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Opt-out choice framing attenuates gender differences in the decision to compete in the laboratory and in the field

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Research shows that women are less likely to enter competitions than men. This disparity may translate into a gender imbalance in holding leadership positions or ascending in organizations. We provide both laboratory and field experimental evidence that this difference can be attenuated with a default nudge—changing the choice to enter a competitive task from a default in which applicants must actively choose to compete to a default in which applicants are automatically enrolled in competition but can choose to opt out. Changing the default affects the perception of prevailing social norms about gender and competition as well as perceptions of the performance or ability threshold at which to apply. We do not find associated negative effects for performance or wellbeing. These results suggest that organizations could make use of opt-out promotion schemes to reduce the gender gap in competition and support the ascension of women to leadership positions.

gender | competition | behavioral economics | organizational behavior | choice architecture

Only three women have ever won the Nobel Prize in physics, the most recent being Donna Strickland. Strikingly, Professor Strickland was an associate professor when she won. Responding to a question about why she was not yet a full professor, she simply answered: "I never applied." (1)

Many selection processes (e.g., promotions, awards, and admissions) require this type of self-nomination. Compared to men, however, women demonstrate less (over)confidence (2, 3), are less likely to self-promote and exaggerate accomplishments (4, 5), and less likely to seek out risks and competition (2, 6). Thus, women might be less inclined to participate in competitive selection processes (7, 8). To date, interventions to reduce gender disparities in hiring, evaluation, and promotion have focused mainly on diversity or unconscious bias training and have failed to show consistent positive results (9). Another approach, training women to "lean in" (10), has not proven successful either: Women who behave assertively and agentically incur "backlash," or a social or economic penalty, for being counter stereotypical and violating gender expectations (5, 11, 12).

We depart from traditional interventions that attempt to change people's mind or "fix the women" and focus instead on changes to the architecture (13) of the decision to compete itself (14, 15). We test an application of the finding that behavior is strongly affected by defaults (13, 16). For promotion and the choice to compete, one must opt in, so the default is to not apply. We propose that an opt-out framing (i.e., making competition the default) may lead to more enrollment and reduce gender differences (17–20). Importantly, this intervention changes the framing of the decision but fully safeguards each individual's autonomous choice.

We run three experiments—a laboratory experiment, a preregistered replication, and a preregistered field experiment on an online labor market. We compare rates of competition for men and women under an opt-in versus an opt-out frame and consider the potential negative consequences of this intervention on performance and wellbeing.

Our first experiment largely follows the paradigm in Niederle and Versterlund (2), which has consistently identified a gender difference in the propensity to compete (21, 22). Our laboratory study introduces one fundamental change to this well-established paradigm, described in the *Study 1* section below. We used zTree (version 4.0) to program the experiment (23).

Study 1

Methods.

Participants. Participants were 482 undergraduate students from a large Canadian university (55.4% women; M_{age} = 19 and SD = 1.64; ethnicity: 67.4% Asian, 19.9% Caucasian, 1.45% Hispanic/Latino, 1.24% African American, and 9.96% indicated "other"). Participants received one course credit for participating and earned financial compensation from one randomly selected stage of the task, which we now describe.

Procedure. The experimental task consisted of adding five two-digit numbers (2). Participants could not use a calculator but were provided scrap paper and had up to 5 min to complete as many questions as they could. At the end of each stage, participants saw their own final score (i.e., the number of correct answers) for that stage. In each stage, participants saw only their own absolute score and did not see their relative performance until the end of the experiment. Participants completed three stages of this same task. The specific compensation scheme, however, was different for each stage.

Stage 1—Piece rate. In stage 1, participants received the noncompetitive piece-rate compensation, which was $0.50 for each correct answer.

Stage 2—Tournament. In stage 2, participants received the competitive tournament compensation. For the tournament, the focal participant's score for that stage would be compared to three other randomly chosen competitors' scores. If the participant held the highest score in that stage compared to

Significance

How can we close the gender gap in high-level positions in organizations? Interventions such as unconscious bias training or the "lean in" approach have been largely ineffective. This article suggests, and experimentally tests, a "nudge" intervention, altering the choice architecture around the decision to apply for top positions from an "opt in" to an "opt out" default. Evidence from the laboratory and the field shows that a choice architecture in which applicants must opt out from competition reduces gender differences in competition. Opt-out framing thus seems to remove some of the bias inherent in current promotion systems, which favor those who are overconfident or like to compete. Importantly, we show that such an intervention is feasible and effective in the field.

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The authors declare no competing interest.

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the other three competitors, they would receive $2 per correct answer or $0 otherwise.

Stage 3—Choice. Before proceeding to the task, we asked participants to choose their compensation scheme for the stage 3 task. Here, we administered our central manipulation—whether the choice of the competitive tournament compensation was framed using opt-in or opt-out framing. Participants were randomly assigned to either an opt-in or opt-out condition.

In the opt-in framing condition, participants were automatically enrolled in the noncompetitive piece-rate compensation. However, participants could choose instead to opt in to the competitive tournament compensation [in which their stage 3 performance would be compared with the stage 2 performance of the three other participants to avoid instances in which not all competitors chose to compete for stage 3 (2)] by checking a box to indicate this. Otherwise, they just had to press a button to proceed to the next page.

In the opt-out framing condition, participants were automatically enrolled in the competitive tournament compensation (with the competition against the stage 2 performance of the three other participants). However, participants could choose to opt out of the tournament and return to the noncompetitive, piece-rate compensation scheme by checking a box. Otherwise, they could press a button to proceed to the next page.

Stage 4—Choice. In the final stage of the experiment, participants were told that they could resubmit their stage 1 performance for compensation. They were given the choice to submit their stage 1 performance to either the piece-rate compensation or a tournament compensation, in which their performance would be compared to three other participants' stage 1 performances. Note, therefore, that there was not an actual additional task in stage 4.

After the four stages, we asked participants to guess their rank (for stages 1 and 2) compared to others against whom they were competing to obtain a measure of (over)confidence. Participants guessed their rank (1 = best, 2 = second best, 3 = third best, or 4 = fourth best) in the stage 1 piece-rate scheme as well as the stage 2 tournament scheme.

Finally, participants completed a six-item version of the State Anxiety Inventory (SAI) (24, 25). The six-item version of the SAI has shown to be highly correlated with the full version of the scale and has been shown to have high internal consistency (alphas above 0.90) (24, 26). Participants indicated how they felt during the experiment, on a scale from 1 (not at all) to 4 (very much). Sample items include "I felt calm" (reverse scored), "I was tense," and "I felt upset." We removed an item with poor item–total correlation from the scale (27). The five-item scale had good reliability (a = 0.73).

Results. There were no gender differences on task performance. From this baseline of equal performance, we examined the choice of competitive compensation in stage 3 (Fig. 1*A1*). For the opt-in condition, we replicate the finding that far fewer women than men chose tournament-based compensation (46.72% versus 72.48% and P from two-tailed t test < 0.001)—a 25% gender gap in the absence of gender-based performance differences. In contrast, in the opt-out condition, men chose the tournament 76.42% of the time compared to 75.38% of women (P from two-tailed t test = 0.85). In other words, making competition the default eliminated the gender gap. Regression estimates controlling for performance in stages 1 and 2, and guessed rank in stage 2, confirm the descriptive evidence in Fig. 1 (Table 1, Model 1).

One concern with frame "nudges" is that they might lead individuals toward choices that negatively affect their performance or wellbeing (28, 29). We find no such consequences. Those who selected the tournament in stage 3 performed better, but there were no significant differences by

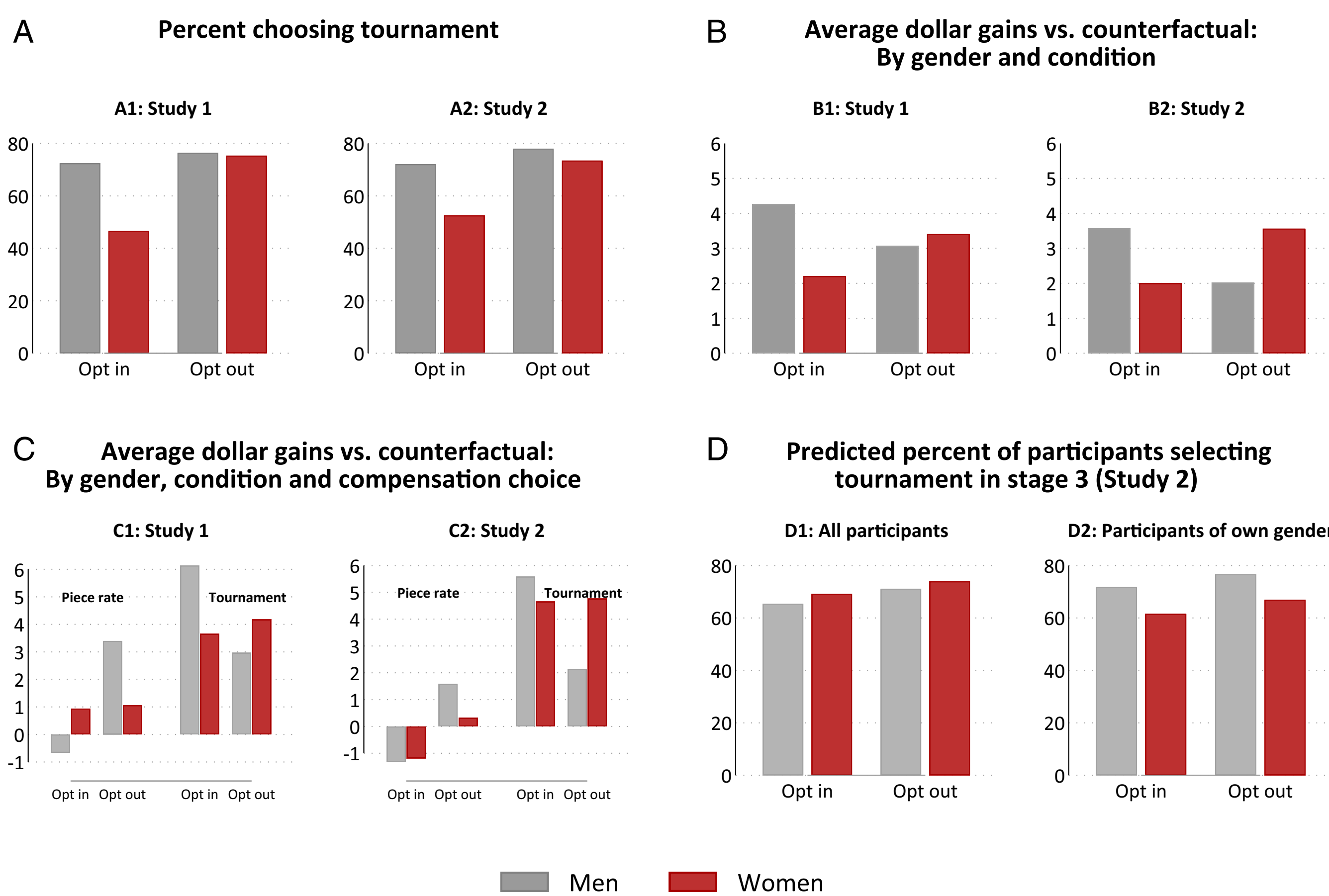

Fig. 1. Study 1 and Study 2 results. "Opt in" condition, default compensation was piece rate. "Opt out" condition, participants were assigned to compete in a winner-takes-all tournament within each group of four by default but could opt out and be compensated on a piece-rate basis instead. *A* reports the percentage of participants who chose tournament compensation in stage 3, by gender and condition. *B* shows the average dollar gains from the actual compensation choice, as compared to the counterfactual choice, bu gender and condition. *C* reports these relative dollar gains, further separating by actual compensation choice. *D* reports the average percent of participants (D1) and of participants of the same gender as the respondent's (D2) that the respondents predicted would choose tournament compensation, by gender and condition. Additional details are in the *Methods* section and *SI Appendix*.

Table 1. Regression estimates for Studies 1 and 2: tournament decision, number of correct answers, and anxiety

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome variable:	Choice of tournament in Stage 3		Correct answers in Stage 3		Anxiety measure	
Estimation:	Probit		OLS		OLS	
Sample	Study 1	Study 2	Study 1	Study 2	Study 1	Study 2
Opt in: Woman	−0.246*** (0.072)	−0.152** (0.060)				
Opt out: Man	0.040 (0.069)	0.111* (0.064)				
Opt out: Woman	0.035 (0.073)	0.030 (0.065)				
Opt in, tournament: Man			−0.084 (0.440)	1.246** (0.480)	−0.061 (0.107)	0.141* (0.078)
Opt out, piece rate: Man			−1.496** (0.589)	0.684 (0.612)	−0.157 (0.119)	0.090 (0.143)
Opt out, tournament: Man			−0.183 (0.440)	0.548 (0.390)	−0.050 (0.128)	0.070 (0.091)
Opt in, piece rate: Woman			−0.150 (0.531)	0.709 (0.534)	0.026 (0.109)	0.216* (0.114)
Opt in, tournament: Woman			0.451 (0.543)	1.070** (0.443)	0.032 (0.096)	0.241*** (0.084)
Opt out, piece rate: Woman			−0.863* (0.505)	0.846 (0.565)	−0.067 (0.110)	0.190* (0.104)
Opt out, tournament: Woman			−0.010 (0.515)	0.819* (0.440)	0.071 (0.125)	0.177* (0.095)
# correct answ. in stage 1	0.005 (0.009)	0.004 (0.009)	0.198*** (0.067)	0.174*** (0.040)	−0.006 (0.007)	0.005 (0.010)
# correct answ. in stage 2	0.019** (0.008)	0.015** (0.007)	0.722*** (0.068)	0.744*** (0.039)	−0.014** (0.006)	−0.011 (0.011)
(Over)confidence	0.044** (0.022)	0.001 (0.018)	0.112 (0.081)	−0.085 (0.065)	0.012 (0.020)	−0.025 (0.023)
Constant			1.830*** (0.648)	0.811* (0.450)	2.304*** (0.112)	1.980*** (0.103)
Observations	482	595	482	595	482	595
Pseudo R2	0.082	0.048	0.705	0.746	0.042	0.023

Overconfidence is calculated as the difference between guessed rank and actual rank in the stage 2 tournament. The parameter estimates from the probit model are expressed as marginal effects. SEs clustered by session are in parentheses (n = 36 in Study 1 and n = 44 in Study 2). * = $P < 0.1$, ** = $P < 0.05$, and *** = $P < 0.01$.

gender or experimental condition (Table 1, Model 3). Moreover, whereas in the opt-in condition men earned a greater monetary surplus than women did (what they earned from their choice compared to what they would have earned from the counterfactual choice), the monetary surplus was more equally distributed in the opt-out condition (Fig. 1*B1*). In particular, a higher proportion of women than men in the opt-out condition made a payoff-maximizing choice in stage 3 by choosing the tournament (Fig. 1*C1*). For anxiety, although women (M = 2.15) reported higher levels of anxiety than men (M = 2.05; P from two-tailed t test = 0.02), there was no significant difference by condition or choice of compensation scheme, suggesting that "nudging" women to compete did not increase anxiety (Table 1, Model 5).

Study 2

Methods. We conducted a preregistered replication (n = 639) of this study with the addition of a postexperimental survey to understand how opt-out framing increases women's competition rates. We obtained almost identical findings on competition rates, performance, and wellbeing* (Table 1, Models 2, 4, and 6). Specifically, in the absence of gender differences in performance on the task, there was again a large gender gap in competition in the opt-in condition, with 52.6% of women choosing a tournament versus 72.1% of men ($P < 0.001$). This gap was reduced in the opt-out condition; 73.5% of women versus 78.0% of men chose the tournament in the opt-out scheme, a difference that is not statistically significant ($P = 0.38$) (Fig. 1*A2*). Results on performance, wellbeing, and pay-offs were also very similar (Fig. 1*B2* and 1*C2*). In the postexperimental survey, we additionally asked participants to report on their perceived norms of competition (i.e., the perceived prevalence of competition [via the estimated proportion of participants who chose the competition] and perceived desirability of competition [via the estimated desirability of competing]) in Study 3. This survey's findings suggest that the opt-out framing signaled significantly stronger norms to enroll (Fig. 1*D1* and 1*D2*), which in turn predicted women's participation in the competition.

Study 3

Finally, we conducted a preregistered, large-scale field experiment on Upwork, an online labor market in which clients hire freelancers to complete various jobs, ranging from data entry to creating mobile apps.† Previous research characterizes Upwork as a skilled labor market with high-stakes jobs (24, 25). Thus, we administered a field experiment on this platform to examine freelancers' choices to compete in a naturalistic setting that has implications for real promotions in organizations.

Methods. We operated as an actual client and hired 477 freelancers (304 men and 173 women), who were unaware of the experiment, to complete a data entry job. The job had three phases with a similar design as our experiment.
Phase 1. In the first phase, all workers completed a "test project" with piece-rate compensation (a base compensation of $5 and a standard-level commission of $0.25 per correct data entry scraped). Participants had 5 min to scrape data about as many companies as they could.
Choice of task. After this first phase, but before the second phase, we gave the freelancers the choice of two possible tasks in the third phase: to perform a standard task, identical in compensation and difficulty to that in the first and second phase ($5 base compensation with $0.25 bonus commission) or to compete for a more advanced, higher-paying task ($7.50 base compensation with $1.00 bonus commission). We note here that in contrast to Studies 1 and 2, in which the noncompetitive and competitive compensations have equivalent, expected payoffs, we chose a more elaborate earning structure (a more lucrative expected payoff if one were to get selected for the advanced task) to mirror real-world promotions. We administered our treatment on the choice of task in the third phase; as in our previous setups, we randomly assigned freelancers to opt in or opt out of competition.

In the opt-in condition, freelancers were by default enrolled in the noncompetitive standard task for the task phase but had the option to apply

*The preregistration is at https://aspredicted.org/blind.php?x=2ty9vt. We metaanalyzed our two studies using fixed effects, with the mean effect size (Cohen's d) weighted by sample size (27). Overall, the gender difference in competition in the opt-in condition was highly significant: $M_d = .46$, $Z = 5.35$, and $P < .001$. The gender difference in competition in the opt-out condition was non-significant: $M_d = .03$, Z = .33, and $P = .74$. These metaanalytic results suggest that, as a whole, opt-out framing eliminated the robust gender difference found in the opt-in condition.

†Preregistration available at https://aspredicted.org/blind.php?x=vf4r4n.

instead to compete for the advanced task in the task phase by checking a box. In the opt-out condition, freelancers were by default enrolled in the competition for the advanced task but had the option to opt out of the competition and proceed instead to the standard task by checking a box.

Phase 2. Following this choice, the second phase was identical to the first (with piece-rate compensation), but for those who chose to compete for the advanced task in the third phase, their performance would also serve as their "application." Only the top 25% performers on the second phase would be selected. Those who chose to compete but were not selected for the advanced task would not be invited back for a third phase at all, and this was also communicated clearly to the freelancers.

Phase 3. After the second phase, there was an evaluation phase in which the research team made the selection decisions for the third phase. Finally, freelancers were invited back to the standard task (if they did not choose to compete), advanced task (if they won the competition), or no task at all (if those chose to compete but did not win the competition).

Our main outcome variable is whether freelancers chose to compete for the advanced task in the third phase.

Results. In the opt-in condition, we again observe a gender gap in the absence of any performance differences between men and women on the data entry task: Women were significantly less likely than men to compete (57.3% versus 72.5% and $P = 0.015$). In the opt-out condition, the gender gap is no longer significant (women: 66.7%; men: 71.6%; and $P = 0.43$). The participation rates and results are remarkably similar to those observed in the two laboratory experiments, despite the different context and partially different design (Fig. 2*A*).

Further analyses to explore how and why opt-out framing attenuated the gender gap suggest that opt-out framing alters women's "sensitivity" to negative performance signals. Here, we examine the relationship between the number of data entry attempts in part 1 of the test project and the choice to apply to the advanced task in the third phase. We conceive the number of data entry attempts as a performance signal because this information was immediately available to the freelancers, whereas actual performance was only determined after the entire study was over, and responses were manually coded and checked for accuracy. In the opt-in condition, women who had fewer attempted data entries in the first phase (and hence may have interpreted this as a negative performance signal) were less likely to apply to the advanced task than men with the same performance signal. In the opt-out condition, however, a negative performance signal in phase 1 no longer deters women from applying to the advanced task when participation is the default (Fig. 2*B*, B1 and B2). These findings echo related literatures on gender differences in response to negative feedback (23, 26). Finally, women who chose to apply to the advanced task improved in performance from phase 1 to phase 2 more than men, especially in the opt-out condition (Table 2). In other words, women in the opt-out condition who

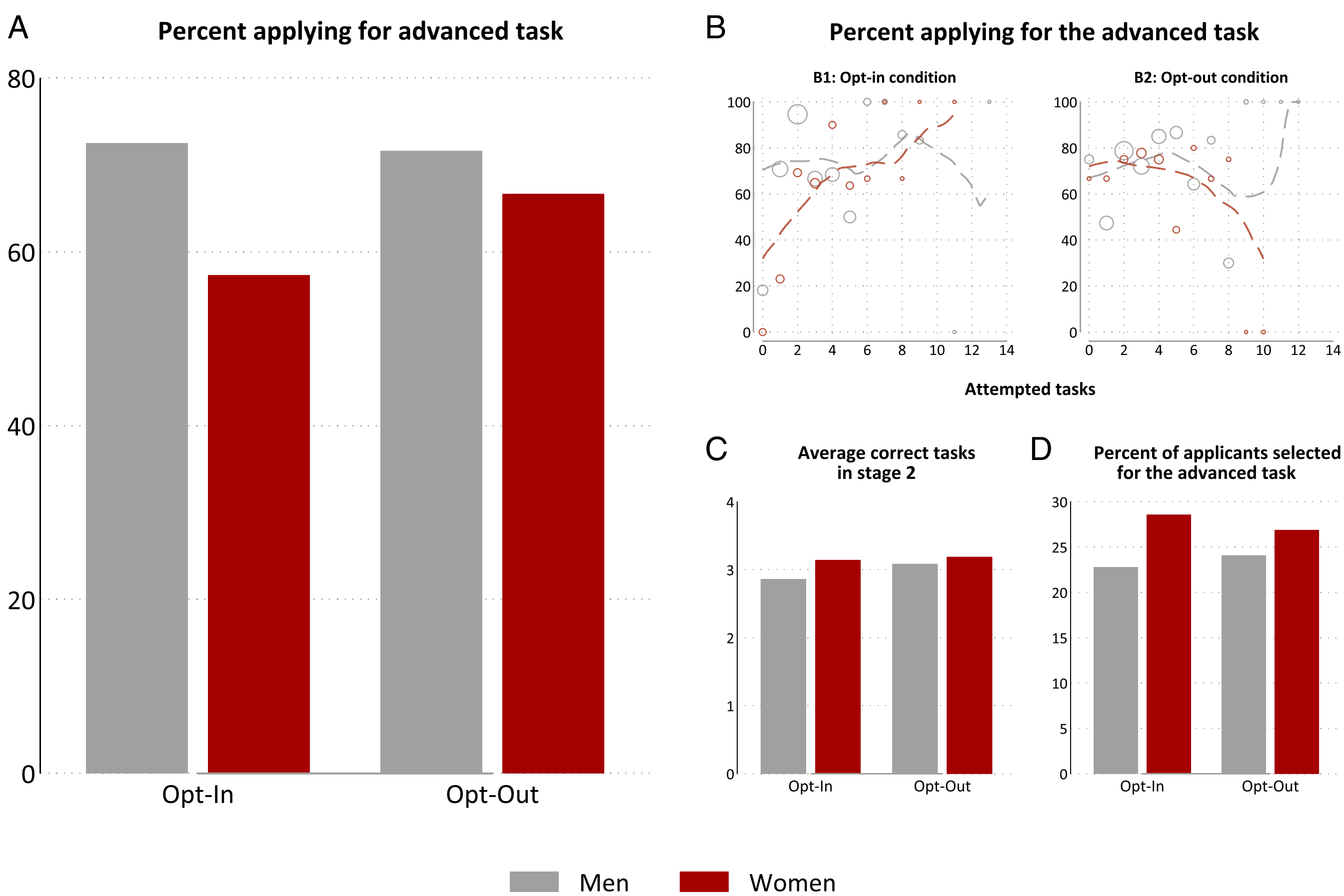

Fig. 2. Field experiment results (Study 3). "Opt in" condition, the default task during task phase was standard-level difficulty. "Opt out" condition, participants were automatically assigned to compete to be selected for an advanced-level difficulty task that also paid, but could opt out to the standard task. *A* reports the percent of particiants who applied to the advanced task, by gender and condition. In *B,* B1 and B2, the *x*-axes report the number of attempted tasks in stage 1. Each circle represents the share of participants (separate by gender), who applied for the advanced task, for each number of attempted tasks in stage 1. The size of the circles is proportional to the number of participants, by gender and experimental condition, who attempted a given number of tasks, relative to the total number of participants of a given gender in a given condition. The dashed lines are smooth polynomial approximations of the relationship between number of attempts in stage 2 and the likelihood of applying for the advanced task (degree zero and bandwidth 1.5), separated by gender. *C* and *D* report the average number of correct tasks and the percent of applicants selected for the advanced tasks (conditional on applying), respectively, as the predicted values by gender and condition, calculated at the average of correct tasks in stage 1 from linear regressions of the number of correct tasks in stage 2 (*C*) or an indicator for being selected for the advanced task conditional on applying (*D*) on the number of correct tasks in stage 1 and the combinations of the gender and condition indicators.

Table 2. Proportion applied to the advanced task in the task phase in the field experiment by gender, treatment condition, and number of data entry attempts in stage 1

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome variable:		Applied for advanced task	Correct answers in Stage 2		Selected for advanced task	
Estimation:		Probit	OLS		Probit	
Sample:	Opt-in condition	Opt-out condition	Opt-in condition	Opt-out condition	Applied for selected task: Opt-in condition	Applied for selected task: Opt-out condition
Woman	−0.407*** (0.104)	0.140 (0.116)	0.025 (0.401)	−0.492 (0.428)	0.098 (0.082)	0.034 (0.071)
Attempted tasks in stage 1	0.019 (0.017)	0.003 (0.016)				
Attempted tasks in stage 1: Woman	0.081** (0.032)	−0.046* (0.026)				
Chose advanced			0.421 (0.281)	0.367 (0.299)		
			0.561 (0.528)	0.908 (0.614)		
			0.648*** (0.051)	0.742*** (0.055)	0.107*** (0.019)	0.092*** (0.016)
			0.748*** (0.223)	0.762*** (0.292)		
Observations	238	239	238	239	159	167
	0.089	0.018	0.486	0.427	0.362	0.231

The coefficient estimates from the probit models are transformed into marginal effects. Robust SEs are in parentheses. * = $P < 0.1$, ** = $P < 0.05$, and *** = $P < 0.01$.

received a negative performance signal in the first phase but did not opt out performed just as well in the competition. Finally, as in Studies 1 and 2, we examined the effect of opt-out framing on performance on stage 2 (Fig. 2*C*) and the percentage of applicants selected for the advanced task (Fig. 2*D*), finding no negative downstream consequences.

Discussion

Overall, our results indicate that making competition the default eliminates the commonly observed gender difference in the propensity to compete. In our experiments, we also rule out potentially negative consequences of nudging on performance or wellbeing. Furthermore, our adaptation of the laboratory experiment to a high-stakes field setting demonstrates the policy implications of an opt-out intervention to close the gender gap for various types of competitions in organizations.

Decades of research have investigated how to close the gender gap, in high-level positions in organizations, to limited success. Promotion processes and the ascension to the highest ranks of an organization have the features of a competitive process, and several studies have demonstrated that women have greater aversion to competition than men. Therefore, this discrepancy in the propensity to compete has been put forth as an explanation for the gender gap in high-level organizational positions. Our study suggests that women's aversion to competition may depend on the context and, in particular, on how the option to compete is presented. Specifically, we find that an "opt-out" framing eliminates gender differences in the willingness to compete.

A practical implication of our studies is that organizations could attenuate the gender gap in competitions by moving from a default, in which applicants must opt in to apply, to a default whereby those who pass a performance and qualification threshold are automatically considered but can choose to opt out. Examples include promotions in organizations, participation into start-up pitch competitions, and innovation or creativity contests. Future work could examine similar interventions that circumvent the self-nomination aspect of opt-in schemes for competitive selection processes. For instance, rather than self-nomination, peer-nomination could attenuate the gender gap. The results of Study 2 also suggest that manipulating or nudging social norms could result in a similar effect.

"Fixing the system" by redesigning processes within organizations to be more inclusive thus appear as a valid alternative to common approaches to closing the gender gap by "fixing the women" or "fixing biases in the mind." Opt-out framing removes some of the bias inherent in current opt-in promotion systems, which favor those who are overconfident, less sensitive to signals of their own performance, and/or like to compete. In fact, the benefits of an opt-out scheme may extend well beyond women to make the process more inclusive for everyone who does not fit that mold.

Data Availability. Anonymized csv and dta files have been deposited in Open Science Framework (https://osf.io/ukh9r/?view_only=20564af037d644ffb1f62040e99397b2). All other study data are included in the article and/or *SI Appendix*.

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