1	812
black	0.034	0.183	0	1	812
chinese	0.410	0.492	0	1	812
filipino	0.032	0.176	0	1	812
indigenous	0.002	0.050	0	1	812
japanese	0.017	0.130	0	1	812
korean	0.033	0.179	0	1	812
latino	0.048	0.214	0	1	812
hawaiian	0.001	0.035	0	1	812
white	0.208	0.406	0	1	812
other	0.028	0.166	0	1	812
Education					
High school in Canada	0.575	0.495	0	1	812
Highest completed level of education:					
high school	0.759	0.428	0	1	812
undergraduate	0.153	0.360	0	1	812
secondary	0.052	0.222	0	1	812
graduate	0.026	0.159	0	1	812
community	0.007	0.086	0	1	812
phd	0.002	0.050	0	1	812
na	0.001	0.035	0	1	812
Major:					
Arts & Humanities	0.100	0.300	0	1	812
Business/Management	0.167	0.374	0	1	812
Engineering	0.094	0.291	0	1	812
Life Sciences	0.160	0.367	0	1	812
Physical & Mathematical Sciences	0.172	0.378	0	1	812
Social Sciences	0.307	0.461	0	1	812
Politics					
economic issues: mixed	0.466	0.499	0	1	812
economic issues: conservative	0.139	0.346	0	1	812
economic issues: liberal	0.395	0.489	0	1	812
social issues: mixed	0.347	0.476	0	1	812
social issues: conservative	0.123	0.329	0	1	812
social issues: liberal	0.530	0.499	0	1	812
Baseline Performance					
Cube Score	5.243	2.000	0	9	812
Outcome Variables					
Payoff Five Round of Quizzes	7.148	2.242	0	14	812
Earned Amount	13.175	7.154	5	60	812
Quiz Score - Standardized by Topic	0.000	0.677	-2	1	812
Quiz Score - Standardized by Topic - Female Type Quiz	-0.000	0.731	-2	1	812
Quiz Score - Standardized by Topic - Male Type Quiz	0.000	0.714	-2	2	812
Total Nominations	6.342	1.970	1	10	812
Total Nominations Male Type Quiz	3.138	1.313	0	5	812
Total Nominations Female Type Quiz	3.204	1.310	0	5	812
Total Optimal Nominations	4.091	2.466	0	10	812
Total Optimal Non-Nominations	2.225	1.895	0	9	812

Notes: This table presents summary statistics for the experimental sample.

TABLE 2 – SUMMARY STATISTICS BY GENDER

Variables	Women	Men	Difference	p-value
Sociodemographic characteristics				
Race				
arab	0.017	0.025	0.008	0.350
South Asian	0.152	0.227	0.075***	0.009
South East Asian	0.058	0.078	0.020	0.244
black	0.048	0.020	-0.028**	0.028
chinese	0.467	0.350	-0.117***	0.001
filipino	0.024	0.040	0.016	0.187
indigenous	0.002	0.003	0.000	0.975
japanese	0.019	0.015	-0.004	0.624
korean	0.029	0.038	0.009	0.473
latino	0.060	0.035	-0.025*	0.098
hawaiian	0.002	-0.000	-0.002	0.318
white	0.195	0.222	0.026	0.361
other	0.027	0.030	0.004	0.752
Education				
High school in Canada	0.600	0.549	-0.051	0.129
Highest completed level of education				
high school	0.764	0.753	-0.011	0.731
undergraduate	0.159	0.146	-0.013	0.613
secondary	0.055	0.048	-0.008	0.616
graduate	0.017	0.035	0.018*	0.097
community	0.005	0.010	0.005	0.386
phd	-0.000	0.005	0.005	0.159
na	-0.000	0.003	0.003	0.318
Major				
Arts & Humanities	0.099	0.101	0.002	0.926
Business/Management	0.178	0.156	-0.022	0.396
Engineering	0.065	0.123	0.058***	0.005
Life Sciences	0.222	0.096	-0.126***	0.000
Physical & Mathematical Sciences	0.128	0.219	0.091***	0.001
Social Sciences	0.308	0.305	-0.004	0.908
Politics				
economic issues: mixed	0.470	0.461	-0.009	0.801
economic issues: conservative	0.082	0.199	0.117***	0.000
economic issues: liberal	0.448	0.340	-0.108***	0.003
social issues: mixed	0.328	0.368	0.040	0.260
social issues: conservative	0.072	0.176	0.104***	0.000
social issues: liberal	0.600	0.456	-0.144***	0.000
Baseline Performance				
Cube Score	5.248	5.237	-0.011	0.932
Outcome Variables				
Payoff Five Round of Quizzes	6.948	7.356	0.408**	0.014
Earned Amount	12.971	13.388	0.417	0.403
Quiz Score - Standardized by Topic	-0.106	0.111	0.217***	0.000
Quiz Score - Standardized by Topic - Female Type Quiz	-0.047	0.049	0.096*	0.064
Quiz Score - Standardized by Topic - Male Type Quiz	-0.165	0.172	0.337***	0.000
Total Nominations	6.277	6.411	0.133	0.328
Total Nominations Male Type Quiz	2.836	3.453	0.617***	0.000
Total Nominations Female Type Quiz	3.441	2.957	-0.484***	0.000
Total Optimal Nominations	3.795	4.401	0.605***	0.000
Total Optimal Non-Nominations	2.361	2.083	-0.278**	0.029
N	415	397		

Notes: This table presents summary statistics by gender. Column 3 presents difference in means across genders. Column 4 reports the p-value of a difference in means test across genders.

TABLE 3 – IMPACT ON CONTINUING OUTCOMES

	Enjoyed Teamwork (1 Not At All - 5 Very Much)		Level of Focus (1 Very Low - 5 Very High)		Likelihood of Renewed Participating in Experiment	
	(1)	(2)	(3)	(4)	(5)	(6)
Men	-0.123 (0.101)	-0.054 (0.112)	0.051 (0.093)	0.010 (0.103)	0.040 (0.0934)	0.021 (0.104)
Hostile treatment	-0.300** (0.095)	-0.378*** (0.108)	-0.049 (0.084)	-0.089 (0.092)	0.047 (0.079)	0.017 (0.090)
Hostile treatment $\times$ Man	-0.004 (0.135)	-0.127 (0.158)	-0.013 (0.125)	-0.073 (0.143)	0.023 (0.122)	-0.037 (0.135)
Hostile treatment $\times$ Majority Men Team		0.247 (0.167)		0.121 (0.135)		0.119 (0.127)
Majority Men Team		-0.139 (0.124)		-0.098 (0.098)		0.039 (0.098)
Sample mean	3.596	3.596	3.933	3.933	4.297	4.297
Observations	812	812	812	812	812	812

Notes: This table presents the impact of the hostility treatment on outcomes collected at the end of the experiment. Outcomes include whether participants enjoyed the teamwork (columns 1 and 2), their reported current level of focus (columns 3 and 4) and their reported likelihood of participating in the experiment again (columns 5 and 6). The even columns further present the impact of the hostility treatment interacted with the gender composition of the team. Standard errors are clustered at the team level.

TABLE 4 – IMPACT OF HOSTILITY ENVIRONMENT ON NOMINATION DECISIONS, QUIZZ PERFORMANCE AND PAYOFF

	Total Nominations		Quiz Score Standardized by Topic		Payoff Five Round of Quizzes		Earned Amount	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: ITT								
Hostile treatment	0.175 (0.144)	0.216 (0.142)	-0.019 (0.046)	-0.003 (0.042)	-0.231 (0.264)	-0.249 (0.206)	0.541 (0.965)	0.297 (0.959)
Baseline cube score	No	Yes	No	Yes	No	Yes	No	Yes
Round FE	No	Yes	No	Yes	No	Yes	No	Yes
Team Composition FE	No	Yes	No	Yes	No	Yes	No	Yes
Payment Scheme Change	No	Yes	No	Yes	No	Yes	No	Yes
Baseline Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	8,120	8,120	8,120	8,120	8,120	8,120	8,120	8,120
Panel B: 2SLS								
Hostile Messages	0.079 (0.056)	0.089 (0.055)	-0.011 (0.018)	-0.006 (0.017)	-0.091 (0.101)	-0.096 (0.078)	0.139 (0.369)	0.061 (0.370)
Baseline cube score	No	Yes	No	Yes	No	Yes	No	Yes
Round FE	No	Yes	No	Yes	No	Yes	No	Yes
Team Composition FE	No	Yes	No	Yes	No	Yes	No	Yes
Payment Scheme Change	No	Yes	No	Yes	No	Yes	No	Yes
Baseline Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	7,560	7,560	7,560	7,560	7,560	7,560	7,560	7,560

Notes: This table presents the impact of the hostility treatment on participants' nomination decisions, performance and payoff. Outcomes include participants' total nomination decisions (columns 1 and 2), average quizz score standardized by topic (columns 3 and 4), quizz payoff for the five rounds (columns 5 and 6), and their final payoff (columns 7 and 8) . The even columns further present the impact of the hostility treatment controlling for participants' baseline cube score, round fixed effects, team composition fixed effects, a dummy variable equal one for the three sessions with a different payment scheme (payoff calculated from performance for 3 random rounds to payoff calculated from performance for 2 random rounds), and baseline characteristics such as race, major, educational levels and political views. Panel A presents the ITT estimates from Equation (1). Panel B presents the 2SLS estimates from Equation (4). Standard errors are clustered at the team level.

TABLE 5 – IMPACT ON PAYOFF

	Payoff Five Round of Quizzes			
	ITT	2SLS	ITT	2SLS
	(1)	(2)	(3)	(4)
Men	0.523*** (0.175)	0.524*** (0.175)	0.229 (0.171)	0.228 (0.170)
Hostile treatment	-0.163 (0.237)		0.150 (0.287)	
Total Hostile Messages		-0.064 (0.096)		-0.048 (0.099)
Hostile treatment $\times$ Man	-0.380 (0.282)		0.104 (0.274)	
Total Hostile Messages $\times$ Man		-0.132 (0.108)		0.552 (0.373)
Hostile treatment $\times$ Majority Men Team			-0.975** (0.462)	
Total Hostile Messages $\times$ Majority Men Team				-0.838* (0.480)
Majority Men Team			0.604** (0.306)	0.606** (0.302)
Payment scheme change	Yes	Yes	Yes	Yes
Sample mean	7.148	7.155	7.148	7.155
Observations	8,120	7,560	8,120	7,560

Notes: This table presents the impact of the hostility treatment on participants' payoff, with estimates of the Intention-to-Treat (ITT) in columns 1 and 3, and 2SLS (Columns 2 and 4). Outcomes include participants' quizz payoff for the five rounds. The even columns further present the impact of the hostility treatment interacted with the gender composition of the team. Each regression controls for the payment scheme change occurring after the first three sessions (payoff calculated from performance for 3 random rounds to payoff calculated from performance for 2 random rounds). Standard errors are clustered at the team level.

TABLE 6 – IMPACT ON SCORE

	Quiz Score - Standardized by Topic								
	All Topics			Female Type			Male Type		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Men	0.144** (0.069)	0.081 (0.080)	0.142** (0.069)	0.025 (0.075)	-0.045 (0.087)	0.052 (0.078)	0.264*** (0.073)	0.206** (0.085)	0.233*** (0.072)
Hostile treatment	-0.083 (0.070)	-0.050 (0.078)	-0.069 (0.076)	-0.070 (0.073)	-0.034 (0.082)	-0.057 (0.079)	-0.096 (0.074)	-0.067 (0.083)	-0.081 (0.082)
Hostile treatment $\times$ Man	0.131 (0.093)	0.173 (0.110)	0.168* (0.097)	0.131 (0.103)	0.178 (0.122)	0.190* (0.110)	0.131 (0.096)	0.167 (0.111)	0.146 (0.100)
Hostile treatment $\times$ Majority Men Team		-0.086 (0.110)	-0.002 (0.109)		-0.097 (0.120)	-0.011 (0.118)		-0.076 (0.114)	0.007 (0.114)
Majority Men Team		0.130 (0.079)	0.086 (0.081)		0.142* (0.085)	0.094 (0.085)		0.118 (0.086)	0.078 (0.087)
Controls			Yes			Yes			Yes
Observations	8,120	8,120	8,120	4,060	8,120	8,120	8,120	8,120	8,120

Notes: This table presents the impact of the hostility treatment on quiz score standardized by topic (columns 1 to 3), restricting to female type quizzes (columns 4 to 6) and male type quizzes (columns 7 to 9). Columns 2, 5, and 8 further present the impact of the hostility treatment interacted with the gender composition of the team. In columns 3, 6 and 9, we further control for our baseline characteristics (race, major, educational level and political views). Standard errors are clustered at the team level.

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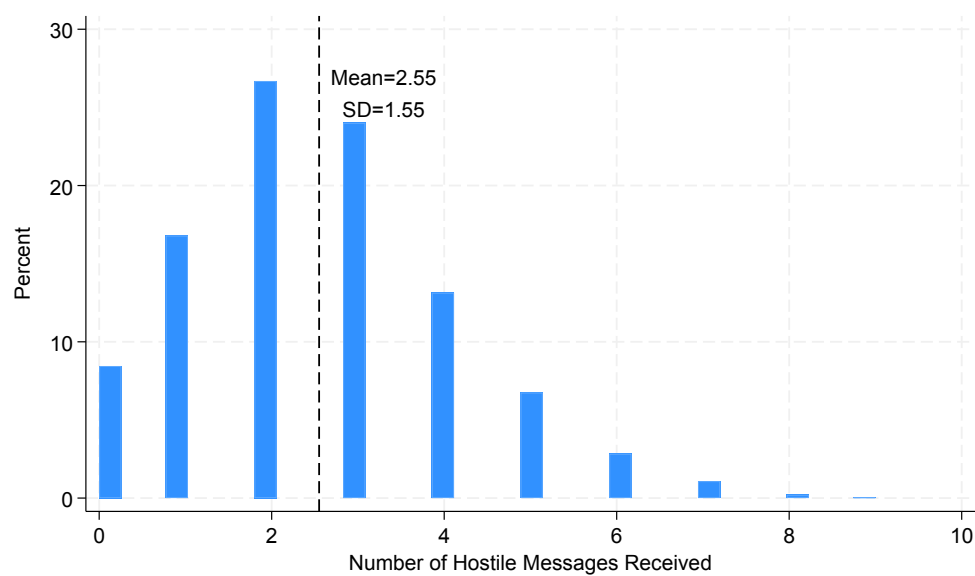
(For Online Publication)

Appendix to Productivity under Hostility

Manuela R. Collis and Clémentine Van Effenterre

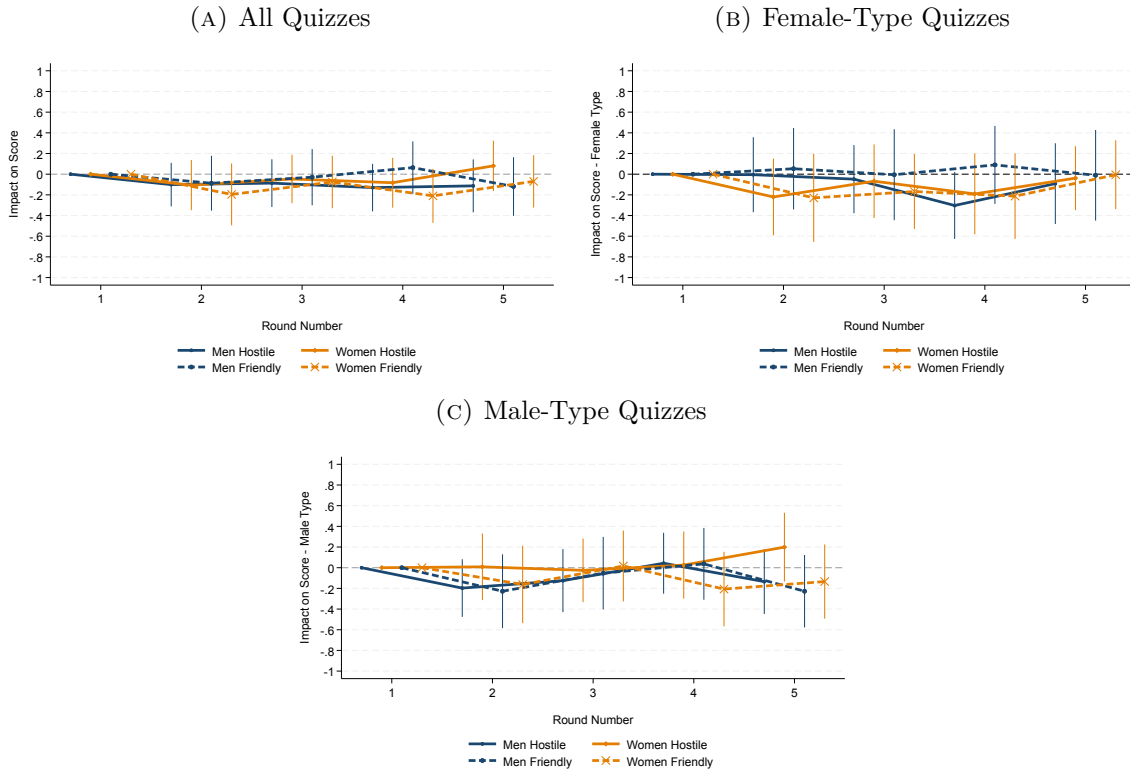
A Additional Tables

FIGURE A1. IV Strategy — Number of Hostile Messages received in Hostile Treatment.



Notes: This figure shows the endogenous variavles in the 2SLS specification described in Equation (4), namely the distribution of number of hostile messages received in hostile treatment.

FIGURE A2. Learning Across Rounds



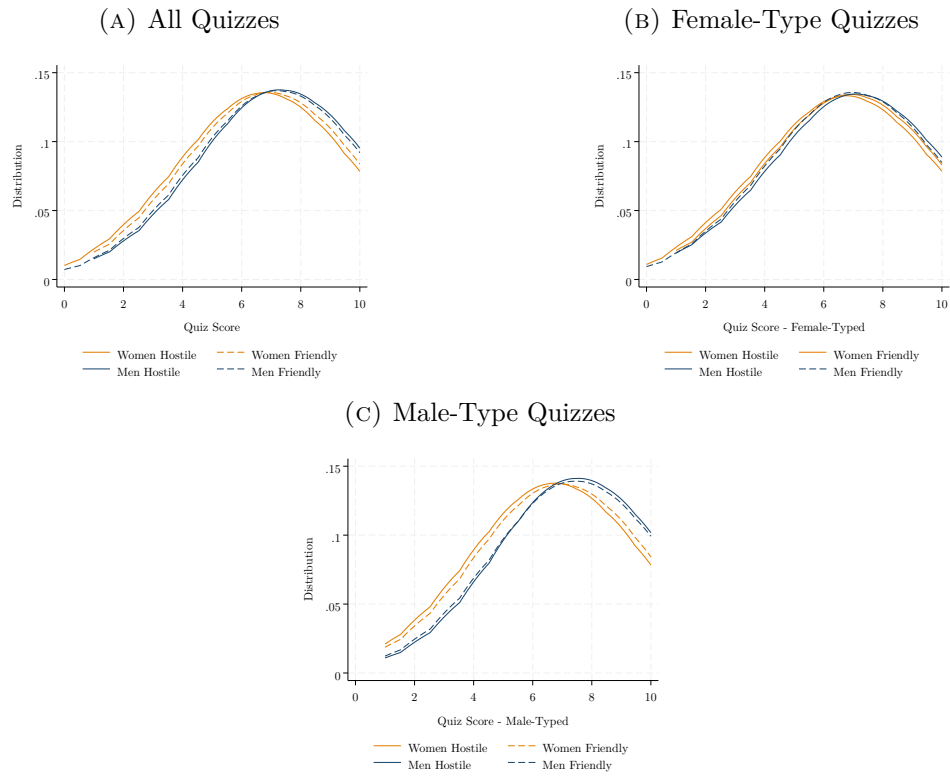
Notes: This figure shows the evolution of performance across rounds, by gender and across the hostile and friendly treatment, for all quizzes (Panel A), female-type quizzes (Panel B) and male-type quizzes (Panel C).

TABLE A1 – MESSAGES BY TREATMENT STATUS

Friendly/Neutral	Hostile
Looks like we are on the same team.	Lol. Our scores are a joke.
We are here to earn money - but let's also have some fun along the way.	At least put some effort...
Congratulations on being selected.	There are some similarities and some differences in our team.
Thank you for nominating yourself. You saved us!	Why did you not nominate yourself?
I'm having a good time.	We are not going to be buddies.
You've got this!	What was that?
This was a strong round!	These scores are embarrassing, someone needs to step it up.
Good luck for the next round!	I'm just here to get this done and earn money.
I'm here to contribute to this.	I've seen sleeping people perform better on these quizzes than us.
We're all here to do our part. Let's see whether luck is on our side.	I'd rather be stranded in a desert than be here.

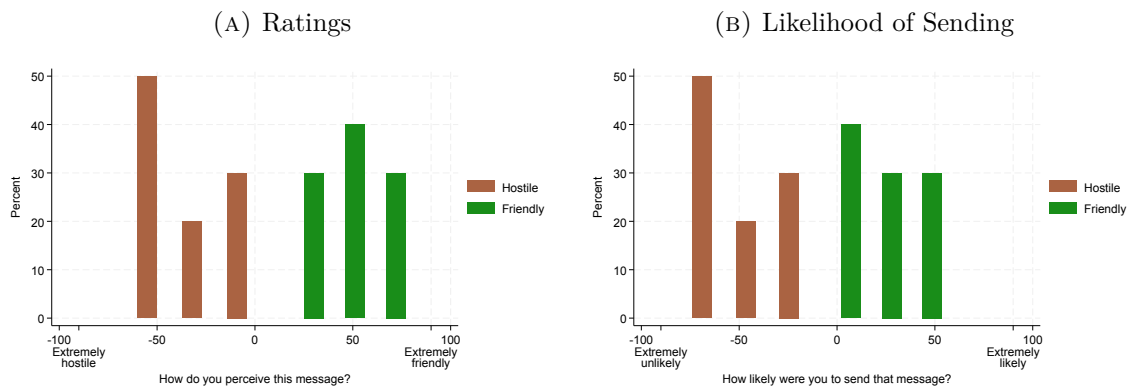
Notes: This table presents the messages available to participants by treatment status.

FIGURE A3. Distribution of Score Across Gender and Treatments



Notes: This figure shows the distribution of scores by gender across treatments for all quizzes (Panel A), female-type quizzes (Panel B) and male-type quizzes (Panel C).

FIGURE A4. External Ratings of Messages



Notes: This figure shows the distribution of hostility score of the messages (Panel A), and participants' likelihood of sending the messages (Panel B), using Cloud Research Connect participants' responses.

TABLE A2 – BALANCING TEST HOSTILE TREATMENT

Variables	Control	Hostile	Difference	<i>p</i> -value
Sociodemographic characteristics				
Men	0.514	0.468	-0.045	0.245
Arab	0.027	0.016	-0.011	0.308
Black or African American	0.016	0.050	0.033***	0.008
Chinese	0.432	0.392	-0.040	0.249
Asian (South; e.g. Indian, Pakistani, Sri Lankan)	0.193	0.185	-0.008	0.757
Asian (Southeast; e.g. Vietnamese, Cambodian, Laotian, Thai)	0.060	0.074	0.015	0.396
Filipino or Indonesian	0.024	0.038	0.014	0.266
Indigenous, First Nations, Native Indian, or Alaskan Native	0.003	0.002	-0.000	0.895
Japanese	0.011	0.023	0.012	0.208
Korean	0.030	0.036	0.006	0.606
Hispanic or Latino/Latina	0.054	0.043	-0.012	0.443
Native Hawaiian or other Pacific Islander	-0.000	0.002	0.002	0.318
White / Caucasian	0.215	0.203	-0.012	0.673
Other / Not Stated	0.027	0.029	0.002	0.851
Education				
High school in Canada	0.560	0.588	0.028	0.410
Highest completed level of education				
high school	0.755	0.761	0.006	0.850
undergraduate	0.155	0.151	-0.004	0.880
secondary	0.038	0.063	0.025*	0.090
graduate	0.035	0.018	-0.017	0.117
community	0.016	0.000	-0.016**	0.012
phd	-0.000	0.005	0.005	0.156
na	-0.000	0.002	0.002	0.318
Major				
Arts & Humanities	0.111	0.090	-0.021	0.310
Business/Management	0.160	0.173	0.013	0.607
Engineering	0.106	0.083	-0.023	0.258
Life Sciences	0.160	0.160	-0.000	0.986
Physical & Mathematical Sciences	0.163	0.180	0.017	0.509
Social Sciences	0.299	0.313	0.014	0.661
Politics				
economic issues: mixed	0.457	0.473	0.016	0.631
economic issues: conservative	0.133	0.144	0.011	0.633
economic issues: liberal	0.410	0.383	-0.027	0.414
social issues: mixed	0.345	0.349	0.004	0.911
social issues: conservative	0.111	0.133	0.021	0.331
social issues: liberal	0.543	0.518	-0.025	0.470
Baseline Performance				
Cube Score	5.182	5.293	0.111	0.412
Test of joint significance	<i>F</i> -stat: 0.700 (<i>p</i> -value: 0.716)			
<i>N</i>	1,840	2,220		

Notes: This table presents balancing test by hostile and friendly environment treatment. Column 3 presents difference in means across treatment and control. Column 4 reports the *p*-value of a difference in means test across treatment and control.

TABLE A3 – BALANCING TEST MAJORITY MEN TREATMENT

Variables	Control	Majority Men	Difference	<i>p</i> -value
Sociodemographic characteristics				
Arab	0.025	0.018	-0.007	0.538
Black or African American	0.044	0.027	-0.017	0.201
Chinese	0.445	0.382	-0.063*	0.070
Asian (South; e.g. Indian, Pakistani, Sri Lankan)	0.154	0.217	0.063**	0.015
Asian (Southeast; e.g. Vietnamese, Cambodian, Laotian, Thai)	0.080	0.058	-0.022	0.213
Filipino or Indonesian	0.027	0.036	0.008	0.517
Indigenous, First Nations, Native Indian, or Alaskan Native	-0.000	0.004	0.004	0.156
Japanese	0.016	0.018	0.001	0.888
Korean	0.025	0.040	0.015	0.189
Hispanic or Latino/Latina	0.049	0.047	-0.003	0.864
Native Hawaiian or other Pacific Islander	0.003	0.000	-0.003	0.317
White / Caucasian	0.203	0.212	0.009	0.760
Other / Not Stated	0.022	0.033	0.012	0.296
Education				
High school in Canada	0.558	0.589	0.032	0.358
Highest completed level of education				
high school	0.731	0.781	0.050	0.109
undergraduate	0.162	0.145	-0.017	0.525
secondary	0.074	0.033	-0.041***	0.009
graduate	0.025	0.027	0.002	0.848
community	0.005	0.009	0.003	0.557
phd	0.003	0.002	-0.001	0.884
na	-0.000	0.002	0.002	0.318
Major				
Arts & Humanities	0.104	0.096	-0.008	0.689
Business/Management	0.165	0.170	0.005	0.849
Engineering	0.088	0.098	0.010	0.608
Life Sciences	0.187	0.138	-0.048**	0.047
Physical & Mathematical Sciences	0.151	0.190	0.039	0.134
Social Sciences	0.305	0.308	0.003	0.922
Baseline Performance				
Cube Score	5.305	5.192	-0.113	0.404
Test of joint significance	<i>F</i> -stat: 0.900 (<i>p</i> -value: 0.476)			
<i>N</i>	1,820	2,240		

Notes: This table presents balancing test by majority men or women team treatment. Column 3 presents difference in means across treatment and control. Column 4 reports the *p*-value of a difference in means test across treatment and control.

B Experimental Instructions

Treatment Design Overview

The experiment uses a 2×2 between-subjects design. The two dimensions vary the **message environment** and whether **group members' gender** is revealed. Everything else— structure, quiz content, payment rules—is identical across treatments.

		Gender Revealed	Gender Not Revealed
Friendly Mes- sages		Treatment A Group assignment shows each member's gender identity. Message menu: supportive, positive messages only.	Treatment C Group assignment shows nicknames only. Message menu: supportive, positive messages only.
	Hostile Messages	Treatment B Group assignment shows each member's gender identity. Message menu: demeaning, hostile messages only.	Treatment D Group assignment shows nicknames only. Message menu: demeaning, hostile messages only.

The two treatment dimensions affect exactly **two screens**:

- **Screen 22** (Group Assignment) — gender tag shown vs. absent.
- **Screens 30 & 47** (Message Selection & Follow-Up Questionnaire) — friendly vs. hostile message menu; gender-guessing questions present vs. absent.

All other screens are identical. The treatment-variant versions of those screens are shown side-by-side at the relevant points below (preceded by the shared screens for context).

Screen 1: Participant Login

Welcome

Please enter your participant label.

[Next]

Screen 2: Introductory Welcome

Welcome

You are invited to complete the introductory portion of the experiment now.

You are about to complete the informed consent form. Once all participants have given their consent to participate in the experiment, I will read the experiment instructions.

[Next]

Screens 3–4: Informed Consent (Page 1)

Informed Consent

You are being asked to take part in a research study being done by Clémentine Van Effenterre from University of Toronto. The purpose of this research is to better understand decision-making processes. Your participation will take approximately 1 hour and 20 minutes to complete. As a participant, you will complete cognitive tests of multiple-choice questions, answer a series of questions about those tests, and answer a short follow-up questionnaire.

This study has several parts. In each part, you will receive clear instructions and will be told how your decisions in that part will influence your earnings in the experiment. Your earnings may also depend on the decisions of other participants in the laboratory right now. In some parts of the experiment, you may have the opportunity to exchange messages with another participant in the laboratory right now.

You will remain anonymous to other participants throughout the experiment. These data may be identifiable to the researcher at first and linked to university-held data but turned

into anonymous (non-identifiable) data for analysis and publication. In the future, this non-identifiable data may be shared with other researchers or participants.

There is a chance that you will be invited back for a follow-up study. The follow-up study is similar in format to today's study but will pay twice the amount for completion (\$10 in show-up fee and \$20 in completion award). The follow-up study will take place in April or May. Selected participants will be contacted three weeks before the follow-up study.

Your participation is completely voluntary. You can agree to take part and later change your mind.

This study does not deceive you by providing misleading or incorrect information. All our communications are truthful, but we may not always reveal all information. Specifically, there are different versions of this study. While you will be fully informed about the version of this study that you have been randomly assigned to, you will not be informed about different versions of this study that other participants are in.

Screen 5: Informed Consent (Page 2)

The principal investigator of this study is Clémentine Van Effenterre from University of Toronto. If you have any questions, concerns, or complaints, or think this research hurt you, talk to the research team at c.vaneffenterre@utoronto.ca. If you have questions about your rights as participants, you can contact the Research Oversight and Compliance Office – Human Research Ethics Program at ethics.review@utoronto.ca or 416-946-3273.

The research study you are participating in may be reviewed for quality assurance to make sure that the required laws and guidelines are followed. If chosen, (a) representative(s) of the Human Research Ethics Program (HREP) may access study related data and/or consent materials as part of the review. All information accessed by the HREP will be upheld to the same level of confidentiality that has been stated by the research team.

If you would like a summary of the results of this research (once the study has been completed), please email c.vaneffenterre@utoronto.ca.

Compensation

You will receive a \$5 show-up fee and an additional \$10 for completing the experiment. Additional payments will be earned depending on decisions and performance during the experiment. We guarantee pay of at least \$17 for each participant and an average payment across all participants of at least \$20.

Yes, I would like to voluntarily participate
in this experiment.

No, I decided against my participation and
would like to exit the study now.

Screen 6: Waiting for Consent

Waiting for participants to complete the consent form.

Once all participants have given their consent to participate in the experiment – I will read the experiment instructions.

It is important that you stay on this page while you wait. Please do not switch to another tab while you wait – you will not receive a pop-up notification when your experimental session is ready.

[*progress bar*]

Screen 7: Overview and General Instructions

Please wait on this page until I have read the instructions.

Overview

Thank you for joining this research study today.

Phone, Internet, and Other Distractions

At this time, please turn off and/or put away any electronic devices/phones/other things you may have brought with you. You are not permitted to browse the internet at any time during this experiment.

During this experiment, you will be working in groups. To move along swiftly and complete this study well within the provided time, your group members rely on you giving this study your full attention, just as you will rely on your group members giving this study their full attention. We ask you to please focus on the tasks for this study.

General Roadmap

This experiment consists of a pre-experimental questionnaire and three main parts, followed by a post-experimental questionnaire. Two of the three parts will ask you to complete cognitive tests of multiple-choice questions, answer a series of questions about those tests and make decisions which may affect you and others. We will explain everything clearly to you as you move through the study. Note that this experiment contains understanding questions. These understanding questions will help us make sure you understand what we ask of you.

You will be paid in cash and dismissed at the conclusion of the experiment, when all participants in the laboratory have completed the experiment. This will take no longer than 80 minutes.

Screen 8: Earnings and Understanding Questions

Earnings and Timeline for Payout

You will receive a combined show-up and completion fee of \$15. On top of that, you will have the opportunity to earn an additional payment. The additional payment can range from \$0 to \$27. The average total payment is \$22.

There will be no further instructions read aloud moving forward, but if you have any questions at any point of this experiment, please raise your hand, and I will come over to assist you.

Understanding Question 1: For completing this study, how much payment will you receive?

- ☐ \$15 + a guaranteed bonus payment within one week.
- ☐ \$15 + no chance of bonus payment.
- ☐ \$15 + the chance to earn an additional bonus payment.

[correct]

Understanding Question 2: Your additional payment will:

- ☐ ...not depend on your decisions in the part-that-counts.
- ☐ ...be equal to \$1 regardless of your decisions in the part-that-counts.
- ☐ ...depend on my decisions and potentially decisions of others in the part-that-counts.

[correct]

Once you are ready to participate, please type this exact sentence into the box below:

I will complete this 80-minute study with my full attention.

[Next]

Screen 9: Pre-Experimental Questionnaire Start

Excellent! Please click Next to begin with the pre-experimental questionnaire. [Next]

Screen 10: Demographics (Page 1)

Demographics

What is your year of birth? [dropdown]

What is your gender identity?

☐ Man ☐ Trans Man ☐ Non-Binary ☐ Woman ☐ Trans Woman ☐ Other

What ethnicity or race best describes you? *(Please select all that apply)*

☐ Asian (South) ☐ Asian (Southeast) ☐ Asian (West) ☐ Arab ☐ Black or African American ☐ Chinese ☐ Filipino or Indonesian ☐ Indigenous / First Nations ☐ Japanese ☐ Korean ☐ Hispanic or Latino/Latina ☐ Native Hawaiian or Pacific Islander ☐ White / Caucasian ☐ Not Stated

Preferred pronoun: ☐ he/him/his ☐ she/her/hers ☐ they/them/theirs

Screen 11: Demographics (Page 2)

Did you attend high school in Canada? ☐ Yes ☐ No

What is your highest completed level of education?

- ☐ No formal qualification ☐ Secondary education ☐ High school diploma/A-levels
☐ Technical/community college ☐ Undergraduate degree (BA/BSc/other)
☐ Graduate degree (MA/MSc/MPhil/other) ☐ Doctorate degree (PhD/other)
☐ Don't know / not applicable

What is your political orientation on economic issues?

- ☐ Consistently liberal ☐ Mostly liberal ☐ Mixed ☐ Mostly conservative ☐ Consistently conservative

What is your political orientation on social issues?

- ☐ Consistently liberal ☐ Mostly liberal ☐ Mixed ☐ Mostly conservative ☐ Consistently conservative

[Next]

Screen 12: Questions About You (Icebreaker)

Some Questions About You

In this experiment, you will work with others. To get to know one another, you will learn a few pieces of information about one another. Your answers to the questions below will help us putting together those pieces of information.

Which cuisine do you prefer? ☐ Italian ☐ Thai

What is prettier? ☐ Sunset ☐ Sunrise

Which vacation destination do you prefer? ☐ Mountains ☐ Beach

Which burger chain serves the better burger? ☐ McDonalds ☐ Burger King

Have you ever been to the Shoe museum on Bloor/St. George? ☐ Yes ☐ No

How would you rate the Athletic Centre?

- ☐ Mediocre ☐ Fine ☐ Great ☐ I have never been to the Athletic Centre

[Next]

Screen 13: Transition to Part 1

Thank you! You are about to start Part 1 of this experiment.

Please click Next to learn more about what Part 1 entails. [Next]

Screen 14: Introduction to Part 1 (Cube Quiz)

Introduction to Part 1

These are the instructions for the first part of the experiment. In this part, you will complete a quiz of 10 questions. Each question will provide you with an unfolded cube and four folded cubes. Your task is to find the one cube among the four folded cubes that matches the unfolded cube.

Here is a practice question for you to solve (note that this question is simply for you to practice and does not influence your payments in any way):

[Cube diagram: unfolded net with dot, line, and wave markings; four folded cube options (A), (B), (C), (D).]

What does the resulting cube look like if you fold this cube together?

☐ A ☐ B ☐ C ☐ D

Payments

You will earn \$0.50 in additional bonus payment for every question you answer correctly. You will receive \$0 for any question you answer incorrectly or that you skip.

Please answer the practice question above and click “Next” to see whether you answered it correctly. You will not be forwarded to the beginning of the quiz yet.

[Next]

Screen 15: Practice Answer Feedback

That’s correct.

When you click Next, the cube quiz will begin. [Next]

Screen 16: Part 1 Quiz Questions (repeated $\times 10$)

Cube Quiz – Question k out of 10

Time left to complete this page: **0:21**

[Cube diagram with four options (A), (B), (C), (D)]

What does the resulting cube look like if you fold this cube together?

☐ A ☐ B ☐ C ☐ D [Next]

Screen 17: Part 2 Overview

Part 2 – Overview

You are going to complete Part 2 of this study in a group.

On the next page, you are going to be randomly paired with three other participants who are in the lab right now.

Once you have been successfully paired with your group members, you will complete 5 rounds with your group. In each round, you are asked to complete two short quizzes, each of which will have the chance to be selected as the group payment. The quizzes will be on a variety of topics and will each take at most four minutes. We have piloted this study and found that each round takes approximately six to ten minutes total.

Please click Next once instructed to do so. [Next]

Screen 18: Part 2 Quiz and Payoff Instructions

Quizzes

In each of the five rounds, you and your group members will be given two quizzes to solve. The style is similar to the Part 1 quiz, but the topic of the quizzes will vary. Each of the two quizzes will involve solving 10 multiple-choice questions on topics such as Psychology, History,

or Computer Science. You will be given 25 seconds to solve each question, and each group member will solve the same two quizzes separately in any given round. After you completed the two quizzes, you will be able to choose whether you want your quiz performances to nominate as the group payment. For each round, among all the nominated quiz performances, one nomination for each quiz will be selected at random to count as the group performance. There is a chance that this group outcome will determine your additional earnings. Note, that in each round, you will learn who nominated their own performance.

Payoff

Since each of the five rounds consists of two quizzes, you are going to complete ten quizzes in total for Part 2. Two out of these ten quizzes will be randomly selected to count towards your bonus payment. For each of these two quizzes, we will randomly determine whether your individual performance will count toward your bonus payment or whether the nominated-and-selected group member's performance will count toward your bonus payment. We'll call the latter the group performance. You will receive \$0.50 per correctly solved question for the two randomly selected quiz performances.

Note that you will receive \$0 in bonus payment if nobody nominates themselves for a given quiz and that quiz's group performance has been randomly chosen to determine part of your bonus payment.

As you move through this part of the experiment, you will be given detailed information about the quizzes, your choices, and the choices of your team members.

Screen 19: Part 2 Understanding Questions

Understanding Question 1: What does Part 2 entail?

- ☐ Working in a group of four and solving quizzes. *[correct]*
- ☐ Completing a survey on one particular topic.
- ☐ A typing task which I can complete while I do other things on the side.

Understanding Question 2: How will Part 2 determine part of your additional payment?

- ☐ My additional payment will only depend on how well I perform on a randomly selected

round of quizzes.

- ☐ My additional payment will depend on two randomly selected quizzes. For each of these two quizzes, the payoff will depend on my personal performance with a 50% chance and depend on the group performance with a 50% chance. *[correct]*
- ☐ My additional payment will depend on three randomly selected quizzes. For each of these three quizzes, the payoff will depend on my personal performance with a 50% chance and depend on the group performance with a 50% chance.

Understanding Question 3: If Part 2 is selected, how much will you receive in additional pay for each correctly solved question in the quizzes selected to determine your additional payment?

- ☐ I will receive a fixed amount of \$7 regardless of how well I or my group members perform.
- ☐ I will receive \$0.50 in additional pay for each correctly solved question in the quizzes that have been selected to determine my additional payment. *[correct]*
- ☐ I will receive \$0.50 in additional pay for my performance on three quizzes of my choice.

[Next]

Screen 20: Nickname Selection and Pairing

That's correct!

You'll now be paired with three other participants.

Please select the Nickname you'd like to use in the Group:

[dropdown: Sky, Comet, Galaxy, Pixel, Spark, Cedar, Sunny, ...]

Once you are ready to continue, please click Next to be paired with three other participants.

[Next]

Screen 21: Waiting for Group Pairing

Please wait for pairing with three others

You are being paired with three other participants who are in the room right now. You are expected to stay on this page until you receive the confirmation that you have been successfully paired. This will take no longer than 5 minutes. It is important that you stay on this page while you wait. Please do not switch to another tab while you wait – you will not receive a pop-up notification when your experimental session is ready.

[*progress bar*]

Screen 22: Group Assignment [TREATMENT VARIES: gender tag shown vs. absent]

Treatments A & B — Gender Revealed

Group Assignment

Congratulations, you have been grouped with three individuals who are in the lab right now.

You are **Galaxy** (*she/her*), and this is your group:

- **Cedar** (*he/him*)
- **Sunny** (*she/her*)
- **Younge** (*she/her*)

We put together some random facts about your group members so that you get to know them:

- **Cedar** finds the Athletic Centre mediocre.
- **Sunny** prefers Thai over Italian cuisine.
- **Younge** has been to the Shoe museum on Bloor/St. George.

You will complete all five rounds of Part 2 with your three group members.

Please click Next to continue to the description of the first quiz. [Next]

Treatments C & D — Gender Not Revealed

Group Assignment

Congratulations, you have been grouped with three individuals who are in the lab right

now.

You are **Galaxy**, and this is your group:

- **Cedar**
- **Sunny**
- **Younge**

We put together some random facts about your group members so that you get to know them:

- **Cedar** finds the Athletic Centre mediocre.
- **Sunny** prefers Thai over Italian cuisine.
- **Younge** has been to the Shoe museum on Bloor/St. George.

You will complete all five rounds of Part 2 with your three group members.

Please click Next to continue to the description of the first quiz. [Next]

Screen 23: Round 1 – Quiz 1 out of 2 Instructions

Round 1 – Quiz 1 out of 2

You begin now with Round 1. You will complete two quizzes which are followed by nomination decisions.

Topic: Verbal

This quiz consists of 10 multiple-choice questions related to the following topic: **Verbal**. Each of the 10 questions will appear on a separate page and you will be given 25 seconds per question. The computer will keep time for you.

Payments

You will earn \$0.50 for every question you answered correctly if this quiz is randomly selected to count as your individual performance toward your bonus payment. If this is any of your group members' nominated-and-selected quiz, that group member will earn \$0.50 for every question you answered correctly. In either case, everyone will receive \$0 for any question you answer incorrectly or that you skip.

Please click Next to begin the quiz. [Next]

Screen 24: Quiz Questions (repeated $\times 10$ per quiz)

Quiz 1 – Question 1 out of 10

Time left to complete this page: **0:20**

Topic: Verbal

VERBAL/ENGLISH LANGUAGE: If there's an error, select the one underlined part that must be changed to make the sentence correct. If there's no error, select No error.

One of the greatest athletes that the United States
ever produced was Jim Thorpe, who was the first
winning gold medals in both the pentathlon and
decathlon. No error

- (A) (B) (C) (D)
(E)

☐ E ☐ C ☐ D ☐ A [Next]

Note: If "Next" is clicked without an answer, a caution popup appears:

Caution! Caution, you are about to continue without
answering the question. [Cancel] [Continue]

Screen 25: Round 1 – Quiz 2 out of 2 Instructions

Round 1 – Quiz 2 out of 2

Topic: Engineering

This quiz consists of 10 multiple-choice questions related to Topic **Engineering**. Each of the 10 questions will appear on a separate page and you will be given 25 seconds per question. The computer will keep time for you.

Payments

You will earn \$0.50 for every question you answered correctly if this quiz is randomly selected to count as your individual performance toward your bonus payment. If this is any of your group members' nominated-and-selected quiz, that group member will earn \$0.50 for every question you answered correctly. In either case, everyone will receive \$0 for any question you answer incorrectly or that you skip.

Please click Next to begin with the quiz. [Next]

Screen 26: Quiz Completion Confirmation

Congratulations!

Congratulations, you have completed the questions related to this test.

Please click Next to continue to your nomination decisions. [Next]

Screen 27: Round 1 – Nomination Decision

Round 1 – Nomination Decision

In this round, you have completed quizzes on the following two topics: **Verbal** and **Engineering**.

Please select below which of your test performances you would like to nominate.

Recall that if more than one group member nominates one of their quiz performances, the group contribution will be determined randomly. If no group member nominated themselves for a given quiz, the group performance of that quiz will be \$0.

- ☐ Quiz 1: Verbal
- ☐ Quiz 2: Engineering
- ☐ I don't want to nominate any of my quiz performances

[Next]

Error if no selection: These fields are required!

Error if quiz and “No Nomination” both checked:

Error, you can't choose to Nominate and No Nomination at the same time

Screen 28: Waiting for Nomination Decisions

Please wait here for the nomination decisions

Congratulations, you submitted your nomination decision.

Please stay on this page. You will be automatically forwarded to the next page once every group member made their nomination decision. The next page will present the nomination decisions.

[progress bar]

Screen 29: Nomination Decisions Summary

Nomination Decisions

Sample outcome: Galaxy (you) and Younge nominated Quiz 1 (Verbal); Galaxy's nomination was randomly selected. Cedar nominated Quiz 2 (Engineering); Sunny chose not to nominate.

Current Round				
Topic	Galaxy (you)	Cedar	Sunny	Younge
Quiz 1: Verbal	Galaxy decided to nominate herself. Selected			Younge decided to nominate herself.
Quiz 2: Engineering		Cedar decided to nominate himself.		
No Nomination			Sunny decided not to put forward a nomination.	

Average score of all group members		
Quiz	Topic	Average
Quiz 1	Verbal	6.3
Quiz 2	Engineering	5.8

Please press Next to know about the payment decision. [Next]

Screen 30: Payment Decision and Message Selection [TREATMENT VARIES: message menu]

The payment decision table (showing group nominations with “**Selected**” highlighted) is identical across treatments and mirrors Screen 29. Below it, participants select messages. The message menu differs by treatment:

Treatments A & C — Friendly Messages

Select messages to send to Cedar: Select messages to send to Sunny: Select messages to send to Younge:

For each group member, participants choose up to 3 messages from:

- ☐ Great effort on the quizzes!
- ☐ Keep it up, we're doing well!
- ☐ I really enjoyed working with our group.
- ☐ Thanks for your contribution this round.
- ☐ You're a great teammate.
- ☐ I'm glad we're in the same group.
- ☐ Good luck on the next quiz!
- ☐ We make a solid team.
- ☐ I appreciate working with you.
- ☐ Nicely done — let's keep it up.
- ☐ There are some similarities and some differences in our team.
- ☐ I'm looking forward to the next round with you.
- ☐ No message should be sent

Treatments B & D — Hostile Messages

Select messages to send to Cedar: Select messages to send to Sunny: Select messages to send to Younge:

For each group member, participants choose up to 3 messages from:

- ☐ I'm just here to get this done and earn money.
- ☐ Lol. Our scores are a joke.
- ☐ What was that?
- ☐ I don't care about these quizzes.
- ☐ I'm already counting down the seconds until this is over.
- ☐ At least put some effort...
- ☐ There are some similarities and some differences in our team.
- ☐ I'd rather be stranded in a desert than be here.
- ☐ These scores are embarrassing, someone needs to step it up.
- ☐ We are not going to be buddies.

- ☐ I've seen sleeping people perform better on these quizzes than us.
- ☐ Why did you not nominate yourself?
- ☐ No message should be sent

[Next]

Screen 31: Waiting for Messages

Please wait ...

Please wait for the other players in the group to send messages.

[progress bar]

Screen 32: Received Messages

You received the following messages from your team members:

Sunny: I'm just here to get this done and earn money.

Young: There are some similarities and some differences in our team.

Young: We are not going to be buddies.

Please click "Next" to Continue. [Next]

Screen 33: Round Completion

Congratulations!

Congratulations, you completed Round 1 out of 5.

Please click "Next" to continue to Round 2. [Next]

(After Round 5: "Congratulations, you completed Round 5 out of 5. Please click "Next" to continue.")

Screen 34: Part 3 Instructions

Part 3

Recall that there is a chance that you will be invited back for a follow-up study. The follow-up study is similar in format to today's study but will pay twice the amount for completion (\$10 in show-up fee and \$20 in completion award). Your chances for additional payments will be identical to today's session. The follow-up study will take place once data collection for Session 1 is completed, likely at the end of this semester. Selected participants will be contacted three weeks prior to the follow-up study.

In this Part, you have the opportunity to change the format of your follow-up study, should you get invited back. Specifically, you will be presented with seven scenarios. In each scenario, you will be able to give up a portion of your fixed earnings (up to \$15) to participate in the alternative format. The alternative format is shown in the right-hand side column.

Note, that with every additional dollar you decide to give up, your chances to play the alternative format increases. If you decide to give up \$0 in your implemented decision, then the follow-up study will be completed in the default format with 100% certainty. If you decide to give up \$15 in order to opt into the alternative format, then the follow-up study will be completed in the alternative format with a 100% certainty and in the default format with a 0% certainty. We will explain this again when you make your decisions.

Recall, if this decision is randomly selected and implemented in your follow-up study, you will be paired with people who have the same preferences as you do. If there are no individuals with the same preferences, we will pair you with participants whose preferences come closest to yours.

Should you be selected for the follow-up study, one of your choices will be implemented. Thus, your decisions are consequential.

Payments

If Part 3 is selected to count as your part-that-counts in this session 1, then you will earn a fixed \$1.50 in additional earnings.

Screen 35: Part 3 Understanding Questions

Understanding Question: How much will you earn for completing Part 3?

- ☐ For completing Part 3, you will earn a fixed \$1.50 in additional earnings. *[correct]*
- ☐ I will not earn any additional payment for completing Part 3.

Understanding Question: In each scenario, what are you asked to do?

- ☐ Close my eyes and randomly select one of the two options.
- ☐ Carefully evaluate the two versions and indicate how much of your fixed earnings you would be willing to give up to participate in the alternative format. *[correct]*

Understanding Question: What happens with my decisions in Part 3?

- ☐ Should I be selected to return to the laboratory to participate in the follow-up study, then one of my decisions will be implemented for my follow-up study. *[correct]*
- ☐ I will have to participate in the follow-up study for sure, and all of my decisions from Part 3 will be implemented.

[Next]

Screen 36: Pre-Part 3 Question

Before we begin with Part 3, please answer the following question:

How likely is it that you would return to this experiment?

☐ Extremely unlikely ☐ Unlikely ☐ Neither likely nor unlikely ☐ Likely ☐ Extremely likely

[Next]

Screens 37–43: Decision d out of 7 (WTP Elicitation)

Decision 1 out of 7

In the follow-up study, your show-up and completion fee combined will be \$30. By default the format of your follow-up study will be as shown in the left-hand side column. You will be

able to give up a portion of your fixed earnings (up to \$15) to participate in the alternative format.

How much of these \$15 would you be willing to give up to participate in the alternative format instead? Recall, if this decision is randomly selected and implemented in your follow-up study, you will be paired with people who have the same preferences as you do.

Default:	Alternative format:
In Part 2, the group outcome (random selection of one nominee per quiz) determines your additional earnings.	In Part 2, the group outcome (random selection of one nominee per quiz) determines your additional earnings.
Only unfriendly exchanges among team members are possible.	Only friendly exchanges among group members are possible.
The experiment takes place in the laboratory.	The experiment takes place in the laboratory.

How much of these \$15 would you be willing to give up?

\$0

\$15

[Slider from \$0 to \$15; default position: \$0. Participant must move the slider before proceeding.]

[Next]

Screen 44: Main Experiment Completion

Congratulations!

Congratulations, you completed the main portion of the experiment.

Thank you for your participation.

All that follows is a short questionnaire. Note that your answers to these questions will not influence your payments.

Once you have completed the questionnaire, you will reach the end of the experiment and learn about your total payment.

Please click Next to continue. [Next]

Screen 45: Follow-Up Questionnaire (Page 1 – Stress & Enjoyment)

Follow-Up Questionnaire

Please indicate your current level of stress below.

☐ Very low ☐ Low ☐ Moderate ☐ High ☐ Very high

Please indicate how much you enjoyed the teamwork.

☐ Not at all ☐ A Little ☐ Somewhat ☐ A Lot ☐ Very Much

How likely is it that you would participate in today's experiment again?

☐ Extremely unlikely ☐ Unlikely ☐ Neither likely nor unlikely ☐ Likely ☐ Extremely likely

[Next]

Screen 46: Follow-Up Questionnaire (Page 2 – Major & Email)

Follow-Up Questionnaire

What college major do/did you complete? [dropdown]

If you are completing a double-major, what is your second college major (optional)? [dropdown]

What is your University of Toronto email address?

This information is required to contact you for the follow-up study should you get selected. Note that we will retain this email until the participants have been selected for the follow-up study. It will be removed before any data is analyzed.

[Next]

Screen 47: Follow-Up Questionnaire (Page 3 – Group Members)

Follow-Up Questionnaire

And a few questions about your group members:

How much did you enjoy working with Cedar?

☐ Not at all ☐ A little ☐ Somewhat ☐ A lot ☐ Completely

If you had to guess, what is Cedar's college major?

☐ Arts & Humanities ☐ Commerce/Management (Rotman) ☐ Engineering
☐ Life Sciences ☐ Physical & Mathematical Sciences ☐ Social Sciences

If you had to guess, what gender was Cedar?

☐ Man ☐ Trans Man ☐ Non-Binary ☐ Woman ☐ Trans Woman ☐ Other

(Repeated for Sunny and Younge.)

[Next]

Screen 48: Follow-Up Questionnaire (Page 4 – Debrief)

Follow-Up Questionnaire

If you had to guess, what do you think was the study about? Please answer in one or more full sentences.

(multi-line)

Do you have any comments or feedback related to this study? (optional)

Was there anything confusing or weird about this study? (optional)

[Next]

Screen 49: Earnings Summary

Your Earnings Summary

Participant ID: 1002

Description	Amount (\$)
Show-up fee	\$5.00
Completion fee	\$10.00
Part 1 earnings	\$3.00
Part 2 earnings	\$4.50
Part 3 earnings	\$1.50
Total earnings	\$24.00

Note that your earnings have been rounded up to the next whole dollar.

Thank you very much for your participation!

How to claim your earnings:

Please remain seated and fill out the receipt until your row is called. Once your row is called, please bring your **(completed) receipt, the pen, and all your belongings** to the experimenter's table to receive your payment. You are then free to leave.