results

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Describing main variables of interest

First, we explored the characteristics of the main practice variables in the dataset. Across conditions, 45.51% of all participants chose to practice, with 48.22% choosing to practice in the piece-rate payment condition and 49.73% choosing to practice in the tournament payment condition. This difference in the choice to practice across conditions is significant when condition is included as a predictor alone, $b = 0.15$, 95% CI [0.02, 0.28], $z = 2.35$, $p = .019$, but in the subsequent section we explain how the effect changes when including other predictors in the model. Participants spent an average of 29.12 seconds practicing across all rounds of practice.

Like all studies in the first chapter, we replicate the effect of gender on risk attitudes, $b = -0.86$, 95% CI [−1.01, −0.70], $t(3920) = -10.71$, $p < .001$, and confidence, $b = -8.46$, 95% CI [−10.12, −6.79], $t(3978) = -9.96$, $p < .001$, such that women were more risk averse and less confident relative to men.

Like all studies in Chapter 1, we find a significant effect of gender on task score when included as a sole predictor, Mwomen=10.45, SD=4.47; Mmen= 12.29, SD =7.28, $b = -1.83$, 95% CI [−2.20, −1.47], $t(3929) = -9.75$, $p < .001$. Contrary to the majority of studies in the first chapter, the effect of gender holds even after including risk attitudes, confidence, and an interaction between gender and condition in the model, $b = -1.38$, 95% CI [−1.89, −0.86], $t(3916) = -5.20$, $p < .001$. We explore this finding further in the discussion section for this study.

		(1)			(2)			(3)	
Predictors	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*	*Estimates*	*CI*	*p*
(Intercept)	12.29	12.01 – 12.57	**<0.001**	12.07	11.68 – 12.47	**<0.001**	10.63	10.02 – 11.25	**<0.001**
gender [Woman]	-1.83	-2.20 – -1.47	**<0.001**	-1.67	-2.19 – -1.15	**<0.001**	-1.38	-1.89 – -0.86	**<0.001**
condition [tournament]				0.43	-0.13 – 0.99	0.129	0.48	-0.07 – 1.03	0.090
gender [Woman] * condition [tournament]				-0.34	-1.07 – 0.40	0.372	-0.39	-1.11 – 0.34	0.297
risk							-0.09	-0.16 – -0.01	**0.019**
conf rank							0.04	0.03 – 0.05	**<0.001**
Observations	3931			3931			3922		
R^2 / R^2 adjusted	0.024 / 0.023			0.024 / 0.023			0.055 / 0.054		

Figure 1: All models are linear regressions with task score as the dependent variable, where man and piece-rate payment scheme are the reference categories for participant gender and competition condition, respectively. After controlling for risk attitudes, confidence, and competition condition, women (INSERT DO / DO NOT) have lower scores on the multiplication task than men, . $p < .05$ is considered significant and bolded.

Characteristic	N = 3,980[1]
better_gender_guess	
Men correctly solved more multiplication problems than women	808 (21%)
There was no difference in how many multiplication problems men and women correctly solved	2,129 (54%)
Women correctly solved more multiplication problems than men	993 (25%)
perc_task_gender_pract	
Men were more likely to practice/study than women	186 (4.7%)
There was no difference in how likely men and women were to practice/study	1,403 (36%)
Women were more likely to practice/study than men	2,341 (60%)
perc_gender_comp_M	
Men would choose each payment scheme equally	620 (16%)
Men would choose piece rate more often than tournament	812 (21%)
Men would choose tournament more often than piece rate	2,491 (63%)
perc_gender_comp_F	
Women would choose each payment scheme equally	820 (21%)
Women would choose piece rate more often than tournament	2,520 (64%)
Women would choose tournament more often than piece rate	583 (15%)
perc_gen_gender_pract	
Men prepare more than women	173 (4.4%)
There is no difference in how much men and women prepare	1,071 (27%)
Women prepare more than men	2,678 (68%)

[1] n (%)

Figure 2: Stopping

Variable	**Man**, N = 1,697[1]	**Woman**, N = 2,283[1]
task_score	12.0 (8.0, 15.0)	10.0 (7.0, 13.0)
practice_problems_binary	639 (38%)	1,159 (51%)
risk	6.00 (3.00, 7.00)	4.00 (2.00, 6.00)
conf_rank	50 (30, 70)	40 (20, 60)

[1] Median (IQR); n (%)

Figure 3: Stopping

Effects of gender and competition condition on both actual practicing and perceptions of one's relative practicing

We replicate the effect of gender on the choice to practice found in Chapter 1, where 51.26% of women chose to prepare via practice, relative to 37.81% of men, $b = 0.55$, 95% CI [0.42, 0.68], $z = 8.37$, $p < .001$ (see Figure @ref(fig:s407)). The gender effect holds in a logistic regression with gender, condition, and the interaction between the two predicting the binary choice to practice problems, $b = 0.51$, 95% CI [0.33, 0.69], $z = 5.49$, $p < .001$ (see Figure @ref(fig:s401)). However, we do not find an interaction between gender and condition, $b = 0.08$, 95% CI [−0.18, 0.34], $z = 0.60$, $p = .547$, contrary to our hypothesis that the gender difference in the choice to prepare would be exacerbated under the tournament payment scheme relative to the piece-rate payment scheme.[1] Additionally, the aforementioned effect of condition on the choice to practice is no longer significant in the model including these additional predictors, $b = 0.10$, 95% CI [−0.09, 0.30], $z = 1.03$, $p = .302$. In a subsequent logistic regression that added confidence, risk attitudes, and task scores to explore whether they explain the gender difference in the choice to practice, we find that gender still significantly predicts the choice to practice when these variables are included in the model, $b = 0.11$, 95% CI [−0.09, 0.30], $z = 1.06$, $p = .290$.

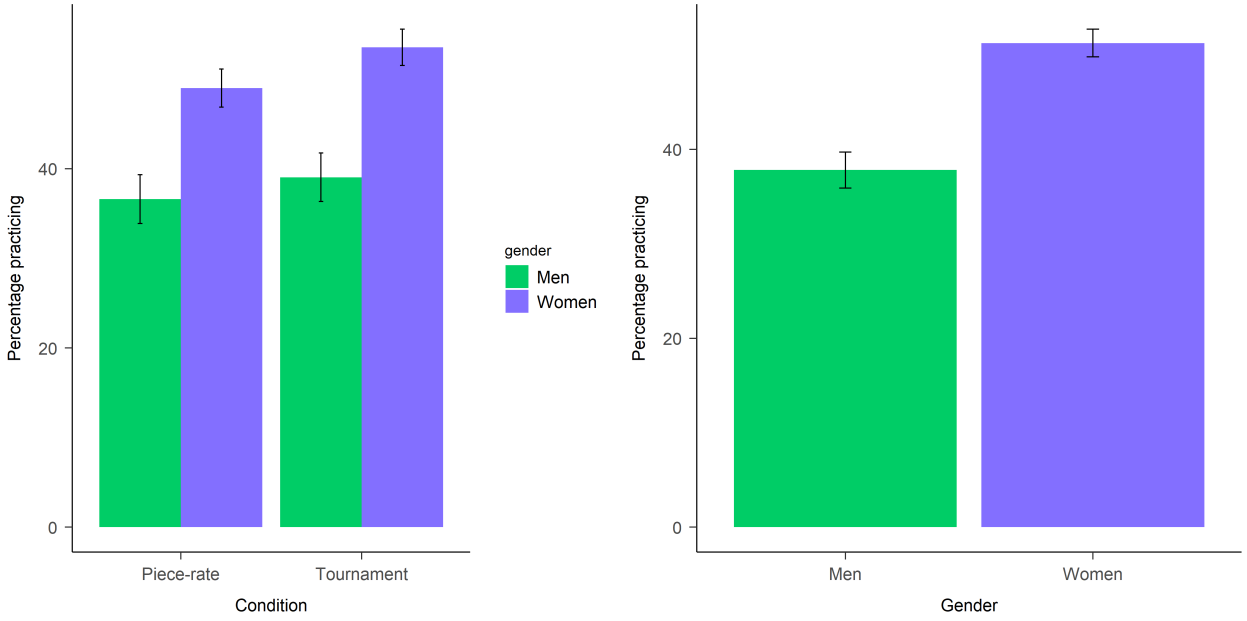

Figure 4: Proportion of men and women in Study X who chose to prepare (right panel) based on assignment to competitive tournament or non-competitive piece-rate payment scheme (left panel). Women choose to prepare more than men, regardless of their decision to compete. Error bars represent standard errors.

We also examined other measures of practice to test the robustness of the effect of gender on practicing. We find that women, relative to men, completed a significantly higher number of practice problems, $b = 0.39$, 95% CI [0.35, 0.43], $z = 18.54$, $p < .001$, more rounds of practice, $b = 0.31$, 95% CI [0.04, 0.59], $z = 2.24$, $p = 0.03$, and spent more time completing practice problems, $b = 13.12$, 95% CI [7.95, 18.28], $t(3959) = 4.98$, $p < .001$ while controlling for payment scheme condition and the interaction between gender and payment scheme condition. None of the interaction effects were significant across any of these dependent variables, meaning that the effects of the payment scheme conditions on the preparation outcomes did not differ by gender.

Based on previous literature on risk aversion and confidence affecting competition entry, we expected participants with especially high levels of risk aversion and/or low levels of confidence would be especially

[1]The interaction between gender and competition condition on the choice to compete is still not significant among the full dataset (i.e., after including participants that were flagged by Qualtrics' fraud detection software): . However, the effect of gender remains significant among the full dataset,

	(1)			(2)			(3)		
Predictors	*Odds Ratios*	*CI*	*p*	*Odds Ratios*	*CI*	*p*	*Odds Ratios*	*CI*	*p*
(Intercept)	0.61	0.55 – 0.67	**<0.001**	0.58	0.50 – 0.66	**<0.001**	0.52	0.41 – 0.67	**<0.001**
gender [Woman]	1.73	1.52 – 1.97	**<0.001**	1.66	1.39 – 1.99	**<0.001**	1.69	1.41 – 2.04	**<0.001**
condition [tournament]				1.11	0.91 – 1.35	0.302	1.11	0.91 – 1.36	0.290
condition [tournament] * gender [Woman]				1.08	0.84 – 1.40	0.547	1.07	0.83 – 1.38	0.613
task score							1.01	1.00 – 1.02	0.058
risk							1.02	0.99 – 1.05	0.132
conf rank							1.00	0.99 – 1.00	**0.014**
Observations	3951			3951			3922		
R^2 Tjur	0.018			0.019			0.022		

Figure 5: All models are logistic regressions with choice to prepare as the dependent variable, where man and piece-rate payment scheme are the reference categories for participant gender and competition condition, respectively. Women prepare more than men regardless of condition, task score, risk attitudes, or confidence. $p < .05$ is considered significant and bolded.

likely to choose to practice before entering a competition, and that this effect may interact with gender. Thus, we tested possible three-way interactions between gender, condition, and risk aversion or confidence on the choice to practice problems through two logistic regressions, but did not find evidence that risk aversion, INSERT, nor confidence, INSERT, interacted with gender and condition.[2].

Accuracy of levels of practicing based on participant gender

Next, we ran a linear regression with gender, condition, and the interaction between those two variables predicting the aforementioned perceived practice deviation variable (that is, subtracting each participants' percentile based on number of practice problems completed from their self-rated decile) to test our second hypothesis that women would be more likely to assume they practice less than others compared to men, especially under the competitive tournament payment scheme. We find a significant effect of gender on perceived practice deviation, such that women (relative to men) were significantly less likely to assume they practice more than others, $b = -14.49$, 95% CI $[-19.43, -9.55]$, $t(3959) = -5.75$, $p < .001$, Mwomen=23.56, SD=56.11; Mmen= 39.69, sd=54.87 (see Figure @ref(fig:s410)). We do not observe a significant effect of condition on perceived relative practice, $b = -1.30$, 95% CI $[-6.61, 4.00]$, $t(3959) = -0.48$, $p = .630$. Finally, we did not find evidence of the anticipated interaction effect between gender and condition on perceptions of relative preparation, $b = -3.25$, 95% CI $[-10.26, 3.76]$, $t(3959) = -0.91$, $p = .364$.

Since this is the first time we have used the perceived practice deviation variable and are not able to attest to its robustness, we also explored another way of testing this hypothesized effect by using participants' self-rated decile as the dependent variable instead of perceived practice deviation and then controlling for number of practice problems attempted (as a proxy for more precise estimate of amount of practicing) in a linear regression. We find that, regardless of the number of practice problems attempted, women are significantly less likely to say they practice more than others, compared to men, $b = -4.19$, 95% CI $[-7.12, -1.27]$, $t(3958) = -2.81$, $p = .005$.

We also explored how self-rated decile changes based on whether participants were asked to compare their

[2]Note: we run analyses with the same predictors using the other measures of preparation as dependent variables (i.e., number of practice problems completed, number of rounds of extra practice, and amount of time spent completing practice problems), and do not find evidence for interaction effects across any of those models

amount of practicing to men or women in the study specifically, and find that participants' perceptions of how much they practiced relative to women in the study are significantly lower than perceptions of much they practiced relative to men, $M_d = -8.09$, 95% CI $[-9.03, -7.14]$, $t(3, 979) = -16.85$, $p < .001$.

Perceptions of gender differences in preparation, performance, and competitiveness

Like in Study 3 of Chapter 1, we ran both chi-square goodness of fit tests with all three response options for the questions about perceptions of gender differences, and if the test with all options was significant, we subsequently ran more targeted chi-square tests to perform pairwise comparisons. Across all measures of perceptions of gender differences in behavior, we replicate effects found in the previous studies. First, the majority of participants (59.57%) said that women would be more likely to practice/study for the task, $\chi^2(2, n = 3980) = 1,782.43$, $p < .001$ (see Figure @ref(fig:s403)), which was significantly higher than the proportion of participants who said men would be more likely to practice/study than women (4.73%), $\chi^2(1, n = 3980) = 1,837.76$, $p < .001$, and the proportion of participants that said there was no difference in the likelihood that men and women would practice/study (35.7%), $\chi^2(1, n = 3980) = 235.00$, $p < .001$.

Similarly, participants were significantly more likely to say that women prepare more than men in general (68.28% of participants), $\chi^2(2, n = 3980) = 2,464.02$, $p < .001$ (see Figure @ref(fig:s406)), relative to the proportion of participants that said men prepare more than women (4.41% of participants), $\chi^2(1, n = 3980) = 2,200.99$, $p < .001$, or that there is no difference in how much men and women prepare (27.31% of participants), $\chi^2(1, n = 3980) = 688.84$, $p < .001$.

Yet, participants did not expect a gender difference in performance on the main multiplication task used, $\chi^2(2, n = 3980) = 781.11$, $p < .001$ (see Figure @ref(fig:s404)), where 54.17% of participants said that there was no difference in how many multiplication problems men and women correctly solved, while 20.56% said men correctly solved more multiplication problems than women,$\chi^2(1, n = 3980) = 594.16$, $p < .001$, and 25.27% said women had a performance advantage over men, $\chi^2(1, n = 3980) = 413.36$, $p < .001$.

Finally, 64.24% of participants expected women would be more likely to choose the piece-rate payment scheme than the tournament payment scheme, $\chi^2(2, n = 3980) = 1,707.40$, $p < .001$ (see Figure @ref(fig:s408)), which was a significantly higher proportion of participants than those who expected women would choose each payment scheme equally (20.9%), $\chi^2(1, n = 3980) = 865.27$, $p < .001$, and than those who expected women would choose tournament more often than piece rate, (14.86%), $\chi^2(1, n = 3980) = 1,209.14$, $p < .001$. On the contrary, when asked about how much men in the study would compete, a significant majority of participants (63.5%) expected men to be more likely to choose the tournament payment scheme over the piece-rate payment scheme, $\chi^2(2, n = 3980) = 1,620.33$, $p < .001$ (see Figure @ref(fig:s409)), relative to the proportion of participants who said men would choose each payment scheme equally (15.8%), $\chi^2(1, n = 3980) = 1,125.25$, $p < .001$, and the proportion who said men would choose piece rate more often than tournament (20.7%), $\chi^2(1, n = 3980) = 853.48$, $p < .001$.

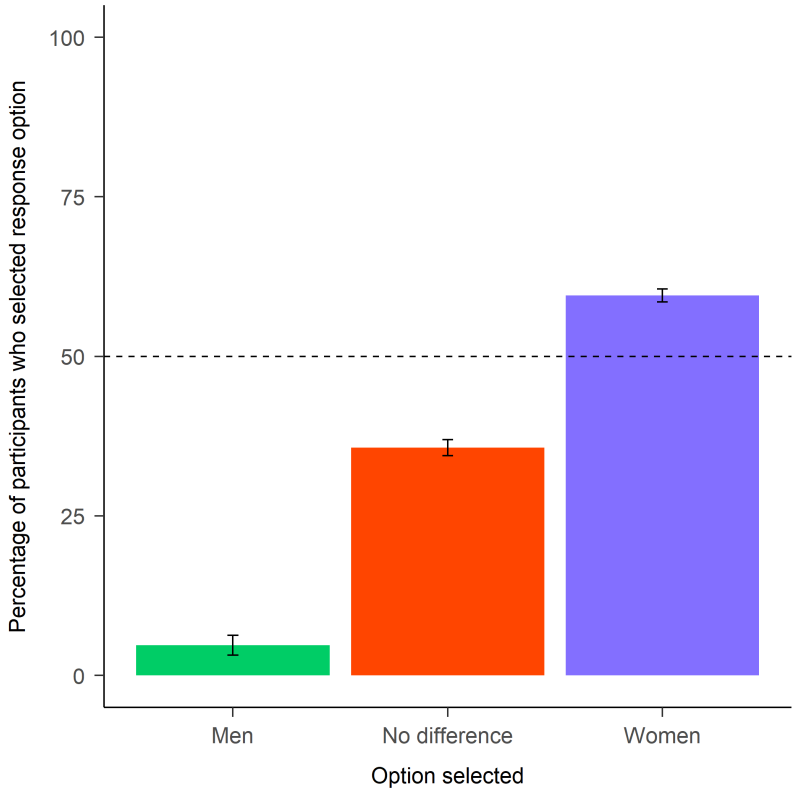

Figure 6: Proportion of participants that predicted women would spend more time preparing for the multiplication task, men would spend more time preparing for the multiplication task, or that there would be no gender differences in preparation for the task. A significantly larger proportion of participants expected women to spend more time preparing for the multiplication task. Error bars represent standard errors.

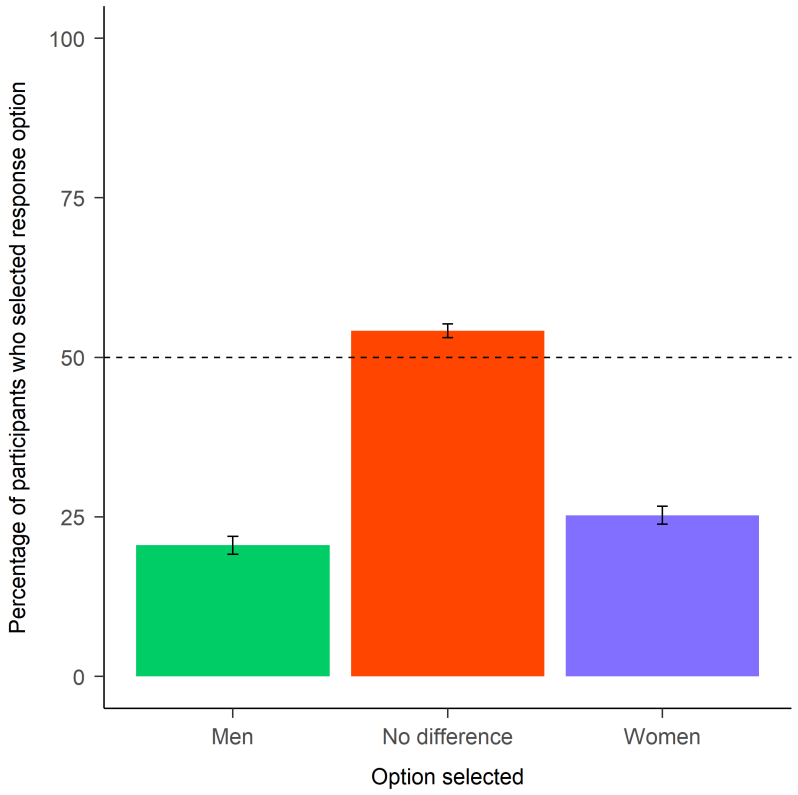

Figure 7: Proportion of participants that predicted women would correctly solve more problems on the multiplication task, men would correctly solve more problems on the multiplication task, or that there would be no gender difference in performance on the multiplication task. A significantly larger proportion of participants expected there to be no gender difference in performance on the multiplication task. Error bars represent standard errors.

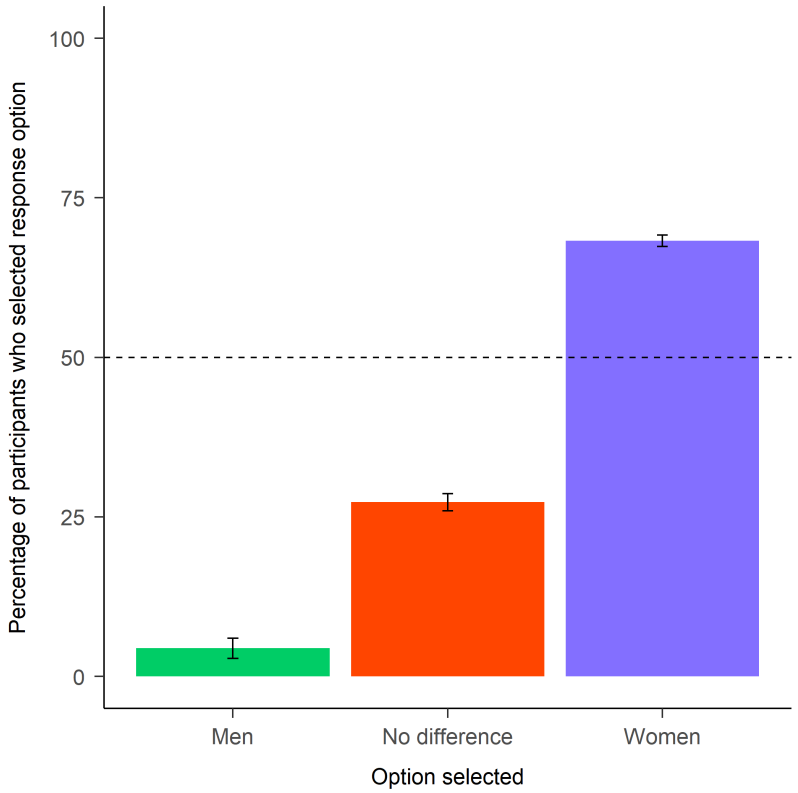

Figure 8: Proportion of participants that predicted women prepare more in general, men prepare more in general, or that there are no gender differences in preparation in general. A significantly larger proportion of participants expected women prepare more in general. Error bars represent standard errors.

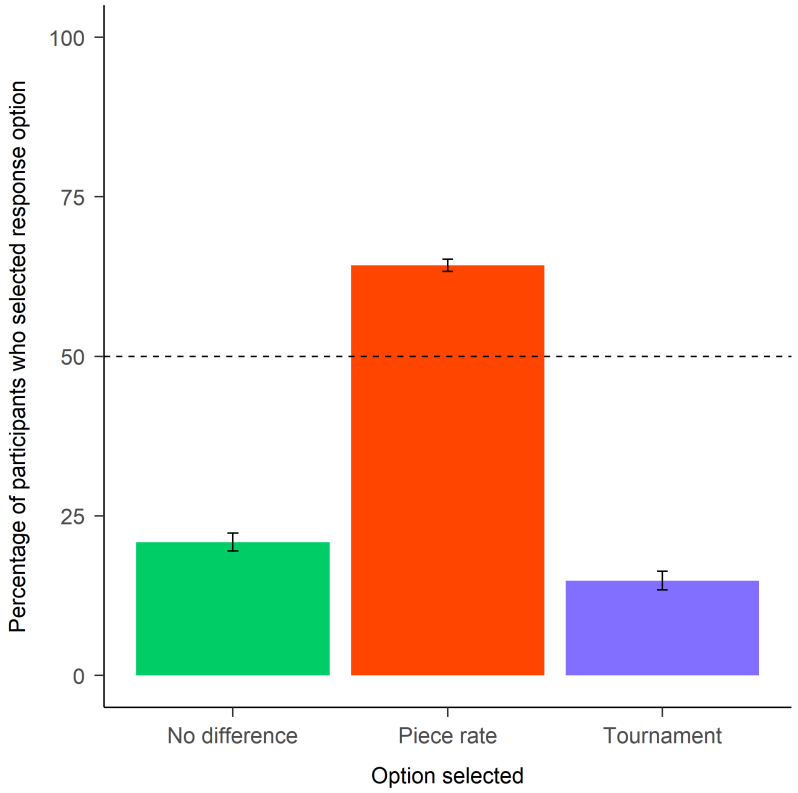

Figure 9: Proportion of participants that predicted women would choose the tournament payment scheme more often, women would choose the piece-rate payment scheme more often, or women would choose each payment scheme at equal rates. A significantly larger proportion of participants expected women to be more likely to choose the non-competitive piece-rate payment scheme. Error bars represent standard errors.

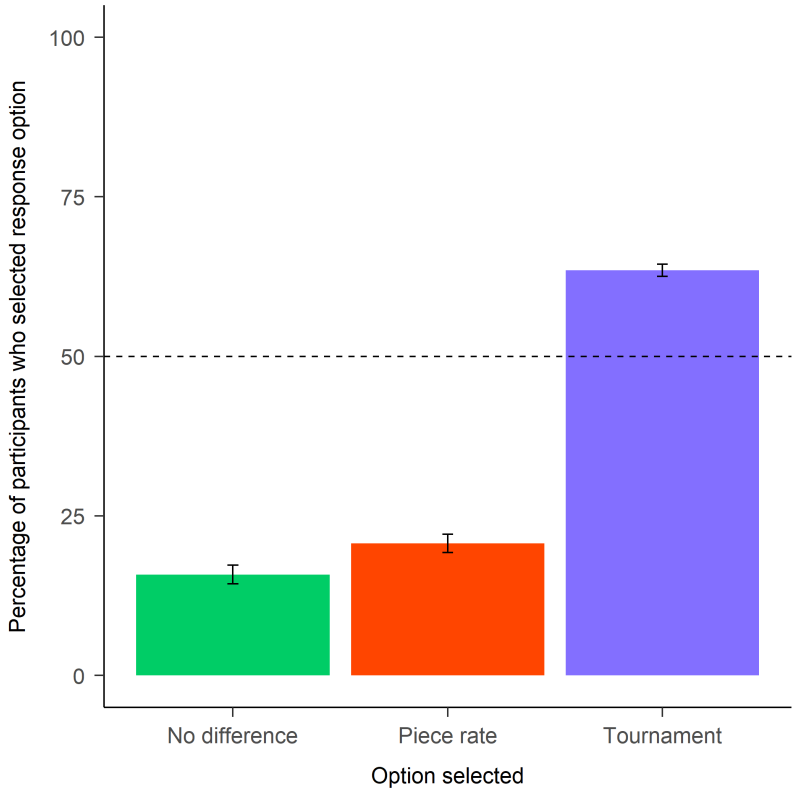

Figure 10: Proportion of participants that predicted men would choose the tournament payment scheme more often, men would choose the piece-rate payment scheme more often, or men would choose each payment scheme at equal rates. A significantly larger proportion of participants expected men to be more likely to choose the competitive tournament payment scheme. Error bars represent standard errors.

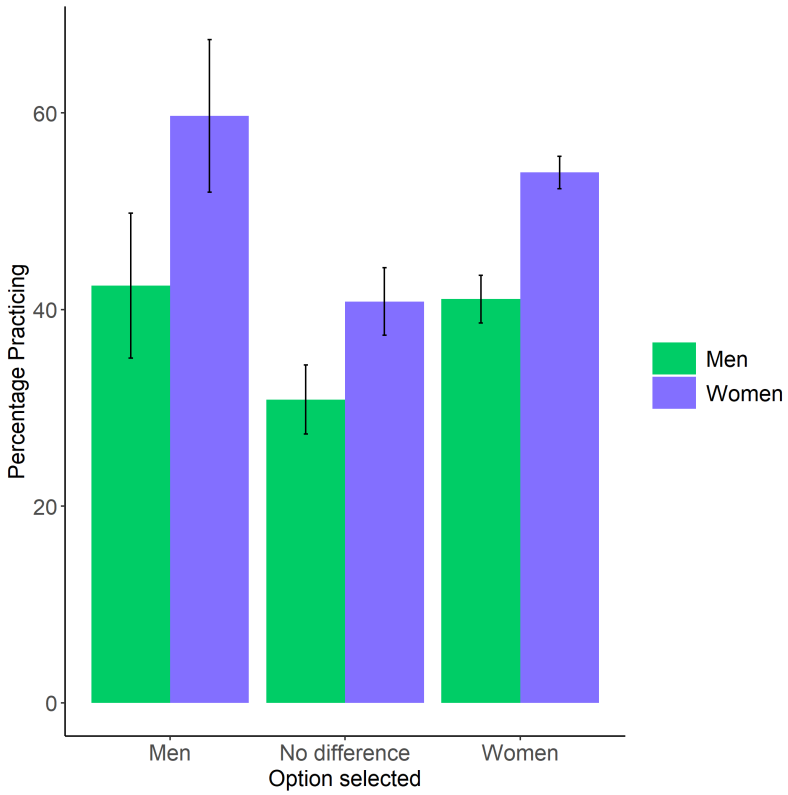

Figure 11: Proportion of men and women who chose to practice based on whether they thought men or women spend more time preparing on most tasks. In this study, participants also had the option to say there was no gender difference in preparation. Women who thought women generally prepare more were especially likely to choose to practice. Error bars represent standard errors.

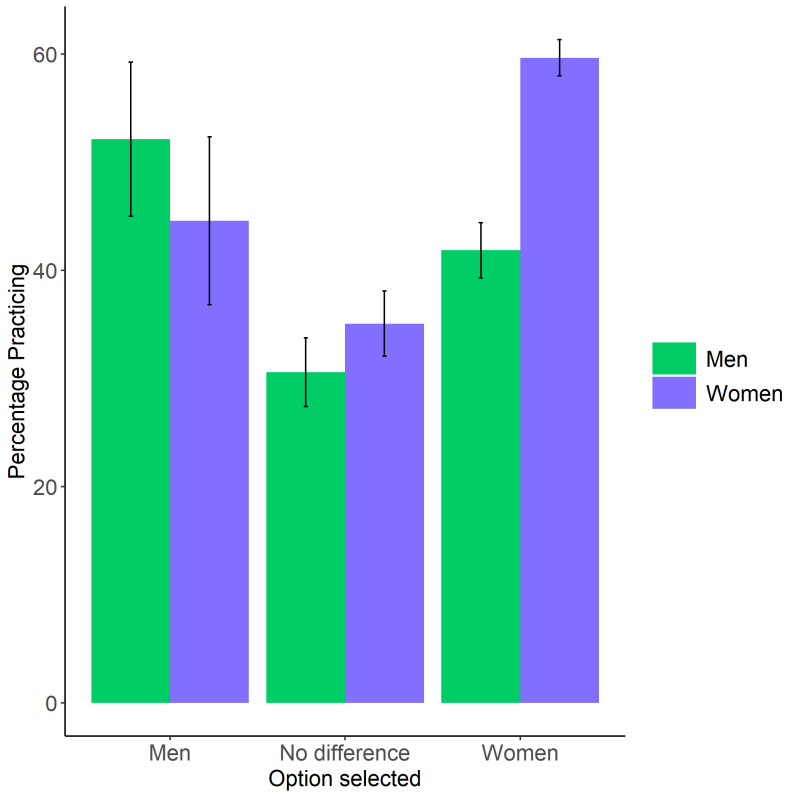

Figure 12: Proportion of men and women who chose to practice based on whether they thought men or women spend more time preparing for the multiplication task. In this study, participants also had the option to say there was no gender difference in preparation. Women who thought women prepare more for the multiplication task were especially likely to choose to practice. Error bars represent standard errors.