

Effects of written self-promotion on gender bias and decision quality *

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Abstract

Written self-promotion is crucial in numerous decision-making scenarios, including job applications, securing funds for start-ups, or academic grant proposals. In two experiments, we study the effects of written self-promotion on decision quality and gender bias. We show that, if anything, written self-promotion slightly improves decision quality. Concerning gender bias, we find that self-promotion does not induce a gender bias that harms women. While women in our sample face adverse effects of written self-promotion due to lower performance beliefs, they can compensate for this disadvantage by applying a more modest writing style and by providing more informative written self-promotion. Finally, we show that the provision of self-promotion can mitigate pre-existing gender biases.

Keywords: gender bias, self-promotion, real-effort

JEL: C9, M51, J16, D91

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1 Introduction

Written self-promotion plays a central role in many career-relevant situations. For example, the majority of employers refer to cover letters when selecting applicants (Schullery et al., 2009), written online-pitches crucially determine which ventures receive funding (Allison et al., 2015; Manning & Bejarano, 2017; Gafni et al., 2019), and the way researchers promote their research in a grant proposal impacts which research is funded and ultimately executed (Kolev et al., 2019, 2020). Despite the relevance, evidence on the causal effects of written self-promotion is scarce. We contribute to filling this gap by providing evidence from two experimental studies on the effect of self-promotion on decision quality and gender bias.

Self-promotion is relevant in contexts characterized by a conflict of interest and information asymmetry. In such contexts, agents have an incentive to inflate written self-promotion, rendering self-promotion uninformative. Research on self-promotion has mainly focused on self-promotion provided on one-dimensional numeric scale. Related research reveals that self-promotion may be informative, and thus may have a positive impact on decision quality (Exley & Kessler, 2022). Despite the conflict of interest, not all individuals lie, and those who do usually do not lie to the maximum possible extent (Gneezy, 2005; Fischbacher & Föllmi-Heusi, 2013). Thus, self-promotion is likely to be informative with respect to the performance beliefs held by agents. While self-promotion may improve decision quality, one worry is that self-promotion is disadvantageous to women (Bohnet et al., 2021; Manian & Sheth, 2021; Exley & Kessler, 2022; Abraham, 2023; Exley & Nielsen, 2024).¹ In fact, research on self-promotion that is provided in a one-dimensional numeric scale (for example, by asking about the agreement to the statement “I performed well on the test I took [...]”) reveals that gender differences in performance beliefs lead to less favorable self-promotion provided by women (Exley & Kessler, 2022; Exley & Nielsen, 2024). Such gender differences are shown to result in a sustainable gender gap as decision-makers do not fully account for gender differences in self-promotion (Reuben et al., 2014; Bohnet et al., 2021; Exley & Nielsen, 2024).

In this paper, we add to the literature on gender differences in self-promotion by focusing on written self-promotion. Different to one-dimensional self-promotion

¹ Closely related research further shows that women are less likely to self-cite (Azoulay & Lynn, 2020), to promote certain skills in their CV (Murciano-Goroff, 2021) or to take credit for group work success in front of employers (Lozano, 2024).

provided on numerical scales, written self-promotion provides a broader set of signals on actual performance. In addition to a signal on performance beliefs, the writing style is shown to be correlated with relevant characteristics of agents (Lerchenmüller & Sorenson, 2019; Kolev et al., 2020; Andres & Bruttel, 2024), and may thus be informative. Furthermore, written self-promotion may convey credible performance signals (descriptions of performance) which are relevant to the formation of the principals' performance expectations. For example, written pitches and grant applications, typically include information on the planned project.

We conduct two preregistered experimental studies.² Both studies, follow a two-stage experimental procedure. In the first stage, agents (participants in the first stage of our experiments) perform a real effort task and provide written self-promotion. They are incentivized to provide a self-promotion that convinces a decision-maker (participants in the second stage of our experiments) to select them over another agent. In the second stage, decision-makers choose between two agents, incentivized to select the better-performing one. To provide insights on the effect of self-promotion on decision quality and gender bias, we vary the information provided to decision-makers. Specifically, we vary whether we reveal (1) self-promotion, (2) the agents' gender, and (3) a performance indicator (only one of our experimental studies) to decision-makers.

Between studies, we vary the task assigned to agents. In the first study, the Math Study, the real effort task that agents perform is a math and science quiz. In the second study, the Ideation Study, agents perform a creative task, the world illustration task (WIT, see Laske et al., 2024). In the Ideation Study, agents can describe their idea in the written self-promotion. These descriptions are a credible performance signal as agents cannot describe ideas that they do not have. Such descriptions are not possible in the Math Study. Thus, one central difference between the Math Study and the Ideation Study is the relevance of credible signals provided through written self-promotion.

Another difference between the Math Study and the Ideation Study lies in the introduction of an additional treatment dimension. In the Ideation Study, we vary whether a performance indicator is provided to decision-makers. This performance

² The preregistrations for the two experimental studies can be accessed under the following links: https://osf.io/9c6d4/?view_only=595586a1698e4d51af79c5c0bf994373 and <https://doi.org/10.17605/OSF.IO/WY2K5>. To enhance readability and ensure consistency between the analyses of the two studies, we occasionally deviate from our preregistered analyses. We outline these deviations, accompanied by complementary analyses in the Appendix, demonstrating that the results from the preregistered specifications closely align with those presented in the main paper.

indicator constitutes an additional performance signal that is not provided by the agent. Real-life examples of such performance indicators accompanying self-promotion could be expert evaluations of start-ups, university grades of an applicant, or the publication track record of a researcher. Ex-ante, the interaction between such performance indicators and self-promotion is unclear. On the one hand, performance indicators may enhance the impact of self-promotion making. In our design, we provide decision-makers in the treatments including an additional performance indicator with pictures of the ideas generated by an agent. Performance indicator may reduce the relevance of self-promotion, as information can also be inferred through the performance indicator. At the same time, self-promotion may gain in informativeness through the combination. For instance, performance indicators can assist decision-makers in interpreting self-promotion by providing insights into the agent's overconfidence. Using this design, we can quantify decision quality as the fraction of correct choices, i.e., choices in which decision-makers choose the better performing agent. To quantify whether self-promotion induces a gender bias, we focus on the fraction of women chosen by decision-makers who do not know the agent's gender. To analyze whether self-promotion reduces gender bias, we examine gender in-group favoritism measuring the fraction of choices in which decision-maker and agent share the same gender. To quantify the writing style, we implement a two-step approach: In the first step, we quantify characteristics of written self-promotion using up-to-date word processing tools. In the second step, we conduct a principal component analysis to determine writing patterns that are relevant to success in the context of self-promotion. Finally, in the Ideation Study, we quantify credible signals through classifications of descriptive content included in the self-promotion.

We find only weak evidence for a positive impact of written self-promotion on decision quality. Self-promotion leads to slight improvements in decision quality. However, effect sizes are relatively small and do not always meet conventional levels of statistical significance. This positive effect of written self-promotion seems primarily associated with the transmission of performance beliefs. The writing style has a significant impact on the likelihood of being chosen but not on decision quality. Specifically, we find that self-promotion that are more modest (characterized by a writing style scoring high in authenticity and low in clout) are chosen more often. In the Ideation Study, we further find that credible signals are relevant, where controlling for actual quality, agents who provide longer descriptions are more likely to be chosen by the decision-makers. While

the writing style and credible performance signals have an impact on the behavior of decision-makers, we do not find evidence that they have an impact on decision quality.

We can show that self-promotion does not lead to systematic disadvantages for female agents. In line with previous studies analyzing self-promotion on one-dimensional scales (Exley & Kessler, 2022), we can show that women have lower performance beliefs and that gender differences in performance beliefs lead to a lower probability of women being chosen. However, we can also show that written self-promotion provided by women tend to be more informative (include more credible signals) and to be written in a more modest writing style. We find that decision-makers favor informative and modest written self-promotion. Thus overall, we find that women can compensate for disadvantages arising due to lower performance beliefs by providing on average more modest and more informative self-promotion as compared to male agents. Thus, similar to closely related research on effects of self-promotion on task assignment (Silva Goncalves & van Veldhuizen, 2020), we find no gender differences in success, despite finding that women providing slightly lower numerical self-promotion.

We find evidence for a bias reduction effect of self-promotion. Absent of self-promotion, we find evidence for gender in-group favoritism (male decision-makers favoring male agents and female decision-makers favoring female agents) in both studies. Additionally, we observe a gender bias favoring females in the Ideation Study. We find that self-promotion significantly reduces both types of biases. This finding is in line with previous studies on the effect of information on gender bias, (see e.g., Bohren et al., 2023; Castillo & Petrie, 2010; Reuben et al., 2014 or Neumark, 2018 for a review). It seems that the reduction of pre-existing gender bias is due to a shift in focus. Once self-promotion is provided, decision-makers seem to choose based on the characteristics of presented self-promotion rather than based on the agent's gender.

Finally, we analyze the interaction of written self-promotion with additional performance indicators. Our results indicate that self-promotion complements performance indicators. It seems that self-promotion is especially valuable in improving decision quality if it is accompanied by both information on the agent's gender and an performance indicator.

Our results suggest that the format of self-promotion matters largely when it comes to the impact of self-promotion on gender bias. Previous experiments have shown that self-promotion on numerical scales can induce gender bias, harming women (Exley & Kessler, 2022; Exley & Nielsen, 2024). Our findings show that when self-promotion is provided in

written form, this is not the case. In fact, we find that written self-promotion is effective in reducing pre-existing gender bias.

2 Design and Procedure (Math Study)

We conduct a two-stage experiment where the design mimics decision-making settings in which written self-promotion is typically relevant. In the first stage, agents perform a real-effort task and provide a self-promotion for their work. In a second stage, decision-makers select between agents. Decision-makers are incentivized to choose the agents with the highest performance. In contrast, agents receive more money if they are chosen by one randomly matched decision-maker, independent of whether or not this agent actually performed better. This procedure is common knowledge.

The real-effort task consists of answering a math and science quiz. In particular, agents answer 20 questions similar to those from the ASVAB (Armed Services Vocational Aptitude Battery).³ Agents have 30 seconds to answer each question (see questions in Appendix B). We measure performance as the number of correct answers in this test. Only after performing the task, agents received detailed information about the second stage and asked to provide self-promotion.⁴ To elicit self-promotion, agents are asked to provide a written text to convince the decision-maker to choose them. After providing self-promotion, we assess agents' performance beliefs. In the second stage, decision-makers take 20 binary choices. In each of these choices, decision-makers select between two randomly drawn agents, one male and one female agents. One of these 20 choices is randomly determined and incentivized.

Between treatments, we vary the information provided to decision-makers. In a 2×2 factorial design, we vary whether agents' self-promotion and/or agents' gender are revealed to decision makers. The treatments and sample sizes (number of decision-makers) are summarized in Table 1. In SP-blind, self-promotion but not the agent's gender is revealed to decision-makers. In SP-revealed, self-promotion and the agent's gender are revealed to decision-makers. In No-revealed, the decision-makers only know the agent's gender when deciding. We conducted this last treatment to control for the effects of revealing gender and cleanly assess the effect of self-promotion in this context. Our baseline comparison is a situation in which decision-makers have no information. For this

³ The procedure is similar to that applied by Exley & Kessler (2022).

⁴ We chose this sequence to avoid any treatment effects on actual performance.

baseline, we conducted a pseudo treatment in which we run the experiment using bots who randomly select agents (No-blind).⁵ We assign treatments on the decision-maker level.

Table 1: Treatments (Math Study)

	Gender-blind	Gender-revealed
No performance signal	No-blind* n=225	No-revealed n=201
Self-promotion revealed	SP-blind n=211	SP-revealed n=212

Note: The table illustrates our treatments and the number of decision-makers assigned to each treatment. In each treatment, we draw from the entire sample of agents (n=164), such that the sample of agents on which decision-makers decide is constant. *No-blind is a simulated pseudo-treatment in which bots randomly choose agents and serve as a baseline comparison.

Figure 1 shows an example screen from one decision round in SP-revealed, illustrating how we reveal self-promotion and gender to the decision-maker. Whenever self-promotion is revealed, we provide decision-makers with the written self-promotion of both agents on the decision screen. To reveal gender, we color the buttons that decision-makers click to select an agent. Purple buttons indicate that the corresponding agent is female and blue buttons that the corresponding agent is male. We informed decision-makers about this color code when applicable. If gender is not revealed, all buttons were grey.

We use the same sample of 164 agents, to generate choice data in all treatments. To avoid deception, agents are informed that self-promotion and gender may be revealed to decision-makers. Overall, we collect data from 164 agents, 82 female and 82 male agents.

We conducted the experiment in October 2021. For the first stage, we sampled agents on Prolific. In line with our preregistered exclusion criteria, agents who did not pass our attention check questions or finished the experiment in less than 2 minutes are not included in the final sample. Agents received a bonus of 3 GBP (in addition to 1.5 GBP fixed pay), if a randomly chosen decision-maker chose them. The average payment was 2.96 GBP and the average duration of the experiment 10 minutes.

For the second stage, we sampled decision-makers through the platform Amazon Mechanical Turk (Mturk).⁶ We collected data for all treatments simultaneously and randomly assigned participants to one of the three treatments. We restricted our sample

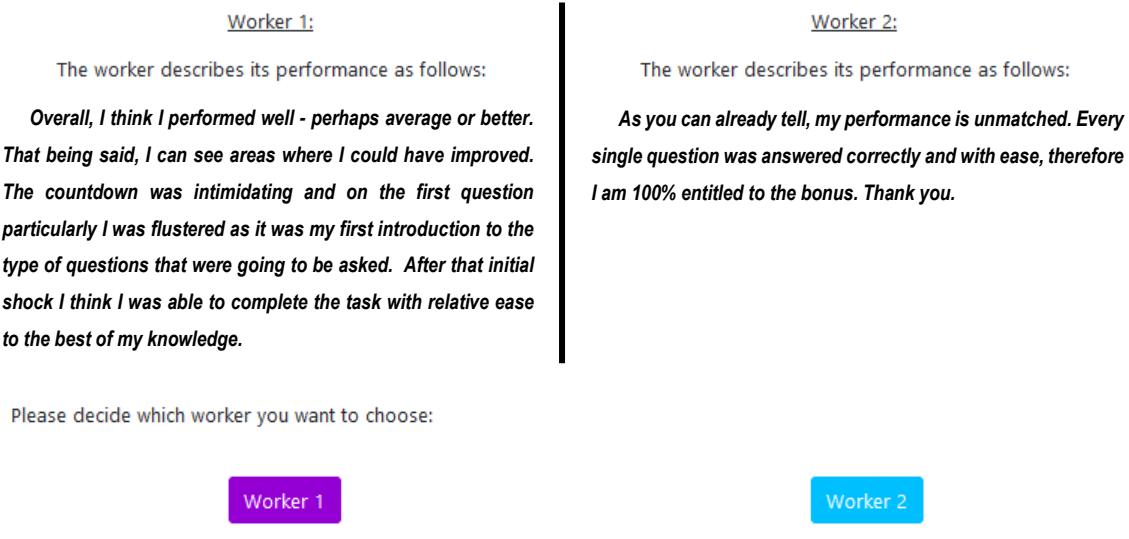
⁵ We simulated the pseudo treatment in oTree.

⁶ We chose to recruit participants on Mturk for the second stage due to lower platform fees and the much higher sample size required compared to the first stage.

to decision-makers who passed our attention check questions and did not complete the experiment in less than 1.5 minutes. Our final sample consists of 624 decision-makers, 351 female and 498 male decision-makers. Decision-makers received a bonus of 1.5 USD bonus (additional to 0.30 USD fixed pay), if they selected the better agent in one randomly determined round. On average, decision-makers worked for 5 minutes and earned 1.46 USD.

To quantify the treatment effect on decision quality, we focus on correct choices. We classify choices as correct whenever the decision-maker choose the better agent, i.e., the agent with the larger number of correct answers. In case of a tie, we perform a random

Figure 1: Decision screen in SP-revealed (Math Study)



Note: The figure shows an example decision screen from SP-revealed. Buttons reveal the agent's gender and texts displayed are what we refer to as the agent's self-promotion. Note that in the experiment, agents were called workers.

draw to determine which choice is considered as correct. We quantify whether self-promotion induce a gender bias, we focus on the fraction of women chosen. To analyze whether self-promotion reduce gender bias, we focus on gender in-group favoritism focusing on the fraction of choices in which decision-maker and agent are of the same gender.

We are especially interested in understanding how written self-promotion affect decision making. Different to self-promotion on a numeric scale, which are rather limited in the information they convey, we argue, that self-promotion may convey more rich information. Specifically, we argue that written self-promotion may reveal a) agents performance beliefs, b) agents characteristics and c) credible performance signals. We

use performance beliefs elicited after the experiment as an approximation of the relevance of performance beliefs for the effect of self-promotion.⁷

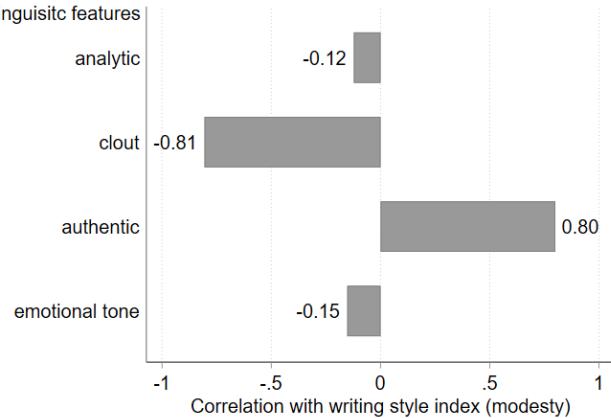
We quantifying relevant aspects of the writing style using a two-step approach to create an index that reflects the writing style favored by decision-makers. Note that we derive this index from self-promotion and decision-maker choices in the Math and Ideation Study, aiming to construct a generalized measure. In the first step, we apply the Linguistic Inquiry and Word Count (LIWC, Boyd et al., 2022). The LIWC is a research-based software tool that quantifies written texts generating four summary variables: analytical thinking (see, e.g., Pennebaker et al., 2014), clout (see, e.g., Kacewicz et al., 2014), authenticity (see, e.g., Newman et al., 2003), and emotional tone (see, e.g., Cohn et al., 2004). In the second step, we conduct a principal component analysis (PCA) based on the pooled sample of self-promotion from both studies ($n=416$). The resulting index for modest writing style is a linear combination of features, each weighted according to their relevance to the decision-maker's choices.⁸ Figure 2 illustrates the correlation of modest writing style with individual linguistic features. Specifically, a modest writing style is characterized by high values for authenticity and low values for clout.⁹ We validate this construct using unsupervised machine learning (k-means approach) and show in Appendix A.1 that the approach captures a similar construct.

⁷ Previous research on the effect of self-promotion already reveals that performance beliefs are relevant to the effect of self-promotion (Exley & Kessler, 2022; Exley & Nielsen, 2024). Performance beliefs are only incentivized in the Ideation Study.

⁸ The principal component analysis is a commonly used and validated approach to generate such indices (see e.g., Balboni et al., 2022; Bandiera et al., 2020). Our measure for modesty explains around 30% of the variance in the probability to be chosen by the decision-maker.

⁹ The LIWC describes authenticity as speaking in an honest, spontaneous way with little-to-no social inhibitions (as opposed to, e.g., prepared speeches). Low levels of clout are associated with self-doubt and caution, as opposed to high scores are associated with high confidence, social status, or leadership.

Figure 2: Correlation of linguistic features with an index for modest writing style



Note: The figure shows the pairwise correlation between the linguistic features and the first component obtained from a PCA that explains decision-makers' choices in SP-blind, which we call our writing style index. Drawing on the associations displayed, we interpret this as an index indicative of a modest writing style. We include the full sample ($n=416$) of self-promotion of the Math Study ($n=164$) and the Ideation Study ($n=252$). Analytic, clout, authentic, and emotional tone are linguistic summary variables generated using the LIWC, a standardized research-based dictionary. The first component explains around 30% of the variance in the probability of being chosen by the decision-maker in SP-blind.

3 Results (Math Study)

In Table 2, we present the summary statistics on decision-maker and agent behavior, alongside results from non-parametric bivariate analyses. A first thing to notice is that we observe significant gender differences in performance. Specifically, we observe that men provide on average 11 correct answers and women only 9 correct answers (see Panel (b) of Table 2). To give consideration to these gender differences, we additionally provide regression results controlling for performance. Table 3 provides results from linear probability models using correct choice, women chosen and same gender chosen as dependent variables, controlling for actual performance in the latter two cases.¹⁰

Overall, we find that the fraction of correct choices is around 0.5, i.e., the outcome of random choice. We find a slight tendency that self-promotion improves decision quality. In No-blind, we observe 0.49 percent correct choices, while it is 0.52 in SP-blind. In No-revealed, the percentage of correct choices is 0.51, while it is 0.52 percent in SP-revealed.

¹⁰ For both studies, we preregistered to cluster standard errors at the agent and decision-maker level. Following recently published evidence we only cluster at the level of the randomization, i.e., the decision-maker level (Abadie et al., 2023), in the main paper. Additionally, we preregistered controlling for performance using performance fixed effects for the Math Study. To ease interpretability of constants in Table 6 we instead use controls for differences in performance between agents. In Appendix A.3 we demonstrate that the preregistered specifications (columns 2 and 4 in Table A 4) yield nearly identical coefficients to those in columns 1 and 3 of Table 6 (which we report alongside in columns 1 and 3 in Table A 4). Only the already weak effect of self-promotion on decision quality does not meet conventional levels of significance anymore (see column 2 of Table A 4).

However, the increase in decision quality due to self-promotion is only significant in the gender-blind setting (see Table 2 and Table 3, Panel (a), columns 1 and 4).¹¹

Table 2: Summary statistics (Math Study)

Panel (a): Decision-maker behavior		Gender-blind		Gender-revealed	
		No-blind	SP-blind	No-revealed	SP-revealed
Chosen (frac.)					
Correct choice		0.49 (0.12)	0.51* (0.11)	0.51 (0.13)	0.52 (0.12)
Women chosen		0.50 (0.12)	0.50 (0.10)	0.51 (0.22)	0.52 (0.16)
Same gender chosen		0.50 (0.12)	0.49 (0.10)	0.56 (0.21)	0.51** (0.16)
N decisions		4,500	4,220	4,240	4,020
n decision-makers		225	211	212	201
Panel (b): Agent behavior					
		Overall	Female agents		Male agents
Performance		10.37 (3.43)	9.39 (3.60)	11.35*** (2.97)	
Performance beliefs		12.34 (3.92)	11.66 (4.06)	13.01** (3.67)	
Modesty		0.00 (1.18)	0.22 (0.97)	-0.22*** (1.33)	
n agents		164	82	82	

Note: Mean values and standard deviations in parentheses. In Panel (a) data is aggregated on decision-maker level and we provide results for the separate treatments. Superscripts in Panel (a) indicate significances from pairwise MWU-tests comparing No-blind to SP-blind and No-revealed to SP-revealed, respectively. In Panel (b), data is aggregated on agent level and we provide results for female and male agents separately, where superscripts indicate significances from MWU-tests comparing female and male agents. * p≤0.1; ** p<0.05; *** p<0.01.

To understand whether self-promotion induces a gender bias, we analyze the fraction of women chosen. In the gender-blind setting, we find that the fraction of women chosen is 0.50, independent of whether or not self-promotion is provided. In the gender-revealed setting, we find a slight advantage for women. Absent of self-promotion, the fraction of women chosen is 0.51 while it is 0.52 including self-promotion. Overall, we find no evidence for a significant effect of written self-promotion on the fraction of women being chosen (see Table 3, Panel (a), columns 2 and 4).¹²

¹¹ Throughout the paper when referring to p-values, we report results from two-tailed tests.

¹² We also preregistered an analysis of treatment differences on the agent-level using controls for a dummy indicating that the agent is female and interactions with treatment indicators. We show in Appendix A.3 that this specification similarly finds no effect on women chosen (see coefficients for the female agent dummy and the respective interactions in Table A 6 which are all around zero and statistically insignificant). We preregistered additional analyses to further investigate potential gender bias which we do not report as we find no evidence of such bias. Table A 6 also shows that revealing gender has no effect on women chosen (see the coefficient for female agent x gender, which is close to zero and insignificant) and does not influence the interpretation of women's self-promotion (see coefficient for female agent x gender x self-promotion). These questions were preregistered for analysis.

Next, we examine whether revealing self-promotion can reduce gender bias. Absent of self-promotion, we find evidence for in-group favoritism in the gender-revealed setting. Specifically, the fraction of decisions in which decision-makers choose the agent of the same gender is 0.56. This fraction is significantly larger than the fraction in which decision-makers choose the agent of the same gender in No-blind ($p<0.01$, see coefficient for Gender in Table A 5 in Appendix A.3) and significantly higher than 0.5 (Wilcoxon signed-rank test: $p<0.01$).¹³ We find that in-group favoritism in the gender-revealed setting is significantly reduced once self-promotion is revealed (see Table 3, Panel (c), columns 3 and 4). Summarizing, we find that revealing self-promotion significantly reduces pre-existing gender bias.

In summary, we find that self-promotion improves decision quality, does not induce gender bias, but reduces pre-existing gender biases. In Figure 3, we plot the estimates provided in Table 3 (see columns 1 and 4), summarizing these findings. Dots refer to the respective treatments in which self-promotion is not provided and triangles to treatments in which self-promotion is provided. Thus, the red lines connecting dots and triangles indicate the effect of self-promotion.

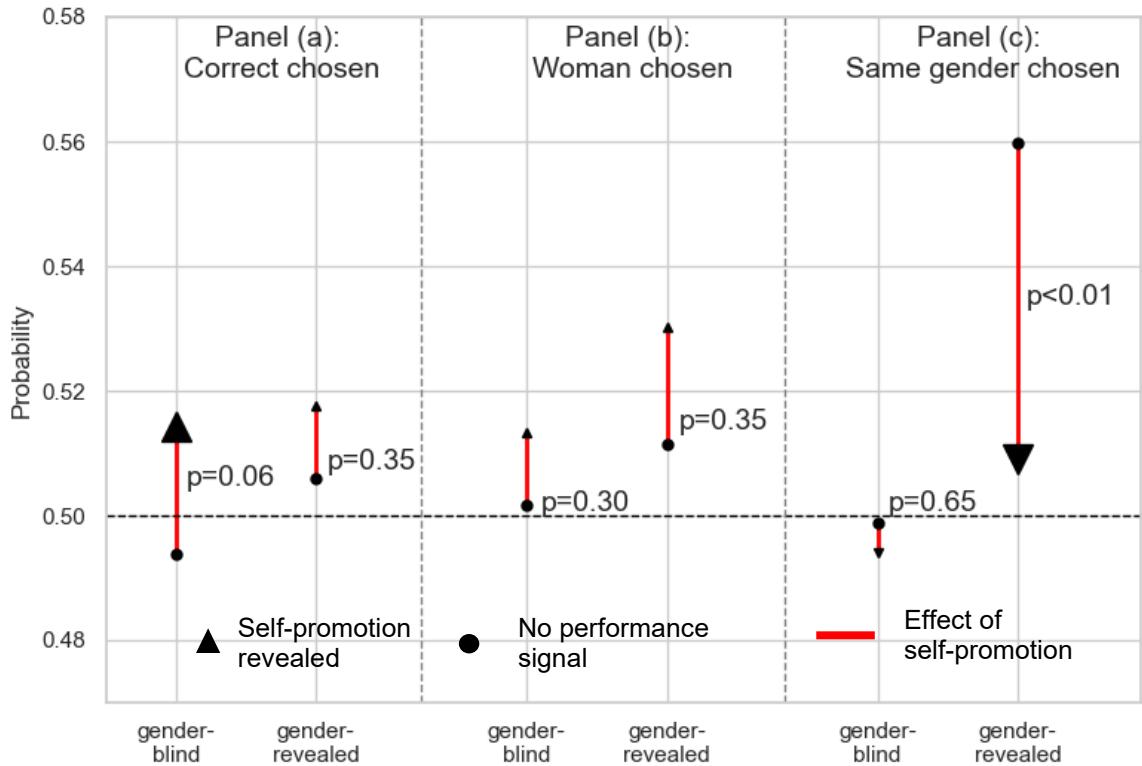
To better understand the effect of self-promotion on decision-makers, we will now focus on agent behavior (see Panel (b) of Table 2 for the relevant summary statistics). As discussed above, we find that male agents perform on average 19 percent better than female agents. In absolute numbers, we also find that performance beliefs of male agents are significantly higher than performance beliefs of female agents (MWU-test: $p=0.03$). Controlling for actual performance, women still hold lower performance beliefs, although these differences become smaller and statistically insignificant (see Table A 3 in Appendix A.2).¹⁴ Focusing on the writing style, we find that self-promotion written by women scores significantly higher in our standardized measure for modesty (MWU-test: $p<0.01$). We reveal significant differences in modesty, which become more pronounced when controlling for performance (see Table A 3 in Appendix A.2).¹⁵

¹³ Table A 5 further confirms the equivalence of the preregistered model to the main paper's specification (compare columns 1 and 2, 3 to 4 and 5, and 6 to 7 and 8, respectively). It also shows that the results remain consistent when splitting the gender-blind and gender-revealed settings. The Gender coefficient indicates the difference between No-revealed and No-blind and thus, controls for the effect of revealing gender.

¹⁴ We find that performance beliefs are correlated with actual performance (Spearman: $\rho=0.45$, $p<0.01$).

¹⁵ One may worry that written self-promotion reveals the gender of the agents. We investigate this through a follow-up data collection in which raters guess the agent's gender based on self-promotion. We sampled 92 raters on MTurk from English-speaking countries and incentivized them to accurately predict the likelihood (in 0-100 percent) that the agent is female based on self-promotion. Each rater was shown a

Figure 3: Effects of self-promotion (Math Study)



Note: This graph is based on the estimates from LPMs reported in columns 1 and 3 of Table 3. Dots indicate the respective constant; triangles indicate the sum of the constant and the coefficient for the self-promotion dummy (equals 1 when self-promotion is revealed). The difference (red lines) shows the effect of self-promotion. Headers indicate the respective binary outcome (e.g., below 'correct chosen' we display estimates from the regression of correct choice). P-values show significances of the effect of self-promotion. Size of triangles reflects the statistical significance of the result.

To understand how differences in written self-promotion impact decision-makers, we provide regression analysis on the fraction of decisions in which agents got chosen by decision-makers in SP-blind. Table 3 shows the results, revealing that we find significant positive effects of performance beliefs and modesty. Thus, we can show that both performance beliefs and modesty are relevant when it comes to the effect of self-promotion.

random sample of 20 self-promotions. Each self-promotion was shown to at least nine raters. In the analysis, we use averages over all assigned raters. We find that raters are not able to predict the gender of an agent based on the written self-promotion (MWU-test: $p=0.46$). Thus, self-promotion does not seem to be informative on an agent's gender.

Table 3: OLS regression of effects of agent behavior on decision-makers' choices

	DV: Chosen in SP-blind			
	(1)	(2)	(3)	(4)
Performance	0.017 (0.010)			0.005 (0.011)
Performance beliefs		0.026*** (0.009)		0.026** (0.011)
Modesty			0.033*** (0.010)	0.034*** (0.010)
Constant	0.500*** (0.009)	0.500*** (0.009)	0.500*** (0.009)	0.500*** (0.009)
Obs.	164	164	164	164

Note: Coefficients are from an OLS regression of the fraction of decisions in which the agent was chosen by decision-makers in SP-blind. Controls for performance, performance beliefs are modesty are standardized. Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p≤0.1.

To investigate whether differences in performance (beliefs) and modesty relate to the treatment effects observed, we control for their standardized differences between the two agents the decision-maker faces in a decision, and the interaction with the self-promotion dummy. We provide the respective regression models in Table 3. In Panel (a) of Table 3, we analyze the effect of self-promotion on decision quality. Both in the gender-blind and in the gender-revealed setting, we observe that controlling for differences in performance beliefs eliminates the (marginally) positive impact of self-promotion on the likelihood of choosing the correct option (see Table 3, Panel (a), Columns 2 and 5). Controlling for differences in modesty does not significantly affect the main effect of self-promotion on decision quality (see Table 3, Panel (a), columns 3 and 6).

Results in columns 2 and 3 of Panel (c) of Table 3 suggest that differences in performance beliefs and modesty do not seem to be the central driver of reduced in-group favoritism in the self-promotion treatments. Rather, it seems that the decrease in in-group favoritism through written self-promotion seems to be driven by decision-makers' focusing on self-promotion and deciding based on their characteristics instead of based on the agent's gender.

Table 4: LPM of effects of self-promotion

	Gender-blind			Gender-revealed		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel (a): Correct choice						
Self-promotion	0.020*	0.006	0.007	0.012	0.003	0.004
	(0.011)	(0.012)	(0.012)	(0.012)	(0.013)	(0.013)
Constant	0.494***	0.495***	0.494***	0.506***	0.507***	0.507***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)
Controls						
Performance beliefs	No	Yes	Yes	No	Yes	Yes
Modesty	No	No	Yes	No	No	Yes
Obs.	8,720	8,720	8,720	8,260	8,260	8,260
n decision-makers	436	436	436	413	413	413
Panel (b): Woman chosen						
Self-promotion	0.012	0.014	-0.002	0.019	-0.006	0.000
	(0.011)	(0.011)	(0.011)	(0.020)	(0.020)	(0.020)
Constant	0.502***	0.501***	0.502***	0.511***	0.511***	0.512***
	(0.010)	(0.010)	(0.010)	(0.020)	(0.020)	(0.020)
Controls						
Performance beliefs	No	Yes	Yes	No	Yes	Yes
Modesty	No	No	Yes	No	No	Yes
Obs.	8,720	8,720	8,720	7,616	7,616	7,616
n decision-makers	436	436	436	413	413	413
Panel (c): Same gender chosen						
Self-promotion	-0.005	-0.005	-0.003	-0.049**	-0.051***	-0.049***
	(0.011)	(0.011)	(0.010)	(0.019)	(0.019)	(0.019)
Constant	0.499***	0.499***	0.499***	0.560***	0.560***	0.560***
	(0.009)	(0.009)	(0.009)	(0.017)	(0.017)	(0.017)
Controls						
Performance beliefs	No	Yes	Yes	No	Yes	Yes
Modesty	No	No	Yes	No	No	Yes
Obs.	8,085	8,085	8,085	7,616	7,616	7,616
n decision-makers	436	436	436	413	413	413

Note: Coefficients are from a LPM with random effects at the agent level. Dependent variables equal 1 if the better agent is chosen (correct choice) in Panel (a) if the woman is chosen in Panel (b), or when the agent of the same gender is chosen in Panel (c), and 0 otherwise. Self-promotion is a dummy that equals 1 when self-promotion is revealed and 0 otherwise. Effects are interpreted relative to the base category, that is No-blind for columns 1-3 and No-revealed for columns 4-6. Controls for modesty and performance beliefs are controls for standardized differences between the agents in the respective decision in terms of these variables and their interactions with the self-promotion dummy. Regressions in Panel (b) and (c) similarly control for performance differences. Panel (a) does not include controls for performance differences as the outcome variable, i.e., selecting the better candidate, is directly correlated with the agents' performances. Standard errors are clustered at the decision-maker level (reported in parentheses). *** p<0.01, ** p<0.05, * p≤0.1. Decisions in all specifications are based on the full sample of agents (n=164).

In summary, we find that characteristics of the revealed self-promotion significantly affect decision-makers' choices. Specifically, decision-makers are more likely to choose agents with higher performance beliefs but more modest language than their competitors. We find that differences in performance beliefs can explain the small improvements in decision quality through self-promotion. We further observe that women offset potential disadvantages of lower performance beliefs by more modest writing. This finding explains why written self-promotion does not induce a bias harming women. Lastly, we showed that the decrease in in-group favoritism through written self-promotion seems to

be driven by decision-makers' focusing on self-promotion and deciding based on their characteristics instead of based on the agent's gender.

In the Math Study, we consider decisions in a context where all information available to the decision-maker is provided by the agent and is potentially biased. In other decision contexts such as job applications, grant decisions or venture capital investments, there is typically a richer set of information available to decision-makers. Specifically, written self-promotion may contain a description of the respective work which can be considered as a credible signal. Furthermore, decision-makers may receive information on relevant performance indicators that are not provided by agents. In the second study, the Ideation Study, we give consideration to this more complex set of information that is available to decision-makers.

4 Design and Procedure (Ideation Study)

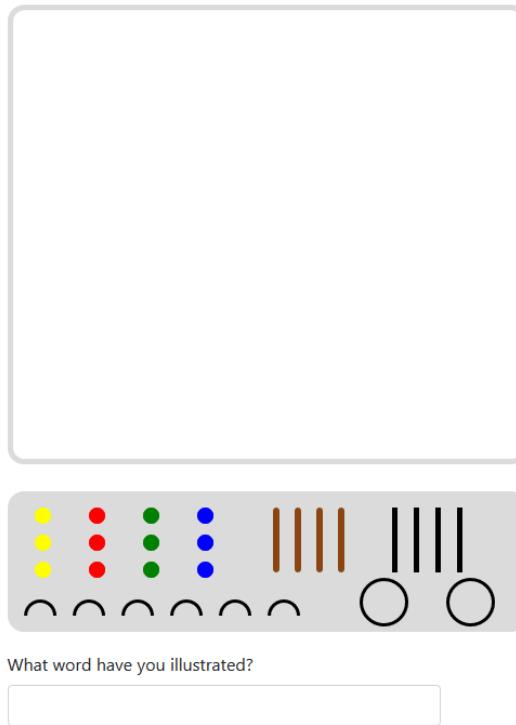
In the Ideation Study, we implement a similar experimental procedure as in the Math Study, however with three central differences: First, we apply a different real-effort task, namely the word illustration task (Laske et al., 2024). Second, we add an additional treatment dimension, varying whether decision-makers receive a performance indicator that is not provided by the agent. Third, we measure whether written-self promotions include credible performance signals, i.e., descriptions of ideas.

In the word illustration task, agents are instructed to come up with one word and illustrate it with a predefined set of materials. In this task, agents face the challenge of thinking about a word they wish to illustrate and a way of doing so. Figure 5 shows the working screen, depicting the set of materials in the grey box. To illustrate their word, agents can drag materials into the working area (white area with grey frame) and resize, rotate, and change the layer of objects. Once agents have finished illustrating a word, they insert this word in the text field below (see the lower part of Figure 4). We measure performance as the product of the quality and the originality of the idea. The quality of an idea is the percentage of independent raters that can identify the illustrated word based on the picture only.¹⁶ The originality of an idea as a binary variable that equals one if the idea is unique among a set of 50 ideas from the same experiment (not included in the final sample) and 0 otherwise (Figure A 1 in Appendix A shows some example ideas).

¹⁶ To measure quality, we sampled customers (who did not participate in the experiment) via MTurk right after conducting the first stage of the experiment. We asked them to identify the illustrated words based on the agent's illustration. Costumers were paid 10 cents for each correctly identified word.

As in the Math Study, agents work on the task, are informed about the second stage (only after performing the task) and provide a written self-promotion of their performance. Finally, we ask agents about their performance beliefs. In the second stage, decision-makers decide between agents from the first stage through 10 decision rounds. Again, we always draw one male and one female agent from the entire sample, ensuring decision-makers do not decide on the same agent twice. Agents receive a bonus in case the decision-maker chooses them, and decision-makers receive bonus if they choose the better-performing agent. Payoffs were defined based on a randomly selected decision.

Figure 4: Set of provided materials in the Ideation Study



We replicate the treatments from the Math Study. In addition, we conduct treatments in which we reveal an additional performance signal, which we call performance indicator. The performance indicator is the picture of the agent's illustration. In Indicator-blind, we only reveal the performance indicator, while in SP-Indicator-blind, the decision-makers see the agent's self-promotion in addition to the performance indicator. In the respective treatments in the gender-revealed setting (Indicator-revealed and SP-indicator-revealed), decision-makers additionally know the agent's gender. Our baseline comparison (No-blind) is again a pseudo treatment in which agents are selected randomly¹⁷. Again, decision-makers are randomly allocated to the remaining seven

¹⁷ We simulated the pseudo treatment in oTree.

treatments. We summarize treatments and the number of decision-makers per treatment in Table 4.

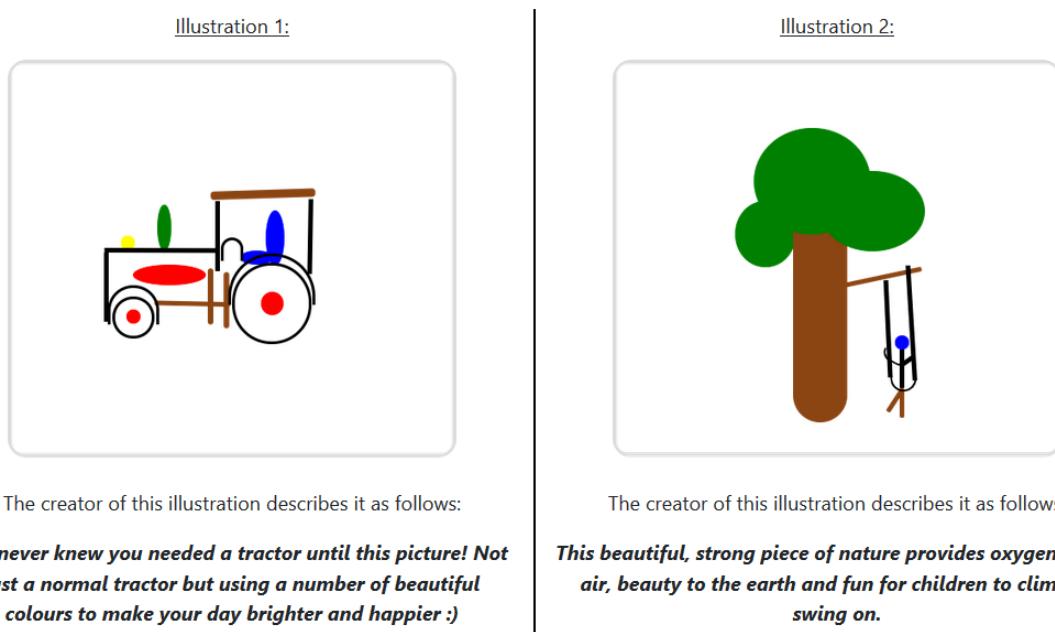
Table 4: Treatments (Ideation Study)

	Gender-blind	Gender-revealed
No performance signal	No-blind* n=650	No-revealed n=661
Self-promotion	SP-blind n=629	SP-revealed n=638
Performance indicator	Indicator-blind n=619	Indicator-revealed n=637
Self-promotion and performance indicator	SP-Indicator-blind n=618	SP-Indicator-revealed n=627

Note: The table illustrates our treatments and the number of decision-makers assigned to each treatment. In each treatment, we draw from the entire sample of agents (n=252), such that the sample of agents on which decision-makers decide is constant. *No-blind is a simulated pseudo-treatment in which bots randomly choose agents and serve as a baseline comparison.

Figure 6 shows an example decision screen in SP-indicator-revealed. We reveal self-promotion and gender equivalently to the Math Study by displaying the written self-promotion on the screen and using the same color-coded button. We reveal performance indicators using a picture of the agents' illustration.

Figure 5: Decision screen in SP-Indicator-revealed from the Ideation Study



Please decide which illustration you want to choose:

Illustration 1

Illustration 2

Note: The figure shows an example decision screen from SP-Indicator-revealed. Buttons reveal the agent's gender, texts are the agent's self-promotion and pictures the performance indicators, i.e., pictures of the agents' ideas. Note that in the experiment, ideas were called illustrations.

We conducted the first stage of the experiment in March 2021 as an online experiment on Prolific. We excluded agents who did not pass our attention checks, generated invalid ideas (e.g., illustrated the letters of the word using the provided materials instead of drawing an illustration that represents the word), or finished the task in less than five minutes. We sampled only native English speakers for the experiment. Our final sample consists of 126 female and 126 male agents. Agents could earn a 3 GBP bonus (additional to 2.5 GBP fixed pay). They received an average payment of 4.34 GBP, and the average duration of the experiment was 20 minutes. For the second stage, we again sampled new participants as decision-makers through MTurk. We collected data for all treatments simultaneously and randomly assigned decision-makers to one of the seven treatments. As pre-registered, we restricted our sample to decision-makers who passed our attention check questions and did not complete the task in less than 1 minute. We have to drop 22 decision-makers, who neither identified as female nor as male because we cannot define in-group favoritism for these decision-makers. Our final sample consists of 4,429 decision-makers, of which 2,380 are male and 2,049 are female. The bonus decision-makers potentially earned was 1.5 USD bonus (additional to 0.30 USD fixed pay). Decision-makers worked for 5 minutes and earned, on average, 1.06 USD.

We use the same procedure as in the Math Study to measure correct choice, woman chosen, same gender chosen, performance belief and modest writing style. Different to the Math Study, the Ideation Study allows agents to include credible signals for their actual performance. Self-promotion can substantially differ along this dimension. For instance, one agent promotes the illustration of a face as follows ‘Staring at you waiting for you to pick me. :-)’. In contrast, another agent providing an illustration of a face promotes it as follows ‘my illustration uses colour for the eyes and the nose instead of using just lines, also the face is smiling and happy’. We asked two independent raters to classify those parts of the self-promotion that are descriptions of the idea. As typical for subjective assessments in the context of creativity, the classifications are highly but not perfectly correlated (Spearman: rho=0.47, p<0.01). Our measure for credible signals is derived as the mean number of characters used in describing ideas.

5 Results (Ideation Study)

In Table 5 we provide summary statistics for decision-maker behavior absent of a performance indicator (Panel (a)), decision-maker behavior when the performance indicator is provided (Panel (b)) and agent behavior (Panel (c)). We will start by focusing

on decision-maker behavior absent of performance indicators. Table 7 shows the regression results for decision quality (Panel (a)), women chosen (Panel (b)) and same gender chosen (Panel (c)) in the treatments in which no performance indicator is provided. As in the Math Study, we provide a graphical illustration of coefficients in settings not involving a performance indicator in Figure 6. The regression results are provided in Table 7.¹⁸

Concerning decision quality, we find that the fraction of correct choices somewhat increases through the provision of self-promotion in both gender-blind and gender-revealed settings. Effects are around 1-2 percentage points but only statistically significant in the gender-blind setting (see Table 7, Panel (a), columns 1 and 5, respectively). Thus, we find a slight positive effect of self-promotion on decision quality.

Concerning the fraction of women chosen, we find that self-promotion does not induce a bias that harms women in the gender-blind setting. In contrast, revealing self-promotion slightly increases the fraction of women chosen. However, the effect is not significant (see Table 7, Panel (b), column 1). In the gender-revealed setting, we observe that absent of self-promotion, decision-makers choose women more often than men. The fraction of women chosen in No-revealed is with around 0.57 significantly higher compared to random choice (Wilcoxon signed-rank test against 0.5: $p<0.01$) and also significantly higher than the probability that women are chosen in No-blind ($p<0.01$, see coefficient Gender in column 3-5 in Table A 10 in Appendix A.6).¹⁹ Thus, we find evidence for pre-existing gender bias favoring women. We find that self-promotion significantly counteracts this bias (see Table 7, Panel (b), column 5).²⁰

¹⁸ We report the preregistered specifications in Table A 8 in Appendix A.6 showing that the coefficients from Table 7 are (see columns 1 and 3 of Table A 8) almost identical to those that the preregistered specification with two-way clustered standard errors and separate controls for originality and quality yield (see columns 2 and 4 of Table A 8).

¹⁹ Table A 10 further confirms the equivalence of the preregistered model to the main paper's specification (compare columns 1 and 2, 3 to 4 and 5, and 6 to 7 and 8, respectively). It also shows that the results remain consistent when splitting the gender-blind and gender-revealed settings. Note that the Gender coefficient reflects the difference between the base categories in our split analysis, as it serves as a dummy for the gender-revealed setting.

²⁰ We preregistered to additionally evaluate the effect of our treatments comparing the fraction of decisions in which a female agent is chosen between treatments using Wilcoxon signed-rank tests. Using this alternative test, we can confirm that the slight advantage of women through the provision of their self-promotion is not significant ($p=0.32$), that women are chosen more often when gender is revealed ($p<0.01$) and that providing self-promotions reduced this bias ($p=0.02$). We also preregistered additional analyses to further investigate potential gender bias induced through self-promotion, which we do not report as we find no evidence of such bias.

Table 5: Summary statistics (Ideation Study)

Panel (a): Decision-maker behavior absent of performance indicator				
	Gender-blind		Gender-revealed	
	No-blind	SP-blind	No-revealed	SP-revealed
Chosen (frac.)				
Correct choice	0.50 (0.16)	0.51* (0.16)	0.49 (0.16)	0.50 (0.15)
Women chosen	0.50 (0.16)	0.51 (0.16)	0.57 (0.21)	0.54** (0.17)
Same gender chosen	0.50 (0.16)	0.51 (0.16)	0.52 (0.22)	0.50*** (0.17)
N decisions	6,500	6,290	6,610	6,380
n decision-maker	650	629	661	638
Panel (b): Decision-maker behavior in the presence of performance indicator				
	Gender-blind		Gender-revealed	
	Indicator-blind	SP-Indicator-blind	Indicator-revealed	SP-Indicator-revealed
Chosen (frac.)				
Correct choice	0.53 (0.16)	0.54 (0.16)	0.52 (0.16)	0.54** (0.16)
Women chosen	0.49 (0.16)	0.51* (0.16)	0.51 (0.17)	0.52 (0.16)
Same-gender chosen	0.49 (0.16)	0.49 (0.16)	0.49 (0.17)	0.49 (0.16)
N decisions	6,190	6,180	6,369	6,270
n decision-makers	619	618	637	627
Panel (c): Agent behavior				
	Overall	Female agents		Male agents
Performance	26.19 (32.08)	25.32 (32.66)		27.06 (31.60)
Performance beliefs	43.35 (43.37)	36.56 (43.20)		50.15** (42.63)
Modesty	0.00 (1.19)	0.09 (1.20)		-0.09 (1.17)
Credible signal	50.28 (65.15)	55.59 (69.30)		44.97* (60.54)
Overconfident	0.42 (0.50)	0.35 (0.48)		0.50** (0.50)
Belief error	2,668.37 (3,211.31)	2,461.19 (3,164.53)		2,875.55* (3,256.80)
n agents	252	126		126

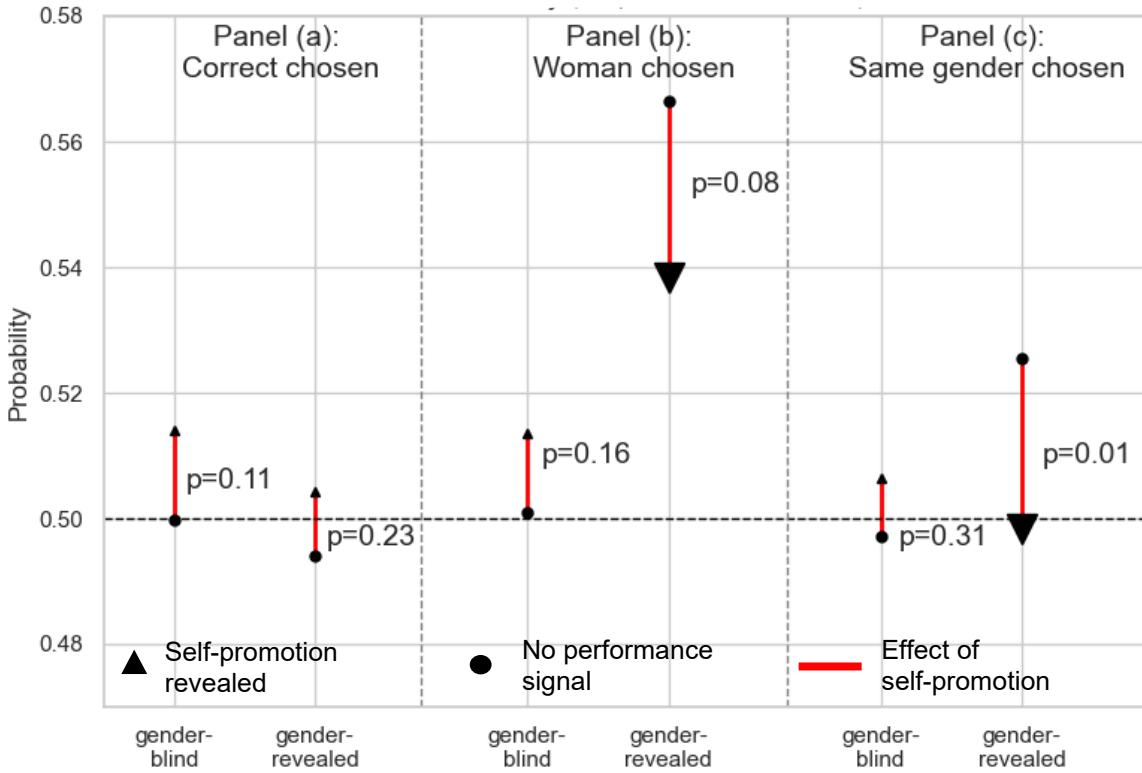
Note: Mean values and standard deviations in parentheses. In Panel (a) data is aggregated on decision-maker level and we provide results for the separate treatments. Superscripts in Panel (a) indicate significances from pairwise MWU-test comparing No-blind and SP-blind and No-revealed and SP-revealed, respectively. In Panel (b), superscripts indicate the respective significances comparing Indicator-blind and SP-Indicator-blind and Indicator-revealed and SP-Indicator-revealed, respectively. In Panel (c), data is aggregated on agent level and we provide means and standard deviations for the overall sample and for female and male agents separately. Superscripts in Panel (c) indicate significances from MWU-tests or Fisher-Exact tests, respectively, comparing male and female agents. * p≤0.1; ** p<0.05; *** p<0.01.

As in the Math Study, we also find significant in-group favoritism among decision-makers. When gender is revealed, the fraction of decisions in which decision-makers choose a same-gender agent is 0.53. This is significantly higher than random choice (Wilcoxon signed-rank test against 0.5: p<0.01) and significantly higher than in No-blind (p<0.05, see coefficient Gender in columns 6-8 in Table A 10 in Appendix A.6). As in the

Math Study, we find that self-promotion reduces this bias (see Table 7, Panel (c), columns 1 and 5).

Overall, absent of a performance indicator, we can replicate the findings from the Math Study and find that self-promotion has a slight but insignificant positive effect on decision quality, does not induce gender bias but instead decreases pre-existing bias (see Figure 6 for graphical summary of results).

Figure 6: Effects of self-promotion absent of performance indicators (Ideation Study)



Note: This graph is based on the estimates from LPMs reported in columns 1 and 3 of Table 7. Dots indicate the respective constants, triangles the sum of constants, and the coefficient for the self-promotion dummy (equals 1 when self-promotion is revealed). Constants reflect probabilities in No-blind and No-revealed, respectively. The difference (red lines) shows the effect of revealing self-promotion. Headers indicate the respective binary outcome. P-values refer to the effect of self-promotion (i.e., a p-value of the estimate for the self-promotion dummy). The size of the triangles reflects the statistical significance of the result.

As a next step, we analyze agent behavior. We find no significant differences in the performance of male and female agents (MWU-test: $p=0.49$). However, we observe large gender differences in performance beliefs (MWU-test: $p=0.02$). Specifically, on average women belief that their performance is 36, while men belief that their performance is 50.

As in the Math Study, we find that women are slightly more modest in their written self-promotion as compared to men. However, the difference in modesty is less pronounced in the Ideation Study and not statistically significant (MWU-test: $p=0.20$). In the Ideation

Study, we additionally classify credible signals, measured as the length of the description of the idea. We find that women provide significantly longer descriptions of their ideas as compared to men (MWU-test: $p=0.09$).

The significance of all outlined gender differences remains unaffected by controlling for performance (see Table A 7 in Appendix A.5). Summarizing, we find that women have lower performance beliefs, are less overconfident, slightly more modest in their writing style and provide more credible performance signals in their self-promotion.

As a next step, we want to analyze how differences in agent behavior affect decision-makers' choices. To do so, we provide regression analysis of their effect on the fraction of decisions in which the agents were chosen by decision-makers in SP-blind. We report results in Table 6. We find that the likelihood that an agent is chosen is not significantly correlated with the performance (column 1). However, we find a significant positive correlation of choices with performance beliefs (column 2), modesty (column 3) and credible signals (column 4).

Table 6: OLS regression of effects of agent behavior on decision-makers' choices absent of performance indicators

	DV: Chosen in SP-blind				
	(1)	(2)	(3)	(4)	(5)
Performance	0.008 (0.007)				0.004 (0.006)
Performance beliefs		0.018** (0.007)			0.018*** (0.007)
Modesty			0.023*** (0.006)		0.022*** (0.006)
Credible signal				0.046*** (0.007)	0.044*** (0.007)
Constant	0.500*** (0.007)	0.500*** (0.007)	0.500*** (0.007)	0.500*** (0.007)	0.500*** (0.006)
Obs.	252	252	252	252	252

Note: Coefficients are from an OLS regression of the fraction of decisions in which the agent was chosen by decision-makers in SP-blind. Controls for performance, performance beliefs, modesty and credible signals are standardized. Robust standard errors are reported in parentheses. *** $p<0.01$, ** $p<0.05$, * $p\leq 0.1$.

In the following, we analyse the role of performance beliefs, modesty and credible signals in explaining the observed treatment effects in the context absent of an additional performance indicator. Again, we add controls of the standardized differences between the agent's performance (beliefs), modesty and credible signals, and the respective interaction with the self-promotion dummy to investigate their relevance to the observed treatment effects.

Focusing on the increase in decision quality, we find that similar to the Math Study slight positive effects of self-promotion on decision quality are likely related to the transmission of performance beliefs through self-promotion (see Table 7, Panel (a), columns 2 and 6).

Focusing on the fraction of women chosen, we find that differences in performance beliefs do indeed have a negative impact on the fraction of women chosen. Specifically, controlling for performance beliefs (see Table 7, Panel (b), columns 2 and 6), we find a more positive effect of self-promotion on women as it is absent of these controls (see Table 7, Panel (b), columns 1 and 5). However, we find that women can compensate for this gender difference in self-promotion through difference in the writing style. In the Ideation Study, this difference is particularly pronounced in the provision of credible signals, which compensates for the negative impact of gender differences in performance beliefs (see Table 7, Panel (b), columns 4 and 8).

With respect to same gender chosen, we find no significant effect of self-promotion in the gender-blind context. However, as in the Math Study, we observe in-group favoritism where decision-makers are more likely to choose the agent of their gender. The fraction of decisions in which they do so is 0.52. As in the Math Study, we find that this effect is unrelated to controls for performance beliefs, modesty or credible signals (see Table 7, Panel (c), columns 5 to 8.), while results suggest that decrease in in-group favoritism is by shifting decision-makers' focusing from the agents' gender to their self-promotion.

Table 7: LPM of effects of self-promotion absent of performance indicators

	Gender-blind				Gender-revealed			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel (a): Correct choice								
Self-promotion	0.014 (0.009)	0.009 (0.009)	0.006 (0.011)	0.006 (0.009)	0.010 (0.009)	0.002 (0.009)	0.002 (0.009)	-0.001 (0.009)
Constant	0.500*** (0.006)	0.501*** (0.007)	0.501*** (0.006)	0.501*** (0.006)	0.494*** (0.007)	0.498*** (0.007)	0.498*** (0.007)	0.498*** (0.007)
Controls								
Performance beliefs	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Modesty	No	No	Yes	Yes	No	No	Yes	Yes
Credible signal	No	No	No	Yes	No	No	No	Yes
Obs.	12,790	12,790	12,790	12,790	12,990	12,990	12,990	12,990
n decision-makers	1,279	1,279	1,279	1,279	1,299	1,299	1,299	1,299
Panel (b): Woman chosen								
Self-promotion	0.012 (0.009)	0.020** (0.009)	0.016* (0.009)	0.007 (0.009)	-0.028*** (0.011)	-0.018* (0.011)	-0.019* (0.011)	-0.026** (0.011)
Constant	0.501*** (0.007)	0.500*** (0.007)	0.500*** (0.007)	0.501*** (0.007)	0.566*** (0.009)	0.563*** (0.010)	0.563*** (0.010)	0.563*** (0.009)
Controls								
Performance beliefs	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Modesty	No	No	Yes	Yes	No	No	Yes	Yes
Credible signal	No	No	No	Yes	No	No	No	Yes
Obs.	12,790	12,790	12,790	12,790	12,990	12,990	12,990	12,990
n decision-makers	1,279	1,279	1,279	1,279	1,299	1,299	1,299	1,299
Panel (c): Same gender chosen								
Self-promotion	0.009 (0.009)	0.009 (0.009)	0.008 (0.009)	0.010 (0.009)	-0.027** (0.011)	-0.028*** (0.011)	-0.028*** (0.011)	-0.028** (0.011)
Constant	0.497*** (0.007)	0.497*** (0.007)	0.497*** (0.006)	0.497*** (0.006)	0.526*** (0.010)	0.526*** (0.010)	0.526*** (0.010)	0.526*** (0.010)
Controls								
Performance beliefs	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Modesty	No	No	Yes	Yes	No	No	Yes	Yes
Credible signal	No	No	No	Yes	No	No	No	Yes
Obs.	12,790	12,790	12,790	12,790	12,990	12,990	12,990	12,990
n decision-makers	1,279	1,279	1,279	1,279	1,299	1,299	1,299	1,299

Note: Coefficients are from LPMs with random effects at the agent level. Dependent variables equal 1 if the better agent is chosen (correct choice) in Panel (a), if the woman is chosen in Panel (b), or if the same-gender-agent is chosen in Panel (c), and 0 otherwise. Self-promotion is a dummy indicating whether self-promotion is provided. Effects are interpreted relative to the base category, which are No-blind (columns 1-4) and No-revealed (columns 5-8). Controls for modesty and performance beliefs are controls for standardized differences between the agents in the respective decision in terms of these variables and their interactions with the self-promotion dummy. Regressions in Panel (b) and (c) similarly control for performance differences. Panel (a) does not include controls for performance differences as the outcome variable, i.e., selecting the better candidate, is directly correlated with the agents' performances. Standard errors are clustered at the decision-maker level (reported in parentheses). *** p<0.01, ** p<0.05, * p≤0.1. Decisions in all specifications are based on the full sample of agents (n=252).

Lastly, we analyze how results change when an additional performance indicator is available to decision-makers, examining whether self-promotion is complementary or becomes less relevant. In Table 8, we provide regression analysis focusing on choice behavior in SP-Indicator-blind. We find that actual performance has significant positive effects on the fraction of choices an agent is chosen in SP-Indicator-blind, confirming that the performance indicator is informative. Results for the effect of performance beliefs (see

Table 8, column 2) are strikingly similar to the results from the setting without performance indicator. Thus, even with an additional performance indicator, performance beliefs transmitted through self-promotion are on average as important to decision-makers as in its absence. We find that credible signals are also relevant when a performance signal is available and that the coefficient is similar to that in the context without a performance signal (see Table 8, column 4). With respect to modesty, we find that modesty is slightly but insignificantly less important to decision-makers once an additional performance signal is available (Wald-test: $p=0.18$).

When shown accompanied by performance indicators self-promotion may convey information on the precision of performance beliefs held by agents. This information may make it easier for decision-makers to infer valuable information from self-promotion. Table 5, Panel (c) provides summary statistics on the fraction of overconfident agent and the average belief error of men and women separately. We classify an agent as overconfidence whenever the difference between performance belief and actual performance is larger than the mean difference in our sample. Additionally, we measure the belief error as the mean squared deviation between performance and performance belief. Women tend to be less prone to overconfidence than men. Among men, around 50% are overconfident, compared to only around 35% among women (Fisher exact test: $p=0.02$). Moreover, performance beliefs of women are more aligned to actual performance as compared to men, i.e., there belief error is smaller (MWU-test: $p=0.06$).

To assess whether complementarities between self-promotion and performance indicator are relevant, we control for these two variables and the interaction in the model provided in column 5 of Table 8. We find that the belief error is indeed relevant to decision behavior and that the reaction of decision-makers towards overconfident agents is very different to the reaction of decision-makers to errors made by underconfident agents (see Table 8, column 5).

Table 8: OLS regression of effects of agent behavior on decision-makers' choices in presence of performance indicators

	DV: Chosen in SP-Indicator-blind					
	(1)	(2)	(3)	(4)	(5)	(6)
Performance	0.029*** (0.008)					0.012 (0.032)
Performance beliefs		0.018** (0.009)				0.025 (0.044)
Modesty			0.012* (0.007)			0.012* (0.007)
Credible signal				0.042*** (0.007)		0.040*** (0.006)
Overconfident					0.007 (0.021)	-0.028 (0.085)
Belief error					0.037** (0.015)	0.030 (0.040)
Overconfident x belief error					-0.046** (0.021)	-0.035 (0.065)
Constant	0.500*** (0.008)	0.500*** (0.009)	0.500*** (0.009)	0.500*** (0.008)	0.509*** (0.014)	0.521*** (0.051)
Obs.	252	252	252	252	252	252

Note: Coefficients are from an OLS regression of the fraction of decisions in which the agent was chosen by decision-makers in SP-Indicator-blind. Controls for performance, performance beliefs, modesty and credible signals are standardized. Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p≤0.1.

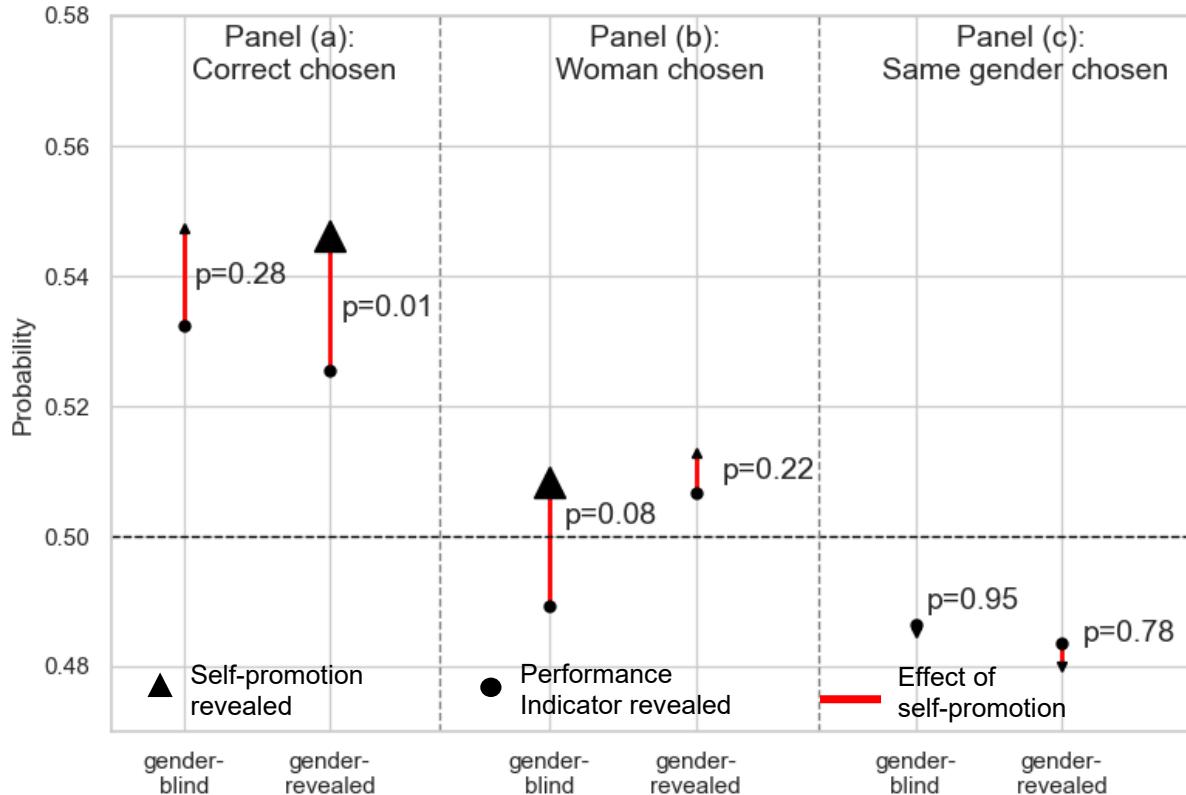
Table 9 and Figure 8 display regression results on treatments in which the performance indicator is provided to decision makers. We find that self-promotion improves decision quality especially in the gender-revealed setting. These improvements cannot be explained through performance beliefs, modesty or credible signals alone. Instead, they appear to be related to an improved perception of self-promotion due to information on agents' overconfidence.

We find that self-promotion has a positive impact on the likelihood that women are chosen (see Table 9, Panel (b)). This effect is however, only significant only for the gender-blind setting and does also not always meet conventional levels of statistical significance in the gender-blind setting, when using alternative tests.²¹ Different to the effects

²¹ Again, we also report p-values of the comparison of the fraction of female agents chosen by treatment using the Wilcoxon signed-rank test, as we have preregistered this additional analysis. The positive impact of self-promotion on the likelihood that women are chosen is not significant neither in the gender-blind, nor in the gender-revealed setting (p=0.28 and p=0.17) when using this alternative test. The effect is also not significant when using the preregistered specification (compare columns 1 and 2 in Table A 9 in Appendix A.6, where column 1 reports the model specification from Table 9 and column 2 the preregistered one). Other than that, Table A 9 again demonstrates that the preregistered specification yields almost the same coefficients as the ones reported in Table 9.

observed in absence of the performance indicator, we do not observe a negative impact of performance beliefs on the likelihood of women chosen (see Table 9, Panel (b), columns 2 and 6). Instead, women appear to benefit from complementarities between self-promotion and performance indicators. This benefit seems related to overconfidence affecting the interpretation of self-promotion, being favorable to women who are less prone to overconfidence.

Figure 7: Effects of self-promotion in presence of performance indicators (Ideation Study)



Note This graph is based on the estimates from LPMs reported in columns 1 and 3 in Table 9, where dependent variables equal 1 if the better agent is chosen (correct choice) in Panel (a) if the woman is chosen in Panel (b), or if the same-gender-agent is chosen in Panel (c), and 0 otherwise. Dots indicate the constants, triangles indicate the sum of the constants and the coefficient for the self-promotion dummy (equals 1 when self-promotion is shown). Constants reflect probabilities in Indicator-blind and Indicator-revealed, respectively. The difference (red lines) shows the effect of revealing self-promotion. P-values refer to the effect of self-promotion (i.e., a p-value of the estimate for self-promotion). The size of the triangles reflects the statistical significance of the result.

Table 9: LPM of effects of self-promotion in presence of performance indicators

	Gender-blind					Gender-revealed				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel (a): Correct choice										
Self-promotion	0.010 (0.009)	0.011 (0.009)	0.010 (0.009)	0.009 (0.009)	-0.009 (0.019)	0.021** (0.009)	0.021** (0.009)	0.021** (0.009)	0.020** (0.009)	0.008 (0.019)
Constant	0.531*** (0.010)	0.526*** (0.010)	0.526*** (0.010)	0.525*** (0.010)	0.524*** (0.017)	0.514*** (0.010)	0.510*** (0.010)	0.510*** (0.009)	0.509*** (0.009)	0.519*** (0.017)
Controls										
Performance beliefs	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Modesty	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Credible signal	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Over-confidence	No	No	No	No	Yes	No	No	No	No	Yes
Obs.	12,370	12,370	12,370	12,370	12,370	12,639	12,639	12,639	12,639	12,639
n decision-makers	1,237	1,237	1,237	1,237	1,237	1,264	1,264	1,264	1,264	1,264
Panel (b): Woman chosen										
Self-promotion	0.016* (0.009)	0.015* (0.009)	0.015* (0.009)	0.014 (0.009)	-0.006 (0.016)	0.011 (0.009)	0.014 (0.009)	0.013 (0.009)	0.012 (0.009)	0.002 (0.015)
Constant	0.491*** (0.012)	0.497*** (0.012)	0.494*** (0.012)	0.490*** (0.011)	0.509*** (0.016)	0.505*** (0.012)	0.511*** (0.012)	0.509*** (0.012)	0.503*** (0.012)	0.512*** (0.016)
Controls										
Performance beliefs	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Modesty	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Credible signal	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Over-confidence	No	No	No	No	Yes	No	No	No	No	Yes
Obs.	12,370	12,370	12,370	12,370	12,370	12,639	12,639	12,639	12,639	12,639
n decision-makers	1,237	1,237	1,237	1,237	1,237	1,264	1,264	1,264	1,264	1,264
Panel (c): Same gender chosen										
Self-promotion	-0.001 (0.009)	-0.000 (0.009)	0.000 (0.009)	-0.001 (0.009)	0.000 (0.016)	-0.003 (0.009)	-0.003 (0.009)	-0.002 (0.009)	-0.002 (0.009)	0.010 (0.015)
Constant	0.492*** (0.010)	0.492*** (0.010)	0.492*** (0.010)	0.492*** (0.009)	0.503*** (0.014)	0.494*** (0.010)	0.494*** (0.010)	0.494*** (0.010)	0.494*** (0.010)	0.491*** (0.014)
Controls										
Performance beliefs	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Modesty	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Credible signal	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Over-confidence	No	No	No	No	Yes	No	No	No	No	Yes
Obs.	12,370	12,370	12,370	12,370	12,370	12,639	12,639	12,639	12,639	12,639
n decision-makers	1,237	1,237	1,237	1,237	1,237	1,264	1,264	1,264	1,264	1,264

Note: Coefficients are from a LPM with random effects at the agent level. Dependent variables equal 1 if the better agent is chosen (correct choice) in Panel (a) if the woman is chosen in Panel (b), or if the same-gender-agent is chosen in Panel (c), and 0 otherwise. Self-promotion is a dummy indicating whether self-promotion is provided to decision-makers. Effects are interpreted relative to Idea-blind (columns 1-4) and Idea-revealed (columns 5-8). Controls for modesty and performance beliefs are controls for standardized differences between agents in the respective decision and their interactions with self-promotion. Regressions in Panel (b) and (c) similarly control for performance. Panel (a) does not include controls for performance as correct choice is directly correlated with performances. Overconfidence controls are interactions of indicators for overconfidence for both agents, the error and the self-promotion dummy. Standard errors are clustered at the decision-maker level (reported in parentheses). *** p<0.01, ** p<0.05, * p≤0.1. Decisions in all specifications are based on the full sample of agents (n=252).

Summarizing, we find that whenever performance indicators are available, self-promotion still positively impacts decision quality. The improvement in decision quality seems related to complementarities in information provided through self-promotion and through the performance indicator. Second, we find that self-promotion leads to an increase in the fraction of women chosen. Again, this seems to be due to complementarities in information provided which are especially favorable to women, as women are less prone to overconfidence. We find that a performance indicator successfully mitigates gender biases, so that self-promotion does not reduce existing gender biases.

6 Conclusion

We provide causal evidence from two experimental studies, the Math and the Ideation Study, for the effects of written self-promotion on decision quality and gender bias. In both studies, we mimic the typical conflict of interest arising in many labor-market contexts involving self-promotions in which agents' want to be chosen by decision-makers who seek to find the best candidate. In both experiments, we vary decision-makers' access to agents' self-promotions and gender. The studies differ in their possibility of including (credible) performance signals in the self-promotion and the availability of additional performance indicators (which we vary in additional treatments conducted in the Ideation Study).

Concerning decision quality, we find that written self-promotion has little informational value but does not deteriorate decisions. Revealing self-promotion can slightly increase the probability of selecting the better agent, while effects do not always meet conventional levels of significance. Exploring possible mechanisms behind improvements in decision quality, we show that in both studies, our results are in line with a noisy transmission of performance beliefs. In the Ideation Study we can further show that self-promotion is complementary to performance indicators, revealing additional information on overconfidence when both are available. This connects our work to previous research on lying. This literature has shown similar effects in settings involving a conflict of interest in the context of numerical reports (see, e.g., Gneezy, 2005). We add to this research by showing that results also hold for messages sent in written form and regarding more complex outcomes, such as performance in an ideation task.

Concerning gender bias, we first find that revealing self-promotion does not lead to women being selected less frequently than men. We further explore why this is the case

for written-self-promotion, while prior literature finds that self-promotion can induce negative effects when provided on numerical scales (Bohnet et al., 2021; Exley & Kessler, 2022; Exley & Nielsen, 2024). In line with findings in this literature, we observe that women in both of our studies have lower performance beliefs. However, analyzing writing style, we find evidence suggesting that women offset potential disadvantages resulting from this gender gap by a more modest writing style. While some experiments from economics and psychology find modesty to have positive effects on likeability (Hoorens et al., 2012; O'Mara et al., 2019; Manian & Sheth, 2021), other studies find negative impacts, suggesting that a more modest writing style may explain lower success rates of women in academia (Lerchenmüller & Sorenson, 2019; Kolev et al., 2020). Our results add to the understanding of these effects, suggesting that negative outcomes of women may rather be driven by transmitted performance beliefs, that women fail to offset in these contexts, or are driven by other known gender differences found in the context of academia (see, e.g., Ceci et al., 2014). In the Ideation Study, we can further show that women increase their probability of success as their self-promotion contains more credible signals and they are less prone to overconfidence, a trait revealed through the provision of a performance indicator. This further adds to findings on gender differences in information disclosure (Exley et al., 2024). In the settings observed in prior literature, women face disadvantages through disclosing more information, while we can show that more comprehensive information disclosure may also enhance women's success in other settings.

Concerning gender bias, we second find that written self-promotion can eliminate prevailing gender bias when no other performance signals are available. For both studies, we find significant evidence for in-group favoritism that is fully eliminated by providing self-promotion. In the Ideation Study, we further show that the bias reduction effects of self-promotion are strikingly similar to that of a performance indicator that is not provided by the agent. Our additional analysis suggests that the effect is driven by a shift in decision-makers' focus from the agents' gender to the agents' self-promotion. Previous research has shown that gender biases can be reduced by the provision of information (Castillo & Petrie, 2010; Reuben et al., 2014; Bohren et al., 2019). We can add to this literature by showing that even performance signals with limited informational value (such as self-promotion) can reduce gender biases.

Our research provides valuable insights for practitioners on the effect of different decision procedures, providing guidance on how to design such procedures in practice.

Our results show that written self-promotion can serve as (very noisy) performance signal without harming women and can reduce existing gender biases. These findings are particularly relevant for decision-making settings in which no other performance indicators are available, such as in innovation-related contexts. In these settings, decisions are often based on the sole description of an idea. Based on our research, written self-promotion can provide value when other performance signals are unavailable.

Our findings are also relevant for designing decision processes in contexts where the availability of other performance signals is more likely, such as hiring, promotion, and job assignments. Many firms include self-promotion in the form of self-evaluations in performance reviews. This practice is discussed in- and outside research, particularly focusing on potential biases arising from it (Bohnet et al., 2022; Abraham, 2023). We can add to this discussion that written self-promotion can provide complementary value in the presence of other performance indicators. Concerning gender bias, our results imply that, when designing decision processes, one should carefully consider the format of self-promotion. In contrast to self-promotion on numerical scales, written self-promotion in our setting do not harm the success of women. Their provision may even enhance women's success rates by reducing in-group favoritism since most labor-market-relevant settings are still dominated by male decision-makers (AllRaise, 2020; Burns et al., 2021)

We end this article by discussing limitations and highlighting the fruitful directions for further research that our study offers. First, in our setting, women do not face disadvantages through written self-promotion. However, additional studies are needed to investigate whether this holds in the context of face-to-face interaction or other formats of self-promotion. Second, in our setting, women succeed in offsetting potential disadvantages due to lower performance beliefs. However, it is still to be determined which effects dominate other settings. On the one hand, this points towards empirically testing the effects in different contexts. On the other hand, our findings suggest additional settings in which women succeed to offset potential disadvantages through lower performance beliefs, which would be interesting to investigate. Lastly, we find that despite their limited informational value, self-promotion can reduce gender bias. More research is needed to understand what requirements need to be fulfilled so that a specific signal is suitable to reduce gender bias.

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Appendix A: Additional analyses and supplementary material

A.1 Relevant features of self-promotions

We use k-means clustering to validate our PCA approach, predicting favorability clusters of self-promotion based on being chosen in SP-blind and the linguistic features obtained from the LIWC. Table A 1 shows that we obtain two clusters, where cluster 1 is associated with a significant higher probability to be chosen in SP-blind, than cluster 2 (MWU-test: $p<0.01$). This implies that cluster 1 describes the favorable writing style. Table A 1 further shows that, the largest differences between the writing styles captured by cluster 1 and 2 are in clout and authentic (see differences in means between clusters in column 3). This aligns with the index generated by the PCA reported in the main paper. Thus, we can equivalently label this cluster as indicative for modesty.

Table A 1: K-means cluster of linguistic features

	Cluster 1 (Modest)	Cluster 2 (Assertive)	Difference
Chosen in SP-blind	0.51 (0.12)	0.48 (0.11)	0.03***
Analytic	-0.16 (0.99)	0.27 (0.94)	-0.43***
Clout	-0.55 (0.47)	0.94 (0.96)	-1.49***
Authentic	0.50 (0.75)	-0.85 (0.75)	1.35***
Emotional tone	-0.06 (0.97)	0.10 (1.03)	-0.16
N	274	142	416

Note: The table reports means and standard deviations below in parentheses. Cluster 1 and Cluster 2 are obtained through k-means analysis of the linguistic features obtained by the LIWC – analytic, clout, authentic and emotional tone, explaining differences in Chosen in SP-blind. Chosen in SP-blind is the fraction of choices in which agents in the respective cluster got chosen in SP-blind. Linguistic features are standardized within study, to be comparable. Significances are indicated from pairwise MWU-tests, where *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The sample includes all agents from both studies ($n=416$).

In an additional LPM reported in Table A 2 we compare effects in predicting that a workers' self-promotion is in cluster 1, i.e., the modest self-promotions. We compare coefficients for authenticity and clout to the other linguistic features, confirming their relevance to be significantly higher (Wald-tests: $p<0.01$).

Table A 2: LPM of modesty (cluster 1)

	Cluster 1 (Modest)
Analytic	-0.054*** (0.012)
Clout	-0.256*** (0.019)
Authentic	0.224*** (0.015)
Emotional tone	-0.010 (0.012)
Constant	0.659*** (0.013)

Obs. 416

Note: LPM predicting being part of the modest writing style (cluster 1). Aanalytic, clout, authentic and emotional tone are the linguistic features obtained by the LIWC (standardized within study). Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

For both studies we can show that we find gender differences in line with those reported in the main text. While 70% of women belong to cluster 1, the one aligning with the modest writing style favored by decision makers, only 60% of men do (Fisher-Exact-test: p=0.05).

A.2 Gender differences controlled for performance (Math Study)

Table A 3: Agent behavior with performance controls

	Performance beliefs		Modesty	
	(1)	(2)	(3)	(4)
Female agent	-1.354** (0.605)	-0.409 (0.578)	0.444** (0.182)	0.493** (0.190)
Performance		0.481*** (0.079)		0.025 (0.026)
Constant	13.012*** (0.406)	7.552*** (1.020)	-0.222 (0.147)	-0.504 (0.338)
Obs.	164	164	164	164

Note: The OLS regression shows gender differences (see coefficient for female agent, that is a dummy equaling 1 for female agents and zero for male agents) in agent behavior reported as descriptive statistics in Panel (b) in Table 2, controlled for performance. The dependent variables are the agents' performance belief (columns 1-2), and the agents' modesty (columns 3-4). Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p≤0.1.

A.3 Replicating main results with alternative additional preregistered specifications (Math Study)

Table A 4: LPM of effects of self-promotion

	Gender-blind		Gender-revealed	
	(1)	(2)	(4)	(5)
Panel (a): Correct choice				
Self-promotion	0.020*	0.020	0.012	0.012
	(0.011)	(0.014)	(0.012)	(0.014)
Constant	0.494***	0.125*	0.506***	0.033
	(0.009)	(0.072)	(0.009)	(0.041)
Obs.	8,720	8,720	7,616	7,616
n decision-makers	436	436	413	413
Panel (b): Woman chosen				
Self-promotion	0.012	0.000	0.019	0.008
	(0.011)	(0.019)	(0.020)	(0.023)
Constant	0.502***	0.480***	0.511***	0.455***
	(0.010)	(0.068)	(0.020)	(0.046)
Obs.	8,720	8,720	7,616	7,616
n decision-makers	436	436	413	413
Panel (c): Same gender chosen				
Self-promotion	-0.005	-0.003	-0.049**	-0.048**
	(0.011)	(0.013)	(0.019)	(0.020)
Constant	0.499***	0.570***	0.560***	0.527***
	(0.009)	(0.062)	(0.017)	(0.051)
Obs.	8,085	8,085	7,616	7,616
n decision-makers	436	436	413	413

Note: Coefficients are from a LPM with random effects at the agent level. Dependent variables equal 1 if the better agent is chosen (correct choice) in Panel (a) if the woman is chosen in Panel (b), or when the agent of the same gender is chosen in Panel (c), and 0 otherwise. Self-promotion is a dummy that equals 1 when self-promotion is revealed and 0 otherwise. Effects are interpreted relative to the base category, that is No-blind for columns 1-2 and No-revealed for columns 3-4. Columns 1 and 3 show the specifications used in the main paper, columns 2 and 4 show the preregistered specification with performance fixed effects (instead of controlling for differences in performances) and two-way clustered standard errors (at agent and decision-maker level) instead of only at the decision-maker level as in the models reported in Table 7 *** p<0.01, ** p<0.05, * p≤0.1. Decisions in all specifications are based on the full sample of agents (n=164).

Table A 5: LPM with all treatments

	Correct choice		Female chosen			Same gender chosen		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Self-promotion	0.020*	0.020	0.000	0.000	0.000	-0.004	-0.004	-0.004
	(0.011)	(0.014)	(0.011)	(0.017)	(0.018)	(0.011)	(0.013)	(0.013)
Gender	0.012	0.012	0.008	0.008	0.008	0.060***	0.060***	0.060***
	(0.012)	(0.012)	(0.017)	(0.018)	(0.018)	(0.017)	(0.017)	(0.017)
Self-promotion x gender	-0.009	-0.009	0.008	0.008	0.008	-0.045**	-0.045**	-0.045**
	(0.017)	(0.016)	(0.022)	(0.022)	(0.022)	(0.021)	(0.021)	(0.021)
Constant	0.495***	0.495***	0.502***	0.502***	0.463***	0.499***	0.499***	0.519***
	(0.010)	(0.008)	(0.010)	(0.009)	(0.041)	(0.009)	(0.008)	(0.038)
Obs.	16,980	16,980	16,980	16,980	16,980	16,980	16,980	16,980
n agents	162	162	82	82	162	164	164	164

Note: Coefficients are from a LPM with random effects at the agent level. Dependent variables equal 1 if the better agent is chosen (correct choice) in Panel (a) if the woman is chosen in Panel (b), or when the agent of the same gender is chosen in Panel (c), and 0 otherwise. Self-promotion and Gender are dummies that equal 1 when self-promotion, or information on the agents' gender is revealed, respectively, and 0 otherwise. Coefficients are interpreted relative to the base category No-blind. Columns 1, 3 and 6 show the used specification from the main paper with clustered standard errors at the decision-maker level, column 2 shows the preregistered specification clustering standard errors at agent and decision-maker level and column 3 in addition, controls, as preregistered, for the agents' performances using performance fixed effects.

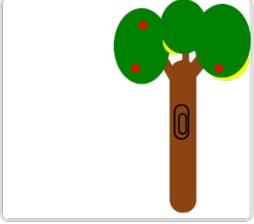
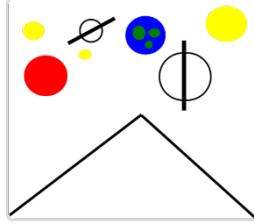
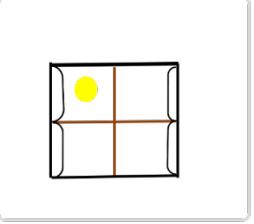
Table A 6: Preregistered specification of analyses of gender differences in treatment effects

	Gender-blind		Gender-revealed		All	
	(2)	(3)	(5)	(6)	(7)	(8)
Self-promotion	-0.001 (0.013)	-0.001 (0.013)	-0.000 (0.010)	-0.000 (0.010)	-0.005 (0.012)	-0.005 (0.012)
Female agent x self-promotion	0.002 (0.022)	0.002 (0.022)			0.005 (0.021)	0.005 (0.021)
Female agent	0.003 (0.011)	0.010 (0.014)			0.001 (0.011)	0.011 (0.013)
Gender			-0.000 (0.005)	-0.000 (0.005)	-0.012 (0.007)	-0.012 (0.008)
Female agent x gender					0.020 (0.013)	0.020 (0.014)
Female agent x self-promotion x gender					0.007 (0.016)	0.007 (0.016)
Performance FE	No	Yes	No	Yes	No	Yes
Constant	0.499*** (0.007)	0.449*** (0.013)	0.500*** (0.005)	0.477*** (0.006)	0.500*** (0.007)	0.459*** (0.011)
Obs.	328	328	656	656	656	656
n agents	164	164	164	164	164	164

Note: Coefficient are from an OLS regression of the agents' success i.e., fraction of decisions in which the agent was chosen in each treatment. Thus, the analysis is on the agent-level. Self-promotion and Gender are dummies that equal 1 when self-promotion and gender, respectively, are revealed to decision-makers in the respective treatment, and zero otherwise. Female agent is a dummy that equals 1 for female agents and 0 for male agents. We report results with and without performance fixed effects, as indicated in the table. Columns 1-2 show results from gender-blind treatments, where the base category is the fractions of decisions in which agents are chosen in No-blind. Columns 3-4 show the respective results from gender-revealed treatments, where the base category is fractions of decisions in which agents are chosen in No-revealed. Columns 5-6 show results from a joint model based on the success in all treatments, where the reference category is No-blind. Standard errors are clustered at the agent level and shown in parentheses.
*** p<0.01, ** p<0.05, * p≤0.1.

A.4 Example ideas from the Ideation Study

Figure A 1: Example ideas and performance

High quality, not original	Original but low quality	High quality and original
		
Word: tree	Word: astronomy	Word: Window
Originality: 0	Originality: 1	Originality: 1
Quality:	Quality: 0	Quality: 90
	Value=0	Value=90

Note: Below the illustrations, the respective word, originality, quality and resulting value (product of originality and quality) are listed. The value of an idea is the performance measure in this experiment.

A.5 Gender differences in agent behavior controlled for performance (Ideation Study)

Table A 7: Agent behavior with performance controls

	Performance beliefs		Modesty		Credible signals		Overconfident		Belief error	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Female agent	-13.595** (5.407)	-13.158** (5.331)	0.189 (0.149)	0.186 (0.149)	10.623 (8.197)	10.793 (8.237)	-0.151** (0.062)	-0.155** (0.061)	-414.357 (404.548)	-417.394 (406.369)
Performance		0.250*** (0.086)		-0.002 (0.002)		0.097 (0.121)		-0.003*** (0.001)		-1.740 (7.339)
Constant	50.151*** (3.798)	43.379*** (4.371)	-0.094 (0.104)	-0.054 (0.120)	44.968*** (5.393)	42.341*** (6.526)	0.500*** (0.045)	0.568*** (0.050)	2,875.548*** (290.139)	2,922.625*** (370.773)
Obs.	164	164	164	164	164	164	164	164	164	164

Note: The OLS regression shows gender differences (see coefficient for female agent, that is a dummy equaling 1 for female agents and zero for male agents) in agent behavior from Panel (c) in Table 5, controlled for performance. The dependent variables are performance belief (columns 1-2), modesty (columns 3-4), credible signals (column 5-6), overconfident (columns 7-8, where agents are classified as overconfident if their belief differs from their actual performance more than the average), and belief error (the squared deviation between performance belief and actual performance). Robust standard errors are reported in parentheses. *** p<0.01, ** p<0.05, * p≤0.1.

A.6 Replicating main results with alternative additional preregistered specifications (Ideation Study)

Table A 8: LPM of effects of self-promotion in absence of performance indicators

	Gender-blind		Gender-revealed	
	(1)	(2)	(4)	(5)
Panel (a): Correct choice				
Self-promotion	0.014 (0.009)	0.014 (0.010)	0.010 (0.009)	0.010 (0.010)
Constant	0.500*** (0.006)	0.503*** (0.017)	0.494*** (0.007)	0.510*** (0.022)
Obs.	12,790	12,790	12,990	12,990
n decision-makers	1,279	1,279	1,299	1,299
Panel (b): Woman chosen				
Self-promotion	0.012 (0.009)	0.012 (0.012)	-0.028** (0.012)	-0.029** (0.012)
Constant	0.501*** (0.007)	0.502*** (0.017)	0.566*** (0.009)	0.560*** (0.020)
Obs.	12,790	12,790	12,990	12,990
n decision-makers	1,279	1,279	1,299	1,299
Panel (c): Same gender chosen				
Self-promotion	0.009 (0.009)	0.009 (0.011)	-0.027** (0.012)	-0.027** (0.012)
Constant	0.497*** (0.007)	0.518*** (0.016)	0.526*** (0.010)	0.518*** (0.022)
Obs.	12,790	12,790	12,990	12,990
n decision-makers	1,279	1,279	1,299	1,299

Note: Coefficients are from a LPM with random effects at the agent level. Dependent variables equal 1 if the better agent is chosen (correct choice) in Panel (a) if the woman is chosen in Panel (b), or when the agent of the same gender is chosen in Panel (c), and 0 otherwise. Self-promotion is a dummy that equals 1 when self-promotion is revealed and 0 otherwise. Effects are interpreted relative to the base category, that is No-blind for columns 1-2 and No-revealed for columns 3-4. Columns 1 and 3 show the specifications used in the main paper, columns 2 and 4 show the preregistered specification with performance fixed effects (instead of controlling for differences in performances) and two-way clustered standard errors (at agent and decision-maker level) instead of only at the decision-maker level as in the models reported in Table 7. *** p<0.01, ** p<0.05, * p≤0.1. Decisions in all specifications are based on the full sample of agents (n=164).

Table A 9: LPM of effects of self-promotion in presence of performance indicators

	Gender-blind		Gender-revealed	
	(1)	(2)	(4)	(5)
Panel (a): Correct choice				
Self-promotion	0.010 (0.009)	0.010 (0.010)	0.021** (0.009)	0.021** (0.008)
Constant	0.531*** (0.010)	0.540*** (0.026)	0.514*** (0.010)	0.488*** (0.024)
Obs.	12,370	12,370	12,639	12,639
n decision-makers	1,237	1,237	1,264	1,264
Panel (b): Woman chosen				
Self-promotion	0.016* (0.009)	0.015 (0.010)	0.011 (0.010)	0.011 (0.010)
Constant	0.491*** (0.012)	0.436*** (0.030)	0.505*** (0.012)	0.472*** (0.025)
Obs.	12,370	12,370	12,639	12,639
n decision-makers	1,237	1,237	1,264	1,264
Panel (c): Same gender chosen				
Self-promotion	-0.001 (0.009)	-0.001 (0.009)	-0.003 (0.009)	-0.003 (0.009)
Constant	0.492*** (0.010)	0.473*** (0.025)	0.494*** (0.010)	0.491*** (0.023)
Obs.	12,370	12,370	12,639	12,639
n decision-makers	1,237	1,237	1,264	1,264

Note: Coefficients are from a LPM with random effects at the agent level. Dependent variables equal 1 if the better agent is chosen (correct choice) in Panel (a) if the woman is chosen in Panel (b), or when the agent of the same gender is chosen in Panel (c), and 0 otherwise. Self-promotion is a dummy that equals 1 when self-promotion is revealed and 0 otherwise. Effects are interpreted relative to the base category, that is No-blind for columns 1-2 and No-revealed for columns 3-4. Columns 1 and 3 show the specifications used in the main paper, columns 2 and 4 show the preregistered specification with performance fixed effects (instead of controlling for differences in performances) and two-way clustered standard errors (at agent and decision-maker level) instead of only at the decision-maker level as in the models reported in Table 9. *** p<0.01, ** p<0.05, * p≤0.1. Decisions in all specifications are based on the full sample of agents (n=164).

Table A 10: LPM with all treatments

	Correct choice		Woman chosen			Same gender chosen		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Self-promotion	0.015*	0.015	0.012	0.012	0.012	0.008	0.008	0.008
	(0.009)	(0.010)	(0.009)	(0.012)	(0.012)	(0.009)	(0.011)	(0.011)
Gender	-0.006	-0.006	0.066***	0.066***	0.066***	0.026**	0.026**	0.025**
	(0.009)	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)	(0.011)
Self-promotion x gender	-0.005	-0.005	-0.041***	-0.041***	-0.041***	-0.036**	-0.036**	-0.036**
	(0.012)	(0.012)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Idea	0.033***	0.033**	-0.010	-0.010	-0.010	-0.006	-0.006	-0.006
	(0.009)	(0.014)	(0.009)	(0.014)	(0.014)	(0.009)	(0.012)	(0.012)
Self-promotion x idea	-0.006	-0.006	0.003	0.003	0.003	-0.008	-0.008	-0.008
	(0.013)	(0.014)	(0.013)	(0.014)	(0.014)	(0.013)	(0.015)	(0.015)
Gender x idea	-0.009	-0.009	-0.051***	-0.051***	-0.051***	-0.025*	-0.025*	-0.024*
	(0.012)	(0.013)	(0.014)	(0.013)	(0.013)	(0.014)	(0.014)	(0.014)
Self-promotion x idea x gender	0.018	0.018	0.036*	0.036*	0.036*	0.035*	0.035*	0.034*
	(0.018)	(0.017)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
Constant	0.498***	0.498***	0.501***	0.501***	0.478***	0.499***	0.499***	0.498***
	(0.008)	(0.006)	(0.009)	(0.006)	(0.017)	(0.008)	(0.006)	(0.014)
Obs.	50,789	50,789	50,789	50,789	50,789	50,789	50,789	50,789
n agents	252	252	252	252	252	252	252	252

Note: Coefficients are from a LPM with random effects at the agent level. Dependent variables equal 1 if the better agent is chosen (correct choice) in Panel (a) if the woman is chosen in Panel (b), or when the agent of the same gender is chosen in Panel (c), and 0 otherwise. Self-promotion, Gender and Indicator are dummies that equal 1 when self-promotion, information on the agents' gender, or the performance indicator is revealed, respectively, and 0 otherwise. Coefficients are interpreted relative to the base category No-blind. Columns 1, 3 and 6 show the used specification from the main paper with clustered standard errors at the decision-maker level, column 2 shows the preregistered specification clustering standard errors at agent and decision-maker level and column 3 in addition, controls, as preregistered, for the agents' performances using performance fixed effects.

Appendix B: Instructions

B.1 Instructions agents (Math Study)

[Click to review previous instructions](#)

Welcome to this task

You will receive a fixed payment of £1.5. Additionally, half of the participants will receive a £3 **bonus**. This bonus is awarded based on your performance on the task and a decision of a third party.

Please carefully read the following instructions before starting to work. Note that there will be an attention check. If you do not pass it, you are not eligible to participate in this task. To be eligible for payment, you have to perform all tasks within the next 2 hours.

At any point in time, you will be able to review previous instruction by clicking on "Click to review previous instructions" in the right top corner of your screen.

Please indicate your Prolific ID, so that we can send you your bonus, if applicable.

Next

Figure A 2: Screen 1

[Click to review previous instructions](#)

Your task

In the following it is your task to complete a test. In this test, you will be asked to answer up to 20 questions equivalent to those from the Armed Services Vocational Aptitude Battery (ASVAB). Each question will test your aptitude in one of the following five categories: General Science, Arithmetic Reasoning, Math Knowledge, Mechanical Comprehension, and Assembling Objects. In addition to being used by the military to determine which jobs armed service members are qualified for, performance on the ASVAB is often used as a measure of cognitive ability by academic researchers.

You will be presented with each of the 20 questions on separate pages. You will be given up to **30 seconds to answer each question**, although you may push the "Next"-button at the bottom of the page to answer a question before the 30 seconds are up.

Half of the participants will receive a bonus. Whether or not you receive a bonus depends on the **perception of a third party regarding how many of your answers are correct**.

Next

Figure A 3: Screen 2

Your participation in the study

Your participation in this study will involve answering up to 20 questions equivalent to those from the ASVAB. Additionally, you will ask you some questions at the end. If you wish to withdraw from the study you can close your browser window at any time. If you wish to continue, please confirm the following:

- I have read, understood and accept the instructions
- I understand that my participation is totally voluntary. I am free to withdraw at any time without having to give a reason
- We can collect your anonymous, non-sensitive personal data (like age, gender etc.) and can use this data for research purposes
- I agree that the data gathered in this study may be stored anonymously and securely
- I agree that the data gathered in this study may be used for research purposes
- I agree to take part in the study

[Next](#)

Figure A 4: Screen 3

[Click to review previous instructions](#)

Attention check

Whether or not you receive a bonus depends on...

- ... a coinflip.
- ... whether a third party thinks I performed well on the test.
- ... whether I complete the test in less than 5 minutes.
- There is no bonus in this task

[Next](#)

Figure A 5: Screen 4

[Click to review previous instructions](#)

Question 1

Time left to complete this page: **0:26**

Solve: $(-3)^3 =$

- 9
- 9
- 27
- 27

[Next](#)

Figure A 6: Screen 5¹

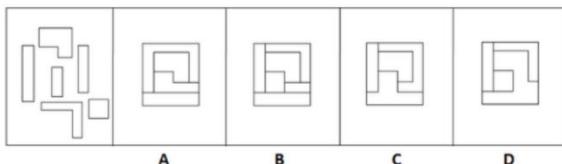
¹ Note that the order of the questions was randomized.

[Click to review previous instructions](#)

Question 2

Time left to complete this page: **0:26**

Which of these images *best* solves the problem in the first picture?



- A
- B
- D
- C

[Next](#)

Figure A 7: Screen 6

[Click to review previous instructions](#)

Question 3

Time left to complete this page: **0:26**

Which is the best description of centrifugal force?

- the response of bodies with inertia to the straight-moving or curved behavior of their container
- the force by which bodies are propelled forward
- the relationship between two opposing forces
- the force responsible for the changes made to water during distillation

[Next](#)

Figure A 8: Screen 7

[Click to review previous instructions](#)

Question 4

Time left to complete this page: **0:26**

A phone company charges \$2 for the first five minutes of a phone call and 30 cents per minute thereafter. If Malik makes a phone call that lasts 25 minutes, what will be the total cost of phone call?

- \$8.00
- \$8.50
- \$9.00
- \$9.50

[Next](#)

Figure A 9: Screen 8

[Click to review previous instructions](#)

Question 5

Time left to complete this page: **0:28**

Five years ago, Amy was three times as old as Mike. If Mike is 10 years old now, how old is Amy?

- 15
- 20
- 25
- 30

[Next](#)

Figure A 10: Screen 9

[Click to review previous instructions](#)

Question 6

Time left to complete this page: **0:27**

There are 5 blue marbles, 4 red marbles, and 3 yellow marbles in a box. If Jim randomly selects a marble from the box, what is the probability of selecting a red or yellow marble?

- $\frac{3}{4}$
- $\frac{1}{4}$
- $\frac{1}{3}$
- $\frac{7}{12}$

[Next](#)

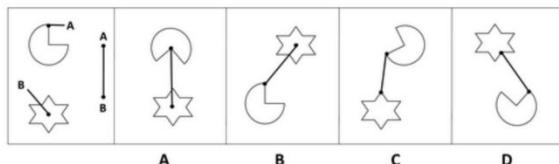
Figure A 11: Screen 10

[Click to review previous instructions](#)

Question 7

Time left to complete this page: **0:23**

Which figure best shows how the objects in the left box will touch if the letters for each object are matched?



- B
- A
- C
- D

[Next](#)

Figure A 12: Screen 11

[Click to review previous instructions](#)

Question 8

Time left to complete this page: **0:26**

What is the pH of water?

- 7
- 6
- 1
- 0

[Next](#)

Figure A 13: Screen 12

[Click to review previous instructions](#)

Question 9

Time left to complete this page: **0:29**

In a classroom of 32 students, 14 are male. What percentage of the class is female?

- 56%
- 46%
- 52%
- 44%

[Next](#)

Figure A 14: Screen 13

[Click to review previous instructions](#)

Question 10

Time left to complete this page: **0:29**

Simplify: $(x^6)(x^5)$

- $2x^{11}$
- $2x^{30}$
- x^{11}
- x^{30}

[Next](#)

Figure A 15: Screen 14

[Click to review previous instructions](#)

Question 11

Time left to complete this page: **0:29**

What is a component of potential energy?

- Upward reactive force
- The energy of movement
- Newtons and distance
- Gravity's relationship to mass

[Next](#)

Figure A 16: Screen 15

Question 12

Time left to complete this page: **0:29**

The energy possessed by a moving object is called ____ energy.

- kinetic
- acceleration
- potential
- true

[Next](#)

Figure A 17: Screen 16

Question 13

Time left to complete this page: **0:29**

Gene expression in physical characteristics such as eye or hair color is referred to as ____.

- phenotype
- genotype
- allele
- homozygous allele

[Next](#)

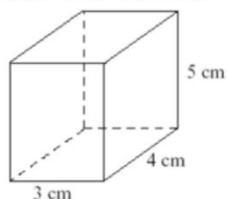
Figure A 18: Screen 17

[Click to review previous instructions](#)

Question 14

Time left to complete this page: **0:26**

The volume of this box is ____.



- 12
- 60
- 20
- 15

[Next](#)

Figure A 19: Screen 18

[Click to review previous instructions](#)

Question 15

Time left to complete this page: **0:27**

What is the advantage of a single pulley?

- It allows you to lift something with less force
- It changes the direction of the effort
- It diminishes the effects of gravity
- It decreases the chances of injury

[Next](#)

Figure A 20: Screen 19

[Click to review previous instructions](#)

Question 16

Time left to complete this page: **0:28**

According to the electromagnetic spectrum, which is the highest frequency (shortest wavelength) wave known to exist?

- gamma rays
- infrared waves
- ultraviolet light waves
- radio waves

[Next](#)

Figure A 21: Screen 20

[Click to review previous instructions](#)

Question 17

Time left to complete this page: **0:29**

What is the function of a *vise* in mechanical applications?

- In mechanical applications, vises are used to arrest motion.
- Vises are designed to function as a source of stability, much like how legs function beneath a table.
- In mechanical applications, vises are designed to assist movement.
- Vises are used to suspend quick movements, slowing the effects of conveyor belts.

[Next](#)

Figure A 22: Screen 21

[Click to review previous instructions](#)

Question 18

Time left to complete this page: **0:26**

Which of these images *best* solves the problem in the first picture?



- C
- B
- A
- D

[Next](#)

Figure A 23: Screen 22

[Click to review previous instructions](#)

Question 19

Time left to complete this page: **0:28**

The sixth root of 64 is:

- 6
- 2
- 4
- 8

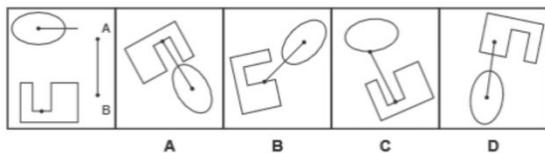
[Next](#)

Figure A 24: Screen 23

Question 20

Time left to complete this page: **0:27**

Which figure best shows how the objects in the left box will touch if the letters for each object are matched?



- A
- C
- B
- D

[Next](#)

Figure A 25: Screen 24

[Click to review previous instructions](#)

Your bonus

Whether or not you receive a **£3 bonus** depends on the decision of a third party who has to choose between your performance and the one of a competing participant from this task. You receive the bonus **only if the third party chooses your performance** over that of a competitor.

The third party earns more money if he or she chooses the better performance of the two. Which performances is better, is determined by the number of correctly answered questions on the test.

[Next](#)

Figure A 26: Screen 25

[Click to review previous instructions](#)

Your bonus

Your task

It is your task now to **promote** your performance in order to **persuade the third party** to choose your performance over that of your competitor so that you receive the bonus.

Please write your promotion in this box.

Next

Figure A 27: Screen 26

[Click to review previous instructions](#)

Your task

Please answer the following questions. One of the answers may be shown to the third party when deciding between you and your competitor.

On a scale from 0 (entirely disagree) to 100 (entirely agree), please indicate the extent to which you agree with each of the following statements:

I performed well on the test I took in part 1.

Entirely disagree

Entirely agree

0

100

Your answer:

Please indicate how well you think you performed on the test you took in part 1.

Terrible

Very poor

Neutral

Good

Very good

Exceptional

Next

Figure A 28: Screen 27

Questionnaire

Are you a native English speaker?

Out of the 20 questions on the test you took in part 1, how many questions do you think **you** answered correctly?

Out of the 20 questions on the test you took in part 1, how many questions do you think **your competitor** answered correctly?

How difficult did you find the task?

Not difficult at all	Very difficult
<input type="radio"/>	<input type="radio"/>

Do you think this task rather favors male or female participants?

Female	None	Male
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How likely do you think is it, that you receive the bonus?

Not likely at all	Very likely
<input type="radio"/>	<input type="radio"/>

How convincing do you think was your verbal promotion?

Not convincing at all	Very convincing
<input type="radio"/>	<input type="radio"/>

How do you see yourself: Are you someone who is willing to take risks or do you try to avoid them?

Not willing at all to take risks	Very willing to take risks
<input type="radio"/>	<input type="radio"/>

Do you like to compete with others?

I don't like competitions at all	I like competitions very much
<input type="radio"/>	<input type="radio"/>

Next

Figure A 29: Screen 28

You have completed the task.

You have completed the task. Your completion code is 7D35BCF3. You will receive your bonus, if applicable, within 6 days after the completion of this task.

Figure A 30: Screen 29

B.2 Instructions decision-makers (Math Study)

[Click to review previous instructions](#)

Welcome to this task

You will receive a fixed payment of \$0.30. Additionally, you can earn a \$1.50 **bonus**. This bonus is awarded based on your performance on the task.

Please carefully read the following instructions before starting to work. Note that there will be an attention check. If you do not pass it, you cannot participate in this task. To be eligible for payment, you further have to perform all tasks within the next 2 hours.

At any point in time, you will be able to review previous instruction by clicking on "Click to review previous instructions" in the right top corner of your screen.

[Next](#)

Figure A 31: Screen 1

[Click to review previous instructions](#)

Your task

This task consists of 20 rounds. In each round, you will have to choose between two workers. You choose a worker by clicking on the button, indicating the respective worker. If the worker is **female** this button is **purple**. If the worker is **male** this button is **blue**.

The workers

The workers were participating in another task in which they completed a test. On the test, they were asked to answer up to 20 questions equivalent to those from the Armed Services Vocational Aptitude Battery (ASVAB). Each question tested their aptitude in one of the following five categories: General Science, Arithmetic Reasoning, Math Knowledge, Mechanical Comprehension, and Assembling Objects. In addition to being used by the military to determine which jobs armed service members are qualified for, performance on the ASVAB is often used as a measure of cognitive ability by academic researchers.

Your decision

It is your goal to **choose the worker with the higher performance on the test**. The workers' performance on the test is defined as the number of questions that he or she solved correctly.

Your bonus

To determine whether or not you receive the bonus, we will randomly choose one out of the 20 rounds after you completed the task.

- If you chose the worker with the **higher performance** in the selected round, your bonus is **\$1.50**.
- If you chose the worker with the **lower performance** in the selected round, your bonus is **\$0**.
- If both workers have the **same performance** in the selected round, your bonus is **\$0.75**.

You will be provided with a description written by the workers in the respective round. Workers know that the description may be shown to you and have an incentive to convince you that they performed well on the test.

[Next](#)

Figure A 32: Screen 2 (SP-revealed)

[Click to review previous instructions](#)

Your task

This task consists of 20 rounds. In each round, you will have to choose between two workers. You choose a worker by clicking on the button, indicating the respective worker.

The workers

The workers were participating in another task in which they completed a test. On the test, they were asked to answer up to 20 questions equivalent to those from the Armed Services Vocational Aptitude Battery (ASVAB). Each question tested their aptitude in one of the following five categories: General Science, Arithmetic Reasoning, Math Knowledge, Mechanical Comprehension, and Assembling Objects. In addition to being used by the military to determine which jobs armed service members are qualified for, performance on the ASVAB is often used as a measure of cognitive ability by academic researchers.

Your decision

It is your goal to **choose the worker with the higher performance on the test**. The workers' performance on the test is defined as the number of questions that he or she solved correctly.

Your bonus

To determine whether or not you receive the bonus, we will randomly choose one out of the 20 rounds after you completed the task.

- If you chose the worker with the **higher performance** in the selected round, your bonus is **\$1.50**.
- If you chose the worker with the **lower performance** in the selected round, your bonus is **\$0**.
- If both workers have the **same performance** in the selected round, your bonus is **\$0.75**.

You will be provided with a description written by the workers in the respective round. Workers know that the description may be shown to you and have an incentive to convince you that they performed well on the test.

[Next](#)

Figure A 33: Screen 2 (SP-blind)

[Click to review previous instructions](#)

Your task

This task consists of 20 rounds. In each round, you will have to choose between two workers. You choose a worker by clicking on the button, indicating the respective worker. If the worker is **female** this button is **purple**. If the worker is **male** this button is **blue**.

The workers

The workers were participating in another task in which they completed a test. On the test, they were asked to answer up to 20 questions equivalent to those from the Armed Services Vocational Aptitude Battery (ASVAB). Each question tested their aptitude in one of the following five categories: General Science, Arithmetic Reasoning, Math Knowledge, Mechanical Comprehension, and Assembling Objects. In addition to being used by the military to determine which jobs armed service members are qualified for, performance on the ASVAB is often used as a measure of cognitive ability by academic researchers.

Your decision

It is your goal to **choose the worker with the higher performance on the test**. The workers' performance on the test is defined as the number of questions that he or she solved correctly.

Your bonus

To determine whether or not you receive the bonus, we will randomly choose one out of the 20 rounds after you completed the task.

- If you chose the worker with the **higher performance** in the selected round, your bonus is **\$1.50**.
- If you chose the worker with the **lower performance** in the selected round, your bonus is **\$0**.
- If both workers have the **same performance** in the selected round, your bonus is **\$0.75**.

[Next](#)

Figure A 34: Screen 2 (No-revealed)

[Click to review previous instructions](#)

Your participation in the study

Your participation in this study will involve guessing the value of an illustration and gender of its creator, based on provided descriptions of the illustrations. If you wish to withdraw from the study you can close your browser window at any time. If you wish to continue, please confirm the following:

- I have read, understood and accept the Instructions
- I understand that my participation is totally voluntary. I am free to withdraw at any time without having to give a reason
- I agree that the data gathered in this study may be stored anonymously and securely
- I agree that the data gathered in this study may be used for research purposes
- I agree to take part in the study

[Next](#)

Figure A 35: Screen 3

[Click to review previous instructions](#)

Attention check

Which of the following statements is true?

- For completing this task, I will receive a fixed payment of \$0.30. There is no additional bonus payment.
- For completing this task, I will receive a fixed payment of \$0.30, and I will receive an additional bonus of \$1.50 if I choose the worker with the higher performance in the randomly selected round.
- For completing this task, I will receive a fixed payment of \$0.30, and I will receive an additional bonus of \$1.50 if I choose the worker with the lower performance in the randomly selected round.
- For completing this task, I will receive a fixed payment of \$0.30, and I will receive an additional bonus of \$1.50 independent of my decisions.

[Next](#)

Figure A 36: Screen 4

[Click to review previous instructions](#)

Your decision

Please decide between the following workers. Which one do you think performed better on the test?

Worker 1:

The worker describes its performance as follows:

I was able to answer most questions fairly quickly and, I think, correctly. Speed of answer is also a component of knowledge/intelligence that may not be captured just by looking at a tally of correct scores.

Worker 2:

The worker describes its performance as follows:

I knew what every single question was asking and answered carefully taking the whole 30s to make sure I have the right answer.

Please decide which worker you want to choose:

[Worker 1](#)

[Worker 2](#)

Figure A 37: Screens 5-24 (SP-revealed)

[Click to review previous instructions](#)

Your decision

Please decide between the following workers. Which one do you think performed better on the test?

Worker 1:

The worker describes its performance as follows:

You should choose the individual who objectively performed better on the test. If they got more questions correct than I did, they should be awarded the bonus. If I got more questions correct, then I should be awarded the bonus. You should pick whoever performed better overall. I believe I answered to the best of my ability, and while I do hope I was good enough for the bonus, it should go to whoever was better.

Worker 2:

The worker describes its performance as follows:

I believe that I should receive this promotion because I am very math minded and I knew how to do all the math related questions. My weakness was the sciences related questions because I have not taken a course on science in about 4 years. Therefore, I performed to the best of my ability showing the strengths that I have.

Please decide which worker you want to choose:

[Worker 1](#)

[Worker 2](#)

Figure A 38: Screens 5-24 (SP-blind)

[Click to review previous instructions](#)

Your decision

Please decide between the following workers. Which one do you think performed better on the test?

Please decide which worker you want to choose:

[Worker 1](#)

[Worker 2](#)

Figure A 39: Screens 5-24 (No-revealed)

Questionnaire

Please answer some additional questions.

Please indicate your gender.

----- ▾

Are you a native English speaker?

----- ▾

Do you think the workers task (completing math and science questions equivalent to those from the ASVAB test) rather favors male or female participants?

Female	None	Male
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How likely do you think is it, that you receive the bonus?

Not likely at all	Very likely
<input type="radio"/>	<input type="radio"/>

How do you see yourself: Are you someone who is willing to take risks or do you try to avoid them?

Not willing at all to take risks	Very willing to take risks
<input type="radio"/>	<input type="radio"/>

Do you like to compete with others?

I don't like competitions at all	I like competitions very much
<input type="radio"/>	<input type="radio"/>

Next

Figure A 40: Screen 25

You have completed the task

You have completed the task. You will receive your bonus, if applicable, within 6 days after the completion of this task. Your completion code is LUH2021.

Figure A 41: Screen 26

B.3 Instructions for follow-up data collection: Predictions of gender based on self-promotions (Math Study)

[Click to review previous instructions](#)

Welcome

You will receive a fixed payment of **\$0.30**. Additionally, you can **earn a bonus** of up to **\$5.00**. This bonus is awarded based on your performance on the task.

Please carefully read the following instructions before starting to work. Note that there will be an attention check. If you do not pass it, you are not eligible to participate in this task. To be eligible for payment, you have to perform all tasks within the next 2 hours.

At any point in time, you will be able to review previous instruction by clicking on "Click to review previous instructions" in the right top corner of your screen.

[Next](#)

Figure A 42: Screen 1

[Click to review previous instructions](#)

Instructions

In the following, you will see **20 descriptions** of the performance of workers in a prior task. These other workers answered 20 questions on a **test from the Armed Service Vocational Aptitude Battery (ASVAB)**. Each question tested their aptitude in the following five categories: General Science, Arithmetic Reasoning, Math Knowledge, Mechanical Comprehension, and Assembling Objects.

After completing this test, participants were asked to describe their performance on the test. Workers had an incentive to provide favourable descriptions of their performance since their earnings depended on being perceived as high performers on the test.

[Next](#)

Figure A 43: Screen 2

[Click to review previous instructions](#)

Instructions

Your task

Based on the descriptions it is your task to guess:

1. How many questions did the worker get right on the test
2. What is the gender of the worker

Payment

You will receive your payment only if you complete the entire task. You receive **\$0.30** for participating in the task. In addition, you can receive a bonus of up to **\$5.00** depending on the accuracy of your guess. To determine the bonus, we will randomly choose one out of the 20 rounds after you completed the task.

[Next](#)

Figure A 44: Screen 3

[Click to review previous instructions](#)

Instructions

Guess the number of correctly answered questions

Your guess is a number from 0 to 20, indicating your guess regarding the number of correctly answered questions. You choose your guess by clicking a response bar similar to the one in figure 1. The width of the **red part** of the bar indicates **your guess of the number of correctly answered questions**.

For your guess with respect to the number of correctly answered questions, payment depends on the deviation from the true number of correctly answered questions:

- If your answer **is correct** your **bonus is \$4.00**.
- If your answer deviates by **1 question** your **bonus is \$2.00**.
- If your answer deviates by **2 questions** your **bonus is \$1.00**.
- Otherwise you do not receive a bonus.

Please use the slider to indicate **how many questions out of 20** you think the worker answered correctly on the task.



Your answer: The worker answered **12 questions** correctly.

Figure 1: Example of the response bar for guessing the number of correctly answered questions

[Next](#)

Figure A 45: Screen 4

[Click to review previous instructions](#)

Instructions

Guess the gender of the worker

Your guess is a percentage probability from 0 to 100 – with 0 indicating a 0-out-of-100 chance that the gender of the worker is female and 100 indicating a 100-out-of-100 chance that the gender of the worker is female. The number you provide is called *Your Guess*. You choose *Your Guess* by clicking the response bar that will be shown on your screen. The width of the **red part** of the bar indicates **your guess that the worker is female**.

- Larger values of *Your Guess* (larger width of red part) represent a greater chance that the creator is female and a smaller chance that the creator is male.
- Smaller values of *Your Guess* (larger width of blue part) represent a greater chance that the creator is male and a smaller chance that the creator is female.

The width of the **blue part** of the bar is $100 - \text{Your Guess}$ and represents **your guess that the worker is male**.

Your guess will be used to determine your chances of winning a **bonus of 1\$**. Your chance of winning the bonus is set so that **more accurate guesses lead to a higher chance of winning**.

Please use the slider to indicate your guess for the **chance** that the worker who wrote the text **is female**.

I believe the creator is male

I believe the creator is female



Your answer: **52% chance** that the worker is female.

Figure 1: Example of the response bar for guessing the gender of the worker

[Next](#)

Figure A 46: Screen 5

[Click to review previous instructions](#)

Your participation in the study

Your participation in this study will involve guessing the value of an illustration and gender of its creator, based on provided descriptions of the illustrations. If you wish to withdraw from the study you can close your browser window at any time. If you wish to continue, please confirm the following:

- I have read, understood and accept the Instructions
- I understand that my participation is totally voluntary. I am free to withdraw at any time without having to give a reason
- I agree that the data gathered in this study may be stored anonymously and securely
- I agree that the data gathered in this study may be used for research purposes
- I agree to take part in the study

[Next](#)

Figure A 47: Screen 6

[Click to review previous instructions](#)

Attention check

Whether or not you earn a bonus depends on...

- ... a coinflip.
- ... the accuracy of your guess regarding the number of correctly answered questions and the gender of the worker in the randomly selected round.
- ... your performance on the test from the Armed Service Vocational Aptitude Battery (ASVAB).
- There is no bonus in this task.

[Next](#)

Figure A 48: Screen 7

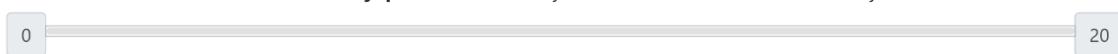
[Click to review previous instructions](#)

Task

The worker describes its performance as follows:

„I knew what every single question was asking and answered carefully taking the whole 30s to make sure I have the right answer.“

Please use the slider to indicate **how many questions out of 20** you think the worker answered correctly on the task.



Please use the slider to indicate your guess for the **chance** that the worker who wrote the text **is female**.

I believe the creator is male

I believe the creator is female



[Next](#)

Figure A 49: Screen 8-27

[Click to review previous instructions](#)

Questionnaire

Please indicate your gender.

 ----- ▾

Are you a native English speaker?

 ----- ▾

Next

Figure A 50: Screen 28

You have completed the task

Thank you for participating in this task. Your completion code is LUH2021.

Figure A 51: Screen 29

B.4 Instructions agents (Ideation Study)

[Click to review previous instructions](#)

Welcome to this task

You will receive a fixed payment of £2.5. Additionally, half of the participants will receive a £3 **bonus**. This bonus is awarded based on your performance on the task and a decision of a third party.

Please carefully read the following instructions before starting to work. Note that there will be an attention check. If you do not pass it, you are not eligible to participate in this task. To be eligible for payment, you have to perform all tasks within the next 2 hours.

At any point in time, you will be able to review previous instruction by clicking on "Click to review previous instructions" in the right top corner of your screen.

Please indicate your Prolific ID, so that we can send you your bonus, if applicable.

Next

Figure A 52: Screen 1

Technology

On the next page you will see objects that you can move, resize and rotate in the following ways:

Move: Select the object you want to **move, drag it and drop it**.

Rotate: Select the object you want to rotate. A control box will appear (see Figure 1). To rotate objects, click on the **green circle** on the top and **rotate it**.

Resize and rescale: Select the object you want to resize. A control box will appear (see Figure 1). **You can resize objects by dragging the blue circles** in the desired direction.

Change layer: **Right click** on an object to **change its layer**. A menu will appear (see Figure 2), in which you can select between different options. To bring an object one step closer to the front, click "Bring Forward". To send an object one step toward the back, click "Send Backward". To bring an object to the front of all overlapping elements, click "Bring to Front". To send an object to the back of all overlapping elements, click "Send to Back".

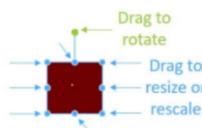


Figure 1: Control box (on click)

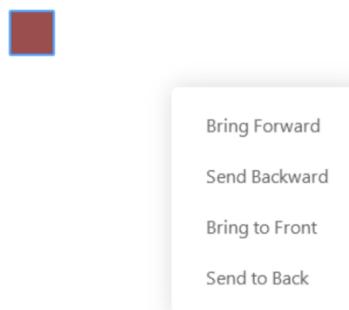


Figure 2: Menu (on right click)

[Next](#)

Figure A 53: Screen 2

[Click to review previous instructions](#)

Try it yourself!

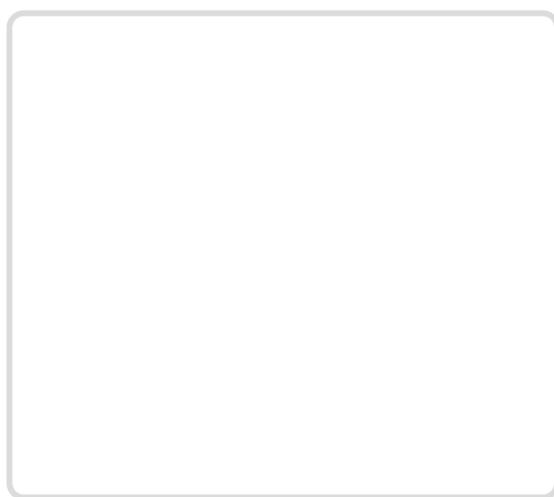
To test the technology, please try it yourself. Below you see the picture area (large white area) and the object area (smaller grey area). We ask you to rebuild the illustration provided below in the picture area, using the objects provided in the object area, and to submit it when you are done.

1. Rebuild the picture below in the **picture area**. Note that **only the content in the picture area will be submitted**.



2. Press "preview" to preview your work. Click inside the picture area to end the preview.

3. Press "submit" to submit the result and advance to the next page.



[Preview](#) [Submit](#)

Figure A 54: Screen 3

[Click to review previous instructions](#)

Your task

Your task is to create an illustration in the picture area. To do so, you can use all or some of the objects provided in the object area. Your illustration should represent an English-language word. Thus, you should come up with a word for an object, item, action, etc. that can be drawn or visualized. Please indicate which word you illustrated by writing it in the text field, which is provided above the picture area. Note that in the picture area, you should **illustrate words and not write them** and that you should only write in the text field.

In doing so, there are some rules:

- Work **inside the picture area**.
- You are only allowed to illustrate **single words** (no blanks allowed in the text field).
- The word you illustrate should be included in a **standard English dictionary**.

Whether or not you receive a bonus depends on whether a third party thinks that your illustration is original and recognizable. Thus your illustration should be:

1. **Original:** The word is **not** among a set of 50 illustrated words from this task.
2. **Recognizable:** People can **recognize the illustrated word** when they see your illustration.

Half of the participants will receive a bonus.

[Next](#)

Figure A 55: Screen 4

[Click to review previous instructions](#)

Attention check

This is an attention check. If you pass it, you will advance to the next page of the task. If you do not pass it, you cannot participate in this task.

Whether or not you receive a bonus depends on...:

- ... the assessment of a third party regarding the aesthetic value of your illustration and the number of objects used.
- ... the assessment of a third party regarding the originality and the recognizability of your illustration.
- ... the number of objects used in your illustration and the assessment of a third party regarding its originality.
- ... the length of the illustrated word and the assessment of a third party regarding the recognizability.

[Next](#)

Figure A 56: Screen 5

[Click to review previous instructions](#)

Your task

Please proceed as follows:

1. Illustrate your word in the picture area. Only the content of this area will be saved when you submit your result. Everything outside will be cropped out.
2. Indicate the word you illustrated in the text field.
3. Press the "preview" button if you want to preview your illustration. Click inside the picture area to end the preview.
4. Press the button "submit" to submit your result and advance to the next page.



What word have you illustrated?

[Preview](#) [Submit](#)

Figure A 57: Screen 6

[Click to review previous instructions](#)

Your bonus

Whether or not you receive a **£3 bonus** depends on the decision of a third party who has to choose between your illustration and that of a competing participant from this task. You receive the bonus **only if the third party chooses your illustration** over that of a competitor.

The third party earns more money if he or she chooses the better illustration of the two. Which illustration is better, is determined based on whether the illustration is original (within a group of 50 participants, no one else illustrated the same word) and how well the word illustrated in an original illustration can be recognized.

[Next](#)

Figure A 58: Screen 7

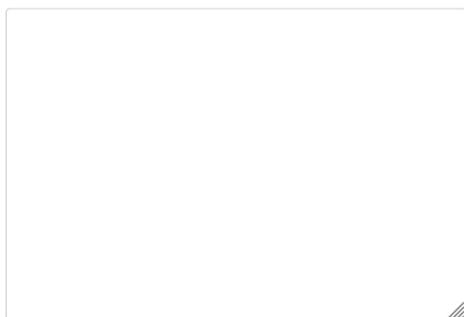
[Click to review previous instructions](#)

Your bonus

Your task

It is your task now to **promote** your illustration in order to **persuade the third party** to choose your illustration over that of your competitor so that you receive the bonus.

Please write your promotion in this box. (You can review your illustration below.)



You illustrated the word "Example". This is your illustration:



[Next](#)

Figure A 59: Screen 8

Questionnaire

Please answer some additional questions.

Are you a native English speaker?

1

Do you have a red-green colorblindness?

How creative are you?

Not creative at
all

Very creative

○ ○ ○ ○ ○ ○ ○

How difficult did you find the task?

Not difficult at all

Very difficult

○ ○ ○ ○ ○ ○ ○

Do you think this task rather favors male or female participants?

Female

None

Male

○ ○ ○ ○ ○ ○ ○

How likely do you think is it, that you receive the bonus?

Not likely at
all

Very likely

○ ○ ○ ○ ○ ○ ○

How convincing do you think was your verbal promotion?

Not
convincing at
all

Very

○ ○ ○ ○ ○ ○ ○

Figure A 60: Screen 9

Figure A 61: Screen 9 cont.

[Click to review previous instructions](#)

Your guess and the actual originality of your illustration

In the following you can earn a bonus of £0.50. You have to guess the chance that your illustration is original. Your guess will be used to determine your chances of winning the bonus. Your chance of winning the bonus is set so that more accurate guesses lead to a higher chance of winning.

Your guess is a percentage probability from 0 to 100 – with 0 indicating a 0-out-of-100 chance that the illustration is original and 100 indicating a 100-out-of-100 chance that the illustration is original. The number you provide is called *Your Guess*. You choose *Your Guess* by clicking the response bar on your screen. The width of the red part of the bar indicates your guess that the illustration is original.

- Larger values of *Your Guess* represent a greater chance that your illustration is original and a smaller chance that your illustration is not original.
 - Smaller values of *Your Guess* represent a greater chance that your illustration is not original and a smaller chance that your illustration is original.

The width of the blue part of the bar is $100 - \text{Your Guess}$ and represents your guess that the illustration is not original.

Please use the slider to indicate your guess for the chance that your illustration is original.



Figure A 62: Screen 10

[Click to review previous instructions](#)

Win an extra bonus

In the following, you can win an additional bonus by guessing the percentage of raters that will be able to recognize the illustrated word. Your bonus is determined by the deviation of your guess from the true value.

- If your answer deviates by 5 or less percentage points your bonus is £0.50.
- If your answer deviates by more than 5 but less than 15 percentage points your bonus is £0.10.
- If your answer deviates by 15 or more percentage points your bonus is £0.

What percentage of raters will be able to recognize the illustrated word based on your illustration?

Please use the slider to indicate what percentage of raters will be able to recognize the illustrated word based on your illustration.

A horizontal slider with a scale from 0% to 100%. The slider is currently at 0%. Below the slider is a blue rectangular button with the word "Next" in white text.

Figure A 63: Screen 11

You have completed the task.

You have completed the task. Your completion code is 64B107A8. You will receive your bonus, if applicable, within 6 days after the completion of this task.

Figure A 64: Screen 12

B.5 Instructions decision-makers (Ideation Study)

[Click to review previous instructions](#)

Welcome to this task

You will receive a fixed payment of \$0.30. Additionally, you can earn a \$1.50 **bonus**. This bonus is awarded based on your performance on the task.

Please carefully read the following instructions before starting to work. Note that there will be an attention check. If you do not pass it, you cannot participate in this task. To be eligible for payment, you further have to perform all tasks within the next hour.

At any point in time, you will be able to review previous instruction by clicking on "Click to review previous instructions" in the right top corner of your screen.

[Next](#)

Figure A 65: Screen 1

[Click to review previous instructions](#)

Your task

This task consists of 10 rounds. In each round, you will have to choose between two illustrations provided by two different creators. You choose an illustration by clicking on the button, indicating the respective illustration. If the creator of the illustration is **female** this button is **purple**. If the creator of the illustration is **male** this button is **blue**. The creators are workers from another task who were asked to illustrate words (e.g., objects, items or actions) using a fixed set of materials.

It is your goal to **choose the illustrations with the highest value**. The value of an illustration is determined as follows:

- **Value of illustration = 0 if it is not original**
 - An illustration is **original** if **no other creator** among 50 randomly drawn creators in this task **illustrated the same word**.
- **Value of illustration = recognition rate** (from 0 to 100) if it **is original**
 - The **recognition rate** is the fraction of people (from 0-100%) that recognized the word when we asked them to guess the illustrated word based on the illustration only.

Your bonus

To determine whether or not you receive the bonus, we will randomly choose one out of the 10 rounds after you completed the task.

- If you chose the illustration with the **higher value** in the selected round, your bonus is **\$1.50**.
- If you chose the illustration with the **lower value** in the selected round, your bonus is **\$0**.
- If both illustrations have the **same value** in the selected round, your bonus is **\$0.75**.

You will be provided with a description written by the the creators of the respective illustrations. Creators know that the description may be shown to you and have an incentive to convince you that their illustration is of high value.

[Next](#)

Figure A 66: Screen 2 (SP-revealed)

[Click to review previous instructions](#)

Your task

This task consists of 10 rounds. In each round, you will have to choose between two illustrations provided by two different creators. You choose an illustration by clicking on the button, indicating the respective illustration. If the creator of the illustration is **female** this button is **purple**. If the creator of the illustration is **male** this button is **blue**. The creators are workers from another task who were asked to illustrate words (e.g., objects, items or actions) using a fixed set of materials.

It is your goal to **choose the illustrations with the highest value**. The value of an illustration is determined as follows:

- **Value of illustration = 0 if it is not original**
 - An illustration is **original** if **no other creator** among 50 randomly drawn creators in this task **illustrated the same word**.
- **Value of illustration = recognition rate** (from 0 to 100) if it is **original**
 - The **recognition rate** is the fraction of people (from 0-100%) that recognized the word when we asked them to guess the illustrated word based on the illustration only.

Your bonus

To determine whether or not you receive the bonus, we will randomly choose one out of the 10 rounds after you completed the task.

- If you chose the illustration with the **higher value** in the selected round, your bonus is **\$1.50**.
- If you chose the illustration with the **lower value** in the selected round, your bonus is **\$0**.
- If both illustrations have the **same value** in the selected round, your bonus is **\$0.75**.

In addition to the illustrations, you will be provided with a description written by the creators of the respective illustrations. Creators know that this description may be shown to you and have an incentive to convince you that their illustration is of high value.

[Next](#)

Figure A 67: Screen 2 (SP-Indicator-revealed)

[Click to review previous instructions](#)

Your task

This task consists of 10 rounds. In each round, you will have to choose between two illustrations provided by two different creators. You choose an illustration by clicking on the button, indicating the respective illustration. If the creator of the illustration is **female** this button is **purple**. If the creator of the illustration is **male** this button is **blue**. The creators are workers from another task who were asked to illustrate words (e.g., objects, items or actions) using a fixed set of materials.

It is your goal to **choose the illustrations with the highest value**. The value of an illustration is determined as follows:

- **Value of illustration = 0 if it is not original**
 - An illustration is **original** if **no other creator** among 50 randomly drawn creators in this task **illustrated the same word**.
- **Value of illustration = recognition rate** (from 0 to 100) if it is **original**
 - The **recognition rate** is the fraction of people (from 0-100%) that recognized the word when we asked them to guess the illustrated word based on the illustration only.

Your bonus

To determine whether or not you receive the bonus, we will randomly choose one out of the 10 rounds after you completed the task.

- If you chose the illustration with the **higher value** in the selected round, your bonus is **\$1.50**.
- If you chose the illustration with the **lower value** in the selected round, your bonus is **\$0**.
- If both illustrations have the **same value** in the selected round, your bonus is **\$0.75**.

[Next](#)

Figure A 68: Screen 2 (Indicator-revealed)

[Click to review previous instructions](#)

Your task

This task consists of 10 rounds. In each round, you will have to choose between two illustrations provided by two different creators. You choose an illustration by clicking on the button, indicating the respective illustration. The creators are workers from another task who were asked to illustrate words (e.g., objects, items or actions) using a fixed set of materials.

It is your goal to **choose the illustrations with the highest value**. The value of an illustration is determined as follows:

- **Value of illustration = 0 if it is not original**
 - An illustration is **original** if **no other creator** among 50 randomly drawn creators in this task **illustrated the same word**.
- **Value of illustration = recognition rate** (from 0 to 100) if it **is original**
 - The **recognition rate** is the fraction of people (from 0-100%) that recognized the word when we asked them to guess the illustrated word based on the illustration only.

Your bonus

To determine whether or not you receive the bonus, we will randomly choose one out of the 10 rounds after you completed the task.

- If you chose the illustration with the **higher value** in the selected round, your bonus is **\$1.50**.
- If you chose the illustration with the **lower value** in the selected round, your bonus is **\$0**.
- If both illustrations have the **same value** in the selected round, your bonus is **\$0.75**.

You will be provided with a description written by the the creators of the respective illustrations. Creators know that the description may be shown to you and have an incentive to convince you that their illustration is of high value.

Next

Figure A 69: Screen 2 (SP-blind)

[Click to review previous instructions](#)

Your task

This task consists of 10 rounds. In each round, you will have to choose between two illustrations provided by two different creators. You choose an illustration by clicking on the button, indicating the respective illustration. The creators are workers from another task who were asked to illustrate words (e.g., objects, items or actions) using a fixed set of materials.

It is your goal to **choose the illustrations with the highest value**. The value of an illustration is determined as follows:

- **Value of illustration = 0 if it is not original**
 - An illustration is **original** if **no other creator** among 50 randomly drawn creators in this task **illustrated the same word**.
- **Value of illustration = recognition rate** (from 0 to 100) if it **is original**
 - The **recognition rate** is the fraction of people (from 0-100%) that recognized the word when we asked them to guess the illustrated word based on the illustration only.

Your bonus

To determine whether or not you receive the bonus, we will randomly choose one out of the 10 rounds after you completed the task.

- If you chose the illustration with the **higher value** in the selected round, your bonus is **\$1.50**.
- If you chose the illustration with the **lower value** in the selected round, your bonus is **\$0**.
- If both illustrations have the **same value** in the selected round, your bonus is **\$0.75**.

In addition to the illustrations, you will be provided with a description written by the creators of the respective illustrations. Creators know that this description may be shown to you and have an incentive to convince you that their illustration is of high value.

Next

Figure A 70: Screen 2 (SP-Indicator-blind)

[Click to review previous instructions](#)

Your task

This task consists of 10 rounds. In each round, you will have to choose between two illustrations provided by two different creators. You choose an illustration by clicking on the button, indicating the respective illustration. The creators are workers from another task who were asked to illustrate words (e.g., objects, items or actions) using a fixed set of materials.

It is your goal to **choose the illustrations with the highest value**. The value of an illustration is determined as follows:

- **Value of illustration = 0 if it is not original**
 - An illustration is **original** if **no other creator** among 50 randomly drawn creators in this task **illustrated the same word**.
- **Value of illustration = recognition rate** (from 0 to 100) if it **is original**
 - The **recognition rate** is the fraction of people (from 0-100%) that recognized the word when we asked them to guess the illustrated word based on the illustration only.

Your bonus

To determine whether or not you receive the bonus, we will randomly choose one out of the 10 rounds after you completed the task.

- If you chose the illustration with the **higher value** in the selected round, your bonus is **\$1.50**.
- If you chose the illustration with the **lower value** in the selected round, your bonus is **\$0**.
- If both illustrations have the **same value** in the selected round, your bonus is **\$0.75**.

[Next](#)

Figure A 71: S: Screen 2 (Indicator-blind)

[Click to review previous instructions](#)

Your task

This task consists of 10 rounds. In each round, you will have to choose between two illustrations provided by two different creators. You choose an illustration by clicking on the button, indicating the respective illustration. If the creator of the illustration is **female** this button is **purple**. If the creator of the illustration is **male** this button is **blue**. The creators are workers from another task who were asked to illustrate words (e.g., objects, items or actions) using a fixed set of materials.

It is your goal to **choose the illustrations with the highest value**. The value of an illustration is determined as follows:

- **Value of illustration = 0 if it is not original**
 - An illustration is **original** if **no other creator** among 50 randomly drawn creators in this task **illustrated the same word**.
- **Value of illustration = recognition rate** (from 0 to 100) if it **is original**
 - The **recognition rate** is the fraction of people (from 0-100%) that recognized the word when we asked them to guess the illustrated word based on the illustration only.

Your bonus

To determine whether or not you receive the bonus, we will randomly choose one out of the 10 rounds after you completed the task.

- If you chose the illustration with the **higher value** in the selected round, your bonus is **\$1.50**.
- If you chose the illustration with the **lower value** in the selected round, your bonus is **\$0**.
- If both illustrations have the **same value** in the selected round, your bonus is **\$0.75**.

[Next](#)

Figure A 72: Screen 2 (No-revealed)

[Click to review previous instructions](#)

Attention check

What determines the value of an illustration?

- Its aesthetic value and the number of objects used.
- Its originality and its recognizability.
- Its aesthetic value and its recognizability.
- Its originality and the number of objects used.

[Next](#)

Figure A 73: Screen 3

[Click to review previous instructions](#)

Your decision

Please decide between the following illustrations. Which one do you think has the higher value?

Keep in mind:

- **Value of illustration = 0** if it is not original (i.e. **someone else** among a random set of 50 other creators **illustrated the same word**).
- **Value of illustration = recognition rate** (from 0 to 100) if it is original (i.e. **no one else** among a random set of 50 other creators **illustrated the same word**).

Illustration 1:

The creator of this illustration describes it as follows:

I feel as though the candle will be original and that no other parties will have drawn it. I would say that it is recognisable as well to the majority of people. It took a lot longer than expected as due to the limited colours and shapes,

Illustration 2:

The creator of this illustration describes it as follows:

I have used all of the different shapes available and made good use of the rotational and re-sizing tools. I have layered shapes on top of others and believe that my design is recognisable.

Please decide which illustration you want to choose:

[Illustration 1](#)

[Illustration 2](#)

Figure A 74: Screens 4-13 (SP-revealed)

Your decision

Please decide between the following illustrations. Which one do you think has the higher value?

Keep in mind:

- **Value of illustration = 0** if it is not original (i.e. **someone else** among a random set of 50 other creators **illustrated the same word**).
- **Value of illustration = recognition rate** (from 0 to 100) if it is original (i.e. **no one else** among a random set of 50 other creators **illustrated the same word**).

Illustration 1:

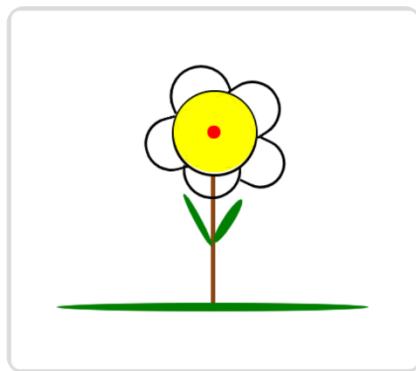
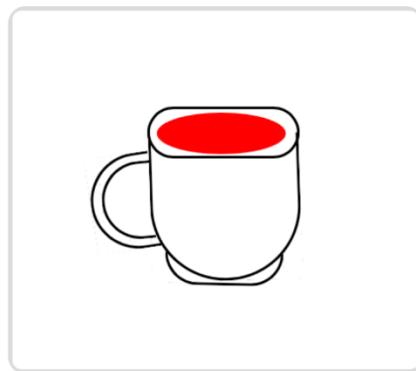


Illustration 2:



The creator of this illustration describes it as follows:

Let's be honest, my flower is pretty much a masterpiece. Such simple lines and shapes, but wow, what a constructive four and a half minutes that turned out to be.... My three year old just walked up to the computer and said "I love that flower daddy". Case closed....!

The creator of this illustration describes it as follows:

here is a beautifully simple design of a university recognised common house hold object, it is bold and eye catching and could be used for a multitude of things, would look great any size, printed out, for function and for pleasure

Please decide which illustration you want to choose:

Illustration 1

Illustration 2

Figure A 75: Screens 4-13 (SP-Indicator-revealed)

Your decision

Please decide between the following illustrations. Which one do you think has the higher value?

Keep in mind:

- **Value of illustration = 0** if it is not original (i.e. **someone else** among a random set of 50 other creators **illustrated the same word**).
- **Value of illustration = recognition rate** (from 0 to 100) if it is original (i.e. **no one else** among a random set of 50 other creators **illustrated the same word**).

Illustration 1:

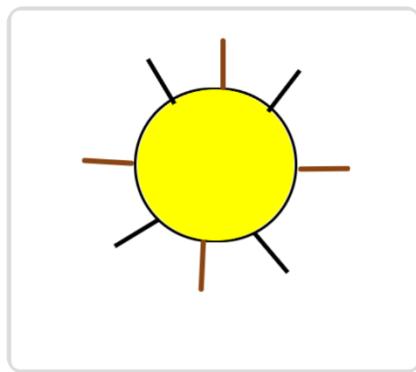
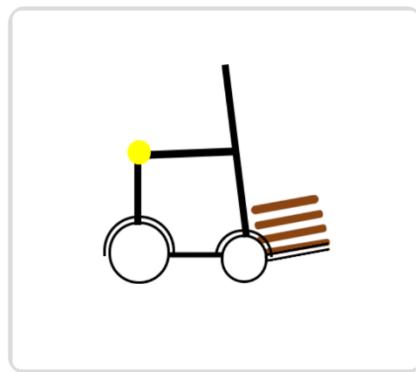


Illustration 2:



Please decide which illustration you want to choose:

[Illustration 1](#)

[Illustration 2](#)

Figure A 76: Screens 4-13 (Indicator-revealed)

Your decision

Please decide between the following illustrations. Which one do you think has the higher value?

Keep in mind:

- **Value of illustration = 0** if it is not original (i.e. **someone else** among a random set of 50 other creators **illustrated the same word**).
- **Value of illustration = recognition rate** (from 0 to 100) if it is original (i.e. **no one else** among a random set of 50 other creators **illustrated the same word**).

Illustration 1:

The creator of this illustration describes it as follows:

Let's be honest, my flower is pretty much a masterpiece. Such simple lines and shapes, but wow, what a constructive four and a half minutes that turned out to be.... My three year old just walked up to the computer and said "I love that flower daddy". Case closed....!

Illustration 2:

The creator of this illustration describes it as follows:

It is a simple but recognisable image of a fork - an object with one long thicker handle and four narrower parallel tines. If you asked anyone, including a young child, what this object is they would all agree it is a fork.

Please decide which illustration you want to choose:

[Illustration 1](#)

[Illustration 2](#)

Figure A 77: Screens 4-13 (SP-blind)

Your decision

Please decide between the following illustrations. Which one do you think has the higher value?

Keep in mind:

- **Value of illustration = 0** if it is not original (i.e. **someone else** among a random set of 50 other creators **illustrated the same word**).
- **Value of illustration = recognition rate** (from 0 to 100) if it is original (i.e. **no one else** among a random set of 50 other creators **illustrated the same word**).

Illustration 1:

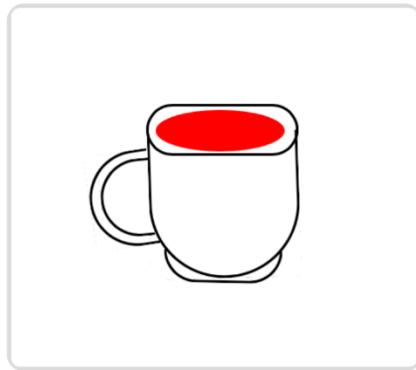
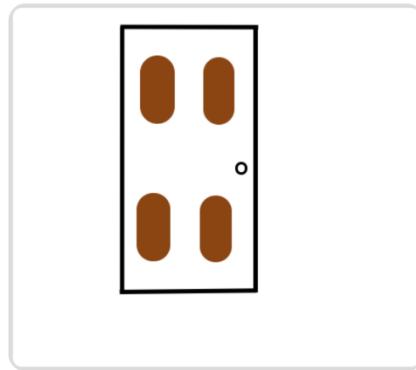


Illustration 2:



The creator of this illustration describes it as follows:

here is a beautifully simple design of a university recognised common house hold object, it is bold and eye catching and could be used for a multitude of things, would look great any size, printed out, for function and for pleasure

The creator of this illustration describes it as follows:

Here we have a traditional wooden door. Complete with the classic 4 panels, and finished with a door knob to allow the door to be opened and closed at ease. "If it ain't broke, don't fix it"

Please decide which illustration you want to choose:

Illustration 1

Illustration 2

Figure A 78: Screens 4-13 (SP-Indicator-blind)

[Click to review previous instructions](#)

Your decision

Please decide between the following illustrations. Which one do you think has the higher value?

Keep in mind:

- **Value of illustration = 0** if it is not original (i.e. **someone else** among a random set of 50 other creators **illustrated the same word**).
- **Value of illustration = recognition rate** (from 0 to 100) if it is original (i.e. **no one else** among a random set of 50 other creators **illustrated the same word**).

Illustration 1:

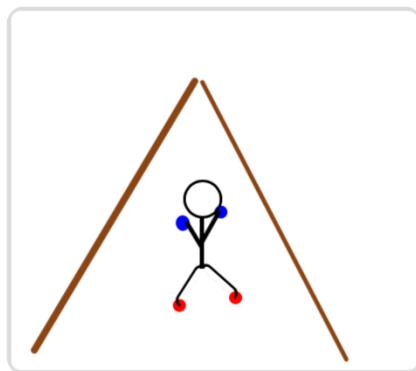
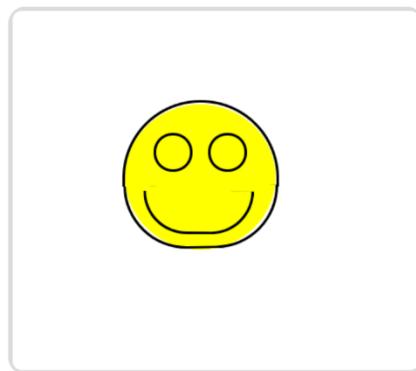


Illustration 2:



Please decide which illustration you want to choose:

[Illustration 1](#)

[Illustration 2](#)

Figure A 79: Screens 4-13 (Indicator-blind)

[Click to review previous instructions](#)

Your decision

Please decide between the following illustrations. Which one do you think has the higher value?

Keep in mind:

- **Value of illustration = 0** if it is not original (i.e. **someone else** among a random set of 50 other creators **illustrated the same word**).
- **Value of illustration = recognition rate** (from 0 to 100) if it is original (i.e. **no one else** among a random set of 50 other creators **illustrated the same word**).

Please decide which illustration you want to choose:

[Illustration 1](#)

[Illustration 2](#)

Figure A 80: Screens 4-13 (No-revealed)

[Click to review previous instructions](#)

Questionnaire

Please answer some additional questions.

Please indicate your gender.

----- ▾

Are you a native English speaker?

----- ▾

Do you have a red-green colorblindness?

----- ▾

Do you think the creators task (illustrating words with a given set of materials) rather favors male or female participants?

Female	None	Male
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How likely do you think is it, that you receive the bonus?

Not likely at all	Very likely
<input type="radio"/>	<input type="radio"/>

How do you see yourself: Are you someone who is willing to take risks or do you try to avoid them?

Not willing at all to take risks	Very willing to take risks
<input type="radio"/>	<input type="radio"/>

Do you like to compete with others?

I don't like competitions at all	I like competitions very much
<input type="radio"/>	<input type="radio"/>

Next

Figure A 81: Screen 14

You have completed the task

You have completed the task. You will receive your bonus, if applicable, within 6 days after the completion of this task. Your completion code is LUH2021.

Figure A 82: Screen 15

B.6 Instructions for follow-up data collection: Rater for quantifying quality of ideas (Ideation Study)

[Click to review previous instructions](#)

Welcome to this task

You will receive a fixed payment of **\$0.30**. Additionally, you can receive a bonus of up to **\$5.00**.

Please carefully read the following instructions before starting to work. To be eligible for payment, you have to perform all tasks within the next 2 hours.

At any point in time, you will be able to review previous instruction by clicking on "Click to review previous instructions" in the right top corner of your screen.

[Next](#)

Figure A 83: Screen 1

[Click to review previous instructions](#)

Instructions

Next, you will see 50 consecutive illustrations on your screen. These illustrations were created by workers in a prior task. These workers' task was to illustrate words, such as objects, items or actions with a provided set of elements. The words could be chosen freely and had to consist of **only one** (British English) word.

Your task is to identify the illustrated words. In order to receive payment for an illustration, you must enter the **exact word** that the other worker assigned to that illustration.

Please note that the words were illustrated by different workers. This means that it is possible to see more than one illustration of the same word.

Payment

You will receive your payment only if you complete the entire task. You receive **\$0.30** for participating in the task. In addition, you receive **\$0.10** for each illustration that you correctly identify.

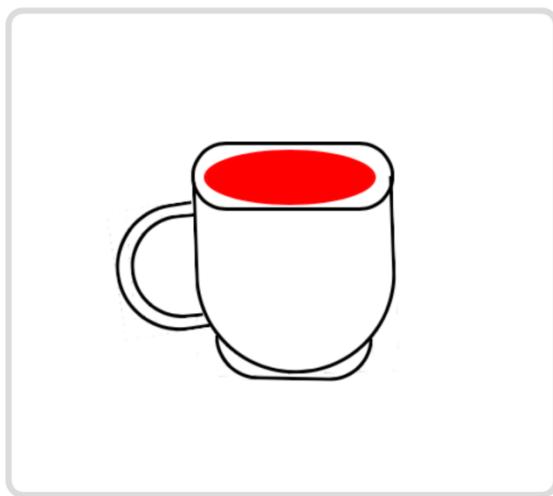
[Next](#)

Figure A 84: Screen 2

[Click to review previous instructions](#)

Task

You receive **\$0.10** for each correctly identified word. A word is correctly identified if you enter the **exact word** that the other worker assigned to that illustration.



Please write down the word that is illustrated.

Next

Figure A 85: Screen 3-52

You have completed the task

Thank you for participating in this task. You will receive your payoff within 6 days after the completion of this task. Your completion code is LUH2021.

Figure A 86: Screen 53

B.7 Instructions for follow-up data collection: Predictions of gender based on self-promotions (Ideation Study)

[Click to review previous instructions](#)

Welcome

You will receive a fixed payment of **\$0.30**. Additionally, you can **earn a bonus** of up to **\$5.00**. This bonus is awarded based on your performance on the task.

Please carefully read the following instructions before starting to work. Note that there will be two attention checks. If you do not pass them, you are not eligible to participate in this task. To be eligible for payment, you have to perform all tasks within the next 2 hours.

At any point in time, you will be able to review previous instruction by clicking on "Click to review previous instructions" in the right top corner of your screen.

[Next](#)

Figure A 87: Screen 1

[Click to review previous instructions](#)

Instructions

Next, you will see 20 descriptions of illustrations on your screen. The creators and writers of the descriptions are workers from another task who were asked to illustrate words (e.g., objects, items or actions) using a fixed set of materials. Creators have an incentive to convince others that their illustration is of high value. The value of an illustration is determined as follows:

- **Value of illustration = 0 if it is not original**
 - An illustration is **original** if **no other creator** among 50 randomly drawn creators in this task **illustrated the same word**.
- **Value of illustration = recognition rate** (from 0 to 100) if it **is original**
 - The **recognition rate** is the fraction of people (from 0-100%) that recognized the word when we asked them to guess the illustrated word based on the illustration only.

[Next](#)

Figure A 88: Screen 2

[Click to review previous instructions](#)

Instructions

Your task

Based on the descriptions, your task is to guess:

1. The value of the illustration
2. The gender of the creator

Payment

You will receive your payment only if you complete the entire task. You receive **\$0.30** for participating in the task. In addition, you can receive a bonus of up to **\$5.00** depending on the accuracy of your guesses. To determine the bonus, we will randomly choose one out of the 20 rounds after you completed the task.

[Next](#)

Figure A 89: Screen 3

[Click to review previous instructions](#)

Instructions

Guess the value of the illustration

Your guess is a number from 0 to 100, indicating your guess regarding the value of the illustration. You choose your guess, by clicking a response bar, similar to the one in figure 1. The width of the **red part** of the bar indicates **your guess of the value of the illustration**.

For your guess with respect to the value of the described illustration, payment depends on the deviation from the true value:

- If your guess deviates by **5 or less** your **bonus is \$4.00**.
- If your guess deviates by **more than 5 and 15 or less** your **bonus is \$2**.
- If your guess deviates by **more than 15** your **bonus is \$0**.



Figure 1: Example of the response bar for guessing the value of the illustration

[Next](#)

Figure A 90: Screen 4

[Click to review previous instructions](#)

Instructions

Guess the gender of the creator

Your guess is a percentage probability from 0 to 100 – with 0 indicating a 0-out-of-100 chance that the gender of the creator is female and 100 indicates a 100-out-of-100 chance that the gender of the creator is female. The number you provide is called *Your Guess*. You choose *Your Guess* by clicking the response bar that will be shown on your screen. The width of the **red part** of the bar indicates **your guess that the creator is female**.

- Larger values of *Your Guess* (larger width of red part) represent a greater chance that the creator is female and a smaller chance that the creator is male.
- Smaller values of *Your Guess* (larger width of blue part) represent a greater chance that the creator is male and a smaller chance that the creator is female.

The width of the **blue part** of the bar is 100 - *Your Guess* and represents **your guess that the creator is male**.

Your guess will be used to determine your chances of winning a **bonus of 1\$**. Your chance of winning the bonus is set so that **more accurate guesses lead to a higher chance of winning**.

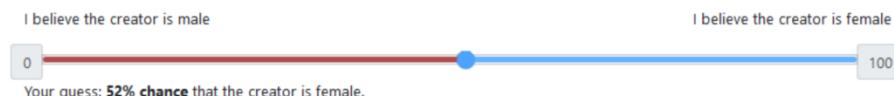


Figure 2: Example of the response bar for guessing the gender of the creator

[Next](#)

Figure A 91: Screen 5

[Click to review previous instructions](#)

Your participation in the study

Your participation in this study will involve guessing the value of an illustration and gender of its creator, based on provided descriptions of the illustrations. If you wish to withdraw from the study you can close your browser window at any time. If you wish to continue, please confirm the following:

- I have read, understood and accept the Instructions
- I understand that my participation is totally voluntary. I am free to withdraw at any time without having to give a reason
- I agree that the data gathered in this study may be stored anonymously and securely
- I agree that the data gathered in this study may be used for research purposes
- I agree to take part in the study

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Figure A 92: Screen 6

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Attention check

Whether or not you earn a bonus depends on...

- ... a coinflip.
- ... the accuracy of your guess regarding the value of the illustration that the worker created in the randomly selected round.
- ... your performance on a creative task that requires you to illustrate words with given objects.
- There is no bonus in this task.

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Figure A 93: Screen 7

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Attention check

What determines the value of an illustration?

- Its aesthetic value and the number of objects used.
- Its originality and its recognizability.
- Its aesthetic value and its recognizability.
- Its originality and the number of objects used.

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Figure A 94: Screen 8

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Task

The creator describes its illustration as follows:

„I have illustrated an old school Tv set from way back into the 70's. This is a reminder of how far we have come in technology advancement. From antenna tv's of black and white to LED's of today.“

Please use the slider to indicate how high you think the **value** of the described illustration is.

Keep in mind:

- Value of illustration = 0 if it is not original (i.e. someone else among 50 other creators illustrated the same word).
- Value of illustration = recognition rate (from 0 to 100) if it is original (i.e. no one else among 50 other creators illustrated the same word).



Please use the slider to indicate your guess for the **chance** that the creator who wrote the text **is female**.

I believe the creator is male

I believe the creator is female



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Figure A 95: Screen 9-28

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Questionnaire

Please indicate your gender.

Are you a native English speaker?

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Figure A 96: Screen 29

You have completed the task

Thank you for participating in this task. Your completion code is LUH2021.

Figure A 97: Screen 30