Working Papers in Economics & Finance
No. 2024-02

# The signals we give: Performance feedback, gender, and competition

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# The signals we give: Performance feedback, gender, and competition*

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January 2024

**Abstract**

Feedback is a vital tool used by organizations and educators to improve performance, spark learning, and foster individual growth. Yet, anecdotal evidence suggests that many individuals are hesitant to provide others with feedback. Moreover, gender biases may influence its provision, with consequences for the representation of women in leadership and competitive professions. We study feedback provision under different conditions that vary the nature of performance signals, how instrumental they are for decision making, and gender of the recipient. Our results reveal that a substantial degree of feedback is withheld by advisors. Moreover, advisors are more likely to shield women from negative feedback in conditions characterized both by a lack of complete information about performance, and feedback that is not immediately instrumental for their decision-making. This effect is driven by male advisors. Our findings showcase how gender differences can arise in feedback provision, and highlight when these differences may be more likely to appear.

**Keywords**: Feedback provision; gender; ego/belief utility; competitiveness; discrimination.
**JEL Classification**: C90, D83, D91, J16, M54.

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# 1 Introduction

Giving feedback to others is ubiquitous in today's world, and it is one of the most powerful tools that organizations and educators have to improve worker performance, increase student learning, and spark individual growth (Prue and Fairbank, 1981; Greve et al., 2003; Hattie and Timperley, 2007). Despite clear benefits, evidence suggests that feedback (both positive and negative) is often withheld (London, 2014; Solomon, 2016; Zenger and Folkman, 2017). Moreover, survey evidence reveals that women may receive vaguer (i.e., more obscure) feedback than men (Correll and Simard, 2016), even though they are no less eager to receive performance feedback (Coffman and Klinowski, 2023). Obscuring feedback or providing low-quality feedback may hinder high-ability workers from entering competitive environments, and more broadly could impede performance improvement (Drouvelis and Paiardini, 2021). Hence, any gender bias that exists in feedback provision may contribute to the observed gender gaps in labor market outcomes and competitive preferences (Niederle and Vesterlund, 2007). Against this backdrop, in this study, we use an online experiment to examine biases in feedback provision and assess the consequences of these biases with a particular focus on gender.

In the environment we consider, an *advisee* (feedback recipient) performs a Raven IQ task and is then matched to an *advisor* (feedback sender) who provides the advisee with performance feedback. Specifically, in our experiment, each advisor observes their advisee's gender and an information signal about their performance quartile, and the advisor has to decide how to convey this information on to their advisee. The advisee subsequently has the option to enter their performance into a tournament.

In our theoretical framework we assume that altruistic advisors care about two factors which contribute to their advisee's welfare: (i) instrumental utility; and (ii) ego utility. The first factor is modelled as a standard utility from economic payoffs (in this case, derived from the advisee's tournament-entry decision and performance), while the second assumes that the advisee also derives utility from believing that they are of high ability. We design treatments to evaluate (gender) biases in the provision of feedback along three main dimensions of interest: (i) the precision of information that the advisor receives about the advisee's performance; (ii) the valence of this information; and (iii) the instrumentality of advisor's feedback in influencing the advisee's decision to enter into a tournament. We also assess what consequences the provided feedback has on advisees' decisions and on the gender-competition gap.

Our first treatment dimension of interest is the precision of the signal. In many situations, advisors or managers may only have incomplete information about the performance of those under their responsibility.[1] To investigate how feedback depends on the precision of signals, advisors are provided with either: (i) signals that were *precise*, i.e., an exact quartile rank from 1 to 4; (ii) signals that were *vague*, i.e., top or bottom half performer; or (iii) *no information*.

[1] Research in other fields suggests that the precision of information may contribute to biases in feedback provision (Bol, 2011).

The feedback that advisors can provide to their advisees depends on the precision of the signal received. That is, those who receive precise or vague signals can decide to obscure feedback, while those who receive no information have no active decision. Advisors who receive precise signals can decide whether to: (i) send precise feedback by fully revealing to advisees their exact rank; (ii) send vague feedback by disclosing whether the rank is in the top or bottom half; or (iii) send no feedback. Advisors who receive vague signals can only choose between the latter two options. In this way, advisors can choose to (partially) obscure information, but they cannot lie to advisees about their performance. We ask whether the advisor's propensity to obscure information about their advisee's performance depends on the precision of this information.

Our second dimension of interest is the valence of the signals advisors receive. That is, we ask whether advisors obscure positive and negative signals of performance differently. Conditional on receiving performance information, the information advisors receive in the experiment is either positive and indicates above-average performance (rank 1 or 2; top-half), or negative and indicates below-average performance (rank 3 or 4; bottom-half). Under the assumption that individuals receive a higher ego utility from receiving positive feedback than negative feedback, our theoretical framework predicts that advisors will be more likely to obscure negative signals from their advisees.

Finally, our third dimension of interest pertains to the instrumentality of feedback. That is, we vary whether advisors have any influence (via their feedback decisions) on the instrumental utility of their advisees. Advisors in the *instrumental* treatment provide their advisees with performance feedback *before* the advisees make their tournament entry decision. On the other hand, advisors in the *non-instrumental* treatment provide their advisees with feedback only *after* the advisees have made their decision, thereby rendering the feedback non-instrumental in influencing the advisee's tournament-entry decision. Given that feedback provides information that can aid advisees in making optimal decisions, we predict that advisors will be less likely to obscure information when feedback is instrumental.

Overall, we find that approximately one-quarter of advisors obscure their signal when providing feedback to their advisee. Surprisingly, contrary to the theoretical framework, positive signals are obscured nearly as much as negative signals. We also find that, on average, advisors obscure feedback similarly for male and female advisees. However, these results at the aggregate level conceal key differences between advisors who receive either precise or vague signals of performance. While there are no differences in obscuring positive or negative precise signals, we find that advisors obscure negative vague signals nearly twice as frequently as they do positive vague signals. Consistent with our theoretical predictions, this difference vis-à-vis vague signals is entirely driven by advisors providing non-instrumental feedback.

Our analysis reveals that this higher likelihood of obscuring negative signals than positive

signals in the non-instrumental treatment can be entirely attributed to advisors who are matched with female advisees. Specifically, advisors receiving negative vague signals are twice as likely to obscure this information from female advisees than from male advisees. Moreover, we find this gender difference to be exhibited by male advisors. We conjecture that advisors may be more inclined to shield the ego utility of female advisees than male advisees from negative feedback. Two features of our data are consistent with this. First, examination of advisors' second-order beliefs reveals that advisors obscure negative feedback for female advisees whom they perceive as more confident about their ability, and who would consequently stand to suffer the greatest ego utility loss from negative feedback. Second, evaluating advisors' responses to the post-experiment questionnaire, we find that advisors matched to a female advisee are more likely to state protecting the advisee's ego as a motive for their feedback choice than those matched with a male advisee.

Finally, when feedback is instrumental, we find that male advisors are also more likely to obscure positive vague signals from female advisees than male advisees. While not predicted by our theory, this is consistent with survey evidence from Correll and Simard (2016), who find that high-performing women tend to receive more vague feedback than high-performing men.

How are advisees' tournament entry decisions influenced by their advisors' feedback? By design, advisors' feedback in the non-instrumental treatment does not influence advisees' tournament entry decisions. However, in the instrumental treatment, feedback *exacerbates* the gender-competition gap. This is because male advisees are more likely than female advisees to disregard negative feedback that advises against entering the tournament. Despite the widened gender-competition gap, advisors' feedback leads to a greater increase in earnings for female advisees than for male advisees.

Taken together, our results have critical implications for the labor market and educational settings. Given that feedback is a pivotal tool for enhancing performance and fostering growth, the fact that a substantial amount of feedback is obscured suggests that some individuals may be operating at a disadvantage, deprived of the insights necessary to refine their skills and optimize their potential. Of particular concern is the gender disparity in feedback provision, which could perpetuate existing inequalities in the workplace and academic arenas. If women receive less feedback or more ambiguous feedback, then they may face challenges in identifying areas for improvement, potentially hindering their career progression and/or academic achievements. Importantly, these consequences can arise even when feedback is not perceived to be immediately instrumental, since feedback received today may shape decisions and/or performance in future tasks, or even in other domains (Huang and Murad, 2020; Banerjee et al., 2020).

Our findings also provide us with new insights on potential ways to counteract biases. We observe that gender biases predominantly manifest in scenarios characterized by incomplete (e.g., vague) information. One immediate recommendation is for the use of more precise in-

struments in performance evaluation, which may serve to attenuate the gender bias in feedback provision. For those providing feedback, it is also important to emphasize the instrumental value of such feedback to its recipients, regardless of its positive or negative connotation. More broadly, our findings underscore the need for measures which can actively discourage stakeholders from obscuring feedback.

In what follows, Section 2 provides an overview of our contributions to the related literature, Section 3 details the experimental design, Section 4 outlines our theoretical framework, and Sections 5 and 6 present the results for advisors' and advisees' behavior, respectively. Section 7 concludes.

## 2 Related Literature

Our study contributes to the large literature on feedback provision. This literature, highlighted in recent reviews by Villeval (2020, 2023), has largely focused on the role of feedback provision on performance and behavior (e.g., Eriksson et al., 2009; Gürtler and Harbring, 2010; Chen and Schildberg-Hörisch, 2019; Drouvelis and Paiardini, 2021; Benistant et al., 2022; Gill and Prowse, 2014; Gill et al., 2019). The majority of this literature focuses on environments where it is assumed that unbiased feedback is exogenously provided to decision-makers, e.g., through an institutionally-enforced feedback provision mechanism.

A further set of studies examines contexts where other parties can lie in their provision of feedback to decision makers. Gneezy et al. (2017) find that individuals tend to lie in the feedback they give about the beauty of other individuals in order to avoid providing negative feedback. In a client-agent interaction where the agent's payoff may depend on the client's happiness level, Ho and Yeung (2014) find that agents use feedback strategically by inflating their feedback when it is (financially) beneficial for them to do so, and clients are naïve when interpreting this distorted feedback. Specifically examining the effects of gender in feedback decisions, Jampol and Zayas (2021) find that under-performing women tend to receive more "white lies" and more positive feedback in subjective evaluations of written essays.[2]

However, in many contexts where performance feedback is provided, advisors have considerable latitude to offer feedback that lies between full honesty and outright deception. Hence, we depart from previous studies by considering a setup where the feedback provider can choose to either partially disclose information (i.e., by providing vague feedback) or to not disclose any information at all. Beyond this, we consider an environment where the financial incentives of the feedback provider and receiver are decoupled. This allows us to systematically evaluate whether and how feedback provision is affected by the feedback provider's concerns about the

[2]Departing from feedback provision to individual decision makers, Ertac et al. (2016, 2019) consider a team environment where a principal has superior information about the performance of two agents under their charge, and they have to decide whether or not to withhold feedback, and whether to provide feedback privately to each agent or publicly to both.

ego and instrumental utilities of the receiver, absent strategic concerns which may otherwise arise if the feedback provider's payoffs are affected by the receiver's actions.[3] This mirrors many settings and relationships that we observe in practice, such as mentoring and peer evaluations (Gibbs, 1991), as well as performance evaluation in corporate settings, where the feedback provider often has indirect or misaligned financial incentives to provide feedback (Prendergast and Topel, 1993). Feedback provision in such contexts may be biased by factors such as information precision, social preferences, or in-group/out-group biases (Bol, 2011).

With our focus on gender differences in feedback provision, our paper contributes to the large literature seeking to understand the factors contributing to gender gaps in labor market outcomes. Within this literature, a body of work has focused on gender gaps in competitive preferences as well as possible interventions to close this gap (Croson and Gneezy, 2009; Niederle and Vesterlund, 2011). Recent work by van Veldhuizen (2022) shows that men are significantly more overconfident than women, resulting in gender differences in self-selection into competitive payment schemes and leadership positions (Reuben et al., 2012; Alan et al., 2020). To this end, scholars have also investigated the role of information and feedback interventions in mitigating gender gaps in competitiveness (Brandts et al., 2015; Kessel et al., 2021; Wozniak et al., 2014; Lovász et al., 2022; Berlin and Dargnies, 2016; Hannan et al., 2008). The general consensus is that exogenous feedback generally helps to mitigate gender gaps.

In practice, feedback is often endogenously determined by decision makers (e.g., mentors, advisors, managers) and may reflect their biases. A related literature examines advice giving for future decisions, noting that this literature typically focuses on generic advice giving without knowledge of recipient characteristics or performance information (e.g., Chaudhuri et al., 2006, 2009; Ding and Schotter, 2019; Schotter, 2003; Schotter and Sopher, 2007).[4] Two recent exceptions, which also focus on gender, are Gallen and Wasserman (2021) and Brandts and Rott (2021). In a field experiment, Gallen and Wasserman (2021) find female students receive more work-life balance advice than males. Brandts and Rott (2021) find in a lab experiment that while advice-giving differs by advisor gender, it does not depend on advisee gender. Distinct from these studies which examine advice giving, we focus on an environment with asymmetric information where advisors have private information about the performance of advisees, and they have the opportunity to obscure this performance information from them.

[3] Regarding such strategic behavior, prior research has examined behavior in "disclosure games", but in these environments feedback typically does not have any impact on the receiver's ego utility. Instead, the sender is modelled as a self-interested party whose payoff is directly affected by the receiver's choice. Jin et al. (2021) examine the binary decision to either reveal or not reveal the true state of the world, while Deversi et al. (2021) provide senders with the option of vague disclosure. Alempaki et al. (2023) find that senders prefer partial truth to direct lying because they do not like to deceive and to be seen as deceptive.

[4] Brandts et al. (2015) do provide advisors (and advisees) with performance information, and find that advice improves decisions but does not eliminate gender gaps.

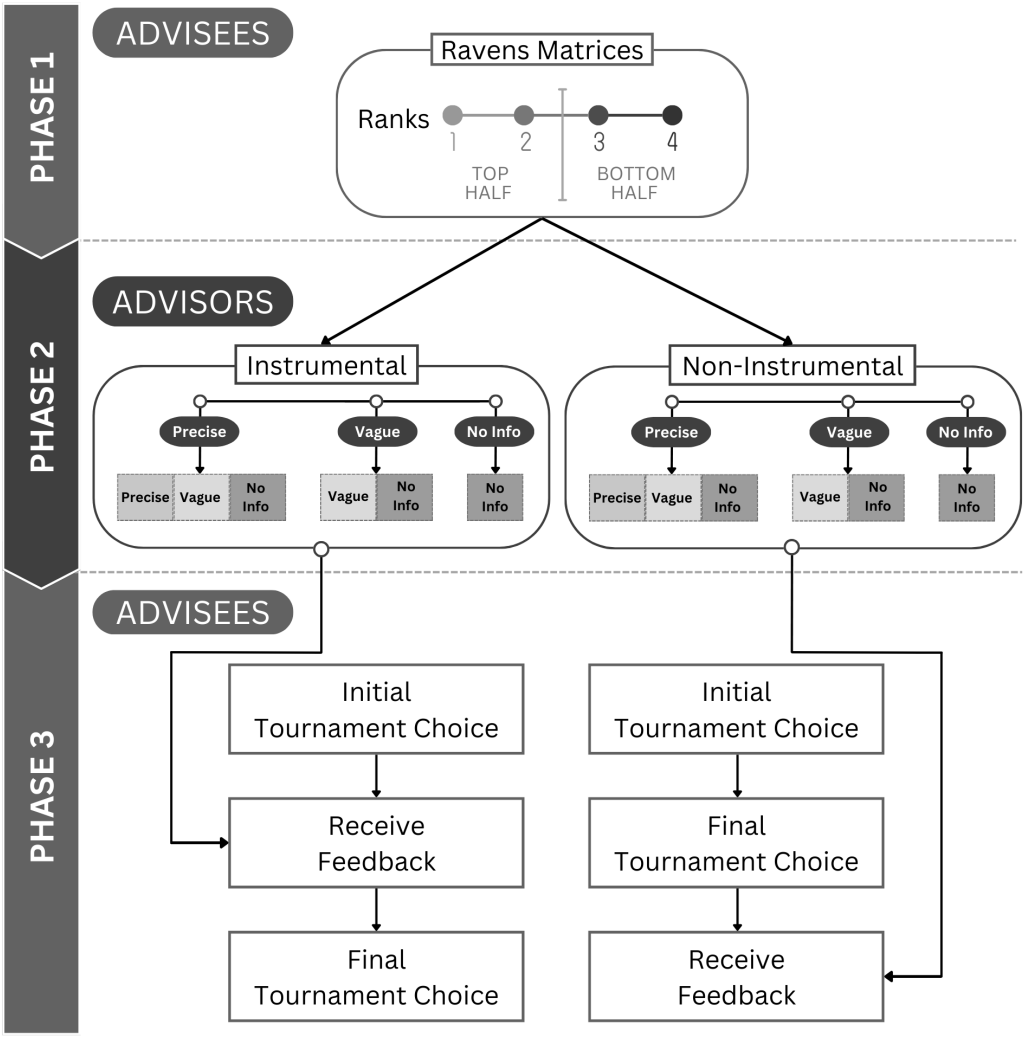



Figure 1: Timeline of the Experiment

## 3 Experimental Design

Participants are randomly assigned the roles of advisors and advisees, and they take part in the experiment asynchronously in three phases. Advisees participate in Phases 1 and 3, while advisors participate in Phase 2. When recruited, advisees are explicitly informed that they are participating in a two-part study, and that they will be invited to complete a follow-up study within 7 days of completing Phase 1. Figure 1 summarizes the timeline of the experiment, with screenshots of the interface available in Appendix B.[5] We detail each phase of the experiment below.

[5]To enhance participant comprehension in the experiment, we framed the decision task using a manager/worker context, with advisors labelled as "Managers" and advisees labelled as "Workers".

## 3.1 Timeline of Experiment

**Phase 1: Advisees complete task and demographic questionnaire.** In Phase 1, participants are recruited as advisees. Advisees first complete a demographic questionnaire. Their responses are used to create a short profile that will be presented to their matched advisors in Phase 2.

Next, advisees are asked to solve 20 Progressive Raven IQ task questions. Each advisee is ranked against 19 other advisees and paid based on their quartile rank in this group of 20. Advisees ranked in the top quartile (ranks 1-5) receive £0.20 for each correct answer, while those in the remaining three quartiles (ranks 6-20) receive £0. Hence, the tournament incentives faced by advisees are similar to that in Niederle and Vesterlund (2007), where only the top 25% of performers receive a positive piece-rate payment for their task performance. To increase the ego-relevance of the task, we explain to participants that the task is based on an IQ test that is commonly used to measure people's intelligence levels, and performance in similar tasks have been found to be correlated with individuals' salaries, job positions, and life satisfaction (a similar ego-relevance manipulation was used in Drobner and Goerg, 2022).

After advisees complete the task, we elicit their prior beliefs about their relative performance. Specifically, they assign 10 tokens across 4 quartile ranks to indicate their belief of falling within each performance quartile. We incentivize advisees' beliefs using the Binarized Scoring Rule (Hossain and Okui, 2013; Erkal et al., 2020), where advisees may receive a fixed reward (£0.10 in this case) with a probability that is determined by the accuracy of their guesses. Instead of providing full details of the scoring rule, we state to participants that the payment scheme is designed such that they can secure the largest chance of receiving this payment by reporting their most accurate guess (Danz et al., 2022). At the end of Phase 1, advisees do not receive any information about their task performance or earnings.

**Phase 2: Advisors receive information about advisees and choose feedback.** In Phase 2, a different sample of participants are recruited as advisors. The Phase 2 experiment is divided into two parts which advisors complete in one sitting. In Part 1, to allow advisors to understand the task and incentives faced by the advisees, advisors complete the exact same set of tasks as the advisees have done in Phase 1.

In Part 2, each advisor is randomly matched to one advisee and shown a profile that is constructed based on the advisee's responses to the demographic questionnaire. Specifically, the profile displays the advisee's gender, quarter of birth, favorite hot beverage, and favorite color. To increase the salience of the advisee's gender, gendered pronouns (e.g., "he/him" or "she/her") are used whenever the instructions refer to the advisee. After advisors are shown their advisee's profile, we elicit their prior beliefs about the advisee's performance in the Raven IQ task. These beliefs are also incentivized using the Binarized Scoring Rule (with the fixed

reward being £0.20).

Next, advisors receive a signal of their advisee's quartile rank in the task. There are four possible quartile ranks (1, 2, 3, and 4). The advisor could receive either a *precise* signal (i.e., they are told the advisee's precise quartile rank), a *vague* signal (i.e., they are told whether the advisee is in the top half or bottom half quartiles) or *no* signal (i.e., they are simply told that the advisee's quartile is between 1 and 4). The probabilities of receiving a *precise*, a *vague*, or *no* signal are 0.65, 0.30, and 0.05, respectively, and these probabilities are common knowledge.[6] Advisors are then asked to choose how they would like to convey this signal to their advisees. Specifically, they can choose to send either precise, vague, or no feedback. Each advisor's options for feedback are limited based on the nature of the signal they received (e.g., an advisor is only able to send either vague or no feedback if they observe a vague signal).[7] Moreover, feedback is restricted to be true, i.e., advisors cannot convey feedback that is not contained in the original signal they have received.

When deciding how to convey the feedback to advisees, the advisors are informed that: (i) their advisee will be re-matched to a new group of 20 advisees and assigned a new rank within this group based on their absolute performance in Phase 1, and (ii) their advisee can choose whether to enter their performance into a tournament within their new group or be paid a piece rate. Under the tournament scheme, advisees will receive £0.20 for each correct answer if they are ranked in the top quartile within the new group, while under the piece-rate scheme, advisees will receive £0.05 for each correct answer in Phase 1 regardless of their rank in the new group.

Advisors (and their matched advisees) are randomly assigned to one of two treatments which vary the instrumentality of the feedback that the advisors send to their advisees. In the *Instrumental-Feedback* treatment, advisors are informed that their advisee will receive the feedback *before* they make their tournament entry decision, while in the *Non-Instrumental Feedback* treatment, advisees will receive the advisor's feedback only *after* they have made their choice. Hence, in the Instrumental-Feedback treatment, advisors' feedback can potentially play an instrumental role in shaping the advisee's tournament entry decision, while in the Non-Instrumental Feedback treatment such an instrumental role is absent.

After the advisors have made their feedback decisions, we elicit their posterior beliefs about the advisee's new quartile rank given the signal they received earlier. At the end of the experiment, advisors complete a short survey including questions about the decisions they have made during the experiment, attention and treatment manipulation checks, questions eliciting their beliefs about the characteristics of their matched advisee, (second-order) beliefs about the advisee's reported confidence in their task performance, as well as a modified Implicit Association

[6] As explained in our theoretical framework (Section 4), it is important that a non-zero proportion of advisors receive no signals. This implies that when advisees receive no feedback, they are unable to determine whether their advisor has received no signal or has chosen to obscure a precise/vague signal.

[7] Since an advisor who receives no signal has no option other than to send their advisee no feedback, we exclude these advisors from our analysis.

Test (IAT) relating to gender bias (Greenwald et al., 1998).[8]

**Phase 3: Advisees receive advisor's feedback and make tournament entry decisions.** In Phase 3, we invite advisees back for the follow-up study. Advisees are first reminded of the tasks they had to perform in Phase 1, as well as how their quartile rank and incentives were determined. Then, they are informed that they will be matched to a new group of 20 advisees and given a *new* quartile rank based on how their Phase 1 performance compares within the new group. Advisees are also informed that they can choose between receiving a piece rate based on their Phase 1 performance or entering their performance into a tournament within this new group.

In both the Instrumental-Feedback and Non-Instrumental Feedback treatments, we first ask advisees to decide whether or not they would like to enter into the tournament before receiving any feedback. This provides us with a baseline measure of the advisees' competitive preferences across both treatments. It also allows us to examine whether, in the Instrumental-Feedback treatment, advisees revise their entry decisions given their advisor's feedback.

Next, advisees are informed that they have been matched with an advisor and given detailed information about the decisions that their advisor faced. This includes a description of the distribution of possible signals that their advisor could have received, as well as the feedback decisions the advisors are asked to make. In both treatments, advisees are asked to make a tournament entry decision *again*, and they are informed that the latter decision will overwrite the earlier decision they have made and be used to determine their payoff in Phase 3. The timing in which advisees receive their advisor's feedback, relative to when they make their second tournament entry decision, depends on which of the two treatments (Instrumental-Feedback or Non-Instrumental Feedback) they and their matched advisor have been assigned to.

Finally, in both treatments, after receiving the advisor's feedback, we elicit advisees' beliefs about their new quartile rank. They then complete a short survey about the decisions they have made during the experiment, including an open-ended question on the reasons behind their feedback choice, as well as a one-shot risk task (Gneezy and Potters, 1997).

## 3.2 Procedures

The experiment is conducted online using oTree (Chen et al., 2016). We recruited a total of 2,620 participants residing in the United States (1,305 advisees and 1,315 advisors) via Prolific, with a balanced sample of male and female participants for both the advisor and advisee sessions. Moreover, the advisor-advisee matches were implemented such that there was a balanced sample of male-to-male, female-to-female, male-to-female, and female-to-male matches, thus

[8]Overall, 27 advisors (2% of the sample) are unable to correctly recall their advisee's gender. Of these, 14 of them are matched with a male advisee while 13 are matched with a female advisee, and this difference is not statistically significant (Fisher's exact test: p-value = 0.861).

allowing us to examine whether advisors' feedback decisions depend on both the advisee's and their own gender.[9] The experiment was pre-registered at AEA RCT Registry (AEARCTR-0006966) prior to the collection of data.[10]

To minimize attrition, we conducted the experiments in eight waves, with each wave lasting about a week. Within each wave, we recruited advisors for Phase 2 immediately after all the advisees had completed Phase 1. Once Phase 2 was completed, advisees were invited back to complete Phase 3 within the same week. Of the 1,305 advisees who completed Phase 1, 1,199 (92%) returned to complete Phase 3 of the experiment. Of the 106 advisees who did not return to complete Phase 3, 53 are male, 52 are female, and 1 identifies as non-binary. There are no gender differences in attrition rates (Fisher's exact test: p-value = 0.359). Phases 1 and 3 lasted about 10 minutes each, while Phase 2 lasted about 20 minutes in total.

Participants had to successfully complete a series of understanding check questions before making their decisions in the experiment. Moreover, participants were only paid if they did not fail any attention checks. Advisees received a fixed reward of £2 and a bonus payment based on their decisions in either Phase 1 or Phase 3 of the experiment, with payments made only if they completed Phase 3. In Phase 2, advisors received a fixed reward of £2.25, as well as a bonus payment based on either: (i) their own performance in the Raven IQ task (Part 1), or (ii) the accuracy of their beliefs about the advisee's performance (Part 2) and for completing the IAT. On average, the bonus payments paid to advisees and advisors were £1.21 and £1.00, respectively. This translates to a total average payment of approximately £9.70 per hour.

## 4 Theoretical Framework

In this section, we present a simple theoretical framework to help guide the interpretation of our results. Advisees have ability $a \in \{G, B\}$ where $G > B$. Each advisee is paired with an advisor, the latter of whom receives a signal $s$ about their advisee's ability. The signal space is $s \in \{G, B, G \cup B\}$. Denote $\mu$ as the probability that the advisor observes a signal that matches the advisee's ability ($s = a$). The advisor never observes a signal that contradicts the advisee's ability, but they may observe an uninformative signal ($s = G \cup B$). Hence, with probability $1 - \mu$ the advisor observes the completely uninformative signal (in our experiment, $1 - \mu = 0.05$).

After observing signal $s$, the advisor decides what feedback $f$ to transmit to their advisee. Matching the experimental design, the advisor cannot lie but can obscure information. Hence,

[9] Due to a recruitment error, two advisors were mistakenly matched with the same advisee in 10 advisor-advisee pairs. In these instances, we randomly picked one of the two advisors' decisions to implement.

[10] We adhere to the pre-registration as much as possible in our analysis. We have more additional exploratory analysis (e.g. results on the advisors' gender and the mechanisms governing the main results) that was not pre-registered and was decided on given the comments from the readers of the working paper and seminar participants where the paper was presented at. It is also worth noting that the pre-registration used the framing of the experimental design context referring to advisors as "managers" and advisees as "workers".

an advisor receiving a signal $s = G$ can choose to send one element $f \in \{G, G \cup B\}$. Analogously, an advisor receiving a signal $s = B$ can choose to send one element $f \in \{B, G \cup B\}$. When $s = G \cup B$, $f = G \cup B$.

We assume that the advisee values information for two reasons: (i) its instrumental value (that is, information guides optimal decision making); and (ii) its hedonic value (that is, the advisee gains ego utility from believing that they are of higher ability). Or equivalently, the advisee receives a lower utility from believing that they are of lower ability.[11]

## 4.1 Advisee's Welfare

The advisee forms subjective prior beliefs $p_0$ about the probability that their ability is $a = G$. We assume that the advisee derives utility from the beliefs they hold about their ability, $b(p_0) = \beta p_0$, where $\beta > 0$ represents the marginal utility the advisee derives from holding higher beliefs about their ability.

Moreover, the advisee receives instrumental utility. Specifically, the advisee's instrumental payoff depends on: (i) whether or not the advisee enters into a tournament; and (ii) the advisee's ability. Denote the advisee's payoff as $\pi_a^E$, where $E \in \{0, 1\}$ represents the advisee's tournament-entry decision and $a \in \{G, B\}$ represents their ability. Hence, there are four possible payoff values, and we assume that

$$\pi_G^1 > \pi_G^0 > \pi_B^0 \geq \beta > \pi_B^1 = 0.$$

The requirement that $\pi_B^0 \geq \beta$ derives from an assumption that instrumental utility weakly dominates ego utility.[12]

Given belief $p_0$, the advisee enters the tournament if and only if

$$\begin{aligned} & p_0 \cdot \pi_G^1 > p_0 \cdot \pi_G^0 + (1 - p_0) \cdot \pi_B^0 \\ \Rightarrow\ & p_0 > \frac{\pi_B^0}{\pi_G^1 - \pi_G^0 + \pi_B^0}. \end{aligned} \tag{1}$$

We denote the resulting instrumental utility as $U(p_0, a)$, since it is completely determined by beliefs $p_0$ and ability $a$. Hence, and assuming that advisees are risk-neutral, the advisee's total welfare is given by

$$W(p_0, a) = b(p_0) + U(p_0, a). \tag{2}$$

[11] Although one could also consider a theoretical model where advisees receive benefits from distorting beliefs, we assume that advisees are Bayesian in their updating behavior (Brunnermeier and Parker, 2005).

[12] Specifically, we assume that the material gain from making the correct entry decision: $\pi_B^0 - \pi_B^1 = \pi_B^0$, is at least as large as the gain from believing one is $a = G$ for certain rather than $a = B$ for certain, which is $\beta$.

## 4.2 Advisor's Utility

The advisor does not receive any direct reward for the feedback they choose to give to their advisee. We assume that the advisor is altruistic, and places some weight $\alpha > 0$ on their advisee's total welfare.

The advisor does not know the prior belief that their advisee holds about their own performance, but the advisor forms second-order beliefs about the advisee's confidence. Let $\hat{p}_0$ represent the advisor's belief of the prior probability that the advisee has assigned to having ability $a = G$. We assume advisors are heterogeneous in their second-order beliefs. Specifically, we assume that $\hat{p}_0$ is uniformly distributed, $\hat{p}_0 \sim \mathcal{U}(0, 1)$.

Given this, we represent the advisor's utility as

$$\alpha \hat{W}(\hat{p}_0, a) = \alpha \left[ b(\hat{p}_0) + U(\hat{p}_0, a) \right]. \tag{3}$$

Next, for simplicity, we normalize $\alpha = 1$. In addition, we also augment the instrumental-utility component of (3) with $\gamma \in \{0, 1\}$ to indicate whether the advisor's feedback has any impact on the advisee's instrumental utility. Specifically, if $\gamma = 0$, the advisor's feedback is non-instrumental in that their feedback will have no impact on the advisee's tournament-entry decision.[13] If $\gamma = 1$, the advisor's feedback is instrumental in influencing the advisee's tournament-entry decision. Hence, given signal $s$, the advisor chooses feedback $f$ to maximize

$$b(\hat{p}_0) + \gamma U(\hat{p}_0, a). \tag{4}$$

## 4.3 Advisor's Feedback Decisions

We now evaluate the advisor's optimal strategy given each possible signal that they receive.

First, consider an advisor who observes $s = G \cup B$. Since they have only one action ($f = G \cup B$), their strategy is trivial.

Next, consider an advisor who observes $s = G$. The advisor can either send precise feedback ($f = G$) or obscure feedback ($f = G \cup B$). It is straightforward to show that they will always send precise feedback, i.e., $f = G$. This is because $f = G$ is a perfectly informative signal, which results in a second-order posterior belief of $\hat{p}_1 = 1$ regardless of the second-order prior. Hence, the advisor will expect the advisee to enter the tournament. Given that only high-ability advisees ($a = G$) can induce such signals (and therefore receive such feedback from their advisor), from the advisor's point of view, this leads to the uniquely maximal welfare for the advisee, consisting of the highest belief and the highest instrumental payoffs: $b(1) + \gamma \cdot \pi^1_G$.[14]

[13] Although the advisee continues to receive instrumental utility from their decision, from the advisor's perspective this utility is fixed and hence unaffected by feedback.

[14] To see that obscuring feedback ($f = G \cup B$) would always result in lower utility to the advisor, it is sufficient to note that obscuring feedback would always result in $\hat{p}_1 < 1$, and $b(\hat{p}_1) < b(1)$ for all $\hat{p}_1 < 1$.

Finally, consider an advisor who observes $s = B$. The advisor can either send precise feedback ($f = B$) or obscure feedback ($f = G \cup B$). Since $b(0) = 0$, the advisor's utility from sending precise feedback is simply $\gamma \cdot \pi_B^0$. We next turn to the advisor's utility from obscuring feedback.

Denote $\nu \in [0, 1]$ as the probability that an advisor observing $s = B$ obscures feedback. We can determine how advisors perceive their advisees to update their beliefs, after receiving feedback, to arrive at a new posterior, $\hat{p}_1$. That is,

$$\begin{aligned}\hat{p}_1 = \Pr(G|f = G \cup B) &= \frac{\Pr(f = G \cup B|G) \cdot \Pr(G)}{\Pr(f = G \cup B)} \\ &= \frac{(1-\mu) \cdot \hat{p}_0}{(1-\mu) \cdot \hat{p}_0 + [(1-\mu) + \mu\nu] \cdot (1 - \hat{p}_0)} \\ &= \frac{0.05 \cdot \hat{p}_0}{0.05 \cdot \hat{p}_0 + (0.05 + 0.95\nu) \cdot (1 - \hat{p}_0)}, \end{aligned} \tag{5}$$

given $\mu = 0.95$.

The advisor expects the advisee to enter the tournament if (5) $>$ the RHS of (1), i.e.,

$$\begin{aligned}&\frac{0.05 \cdot \hat{p}_0}{0.05 \cdot \hat{p}_0 + (0.05 + 0.95\nu) \cdot (1 - \hat{p}_0)} > \frac{\pi_B^0}{\pi_G^1 - \pi_G^0 + \pi_B^0} \\ \Rightarrow &\frac{0.05 \cdot \hat{p}_0}{0.05 + 0.95\nu \cdot (1 - \hat{p}_0)} > \frac{\pi_B^0}{\pi_G^1 - \pi_G^0 + \pi_B^0}. \end{aligned} \tag{6}$$

The LHS of (6) is increasing in $\hat{p}_0$. This implies that the advisor's perception of the likelihood of tournament entry by the advisee is increasing in their belief about the advisee's confidence. Additionally, the LHS of (6) is decreasing in $\nu$. This implies that as more advisors who receive a signal $s = B$ obscure feedback ($f = G \cup B$), the more such feedback is expected to be perceived as a negative signal of performance, thus leading to lower tournament entry by the advisee.

We now make two observations. First, an advisor who perceives that their advisee has sufficiently low confidence will believe that the advisee never (mistakenly) enters the tournament independent of $\nu$. In this case, the advisor will always obscure feedback, since $b(\hat{p}_1) + \gamma \cdot \pi_B^0 > \gamma \cdot \pi_B^0$, and $b(\hat{p}_1) > 0$ for $\hat{p}_1 > 0$.

Second, an advisor who perceives that their advisee has sufficiently high confidence will believe that the advisee always enters the tournament independent of $\nu$. In this case, obscuring feedback ($f = G \cup B$) will nonetheless result in the advisee (mistakenly) entering the tournament (receiving a payoff of $\pi_B^1 = 0$), and consequently having a welfare equal to their ego utility only: $b(\hat{p}_1) = \hat{p}_1 > 0$. On the other hand, sending precise feedback will result in non-entry (receiving a payoff of $\pi_B^0$), zero ego utility (since $b(\hat{p}_1) = b(0) = 0$), and consequently a welfare of: $\gamma \cdot \pi_B^0$. The advisor's decision will therefore depend on the instrumentality of

feedback (i.e., $\gamma$):

1. When feedback is non-instrumental ($\gamma = 0$), the advisor only cares about their advisee's ego utility. Hence, an advisor receiving negative a signal $s = B$ will always obscure feedback. That is, when feedback is non-instrumental, all advisors receiving a negative signal $s = B$ will obscure feedback, and therefore $\nu = 1$. Obscuring feedback has no material consequences, since advisees do not have the opportunity to receive their advisor's feedback before making their tournament entry decision. Because advisees are not naïve, they correctly perceive that "no news is bad news", and hence update in the negative direction. However, given that there is a chance that feedback may have come from an *uninformed* advisor, they remain more confident than the counterfactual of receiving precise feedback ($f = B$).

2. When feedback is instrumental ($\gamma = 1$), the advisor cares about both the ego and instrumental utilities of the advisee. Given our assumption that the advisee's instrumental payoff dominates their ego utility, i.e., $\gamma \cdot \pi_B^0 \geq \beta > b(\hat{p}_1) = \beta \hat{p}_1$, an advisor would send precise feedback *only if they perceive their advisee to have sufficiently high confidence*.

Taken together, an advisor who receives a negative signal $s = B$ will always obscure feedback when feedback is non-instrumental. When feedback is instrumental, the advisor's feedback choice will depend on their second-order beliefs. Specifically, they will obscure feedback if they have sufficiently low $\hat{p}_0$, but they will send precise feedback if they have sufficiently high $\hat{p}_0$. Solving for the precise cut-off $\hat{p}_0^*$ which characterizes the perfect Bayesian equilibrium equates to finding the fixed point of (6):

$$\frac{0.05 \cdot \hat{p}_0^*}{0.05 + 0.95\hat{p}_0^* \cdot (1 - \hat{p}_0^*)} = \frac{\pi_B^0}{\pi_G^1 - \pi_G^0 + \pi_B^0} \tag{7}$$

The precise value of $\hat{p}_0^*$ depends on the payoffs (i.e., $\pi_a^E$ for $E \in \{0, 1\}$ and $a \in \{0, 1\}$). Given our assumptions, we note that the RHS of (7) is bounded between 0 and 1. Here we consider one example, where the ratio of payoffs is similar to the parameters used in our experiment. When $\pi_G^1 = 6$, $\pi_G^0 = 2$, $\pi_B^0 = 1$, and $\pi_B^1 = 0$, from (7), $\nu = \hat{p}_0^* \approx \frac{4}{5}$. Then among advisors who receive a negative signal $s = B$, 80% of advisors (those with $\hat{p}_0 < 0.80$) will obscure feedback, and 20% of advisors (those with $\hat{p}_0 \geq 0.80$) will send precise feedback.

## 4.4 Summary

Here, we summarize the key observations resulting from our theoretical framework. First, independent of the instrumentality of feedback, an advisor who receives a positive signal $s = G$ will always send precise feedback. An advisor who receives a negative signal $s = B$ will obscure feedback when feedback is non-instrumental. However, when feedback is instrumental

and an advisor receives a negative signal $s = B$, some advisors will obscure feedback while others will send precise feedback, and this will depend on their beliefs of the advisee's confidence. Overall, the likelihood of obscuring feedback decreases if: (i) feedback is positive, (ii) feedback is instrumental, and (iii) the advisor holds higher second-order beliefs about the advisee's confidence.

# 5 Advisors' Feedback Decisions

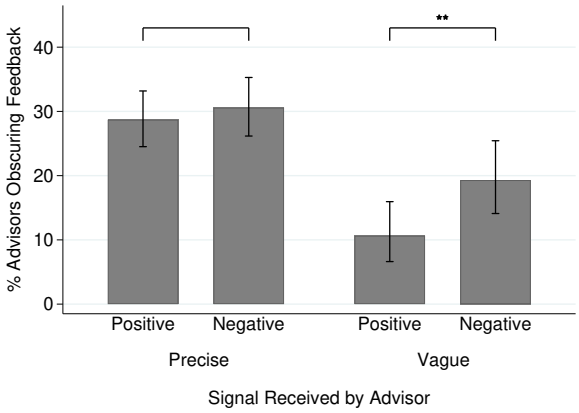
## 5.1 Do advisors obscure feedback to advisees and does this depend on the instrumentality of feedback?

Figure 2 presents advisors' feedback choice based on the signal that they receive, both overall (panel a) and separately by the instrumentality of feedback (panels b and c). In all the figures, we report the proportion of advisors who obscure feedback, that is, they provide feedback that is vaguer than the signals that they received. This is our key variable of interest. Note that this includes advisors who provide vague or no feedback when they receive precise signals, or those who provide no feedback when they receive vague signals. In all figures, vertical error bars represent 95% confidence intervals.

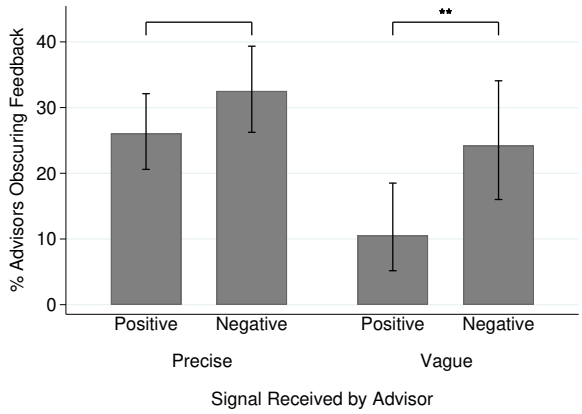
We observe from Figure 2 that a significant amount of feedback is obscured. Overall, advisors obscure feedback to their advisees about 25% of the time. This is the case even when they receive a positive signal about their advisee's performance, where a positive signal is defined as a precise signal of rank 1 or 2, or a vague signal of top half. Panel (a) reveals that, across both treatments, of the advisors who are given a precise or vague positive signal, 29% and 11%, respectively, choose to obscure this feedback to their advisees.

Moreover, panel (a) reveals that advisors are more likely to obscure feedback when they observe a vague negative signal than a vague positive signal of their advisee's performance. 19% of advisors choose to obscure their feedback (by sending no feedback) when they observe a vague negative signal (that the advisee is in the bottom half of the distribution), as compared to 11% of those who observe a vague positive signal (that the advisee is in the top half of the distribution) (Fisher's exact test: p-value = 0.023). The difference in feedback provision between positive and negative signals is not statistically significant with precise signals (Fisher's exact test: p-value = 0.549).

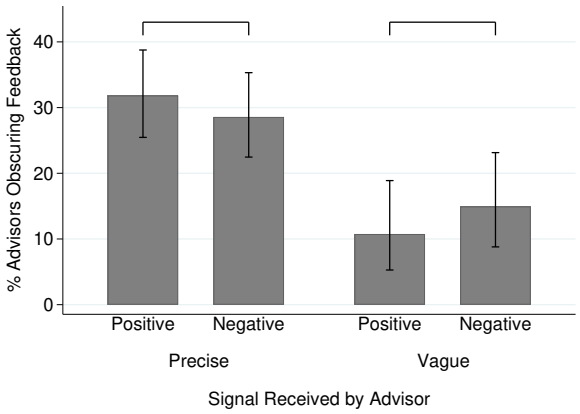
We next investigate whether advisors' decisions depend on the instrumentality of their feedback. Panel (b) of Figure 2 reveals that, when advisors' feedback is non-instrumental in influencing advisee's tournament entry decisions, their propensity to obscure feedback is in line with what we observe in panel (a). Specifically, with non-instrumental feedback, advisors are more likely to obscure vague negative signals than vague positive signals (Fisher's exact test: p-value = 0.021). While advisors are also slightly more likely to obscure precise negative signals than precise positive signals, this difference is not statistically significant (Fisher's exact




(a) Overall




(b) Non-Instrumental Feedback




(c) Instrumental Feedback

Note: Error bars represent 95% confidence intervals.

Figure 2: Proportion of advisors sending feedback that is vaguer than received signal (by signal valence and signal precision)

test: p-value = 0.407). On the other hand, when advisors' feedback is instrumental (panel c), advisors do not differ in their propensity to obscure negative versus positive signals, regardless of whether the signal is precise or vague (Fisher's exact tests: p-values = 0.516 and 0.144, respectively).[15] As robustness, Appendix Figure A.1 pools advisors' feedback decisions across both vague and precise signals separately for each treatment. In line with our conclusions from Figure 2, advisors are more likely to obscure negative signals than positive signals overall with non-instrumental feedback, but not with instrumental feedback.

Table 1 presents estimates of OLS regressions of advisors' decision to obscure feedback to their advisees, both overall (columns 1 and 2), and separately for non-instrumental feedback (columns 3 and 4) and instrumental feedback (columns 5 and 6). The baseline comparison

[15]Comparing behavior across treatments, we observe that while advisors are more likely to obscure vague negative signals with non-instrumental feedback than with instrumental feedback, this difference is not statistically significant (Fisher's exact test: p-value = 0.110). Moreover, there is no statistically significant treatment difference in the advisors' propensity to obscure vague positive signals (Fisher's exact test: p-value = 1.000).

Table 1: OLS regression results of advisors' feedback decisions (overall and by treatment)

| | Overall | | Non-Instrumental | | Instrumental | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Dependent Variable: Advisor obscures feedback to advisee | | | | | | |
| Negative signal | 0.087** | 0.097*** | 0.137** | 0.131** | 0.042 | 0.079 |
| | (0.036) | (0.036) | (0.054) | (0.054) | (0.047) | (0.049) |
| Precise signal | 0.181*** | 0.184*** | 0.155*** | 0.156*** | 0.211*** | 0.229*** |
| | (0.031) | (0.031) | (0.043) | (0.043) | (0.046) | (0.047) |
| Negative × Precise signal | −0.068 | −0.083* | −0.072 | −0.077 | −0.075 | −0.117* |
| | (0.048) | (0.048) | (0.069) | (0.070) | (0.066) | (0.068) |
| Constant | 0.106*** | 0.188** | 0.105*** | 0.109 | 0.108*** | 0.314** |
| | (0.023) | (0.093) | (0.032) | (0.132) | (0.032) | (0.138) |
| Negative signal | 0.019 | 0.014 | 0.065 | 0.054 | −0.033 | −0.038 |
| + Negative × Precise signal | (0.031) | (0.032) | (0.043) | (0.044) | (0.046) | (0.047) |
| Controls | N | Y | N | Y | N | Y |
| Observations | 1,241 | 1,241 | 637 | 637 | 604 | 604 |
| $R^2$ | 0.028 | 0.049 | 0.026 | 0.064 | 0.037 | 0.085 |

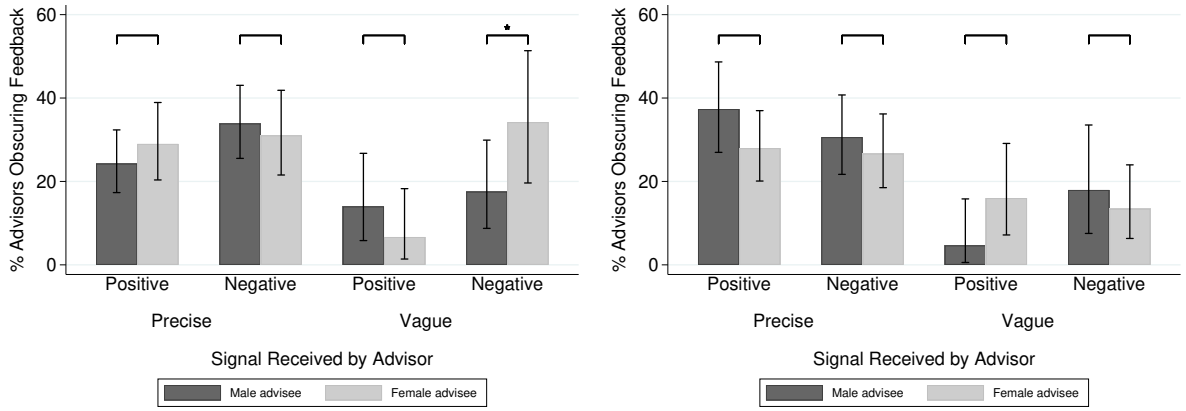
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Robust standard errors in parentheses.
Other controls include the advisor's gender, age, education level, political views on social issues, and U.S. political party affiliation, as well as advisee's gender, quarter of birth, favorite color, and favorite beverage.
The baseline group in all specifications is advisors who observe a positive signal of "Rank 1", "Rank 2", or "Top Half".

group in all columns is advisors who observe a vague positive signal. Hence, the coefficients in the first row provides a test of whether advisors are more or less likely to obscure negative vague signals than positive vague signals. In the last row, we evaluate whether advisors differ in their propensity to obscure negative precise signals relative to positive precise signals. Coefficient estimates of probit regressions presented in Appendix Table A.1 lead to similar conclusions.

The estimates in Table 1 are consistent with our observations in Figure 2. On average, advisors are more likely to obscure negative vague signals than positive vague signals, and this is driven by behavior when feedback is non-instrumental. Regardless of the instrumentality of feedback, there is no statistically significant difference in advisors' propensity to obscure negative versus positive signals when advisors receive precise signals.

We summarize as follows.

**Result 1.** *(a) A non-trivial proportion of advisors obscure feedback to their advisees, even when they receive positive signals about advisee's performance.*
*(b) Advisors are more likely to obscure feedback when they receive a vague negative signal about their advisee's performance than when they receive a vague positive signal. This is driven by advisors providing feedback in the non-instrumental treatment.*




(a) Non-Instrumental Feedback

(b) Instrumental Feedback

Note: Error bars represent 95% confidence intervals.

Figure 3: Proportion of advisors sending feedback that is vaguer than received signal (by signal valence, signal precision, treatment, and advisee's gender)

## 5.2 Do advisors obscure feedback to male and female advisees differently?

We next examine whether advisors' decisions differ based on the advisee's gender. Figure 3 presents advisors' propensity to obscure feedback based on both the instrumentality of feedback and the advisee's gender.

We first focus on the case where advisors provide non-instrumental feedback (panel a). Gender differences emerge in advisors' propensity to obscure feedback when they receive a vague signal. Specifically, when feedback is non-instrumental, advisors are nearly twice as likely to obscure negative vague signals to female advisees (34.2%) than to male advisees (17.5%) (Fisher's exact test: p-value = 0.087), but there is no gender difference in the propensity to obscure positive signals (6.6% for female advisees and 14.0% for male advisees) (p-value = 0.324). On the other hand, when advisors receive a precise signal about their advisee's performance, there are no statistically significant differences in the proportion of advisors who obscure feedback between male and female advisees (positive signals: p-value = 0.455; negative signals: p-value = 0.765). Hence, Result 1(b) – that advisors are more likely to obscure vague negative than vague positive feedback in the non-instrumental treatment – is driven by advisors matched with female advisees.

When feedback is instrumental (panel b), we observe no statistically significant gender differences in the proportion of advisors who obscure feedback when they receive a precise signal (positive signals: p-value = 0.170; negative signals: p-value = 0.539). This is also the case when advisors receive vague signals. Specifically, there is no gender difference in the propensity to obscure negative signals (p-value = 0.585). Moreover, advisors are more likely to obscure positive signals from female advisees than to male advisees. However, this difference is (marginally) not statistically significant (p-value = 0.100).

Table 2: OLS regression results of advisors' feedback decisions (by treatment)

| | Non-Instrumental | | Instrumental | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Dependent Variable: Advisor obscures feedback to advisee | | | | |
| Female advisee | −0.073 | −0.068 | 0.113* | 0.091 |
| | (0.062) | (0.064) | (0.061) | (0.064) |
| Negative signal | 0.035 | 0.028 | 0.128* | 0.168** |
| | (0.071) | (0.068) | (0.069) | (0.073) |
| Precise signal | 0.099 | 0.108* | 0.327*** | 0.328*** |
| | (0.061) | (0.061) | (0.062) | (0.064) |
| Female advisee × Negative signal | 0.240** | 0.243** | −0.154 | −0.161 |
| | (0.111) | (0.112) | (0.096) | (0.098) |
| Female advisee × Precise signal | 0.124 | 0.101 | −0.207** | −0.181** |
| | (0.085) | (0.085) | (0.091) | (0.091) |
| Negative × Precise signal | 0.061 | 0.042 | −0.196** | −0.231** |
| | (0.091) | (0.089) | (0.099) | (0.101) |
| Female advisee × Negative × Precise signal | −0.317** | −0.281** | 0.209 | 0.203 |
| | (0.142) | (0.143) | (0.134) | (0.134) |
| Constant | 0.140*** | 0.163 | 0.047 | 0.227 |
| | (0.049) | (0.137) | (0.032) | (0.139) |
| Female Advisee Relative to Male Advisee by Signal Type | | | | |
| Positive Vague | −0.073 | −0.068 | 0.113* | 0.091 |
| | (0.062) | (0.064) | (0.061) | (0.064) |
| Negative Vague | 0.167* | 0.175* | −0.041 | −0.070 |
| | (0.093) | (0.094) | (0.074) | (0.076) |
| Positive Precise | 0.051 | 0.034 | −0.094 | −0.090 |
| | (0.058) | (0.060) | (0.068) | (0.067) |
| Negative Precise | −0.026 | −0.004 | −0.039 | −0.048 |
| | (0.066) | (0.068) | (0.064) | (0.066) |
| Controls | N | Y | N | Y |
| Observations | 637 | 637 | 604 | 604 |
| $R^2$ | 0.034 | 0.070 | 0.045 | 0.090 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Robust standard errors in parentheses.
Other controls include the advisor's gender, age, education level, political views on social issues, and U.S. political party affiliation, as well as advisee's quarter of birth, favorite color, and favorite beverage.
The baseline group in all specifications is advisors who observe a vague positive signal for a male advisee.

Table 2 presents OLS estimates separately for non-instrumental feedback (columns 1 and 2) and instrumental feedback (columns 3 and 4).[16] The baseline comparison group in all specifications is advisors who are matched with a male advisee and who observe a vague positive signal. For ease of interpretation, we focus on the last four rows, which present the combined effect on the propensity to obscure feedback when advisors are matched with a female advisee

[16]Probit coefficient estimates presented in Appendix Table A.2 yield similar conclusions.

(as compared to with a male advisee) separately given each signal type.[17]

The estimates in the last four rows of Table 2 are broadly in line with the conclusions of our non-parametric tests above. Gender differences emerge when advisors observe vague signals, but not when they receive precise signals about their advisees' performance. Specifically, columns (1) and (2) reveal that advisors are about 17 percentage points (p.p.) more likely to obscure vague negative signals to female advisees than to male advisees when feedback is non-instrumental (p-values = 0.072 and 0.063, respectively).

We summarize our key result as follows.

**Result 2.** *(a) When feedback is non-instrumental, advisors are more likely to obscure vague negative signals from female advisees than from male advisees.*
*(b) Regardless of the instrumentality of feedback, advisors are no different in their propensity to obscure precise signals between male and female advisees.*

We note that the estimates showcased in the bottom rows of Table 2 reveal that advisors are more likely to obscure positive vague signals from female advisees when feedback is instrumental (column 3: p-value = 0.065), but this difference is no longer statistically significant with the inclusion of controls in column (4) (p-value = 0.153). Investigating this further, we consider the inclusion of controls individually and observe that the decrease in significance is due to the inclusion of advisor's gender in column (4).

To delve deeper into this finding, Table 3 breaks down the analysis by the advisor's gender. The estimates reveal that the observed gender biases are driven by *male advisors*. Specifically, male advisors are more likely to obscure vague negative signals from female advisees when feedback is non-instrumental (p-value = 0.021). They are also more likely to obscure vague positive signals from female advisees when feedback is instrumental (p-values = 0.013).

Taken together, both Result 1 and Result 2 imply that advisors are more likely to obscure negative signals than positive signals, and this is largely driven by advisors giving feedback that is non-instrumental in driving advisees' tournament entry decisions. A gender bias exists in feedback provision, where advisors are more likely to obscure negative non-instrumental and, to some extent, positive instrumental feedback from female advisees than from male advisees. These gender biases are exclusively exhibited by male advisors.

### 5.2.1 What are potential drivers of advisors' feedback decisions?

In this section, we examine possible mechanisms that could be driving the differences in advisors' feedback decisions between male and female advisees. We look into the effects of advisors' second-order beliefs, implicit gender biases and descriptive norms. In sum, we find

[17] In other words, conditional on signal type, it shows the impact of the advisee being female. Since the vague positive signal type is the baseline group, the estimate for *Female advisee* in the first part of the table, is therefore identical to the impact of *Positive Vague* in the second part of the table.

Table 3: OLS regression results of advisors' feedback decisions (by treatment and advisor's gender)

| | Male Advisors | | Female Advisors | |
|---|---|---|---|---|
| | Non-Instrumental | Instrumental | Non-Instrumental | Instrumental |
| | (1) | (2) | (3) | (4) |
| Dependent Variable: Advisor obscures feedback to advisee | | | | |
| Female advisee | −0.115 | 0.179** | −0.021 | 0.098 |
| | (0.076) | (0.072) | (0.098) | (0.098) |
| Negative signal | −0.101 | 0.208* | 0.253* | 0.154 |
| | (0.065) | (0.113) | (0.133) | (0.100) |
| Precise signal | 0.158** | 0.382*** | 0.079 | 0.316*** |
| | (0.079) | (0.093) | (0.096) | (0.087) |
| Female advisee × Negative signal | 0.383*** | −0.203 | 0.059 | −0.223* |
| | (0.138) | (0.142) | (0.186) | (0.131) |
| Female advisee × Precise signal | 0.180 | −0.286** | 0.054 | −0.146 |
| | (0.119) | (0.118) | (0.126) | (0.142) |
| Negative × Precise signal | 0.168 | −0.148 | −0.167 | −0.310** |
| | (0.104) | (0.158) | (0.158) | (0.131) |
| Female advisee × Negative × Precise signal | −0.547*** | 0.250 | −0.014 | 0.184 |
| | (0.188) | (0.194) | (0.224) | (0.184) |
| Constant | 0.088 | 0.071 | 0.269 | 0.356* |
| | (0.182) | (0.197) | (0.210) | (0.203) |
| Female Advisee Relative to Male Advisee by Signal Type | | | | |
| Positive Vague | −0.115 | 0.179** | −0.021 | 0.098 |
| | (0.076) | (0.072) | (0.098) | (0.098) |
| Negative Vague | 0.269** | −0.024 | 0.038 | −0.126 |
| | (0.116) | (0.126) | (0.155) | (0.093) |
| Positive Precise | 0.066 | −0.107 | 0.033 | −0.048 |
| | (0.092) | (0.098) | (0.084) | (0.100) |
| Negative Precise | −0.098 | −0.060 | 0.077 | −0.087 |
| | (0.095) | (0.110) | (0.094) | (0.077) |
| Controls | Y | Y | Y | Y |
| Observations | 323 | 301 | 314 | 303 |
| $R^2$ | 0.138 | 0.150 | 0.107 | 0.152 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Robust standard errors in parentheses.
Other controls include the advisor's age, education level, political views on social issues, and U.S. political party affiliation, as well as advisee's quarter of birth, favorite color, and favorite beverage.
The baseline group in all specifications is advisors who observe a vague positive signal for a male advisee.

suggestive evidence that advisors' (second-order) beliefs about advisees' confidence may help explain some of the gender gaps in feedback provision.

**Advisors' second-order beliefs.** We first investigate the role that advisors' second-order beliefs play in driving their feedback decisions. All else equal, our theoretical framework suggests that advisors would be less inclined to obscure negative feedback for overconfident advisees, as they are most likely to mistakenly enter the tournament.

Panel (a) of Appendix Figure A.2 presents advisors' average belief of the prior beliefs held by their advisees about their own rank in the task. The figure reveals that advisors on average believe that male advisees are more confident about their performance than female advisees

(Wilcoxon rank-sum test: p-value = 0.005).[18] In theory, this gender difference in perceived confidence could potentially explain the gender biases in feedback we previously uncovered, e.g. if advisors obscured negative feedback more from (perceived) less confident workers of both genders. However, reproducing the analysis in Table 2 by controlling for advisors' second-order beliefs, columns (1) and (4) of Appendix Table A.3 show that, on aggregate, these second-order beliefs cannot explain the gender bias in obscuring feedback.

Going further, we next split the analysis based on whether advisors have above- or below-median second-order beliefs, by the advisee's gender. Advisors who hold above-median (below-median) second-order beliefs are defined as those who think that their advisees have a higher or equal confidence (lower confidence) about their performance than the median advisor. Figure 4 presents advisors' feedback decisions when feedback is non-instrumental, separately for those who hold above-median second-order beliefs (panel a) and those who hold below-median second-order beliefs (panel b). Panel (a) reveals that advisors who hold above-median second-order beliefs about their advisee's performance are more likely to obscure a vague negative signal of performance from female advisees than from male advisees (Fisher's exact test: p-value = 0.008). On the other hand, those who hold below-median second-order beliefs do not exhibit any gender difference in the propensity to obscure vague negative signals of performance (Fisher's exact test: p-value = 1.000).[19]

Hence, Result 2 appears to be partially explained by advisors' behavior with above-median beliefs about their advisees' confidence in their performance. When feedback is non-instrumental, advisors obscure vague negative signals from female advisees they perceive as more confident than average. On the other hand, confidence appears to play no role in feedback decisions for male advisees. Although not directly predicted by our theoretical framework, this finding suggests that advisors may be assigning a higher weight to the ego utility of female advisees. This is because the ego utility of the most confident advisees will be most impacted by negative feedback. When feedback is non-instrumental, advisors appear to behave as if they care more about the ego utility of confident female advisees, and therefore are more likely to obscure signals of negative performance from them.[20]

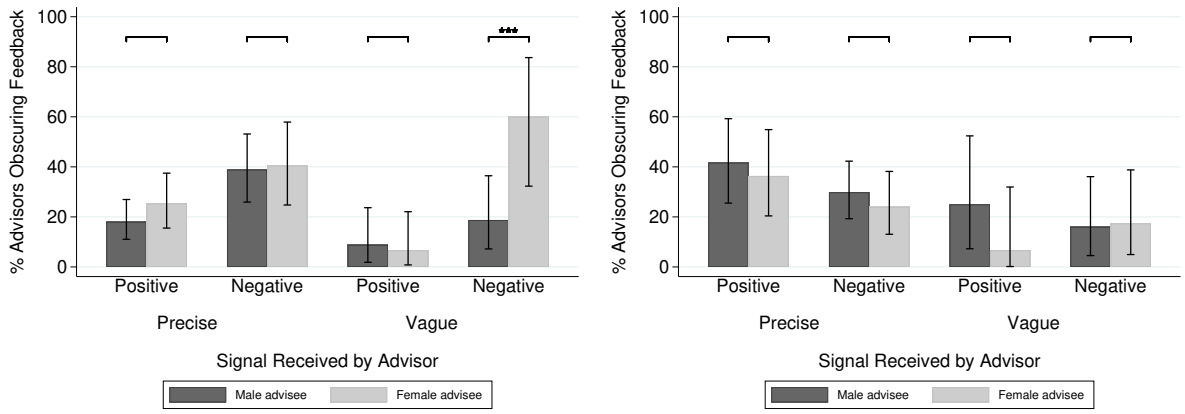
To further investigate this, we examine advisors' stated motives for their feedback decisions, which were elicited in the post-experimental questionnaire. We classify whether or not their

[18] These beliefs are in fact correct, as male advisees are significantly more confident than female advisees in their performance (Wilcoxon rank-sum test: p-value $< 0.001$).

[19] Our conclusions in Figure 4 are supported by regression analysis reported in Appendix Table A.3, where we reproduce the analysis in Table 2 separately for advisors who hold above-median beliefs (columns 2 and 3) and below-median beliefs (columns 5 and 6).

[20] Strictly speaking, our theoretical framework cannot directly account for this result because only ego utility matters in the non-instrumental treatment. Hence even if advisors assigned a higher weight to the ego utility of female advisees, they would still treat them identically (always obscuring negative feedback). However, one can also consider a case where there is a positive moral cost of obscuring feedback, which would be able to generate the result we observe. In the post-experimental questionnaire, it is common for advisors to suggest motives relating to preferences for transparency/honesty as justification for their feedback choice.

open-ended responses include ego-related motives.[21] We find that advisors that receive vague signals about their advisees in the non-instrumental treatment are less likely to state ego-related motives for male advisees (8%) than for female advisees (20%) (Fisher's exact p-value = 0.029). This reinforces the idea that advisors care more about the ego-utility of female advisees than male advisees, especially when feedback is non-instrumental.[22]




(a) $\geq$ Median Confidence

(b) $<$ Median Confidence

Note: Error bars represent 95% confidence intervals.
"$\geq$ Median" ("$<$ Median") implies that advisors believe that their advisees have a higher or equal confidence (lower confidence) about their performance than the median advisor.

Figure 4: Proportion of advisors sending feedback that is vaguer than received signal when feedback is non-instrumental (by advisor's second-order belief)

**Advisors' implicit biases.** Next, we investigate whether advisors' feedback decisions are influenced by their implicit biases (against women), as captured by the modified Implicit Association Test (IAT) (Greenwald et al., 1998). Panel (b) of Figure A.2 presents the average IAT score of advisors. A higher score indicates a greater implicit bias against women. The figure reveals that on average both male and female advisors exhibit an implicit bias against women (i.e., positive IAT score) and there is no statistically significant difference in the IAT score between male and female advisors (Wilcoxon rank-sum test: p-value = 0.906).

Appendix Table A.4 reproduces the analysis in Table 2 controlling for advisors' IAT scores (columns 1 and 4). Overall, we find that advisors' IAT scores do not have any explanatory power on average. When we once again split the analysis based on whether advisors' IAT scores are above or below median (columns 2-3 and 5-6), we do not observe any evidence

[21] Some examples of such responses include: "*I wanted them to feel good about themselves.*", "*I didn't want to squash his confidence.*", "*She did well. It would probably make her feel good to know that.*", and "*I wanted to be slightly more vague in order to avoid hurting my Worker's feelings.*".

[22] This gender difference is not present when advisors receive precise signals when feedback is non-instrumental (Fisher's exact p-value = 0.639), nor in the case where they receive vague or precise signals with instrumental feedback. Overall, we find that ego-related motives are significantly more likely to be present with non-instrumental feedback (12%) than with instrumental feedback (6%) (Fisher's exact test: p-value $<$ 0.001).

that either subgroups exhibit a different behaviour from the one reported in Result 2. Hence, overall, we do not find that advisors' implicit biases (as captured by their IAT scores) provide any meaningful explanation of their behavior.

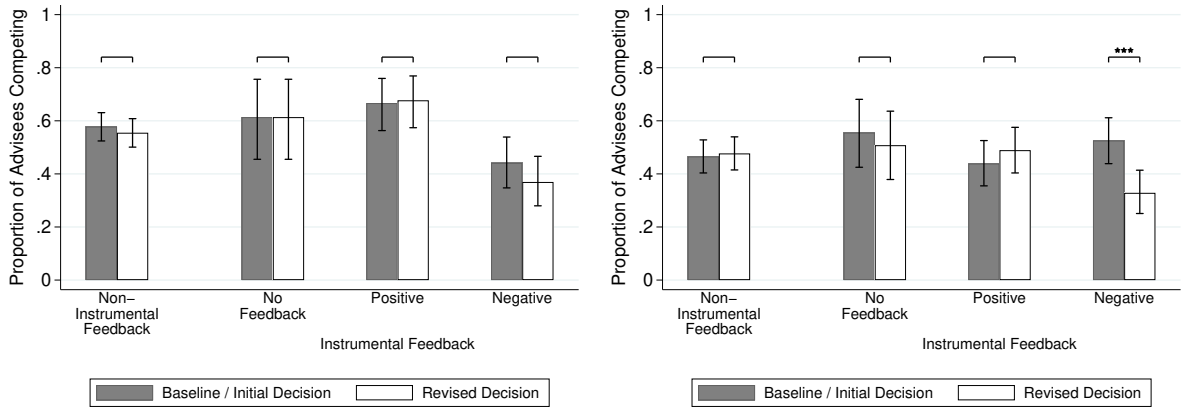
**Beliefs about the behavior of other advisors.** Appendix Figure A.3 presents advisors' beliefs about the feedback decisions of other advisors. Specifically, they were asked to indicate whether they expect gender differences in feedback decisions when advisors observe a negative precise signal of "Rank 4" (panel a) or a positive precise signal of "Rank 1" (panel b), separately for non-instrumental and instrumental feedback. Interestingly, the figures reveal that advisors anticipate other advisors to be more likely to obscure both negative and positive feedback from women than from men (z-test: p-values $< 0.001$ for both negative and positive signals). However, there are no differences in expectations between the non-instrumental and instrumental treatments (Kolmogorov-Smirnov test: p-values = 0.998 and 0.860, respectively, for both a negative and a positive signal). Finally, we find that Result 2 remains robust to the inclusion of advisors' beliefs about the feedback decisions of other advisors as controls (Appendix Table A.5). Hence we do not find that beliefs about descriptive norms provide any meaningful explanation of advisors' behaviour.

**Confusion or noise.** It is possible that behavior in the experiment is affected by general confusion about the instructions. To this end, we analyze advisors' responses in the post-experimental questionnaire, focusing on the justification they gave for their feedback decisions. As robustness, we exclude 8.7% of advisors who do not give a clear justification for their feedback decisions or stated that they provided a random decision.[23] Appendix Tables A.6, A.7, and A.8 repeat the analysis in Tables 1, 2, and 3, respectively, excluding these advisors. Our main conclusions largely remain unchanged.

## 6 Advisees' Tournament Entry Decisions

How does feedback influence advisees' willingness to compete? Recall that all advisees first make a tournament entry decision prior to receiving any information about the advisor's task, thus providing us with their baseline competitive preferences. Then, advisees make a second (revised) tournament entry decision, either before they receive the advisor's feedback (non-instrumental treatment), or after receiving the advisor's feedback (instrumental treatment). Hence, the advisee's revised decision is conditioned either on having no new information at all (in the non-instrumental treatment) or on the specific feedback provided by the advisor (in the instrumental treatment). Figure 5 presents advisees' initial and revised tournament entry decisions, separately for male advisees (panel a) and female advisees (panel b).

[23] This proportion does not differ between treatments or by the advisee's gender.




(a) Male Advisees

(b) Female Advisees

Note: Error bars represent 95% confidence intervals.

Figure 5: Proportion of advisees choosing to enter tournament

Before examining the impact of feedback through our two treatments, we briefly summarize baseline preferences. Overall, 52% of advisees initially choose to enter the tournament, which is substantially higher than the expected 25%, but comparable to the 54% found in Niederle and Vesterlund (2007). Splitting the sample by gender, we find that 57% of male advisees enter the tournament, compared to 48% of female advisees, a significant gap of 9 percentage points (Fisher's exact test: p-value = 0.003).[24] Given the substantial baseline over-entry by both genders, we can note that there may be limited scope for positive feedback to alter decisions.

We now focus on the case where feedback is non-instrumental. By design, advisors' feedback in the non-instrumental treatment should not influence advisees' tournament entry decisions. That is, since advisees do not receive any new information between their two tournament entry decisions, there should be no changes in their decisions on average. Indeed, we do not observe statistically significant differences between advisees' initial and revised decisions when feedback is non-instrumental (Wilcoxon signed-rank test: p-values = 0.117 and 0.549 for male and female advisees, respectively).

When feedback is instrumental *and* advisees receive no feedback from their advisors, we observe that there are no statistically significant differences between advisees' initial and revised decisions (p-values = 1.000 and 0.508 for male and female advisees, respectively). In other words, when advisees receive no feedback from their advisors even when advisors may have the opportunity to do so, they do not revise their tournament entry decisions.[25]

We next consider advisees' decisions based on the valence of the feedback received. We

[24] While substantially less than the gap found in Niederle and Vesterlund (2007), this result is similar to the average gap of 13 percentage points, as found in a recent meta-analysis by Markowsky and Beblo (2022).

[25] Non-revision ends up being optimal in the study, given our earlier findings that advisors obscure both positive and negative signals in the instrumental treatment. This is in contrast to our theoretical framework, which predicts that no feedback should be interpreted as a negative signal given the (predicted) behavior of advisors.

Table 4: OLS regression results of advisees' tournament entry decisions

| | (1) | (2) | (3) |
|---|---|---|---|
| Dependent Variable: Advisee revises decision toward tournament entry | | | |
| Positive instrumental feedback | 0.043 | 0.034 | 0.037 |
| | (0.033) | (0.048) | (0.049) |
| Negative instrumental feedback | −0.132*** | −0.049 | −0.055 |
| | (0.030) | (0.042) | (0.044) |
| No instrumental feedback | −0.019 | 0.023 | 0.026 |
| | (0.036) | (0.048) | (0.048) |
| Female advisee | −0.005 | 0.035 | 0.039 |
| | (0.022) | (0.024) | (0.024) |
| Female advisee × Positive instrumental feedback | | 0.005 | 0.007 |
| | | (0.067) | (0.067) |
| Female advisee × Negative instrumental feedback | | −0.160*** | −0.156*** |
| | | (0.061) | (0.060) |
| Female advisee × No instrumental feedback | | −0.082 | −0.084 |
| | | (0.070) | (0.070) |
| Constant | −0.006 | −0.023 | 0.144 |
| | (0.015) | (0.015) | (0.108) |
| Controls | N | N | Y |
| Observations | 1,196 | 1,196 | 1,196 |
| $R^2$ | 0.025 | 0.033 | 0.038 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Robust standard errors in parentheses.
Other controls include the advisee's age, education level, posterior beliefs about their performance, and absolute score in the task.
Positive feedback implies receiving a feedback of Rank 1, Rank 2, or Top Half, while negative feedback implies receiving a feedback of Rank 3, Rank 4, or Bottom Half.

consider the case where they receive feedback that is positive (pooling both precise and vague), or feedback that is negative. Figure 5 reveals that when advisees receive negative feedback, female advisees revise their decisions by opting out of the tournament (p-value $< 0.001$), but male advisees do not revise their tournament entry decisions (p-value = 0.115). On the other hand, neither male nor female advisees respond to positive feedback (p-values = 1.000 and 0.311 for male and female advisees, respectively). As previously noted, this lack of response may be related to aggregate over-entry.[26]

[26] An alternative classification is to pool advisees who receive precise feedback that they are ranked 2, 3, or 4 as having received "negative" feedback, since these advisees should be opting out of tournament given the information they receive. Results with this alternative classification are reported in Appendix Figure A.4 and Appendix Table A.9. Here, we find that there is a significant response by both male and female advisees to positive feedback in that advisees are more likely to opt into the tournament given positive feedback (p-values = 0.002 and $< 0.001$ for male and female advisees, respectively). However, male and female advisees do not differ in their response to positive feedback (p-values = 0.501 and 0.481 in columns 2 and 3 of Appendix Table A.9, respectively). Additionally, while male advisees respond to negative feedback by being more likely to opt out of tournament (p-value = 0.002), female advisees are still more likely to respond to negative feedback than male advisees (p-values = 0.015 and 0.020 in columns 2 and 3 of Appendix Table A.9, respectively).

Table 4 presents coefficient estimates from OLS regressions of changes in advisees' tournament entry decisions. The dependent variable takes the value of 0 if the advisee does not change their decision, +1 if the advisee initially chooses piece rate but later revises this to tournament entry, and -1 if the advisee initially chooses tournament entry but later revises this to piece rate. The baseline comparison group is advisees in the non-instrumental treatment. Individual dummy variables control for whether advisees in the instrumental treatment receive positive feedback, negative feedback, or no feedback.

The estimates in the table confirm our conclusions from Figure 5. Column (1) reveals that advisees on average do not change their tournament entry decisions when they receive no feedback (p-value = 0.595) or positive feedback (p-value = 0.198), but they opt out of the tournament after receiving negative feedback (p-value $< 0.001$). Columns (2) and (3) include interactions between the advisees' gender and the valence of feedback, which allow us to determine whether male and female advisees differ in their response to each type of feedback. The coefficient estimates affirm that female advisees are more responsive to negative feedback than male advisees by revising their decision away from tournament entry after feedback (p-values = 0.008 and 0.010, respectively). However, male and female advisees do not differ in their response to no feedback (p-values = 0.241 and 0.230, respectively) or to positive feedback (p-values = 0.937 and 0.915, respectively).

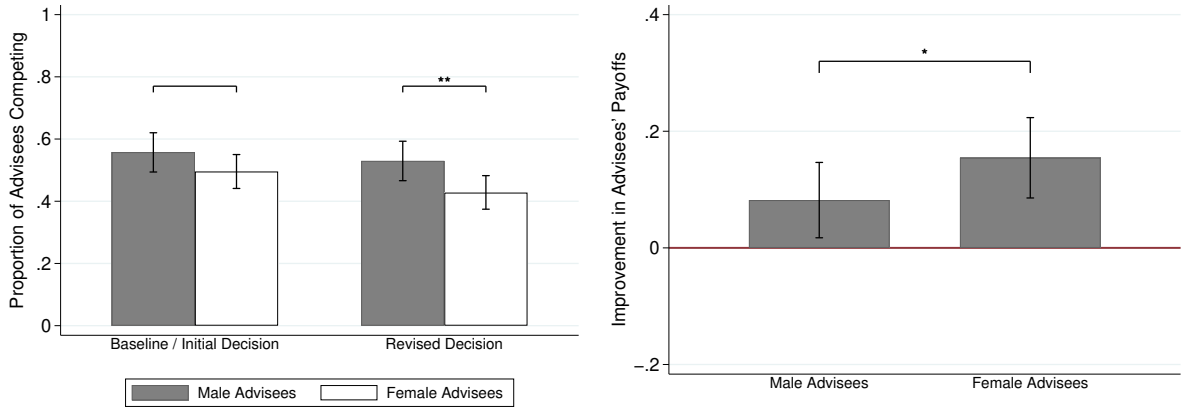
We summarize our findings as follows.

**Result 3.** *On average, advisees respond to feedback by adjusting their tournament entry decisions accordingly in response to feedback. However, female advisees respond more to negative feedback than male advisees by opting out of tournament entry.*

What are the implications of Result 3? We first investigate the impact of advisors' feedback on the gender competition gap. By design, this refers only to the instrumental treatment. Panel (a) of Figure 6 presents the gender competition gap before and after advisees receive advisors' feedback. The figure reveals that, prior to receiving feedback, female advisees are slightly less likely to enter into a tournament than male advisees, although this difference is not statistically significant (Fisher's exact test: p-value = 0.156). Importantly, the gender competition gap widens and becomes statistically significant after advisees receive their advisors's feedback (p-value = 0.016).

How does this translate to gender differences in advisees' earnings? Panel (b) of Figure 6 presents the difference in advisees' implied earnings between their revised and initial tournament entry decisions given instrumental feedback. A positive difference implies that the advisee's revised decision leads to higher earnings than their initial decision, while a negative difference implies that advisees' earnings have decreased as a result of revising their tournament entry decision.

The figure reveals that, on average, there is an improvement in advisees' earnings arising




(a) Gender Competition Gap

(b) Change in Advisees' Earnings

Note: Error bars represent 95% confidence intervals.

Figure 6: Advisees' decisions and earnings in the instrumental treatment

from advisees revising their tournament entry decisions after advisors' feedback (Wilcoxon signed-rank test: p-values = 0.001 and $< 0.001$ for male and female advisees, respectively). However, this positive improvement is greater for female advisees than for male advisees (Wilcoxon rank-sum test: p-value = 0.076). Hence, despite the widening gender competition gap, female advisees enjoy a greater improvement in their earnings compared to male advisees given their advisor's feedback.

Figure 6 highlights two key takeaways arising from gender differences in advisors' provision of instrumental feedback as well as advisees' response to negative feedback. First, the gender competition gap increases when advisors provide instrumental feedback. Second, while advisees' payoffs improve in general as a result of instrumental feedback, the increase in payoffs is greater for female advisees than it is for male advisees.

## 7 Discussion

Feedback provision is a fundamental process in many workplace and education settings. Yet, anecdotal and survey evidence suggests that performance information is often withheld in these contexts. Our findings confirm that about 25% of advisors partially or completely obscure performance information, even when feedback is of immediate instrumental use for decision making by the advisee. Contrary to our theoretical model, but consistent with survey evidence by Solomon (2016) and Zenger and Folkman (2017), positive feedback is obscured nearly as much as negative feedback.

Moreover, when feedback is not immediately instrumental for decision making, we find that (vague) negative signals of performance are significantly more likely to be obscured than positive signals of performance. Critically, the obscuring of negative feedback depends on the advisee's gender. While advisors obscure vague negative feedback from male advisees 17.5%

of the time, they obscure it nearly twice as much (34.2%) from female advisees. This gender difference is exhibited by male advisors.

Examining the possible mechanisms driving this gender difference, we find that advisors' second-order beliefs (about advisee confidence), their implicit bias, or social norms are unable to fully explain our result. However, within the set of advisors matched to women, the tendency to obscure performance information is driven by those who believe that the female advisee they are matched with has above-median confidence. In line with our theory, we conjecture that this suggests a rationale of ego-protection, whereby advisors are "shielding" their female advisees from news that would lead to a substantial negative shock to their (ego) beliefs about their own ability. In line with this, analysis of advisors' stated motives show substantially more ego-related concerns by advisors for female advisees than for male advisees. Critically, this rationale is explicitly gender-based.

We also find that male advisors are more likely to obscure positive instrumental feedback from female advisees than from male advisees. This finding is consistent with anecdotal evidence suggesting that high-performing women receive less precise feedback than high-performing men (Correll and Simard, 2016).

With recent evidence suggesting that women are no less eager to receive performance feedback than men (Coffman and Klinowski, 2023), our findings imply that the differential treatment of female advisees is unwarranted.[27] While we are unable to fully identify intent, the fact that we find the gender biases to be exhibited by male advisors is consistent with a form of paternalistic discrimination (Viki et al., 2003; Buchmann et al., 2023) or benevolent sexism (Erkal et al., 2023). Overall, the differential treatment along gender lines raises important questions about its broader implications for female participation in competitive environments (such as leadership or career progression) or in educational attainment. The greater likelihood of hiding negative news from female advisees signifies an even larger welfare penalty, given we observed stronger responsiveness to feedback from female advisees.

Taking stock of our findings, it is important to explore methods that can address these biases. It is worth noting that we find no evidence of gender bias when advisors receive precise signals of performance, suggesting that unambiguous performance information may potentially help reduce biases feedback provision. As such, implementing standardized feedback mechanisms, such as structured feedback forms or rating scales, may offer a way to ensure more objectivity and reduce the role of personal biases in the performance feedback and appraisal process. Additionally, the idea of gender-neutral feedback platforms, where the gender of the advisee is not disclosed, presents a potential area for future research.

In summary, our study highlights the complexities surrounding feedback provision. Al-

[27] Similarly, Castagnetti and Schmacker (2022) also do not find gender differences in demand for information about ability. An exception is Sharma and Castagnetti (2023), who find that women opt for less informative feedback in an explicitly male-stereotyped task.

though feedback is an instrumental tool for development in organizations and education, our findings reveal that a substantial proportion of feedback is obscured from recipients and that gender biases exist in its provision. Further research is critical to our understanding of methods to promote more precise and comprehensive feedback provision, as well as approaches to mitigate personal biases that affect its delivery.

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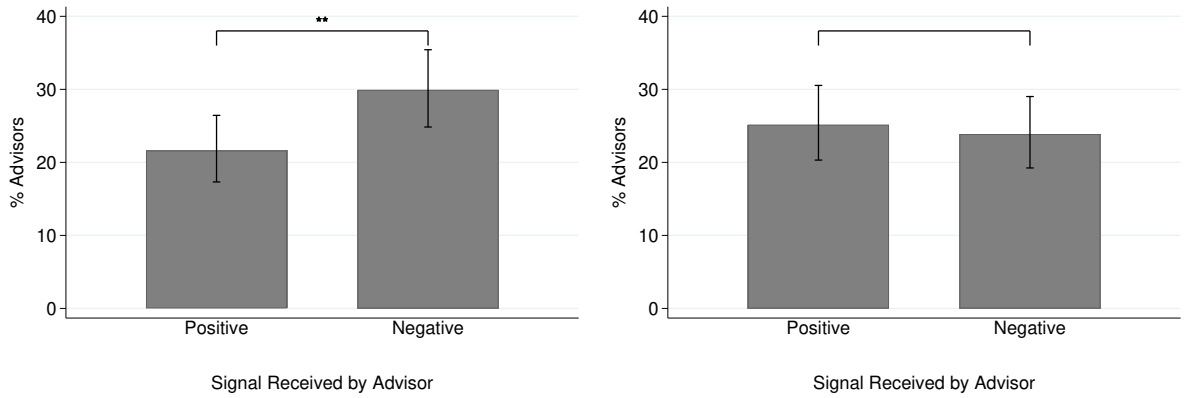
# A Additional Figures and Tables

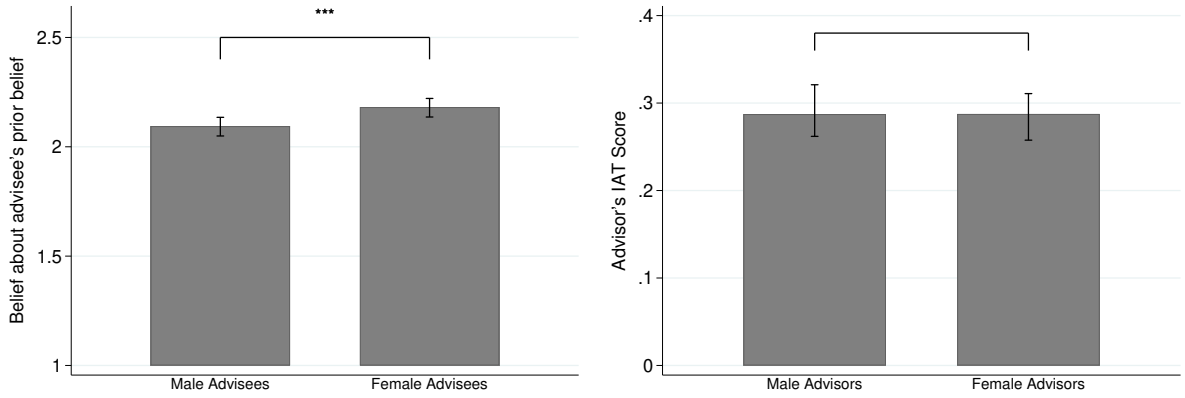



(a) Non-Instrumental Feedback

(b) Instrumental Feedback

Note: Error bars represent 95% confidence intervals.

Figure A.1: Proportion of advisors who send feedback that is vaguer than signal (by signal valence and treatment)

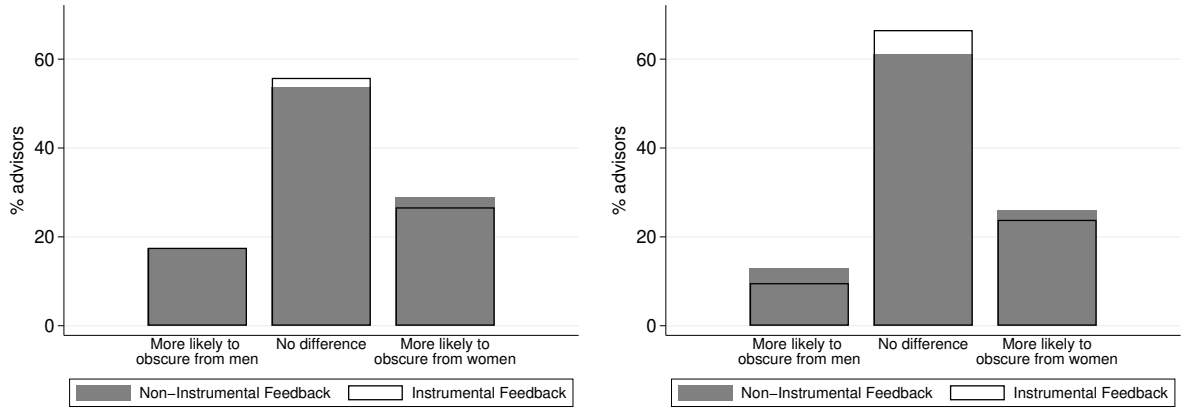



(a) Beliefs about Advisee's Prior

(b) IAT Scores

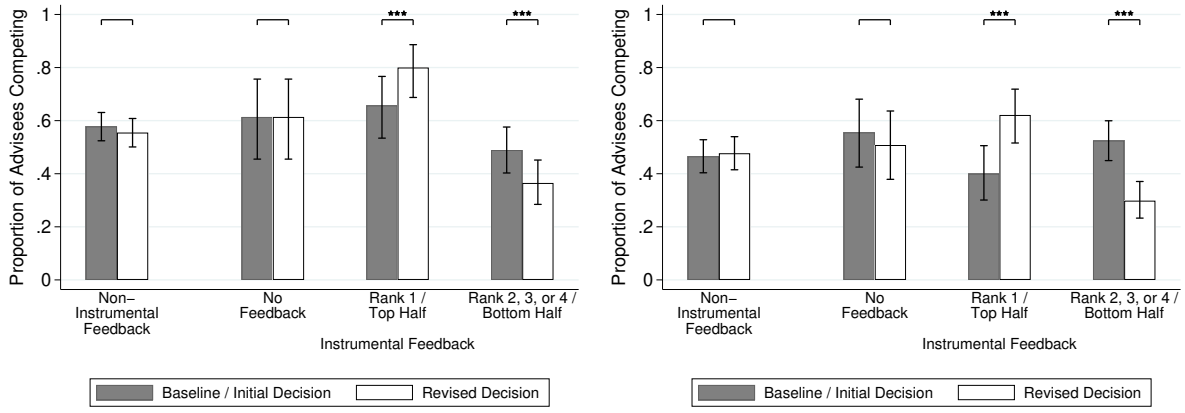
Note: Error bars represent 95% confidence intervals.

Figure A.2: Advisors' second-order beliefs and IAT scores




(a) Advisors observe a negative signal of "Rank 4" (b) Advisors observe a positive signal of "Rank 1"

Figure A.3: Advisors' beliefs about feedback decisions of other advisors




(a) Male Advisees (b) Female Advisees

Note: Error bars represent 95% confidence intervals.
Positive feedback implies receiving a feedback of Rank 1, or Top Half, while negative feedback implies receiving a feedback of Rank 2, Rank 3, Rank 4, or Bottom Half.

Figure A.4: Proportion of advisees choosing to enter tournament

Table A.1: Probit regression results of advisors' feedback decisions (overall and by treatment)

| | Pooled | | Non-Instrumental | | Instrumental | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Dependent Variable: Advisor obscures feedback to advisee | | | | | | |
| Negative signal | $0.379^{**}$ | $0.451^{***}$ | $0.553^{**}$ | $0.589^{***}$ | $0.201$ | $0.367$ |
| | $(0.159)$ | $(0.158)$ | $(0.223)$ | $(0.220)$ | $(0.228)$ | $(0.236)$ |
| Precise signal | $0.684^{***}$ | $0.730^{***}$ | $0.610^{***}$ | $0.665^{***}$ | $0.768^{***}$ | $0.879^{***}$ |
| | $(0.138)$ | $(0.136)$ | $(0.194)$ | $(0.193)$ | $(0.197)$ | $(0.203)$ |
| Negative $\times$ Precise signal | $-0.325^{*}$ | $-0.409^{**}$ | $-0.364$ | $-0.432^{*}$ | $-0.295$ | $-0.472^{*}$ |
| | $(0.183)$ | $(0.183)$ | $(0.256)$ | $(0.257)$ | $(0.263)$ | $(0.273)$ |
| Constant | $-1.246^{***}$ | $-1.046^{***}$ | $-1.252^{***}$ | $-1.308^{***}$ | $-1.240^{***}$ | $-0.711$ |
| | $(0.123)$ | $(0.300)$ | $(0.173)$ | $(0.430)$ | $(0.174)$ | $(0.446)$ |
| Negative signal | $0.054$ | $0.042$ | $0.189$ | $0.158$ | $-0.094$ | $-0.105$ |
| + Negative $\times$ Precise signal | $(0.091)$ | $(0.093)$ | $(0.126)$ | $(0.130)$ | $(0.131)$ | $(0.139)$ |
| Controls | N | Y | N | Y | N | Y |
| Observations | 1,241 | 1,241 | 637 | 637 | 604 | 604 |

$^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

Robust standard errors in parentheses.

Other controls include the advisor's gender, age, education level, political views on social issues, and U.S. political party affiliation, as well as advisee's gender, quarter of birth, favorite color, and favorite beverage.

The baseline group in all specifications is advisors who observe a signal of "Rank 1", "Rank 2", or "Top Half".

Table A.2: Probit regression results of advisors' feedback decisions (by treatment)

| | Non-Instrumental | | Instrumental | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Dependent Variable: Advisor obscures feedback to advisee | | | | |
| Female advisee | −0.421 | −0.449 | 0.685* | 0.604 |
| | (0.363) | (0.362) | (0.393) | (0.406) |
| Negative signal | 0.147 | 0.148 | 0.745* | 0.917** |
| | (0.295) | (0.288) | (0.404) | (0.424) |
| Precise signal | 0.371 | 0.447* | 1.357*** | 1.408*** |
| | (0.250) | (0.249) | (0.359) | (0.373) |
| Female advisee × Negative signal | 0.947** | 1.033** | −0.857* | −0.881* |
| | (0.462) | (0.460) | (0.496) | (0.510) |
| Female advisee × Precise signal | 0.576 | 0.535 | −0.946** | −0.857* |
| | (0.404) | (0.401) | (0.435) | (0.445) |
| Negative × Precise signal | 0.138 | 0.051 | −0.929** | −1.076** |
| | (0.338) | (0.336) | (0.448) | (0.465) |
| Female advisee × Negative × Precise signal | −1.174** | −1.134** | 1.002* | 0.977* |
| | (0.528) | (0.526) | (0.562) | (0.572) |
| Constant | −1.080*** | −1.067** | −1.680*** | −1.219** |
| | (0.221) | (0.451) | (0.330) | (0.536) |
| Female Advisee Relative to Male Advisee by Signal Type | | | | |
| Positive Vague | −0.421 | −0.449 | 0.685* | 0.604 |
| | (0.363) | (0.362) | (0.393) | (0.406) |
| Negative Vague | 0.526* | 0.584** | −0.172 | −0.277 |
| | (0.287) | (0.293) | (0.303) | (0.311) |
| Positive Precise | 0.156 | 0.086 | −0.261 | −0.253 |
| | (0.177) | (0.186) | (0.187) | (0.195) |
| Negative Precise | −0.072 | −0.015 | −0.116 | −0.158 |
| | (0.183) | (0.194) | (0.187) | (0.199) |
| Controls | N | Y | N | Y |
| Observations | 637 | 637 | 604 | 604 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Robust standard errors in parentheses.

Other controls include the advisor's gender, age, education level, political views on social issues, and U.S. political party affiliation, as well as advisee's quarter of birth, favorite color, and favorite beverage.

The baseline group in all specifications is advisors who observe a vague positive signal for a male advisee.

Table A.3: OLS regression results of advisors' feedback decisions (by treatment), controlling for advisors' second-order beliefs

| | Non-Instrumental | | | Instrumental | | |
|---|---|---|---|---|---|---|
| | Pooled | $<$ Median | $\geq$ Median | Pooled | $<$ Median | $\geq$ Median |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Dependent Variable: Advisor obscures feedback to advisee | | | | | | |
| Female advisee | −0.068 | −0.112 | −0.011 | 0.091 | 0.181 | 0.112 |
| | (0.064) | (0.129) | (0.074) | (0.064) | (0.124) | (0.073) |
| Negative signal | 0.024 | −0.035 | 0.071 | 0.168** | 0.315** | 0.104 |
| | (0.069) | (0.130) | (0.082) | (0.073) | (0.160) | (0.071) |
| Precise signal | 0.109* | 0.221 | 0.087 | 0.328*** | 0.397*** | 0.371*** |
| | (0.061) | (0.135) | (0.063) | (0.065) | (0.143) | (0.076) |
| Female advisee × Negative signal | 0.242** | 0.145 | 0.453*** | −0.160 | −0.469** | 0.041 |
| | (0.113) | (0.173) | (0.169) | (0.099) | (0.191) | (0.140) |
| Female advisee × Precise signal | 0.101 | 0.051 | 0.077 | −0.181** | −0.264 | −0.195* |
| | (0.085) | (0.176) | (0.094) | (0.091) | (0.192) | (0.102) |
| Negative × Precise signal | 0.038 | −0.094 | 0.123 | −0.230** | −0.496** | −0.108 |
| | (0.090) | (0.166) | (0.113) | (0.102) | (0.209) | (0.122) |
| Female advisee × Negative × Precise signal | −0.279* | −0.135 | −0.496** | 0.202 | 0.497* | 0.058 |
| | (0.143) | (0.227) | (0.207) | (0.135) | (0.254) | (0.195) |
| Belief about worker's prior | 0.015 | | | −0.002 | | |
| | (0.034) | | | (0.033) | | |
| Constant | 0.133 | 0.251 | 0.088 | 0.231 | 0.272 | 0.103 |
| | (0.156) | (0.228) | (0.174) | (0.152) | (0.248) | (0.178) |
| Female Advisee Relative to Male Advisee by Signal Type | | | | | | |
| Positive Vague | −0.068 | −0.112 | −0.011 | 0.091 | 0.181 | 0.112 |
| | (0.064) | (0.129) | (0.074) | (0.064) | (0.124) | (0.073) |
| Negative Vague | 0.174* | 0.033 | 0.442*** | −0.069 | −0.288* | 0.152 |
| | (0.095) | (0.119) | (0.155) | (0.079) | (0.149) | (0.120) |
| Positive Precise | 0.033 | −0.062 | 0.066 | −0.090 | −0.083 | −0.083 |
| | (0.060) | (0.124) | (0.067) | (0.068) | (0.153) | (0.075) |
| Negative Precise | −0.004 | −0.051 | 0.024 | −0.048 | −0.056 | 0.015 |
| | (0.068) | (0.089) | (0.108) | (0.066) | (0.080) | (0.120) |
| Controls | Y | Y | Y | Y | Y | Y |
| Observations | 637 | 265 | 372 | 604 | 272 | 332 |
| $R^2$ | 0.071 | 0.118 | 0.136 | 0.090 | 0.142 | 0.151 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Robust standard errors in parentheses.

Other controls include the advisor's gender, age, education level, political views on social issues, and U.S. political party affiliation, as well as advisee's quarter of birth, favorite color, and favorite beverage.

The baseline group in all specifications is advisors who observe a vague positive signal for a male advisee.

In columns (2)-(3) and (5)-(6), "$<$ Median" ("$\geq$ Median") implies that advisors believe that their advisees have a lower confidence (higher or equal confidence) about their performance than the median advisor.

Table A.4: OLS regression results of advisors' feedback decisions (by treatment), controlling for advisors' IAT scores

| | Non-Instrumental | | | Instrumental | | |
|---|---|---|---|---|---|---|
| | Pooled | $\geq$ Median | $<$ Median | Pooled | $\geq$ Median | $<$ Median |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Dependent Variable: Advisor obscures feedback to advisee | | | | | | |
| Female advisee | −0.070 | −0.077 | −0.056 | 0.079 | 0.002 | 0.117 |
| | (0.064) | (0.092) | (0.098) | (0.062) | (0.066) | (0.105) |
| Negative signal | 0.017 | −0.036 | 0.102 | 0.151** | 0.224** | 0.115 |
| | (0.069) | (0.099) | (0.092) | (0.074) | (0.111) | (0.113) |
| Precise signal | 0.098 | 0.025 | 0.207** | 0.323*** | 0.330*** | 0.301*** |
| | (0.061) | (0.084) | (0.087) | (0.064) | (0.085) | (0.104) |
| Female advisee × Negative signal | 0.246** | 0.277 | 0.239 | −0.125 | −0.130 | −0.089 |
| | (0.113) | (0.179) | (0.154) | (0.097) | (0.125) | (0.160) |
| Female advisee × Precise signal | 0.105 | 0.082 | 0.106 | −0.170* | −0.077 | −0.186 |
| | (0.085) | (0.117) | (0.127) | (0.089) | (0.109) | (0.142) |
| Negative × Precise signal | 0.055 | 0.173 | −0.099 | −0.221** | −0.237 | −0.210 |
| | (0.089) | (0.130) | (0.126) | (0.101) | (0.151) | (0.153) |
| Female advisee × Negative × Precise signal | −0.282** | −0.332 | −0.233 | 0.175 | 0.065 | 0.174 |
| | (0.143) | (0.215) | (0.203) | (0.133) | (0.182) | (0.211) |
| IAT score | −0.069 | | | −0.123** | | |
| | (0.049) | | | (0.051) | | |
| Constant | 0.184 | 0.278 | 0.162 | 0.274** | 0.270 | 0.256 |
| | (0.138) | (0.196) | (0.188) | (0.139) | (0.184) | (0.217) |
| Female Advisee Relative to Male Advisee by Signal Type | | | | | | |
| Positive Vague | −0.070 | −0.077 | −0.056 | 0.079 | 0.002 | 0.117 |
| | (0.064) | (0.092) | (0.098) | (0.062) | (0.066) | (0.105) |
| Negative Vague | 0.176* | 0.200 | 0.183 | −0.046 | −0.128 | 0.027 |
| | (0.094) | (0.160) | (0.123) | (0.077) | (0.109) | (0.124) |
| Positive Precise | 0.035 | 0.005 | 0.050 | −0.091 | −0.075 | −0.069 |
| | (0.059) | (0.084) | (0.089) | (0.067) | (0.089) | (0.102) |
| Negative Precise | −0.001 | −0.050 | 0.057 | −0.042 | −0.140 | 0.015 |
| | (0.069) | (0.093) | (0.106) | (0.066) | (0.102) | (0.094) |
| Controls | Y | Y | Y | Y | Y | Y |
| Observations | 637 | 323 | 314 | 604 | 298 | 306 |
| $R^2$ | 0.073 | 0.121 | 0.079 | 0.101 | 0.166 | 0.092 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Robust standard errors in parentheses.
Other controls include the advisor's gender, age, education level, political views on social issues, and U.S. political party affiliation, as well as advisee's quarter of birth, favorite color, and favorite beverage.
The baseline group in all specifications is advisors who observe a vague positive signal for a male advisee.
In columns (2)-(3) and (5)-(6), "$\geq$ Median" ("$<$ Median") implies that advisors are more or equally implicitly biased (less implicitly biased) than the median advisor.

Table A.5: OLS regression results of advisors' feedback decisions (by treatment), controlling for advisors' beliefs about the decisions of other advisors

| | Non-Instrumental | Instrumental |
|---|---|---|
| | (1) | (2) |
| Dependent Variable: Advisor obscures feedback to advisee | | |
| Female advisee | −0.057 | 0.103 |
| | (0.064) | (0.065) |
| Negative signal | 0.029 | 0.167** |
| | (0.068) | (0.074) |
| Precise signal | 0.114* | 0.335*** |
| | (0.061) | (0.065) |
| Female advisee × Negative signal | 0.225** | −0.157 |
| | (0.113) | (0.099) |
| Female advisee × Precise signal | 0.070 | −0.198** |
| | (0.087) | (0.092) |
| Negative × Precise signal | 0.034 | −0.237** |
| | (0.089) | (0.102) |
| Female advisee × Negative × Precise signal | −0.253* | 0.207 |
| | (0.143) | (0.135) |
| Other advisors will obscure negative signals from male advisees | 0.046 | 0.034 |
| | (0.054) | (0.056) |
| Other advisors will obscure negative signals from female advisees | −0.038 | −0.008 |
| | (0.041) | (0.044) |
| Other advisors will obscure positive signals from male advisees | 0.121** | 0.112 |
| | (0.061) | (0.070) |
| Other advisors will obscure positive signals from female advisees | 0.007 | −0.033 |
| | (0.045) | (0.047) |
| Constant | 0.150 | 0.217 |
| | (0.137) | (0.138) |
| Female Advisee Relative to Male Advisee by Signal Type | | |
| Positive Vague | −0.057 | 0.103 |
| | (0.064) | (0.065) |
| Negative Vague | 0.168* | −0.054 |
| | (0.094) | (0.078) |
| Positive Precise | 0.013 | −0.095 |
| | (0.061) | (0.068) |
| Negative Precise | −0.015 | −0.045 |
| | (0.068) | (0.065) |
| Controls | Y | Y |
| Observations | 637 | 604 |
| $R^2$ | 0.082 | 0.098 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Robust standard errors in parentheses.
Other controls include the advisor's gender, age, education level, political views on social issues, and U.S. political party affiliation, as well as advisee's quarter of birth, favorite color, and favorite beverage.
The baseline group in all specifications is advisors who observe a vague positive signal for a male advisee.

Table A.6: OLS regression results of advisors' feedback decisions (overall and by treatment) (robustness: excludes participants with no justification for feedback choices or who states that they chose randomly)

| | Overall | | Non-Instrumental | | Instrumental | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Dependent Variable: Advisor obscures feedback to advisee | | | | | | |
| Negative signal | $0.085^{**}$ | $0.092^{***}$ | $0.151^{***}$ | $0.146^{***}$ | 0.025 | 0.055 |
| | (0.035) | (0.036) | (0.054) | (0.056) | (0.045) | (0.046) |
| Precise signal | $0.156^{***}$ | $0.160^{***}$ | $0.141^{***}$ | $0.140^{***}$ | $0.175^{***}$ | $0.190^{***}$ |
| | (0.030) | (0.030) | (0.041) | (0.043) | (0.045) | (0.047) |
| Negative × Precise signal | −0.055 | −0.067 | −0.083 | −0.085 | −0.037 | −0.071 |
| | (0.047) | (0.048) | (0.070) | (0.072) | (0.064) | (0.066) |
| Constant | $0.086^{***}$ | $0.181^{*}$ | $0.081^{***}$ | 0.048 | $0.091^{***}$ | $0.369^{***}$ |
| | (0.021) | (0.093) | (0.030) | (0.131) | (0.031) | (0.141) |
| Negative signal | 0.030 | 0.025 | 0.068 | 0.061 | −0.012 | −0.015 |
| + Negative × Precise signal | (0.031) | (0.032) | (0.043) | (0.044) | (0.046) | (0.047) |
| Controls | N | Y | N | Y | N | Y |
| Observations | 1,133 | 1,133 | 581 | 581 | 552 | 552 |
| $R^2$ | 0.025 | 0.044 | 0.026 | 0.058 | 0.033 | 0.091 |

$^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

Robust standard errors in parentheses.

Other controls include the advisor's gender, age, education level, political views on social issues, and U.S. political party affiliation, as well as advisee's gender, quarter of birth, favorite color, and favorite beverage.

The baseline group in all specifications is advisors who observe a signal of "Rank 1", "Rank 2", or "Top Half".

This analysis mirrors the analysis in Table 1 but excludes advisors who did not give a clear justification for their feedback choice ($n = 108$, 8.7%).

Table A.7: OLS regression results of advisors' feedback decisions (by treatment) (robustness: excludes participants with no justification for feedback choices or who states that they chose randomly)

| | Non-Instrumental | | Instrumental | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Dependent Variable: Advisor obscures feedback to advisee | | | | |
| Female advisee | $-0.113^{**}$ | $-0.102$ | $0.075$ | $0.048$ |
| | $(0.057)$ | $(0.063)$ | $(0.059)$ | $(0.062)$ |
| Negative signal | $0.017$ | $0.008$ | $0.068$ | $0.094$ |
| | $(0.072)$ | $(0.072)$ | $(0.066)$ | $(0.068)$ |
| Precise signal | $0.060$ | $0.071$ | $0.247^{***}$ | $0.243^{***}$ |
| | $(0.063)$ | $(0.065)$ | $(0.064)$ | $(0.066)$ |
| Female advisee × Negative signal | $0.312^{***}$ | $0.324^{***}$ | $-0.078$ | $-0.070$ |
| | $(0.112)$ | $(0.115)$ | $(0.091)$ | $(0.092)$ |
| Female advisee × Precise signal | $0.174^{**}$ | $0.145^{*}$ | $-0.127$ | $-0.096$ |
| | $(0.081)$ | $(0.084)$ | $(0.090)$ | $(0.090)$ |
| Negative × Precise signal | $0.104$ | $0.086$ | $-0.098$ | $-0.125$ |
| | $(0.092)$ | $(0.092)$ | $(0.097)$ | $(0.098)$ |
| Female advisee × Negative × Precise signal | $-0.441^{***}$ | $-0.403^{***}$ | $0.105$ | $0.097$ |
| | $(0.143)$ | $(0.144)$ | $(0.131)$ | $(0.130)$ |
| Constant | $0.136^{***}$ | $0.128$ | $0.050$ | $0.326^{**}$ |
| | $(0.052)$ | $(0.138)$ | $(0.035)$ | $(0.143)$ |
| Female Advisee Relative to Male Advisee by Signal Type | | | | |
| Positive Vague | $-0.113^{*}$ | $-0.102$ | $0.075$ | $0.048$ |
| | $(0.057)$ | $(0.063)$ | $(0.059)$ | $(0.062)$ |
| Negative Vague | $0.199^{**}$ | $0.222^{**}$ | $-0.003$ | $-0.022$ |
| | $(0.097)$ | $(0.097)$ | $(0.069)$ | $(0.069)$ |
| Positive Precise | $0.061$ | $0.043$ | $-0.052$ | $-0.047$ |
| | $(0.058)$ | $(0.059)$ | $(0.068)$ | $(0.067)$ |
| Negative Precise | $-0.069$ | $-0.036$ | $-0.025$ | $-0.021$ |
| | $(0.067)$ | $(0.070)$ | $(0.065)$ | $(0.065)$ |
| Controls | N | Y | N | Y |
| Observations | 581 | 581 | 552 | 552 |
| $R^2$ | 0.040 | 0.070 | 0.036 | 0.092 |

$^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

Robust standard errors in parentheses.

Other controls include the advisor's gender, age, education level, political views on social issues, and U.S. political party affiliation, as well as advisee's quarter of birth, favorite color, and favorite beverage.

The baseline group in all specifications is advisors who observe a vague positive signal for a male advisee.

This analysis mirrors the analysis in Table 2 but excludes advisors who did not give a clear justification for their feedback choice ($n = 108$, 8.7%).

Table A.8: OLS regression results of advisors' feedback decisions (by treatment and advisor's gender) (robustness: excludes participants with no justification for feedback choices or who states that they chose randomly)

| | Male Advisors | | Female Advisors | |
|---|---|---|---|---|
| | Non-Instrumental | Instrumental | Non-Instrumental | Instrumental |
| | (1) | (2) | (3) | (4) |
| Dependent Variable: Advisor obscures feedback to advisee | | | | |
| Female advisee | −0.121 | 0.121* | −0.091 | 0.090 |
| | (0.076) | (0.064) | (0.115) | (0.101) |
| Negative signal | −0.097 | 0.146 | 0.184 | 0.071 |
| | (0.069) | (0.112) | (0.153) | (0.094) |
| Precise signal | 0.102 | 0.311*** | 0.026 | 0.212** |
| | (0.079) | (0.096) | (0.114) | (0.087) |
| Female advisee × Negative signal | 0.416*** | −0.089 | 0.193 | −0.178 |
| | (0.138) | (0.136) | (0.209) | (0.129) |
| Female advisee × Precise signal | 0.205* | −0.197* | 0.115 | −0.087 |
| | (0.117) | (0.116) | (0.138) | (0.143) |
| Negative × Precise signal | 0.217** | −0.042 | −0.091 | −0.163 |
| | (0.107) | (0.161) | (0.176) | (0.126) |
| Female advisee × Negative × Precise signal | −0.629*** | 0.115 | −0.167 | 0.104 |
| | (0.187) | (0.195) | (0.242) | (0.180) |
| Constant | 0.050 | 0.171 | 0.287 | 0.467** |
| | (0.176) | (0.207) | (0.229) | (0.201) |
| Female Advisee Relative to Male Advisee by Signal Type | | | | |
| Positive Vague | −0.121 | 0.121* | −0.091 | 0.090 |
| | (0.076) | (0.064) | (0.115) | (0.101) |
| Negative Vague | 0.295** | 0.032 | 0.103 | −0.088 |
| | (0.116) | (0.122) | (0.168) | (0.083) |
| Positive Precise | 0.083 | −0.076 | 0.024 | 0.003 |
| | (0.089) | (0.100) | (0.081) | (0.097) |
| Negative Precise | −0.129 | −0.050 | 0.050 | −0.071 |
| | (0.096) | (0.114) | (0.098) | (0.073) |
| Controls | Y | Y | Y | Y |
| Observations | 298 | 273 | 283 | 279 |
| $R^2$ | 0.136 | 0.169 | 0.097 | 0.167 |

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.
Robust standard errors in parentheses.
Other controls include the advisor's age, education level, political views on social issues, and U.S. political party affiliation, as well as advisee's quarter of birth, favorite color, and favorite beverage.
The baseline group in all specifications is advisors who observe a vague positive signal for a male advisee.
This analysis mirrors the analysis in Table 3 but excludes advisors who did not give a clear justification for their feedback choice ($n = 108$, 8.7%).

Table A.9: OLS regression results of advisees' tournament entry decisions

| | (1) | (2) | (3) |
|---|---|---|---|
| Dependent Variable: Advisee revises decision toward tournament entry | | | |
| Positive instrumental feedback | $0.197^{***}$ | $0.166^{***}$ | $0.194^{***}$ |
| | $(0.033)$ | $(0.044)$ | $(0.046)$ |
| Negative instrumental feedback | $-0.174^{***}$ | $-0.101^{**}$ | $-0.122^{***}$ |
| | $(0.028)$ | $(0.041)$ | $(0.042)$ |
| No instrumental feedback | $-0.019$ | $0.023$ | $0.027$ |
| | $(0.036)$ | $(0.048)$ | $(0.048)$ |
| Female advisee | $-0.003$ | $0.035$ | $0.037$ |
| | $(0.021)$ | $(0.024)$ | $(0.024)$ |
| Female advisee $\times$ Positive instrumental feedback | | $0.044$ | $0.046$ |
| | | $(0.065)$ | $(0.065)$ |
| Female advisee $\times$ Negative instrumental feedback | | $-0.137^{**}$ | $-0.130^{**}$ |
| | | $(0.056)$ | $(0.056)$ |
| Female advisee $\times$ No instrumental feedback | | $-0.082$ | $-0.087$ |
| | | $(0.070)$ | $(0.071)$ |
| Constant | $-0.007$ | $-0.023$ | $0.164$ |
| | $(0.014)$ | $(0.015)$ | $(0.105)$ |
| Controls | N | N | Y |
| Observations | 1,196 | 1,196 | 1,196 |
| $R^2$ | $0.091$ | $0.099$ | $0.109$ |

$^{*}$ $p < 0.10$, $^{**}$ $p < 0.05$, $^{***}$ $p < 0.01$.

Robust standard errors in parentheses.

Other controls include the advisee's age, education level, posterior beliefs about their performance, and absolute score in the task.

Positive feedback implies receiving a feedback of Rank 1, or Top Half, while negative feedback implies receiving a feedback of Rank 2, Rank 3, Rank 4, or Bottom Half.

## B Experimental Instructions

In this section, we provide screenshots of the instructions for the main tasks for both the advisor and advisee sessions.

## B.1 Instructions for Advisor Sessions

# Overview of Study

Here is a brief overview of the study.

### What will I have to do?

There are **two parts** to this experiment, each consisting of a main task which will be explained in detail later. After you have completed Part 2, you will be asked to complete a **questionnaire**.

This experiment should take 25 minutes on average.

### How much payment will I receive for my participation?

You will receive £2.25 for **completing the study**.

You may receive **additional bonus payments** depending on your decisions in either Part 1 or Part 2. At the end of the study, the computer program will randomly pick **either Part 1 or Part 2** to determine your bonus payment. Since nobody knows which part will be selected for payment, you should pay close attention to both parts as your decisions may determine your earnings.

### How will my payment be made?

Once all participants complete this study, we will determine your bonus payments based on the decisions made in the tasks. The bonus payment will be made via the Prolific platform within a maximum of 21 days from the conclusion of the study.

### Please note!

There will be several **Attention Check** questions throughout this study meant to test whether you are paying attention.
**If you fail to correctly complete one or more of these Attention Check questions, you may not be paid.**

Finally, please note that this research **does not employ deception**. This is regulated by the researchers' institutional ethics committees.

NEXT

# Pre-Experiment Questionnaire

**Please answer the following questions.**
**Any information you give will be recorded anonymously and under no circumstances will they be linked to your identity.**

What is your year of birth?

What is your month of birth?

---------

What is your gender?

---------

What is your ethnicity? Please select all that apply.

- ☐ White/ Caucasian
- ☐ Black/ African-American
- ☐ Latino or Hispanic
- ☐ Asian
- ☐ Native American
- ☐ Native Hawaiian or Pacific Islander
- ☐ Other ethnic group (please state below)

What is the highest education qualification you have attained?

---------

What is your household annual income?

---------

In which US state/territory do you currently live?

---------

On social issues, how would you describe your political leaning among the following options?

---------

Generally speaking, do you usually think of yourself as a...

---------

Of the following, which is your favorite color?

---------

Of the following, which is your favorite choice of hot beverage?

---------

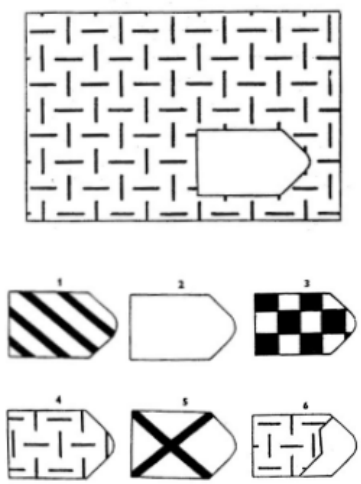
SUBMIT RESPONSES

## Part 1 Instructions

Part 1 is based on an Intelligence Quotient (IQ) test that is commonly used to measure people's intelligence levels.

**Numerous studies have shown that performance in similar intelligence tests are related to important areas of life, such as higher salaries, better job positions, and higher life satisfaction (Gottfredson, 2003; Neisser et al., 1996; Strenze, 2007; Bergman et al., 2015).**

In this task, you will be shown 20 patterns with a missing element. You will be asked to select one option that best completes the pattern. An example pattern is provided below, where option 4 is the correct answer.



(Refresh the page if any of these images fail to load)

You will have 4 minutes to complete a set of 20 patterns. Each correct answer will add 1 point to your score and wrong answers will not affect your score.

All the participants in this study will face the same sequence of patterns.

Your bonus payment will be determined by your performance in the task. **It is in your best interest to perform the task to the best of your ability.**

NEXT

## Part 1 Understanding Check

To check that you have understood the instructions, please answer the following questions. You may go back and read the instructions as many times as you want.

What task will you be completing?

- ○ Number Multiplication Task
- ○ IQ Task
- ○ Picture Recall Task
- ○ Anagram Task
- ○ Number Finding Task

What do you have to do in the task to get the correct answer?

- ○ Select one element that best complete a pattern.
- ○ Solve anagrams with numbers.
- ○ Add a series of 2-digit numbers.
- ○ Count the number of lines in a pattern.

Your bonus payment in Part 1 is expected to be higher the better your performance is.

- ○ True
- ○ False

BACK CHECK ANSWERS

## Part 1

Please proceed to the IQ Task.

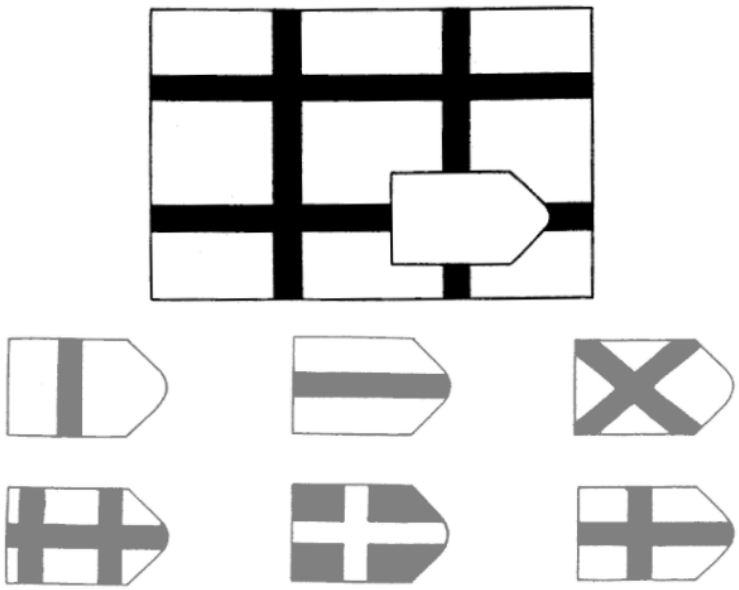
**You will not be able to pause the task, so please make sure that you are available for the next 4 minutes without any interruption.**

BEGIN TASK

Time remaining: **3:57**

### Question 1

Which option best completes the pattern?



(Refresh the page if any of these images fail to load)

SUBMIT ANSWER

## Part 1 Bonus Payment

Your bonus payment in Part 1 will be determined in the following way.

We will match you to **19 other participants who have completed the same IQ Task, selected at random**. You will be given a quartile rank from 1 to 4 based on your performance in this group of 20. This is summarized in the table below.

| Position out of 20 | Quartile Rank | Payment |
|---|---|---|
| 1 – 5 | **1** | £0.20<br>per correct answer |
| 6 – 10 | **2** | £0 |
| 11 – 15 | **3** | £0 |
| 16 – 20 | **4** | £0 |

Hence, a quartile rank of 1 means your score was in the top 5 of scores (you were ranked 1 – 5), while a quartile rank of 4 means you were ranked 16 – 20. Ties will be broken randomly.

If your quartile rank is 1, then you will earn **£0.20 for each correct answer**. If your quartile rank is anything other than 1, then you will earn **£0** regardless of how many correct answers you have provided.

NEXT

## Part 1 Prediction

**Before we conclude Part 1, please state your prediction about your performance in the task.**

Specifically, please assign the following 10 tokens across each of the four quartile ranks.

- Assign **more tokens** to a given quartile rank if you believe that you are **more likely to attain that quartile rank**.
- Assign **fewer tokens** to a given quartile rank if you believe that you are **less likely to attain that quartile rank**.
- The **total** number of tokens assigned across all four quartile ranks **must add to 10**.

**Payment:** You may receive an additional **£0.10** based on the accuracy of your prediction. The rule to determine your payment is designed such that you can secure the largest chance of receiving £0.10 by **reporting your most-accurate prediction**.

**Prediction**

| | Token(s) |
|---|---|
| **Quartile Rank 1:** | 5 |
| **Quartile Rank 2:** | 4 |
| **Quartile Rank 3:** | 1 |
| **Quartile Rank 4:** | 0 |
| | **Total: 10** |

BACK

SUBMIT DECISION

## Part 2

For Part 2, all participants in this experiment have been randomly assigned the role of either a "Manager" or a "Worker".

**You have been assigned the role of a Manager.**

You have been matched with a Worker. You will receive a short CV of your Worker based on information they have given at the beginning of the experiment.

You will be asked to make several decisions relating to your matched Worker. More instructions will be given in the screens to follow.

NEXT

## Part 2 Worker CV

The CV of your Worker is given below.

| **CV of Your Worker** | |
|---|---|
| Gender: | **Male** |
| Month of birth: | **Between October and December** |
| Favorite choice of hot beverage is: | **Coffee** |
| Favorite color is: | **Green** |

**Remember this CV is from a real person whom you have been matched with.**

**Note also that your Worker will not be informed that you have been shown his CV.**

This is to check your attention. What is your Worker's favorite color?

---------

NEXT

## Part 2 Prediction – Instructions

**Please state your prediction about your Worker's performance in Part 1.**

As before, please assign the following 10 tokens across each of the four quartile ranks.

- Assign **more** tokens to a given quartile rank if you believe that **he is more likely to attain that quartile rank**.
- Assign **fewer** tokens to a given quartile rank if you believe that **he is less likely to attain that quartile rank**.
- The total number of tokens assigned across all four quartile ranks must add to 10.

**Payment:** You may receive an additional **£0.20** based on the accuracy of your prediction. The rule to determine your payment is designed such that you can secure the largest chance of receiving £0.20 by reporting your most-accurate prediction.

NEXT

## Part 2 Prediction I

**Please state your prediction about your Worker's performance in Part 1.**

| **CV of Your Worker** | |
|---|---|
| Gender: | **Male** |
| Month of birth: | **Between October and December** |
| Favorite choice of hot beverage is: | **Coffee** |
| Favorite color is: | **Green** |

**Prediction of Worker's Task 1 Quartile Rank**

| | **Token(s)** |
|---|---|
| **Quartile Rank 1:** | 5 |
| **Quartile Rank 2:** | 5 |
| **Quartile Rank 3:** | 0 |
| **Quartile Rank 4:** | 0 |
| | **Total: 10** |

**Payment:** You may receive an additional **£0.20** based on the accuracy of your prediction. The rule to determine your payment is designed such that you can secure the largest chance of receiving £0.20 by reporting your most-accurate prediction.

SUBMIT DECISION

## Part 2 Information about Worker's Performance

**You will receive information about your Worker's Part 1 performance on the next screen.**

This information can come in **one** of three possible formats:

A. With a 65% chance, you will be told his **exact quartile rank** (1, 2, 3, or 4).
B. With a 30% chance, you will be told whether his rank was in the **top half** (quartile 1 or 2) or **bottom half** (quartile 3 or 4).
C. With a 5% chance, you will be told that his quartile rank was **any possible rank between 1 and 4**.

Hence, **(A) is the most informative** information, **while (C) is the least informative** information you can receive.

Your Worker will know that you will receive information in only one of these three formats, and how likely it is that you will receive information in each format.

**He will not know: (i) whether you receive the information in format A, B, or C, or (ii) the exact information you see (that is, the content within A, B, or C).**

**Moreover, he will not receive any other feedback about his performance.**

NEXT

## Part 2 Information about Worker's Performance

Below is information about your Worker's Part 1 performance.

### His Part 1 quartile rank was 1.

**Remember:** Your Worker will **not** be given the information you see above.

This is to check your attention. Which FORMAT of information did you receive above?

---------

NEXT

## Part 2 Feedback to Worker – Instruction (Page 1)

In Part 2, **we will re-assess your Worker's quartile rank**.

Your Worker will be matched to a **new group** of 20 participants, who are **different** to the ones he was matched with in Part 1.

He will be given a **new quartile rank from 1 to 4** based on his performance compared to these new participants.

**This new rank may either be the same or different as before.**

NEXT

**[INSTRUMENTAL TREATMENT]**

## Part 2 Feedback to Worker – Instruction (Page 2)

**In Part 2, your Worker will be asked to choose how she would like to be paid for her <u>new</u> Part 2 rank.**

She can choose to receive either:

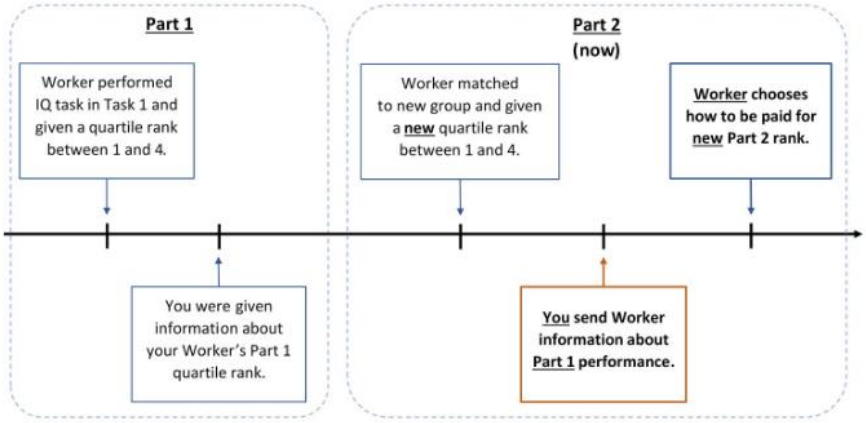
i. **£0.20** for each correct answer **if her <u>new</u> Part 2 quartile rank is 1**, and **£0** otherwise, OR
ii. **£0.05** for each correct answer **irrespective of her <u>new</u> Part 2 quartile rank.**

Your Worker will not receive any information about her Part 1 rank when she makes this decision.

However, **before** she makes her decision, you have a chance to provide her with feedback about her Part 1 performance.

Hence, **she may use your feedback to inform her choice of payment**.

The diagram below summarizes the sequence of events:




BACK NEXT

**[NON-INSTRUMENTAL TREATMENT]**

## Part 2 Feedback to Worker – Instruction (Page 2)

**In Part 2, your Worker will be asked to choose how he would like to be paid for his <u>new</u> Part 2 rank.**

He can choose to receive either:

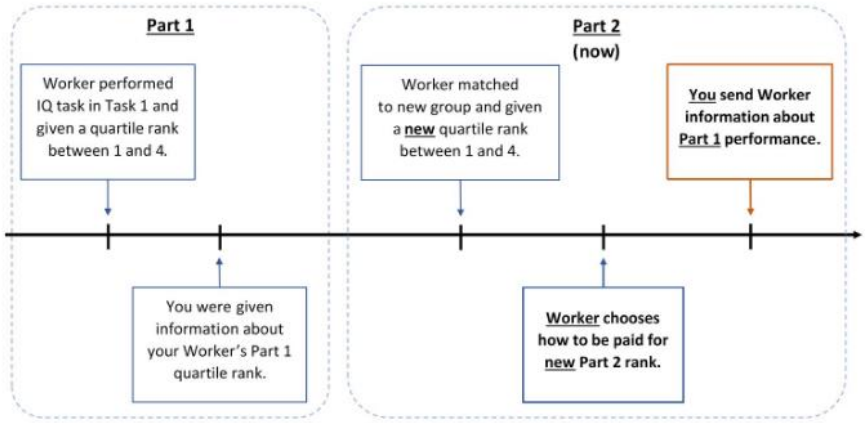
i. **£0.20** for each correct answer **if his <u>new</u> Part 2 quartile rank is 1**, and **£0** otherwise, OR
ii. **£0.05** for each correct answer **irrespective of his <u>new</u> Part 2 quartile rank.**

Your Worker will not receive any information about his Part 1 rank when he makes this decision.

You have the chance to provide him with feedback about his Part 1 performance. However, your feedback will be given to him **after he has made his decision**.

Hence, your feedback **will have no impact on his choice of payment**.

The diagram below summarizes the sequence of events:




BACK NEXT

## Part 2 Understanding Check

To check that you have understood the instructions, please answer the following questions. You may go back and read the instructions as many times as you want.

The content of your feedback may have an impact on your Worker's choice of payment.

- ○ True
- ○ False

Apart from your feedback, your Worker does not receive any other information about their performance.

- ○ True
- ○ False

BACK CHECK ANSWERS

**[INSTRUMENTAL TREATMENT]**

## Part 2 Feedback to Worker

You may provide your Worker with feedback about her Part 1 performance **before** she makes her payment choice for Part 2.

These are the options you can choose from. Please choose one to send to your Worker.

**(1) Your Part 1 quartile rank was between 1 and 4.**
**(2) Your Part 1 rank was in the top half (quartile 1 or 2).**
**(3) Your Part 1 quartile rank was 2.**

Your worker will receive your feedback **before** she makes her payment choice for Part 2.
Hence, **she may use this feedback to inform her choice of payment**.

Apart from this feedback, your Worker will **not** receive any other information about her Part 1 performance.

**Your Decision:**

MESSAGE (1) MESSAGE (2) MESSAGE (3)

**[NON-INSTRUMENTAL TREATMENT]**

## Part 2 Feedback to Worker

You may provide your Worker with feedback about his Part 1 performance **after** he has made his payment choice for Part 2.

These are the options you can choose from. Please choose one to send to your Worker.

**(1) Your Part 1 quartile rank was between 1 and 4.**
**(2) Your Part 1 rank was in the top half (quartile 1 or 2).**
**(3) Your Part 1 quartile rank was 1.**

Your worker will receive your feedback **after** he has made his payment choice for Part 2.
Hence, your feedback will have **no impact on his choice of payment**.

Apart from this feedback, your Worker will **not** receive any other information about his Part 1 performance.

**Your Decision:**

MESSAGE (1) MESSAGE (2) MESSAGE (3)

## Part 2 Prediction II

We now ask you to predict your Worker's **new quartile rank** in light of the information you have been given about him.

Remember that your Worker's new quartile rank **may be the same or different to his previous quartile rank in Part 1**.

| **CV of Your Worker** | |
|---|---|
| Gender: | **Male** |
| Month of birth: | **Between October and December** |
| Favorite choice of hot beverage is: | **Coffee** |
| Favorite color is: | **Green** |

### His PREVIOUS Part 1 quartile rank was 1.

### Prediction of Worker's NEW quartile rank in Part 2:

| | **Token(s)** |
|---|---|
| **Quartile Rank 1:** | 3 |
| **Quartile Rank 2:** | 7 |
| **Quartile Rank 3:** | 0 |
| **Quartile Rank 4:** | 0 |
| | **Total: 10** |

**Payment:** You may receive an additional **£0.20** based on the accuracy of your prediction. The rule to determine your payment is designed such that you can secure the largest chance of receiving £0.20 by reporting your most-accurate prediction.

SUBMIT DECISION

## Questions about your Worker

Please answer the following questions. For each correct answer you will receive £0.05.

What is your Worker's gender?

- ○ Male
- ○ Female
- ○ Trans/Intersex/Other
- ○ Not Displayed

In which month was your Worker born?

- ○ Between January and March
- ○ Between April and June
- ○ Between July and September
- ○ Between October and December
- ○ Not Displayed

What is your Worker's favorite choice of hot beverage?

- ○ Coffee
- ○ Tea
- ○ Hot chocolate
- ○ Not Displayed

What is your Worker's favorite color?

- ○ Red
- ○ Green
- ○ Blue
- ○ Purple
- ○ Not Displayed

My Worker will receive my feedback:

- ○ AFTER they have made their payment choice for Part 2.
- ○ BEFORE they make their payment choice for Part 2

SUBMIT ANSWERS

*(You will receive an additional £0.05 if you answer this question correctly for one of the quartile ranks below, chosen randomly.)*

In Part 1, your Worker was asked to predict their own Part 1 performance **before receiving the message you sent**.

How many tokens do you think your Worker assigned to each of the four quartile ranks?

| | Token(s) |
|---|---|
| **Quartile Rank 1:** | 0 |
| **Quartile Rank 2:** | 0 |
| **Quartile Rank 3:** | 0 |
| **Quartile Rank 4:** | 0 |

**Total: 0**

*(You will receive an additional £0.05 for each question you answer correctly.)*

Consider Workers from this experiment who have attained quartile rank **1** in Part 1 (the top quartile rank).

Which of the following do you think is true?

- ○ Managers are MORE likely to give female workers their EXACT rank than male workers.
- ○ Managers are EQUALLY likely to give both female and male workers their EXACT rank.
- ○ Managers are LESS likely to give female workers their EXACT rank than male workers.

Consider Workers from this experiment who have attained quartile rank **4** in Part 1 (the bottom quartile rank).

Which of the following do you think is true?

- ○ Managers are MORE likely to give female workers their EXACT rank than male workers.
- ○ Managers are EQUALLY likely to give both female and male workers their EXACT rank.
- ○ Managers are LESS likely to give female workers their EXACT rank than male workers.

*Note: EQUALLY likely = difference in percentage of male and female workers receiving EXACT rank is less than 5%.*

NEXT

## Questionnaire

This is the final part of the questionnaire.

In the following pages, you will be shown a number of items and asked to use the keys **E** or **I** on your keyboard to assign these items to categories.

You should assign the following items to the following categories:

| Category | Item |
|---|---|
| Rational | analytical, logical, objective, reasonable, scientific |
| Emotional | perceptive, impulsive, empathetic, delicate, sensitive |
| Male | Ben, Paul, Daniel, John, Jeffrey |
| Female | Rebecca, Michelle, Emily, Julia, Anna |

There are 7 sub-parts for which the instructions change. Please stay alert!

**If you complete the task quickly and with few mistakes, you will receive a payment of £0.25. This payment will be added to your earnings in Part 2.**

NEXT

## B.2 Instructions for Advisee (Part 1)

# Overview of Study

Here is a brief overview of the study.

### What will I have to do?

This experiment will be conducted in **two parts**, each consisting of a main task which will be explained in detail later.

You will now participate in Part 1. After you have made your decisions, we will process the data and invite you to Part 2 of the experiment. Part 2 will occur **within 7 days** after you have completed Part 1.

Part 1 should take 10 minutes on average. Part 2 should take 10 minutes on average.

### How much payment will I receive for my participation?

You will receive £2 for completing **both** Part 1 and Part 2 of the study.

You may receive **additional bonus payments** depending on your decisions in either Part 1 or Part 2. At the end of the study, the computer program will randomly pick **either Part 1 or Part 2** to determine your bonus payment. Since nobody knows which part will be selected for payment, you should pay close attention to both parts as your decisions may determine your earnings.

### How will my payment be made?

Once all participants complete this study, we will determine your bonus payments based on the decisions made in the tasks. The bonus payment will be made via the Prolific platform within a maximum of 21 days from the conclusion of the study.

**You will receive the completion payment and your bonus payment only if you complete both Part 1 and Part 2 of the study.**

### Please note!

There will be several **Attention Check** questions throughout this study meant to test whether you are paying attention.
**If you fail to correctly complete one or more of these Attention Check questions, you may not be paid.**

Finally, please note that this research **does not employ deception**. This is regulated by the researchers' institutional ethics committees.

NEXT

# Pre-Experiment Questionnaire

**Please answer the following questions.**
**Any information you give will be recorded anonymously and under no circumstances will they be linked to your identity.**

What is your year of birth?

What is your month of birth?

---------

What is your gender?

---------

What is your ethnicity? Please select all that apply.

- ☐ White/ Caucasian
- ☐ Black/ African-American
- ☐ Latino or Hispanic
- ☐ Asian
- ☐ Native American
- ☐ Native Hawaiian or Pacific Islander
- ☐ Other ethnic group (please state below)

What is the highest education qualification you have attained?

---------

What is your household annual income?

---------

In which US state/territory do you currently live?

---------

On social issues, how would you describe your political leaning among the following options?

---------

Generally speaking, do you usually think of yourself as a...

---------

Of the following, which is your favorite color?

---------

Of the following, which is your favorite choice of hot beverage?

---------

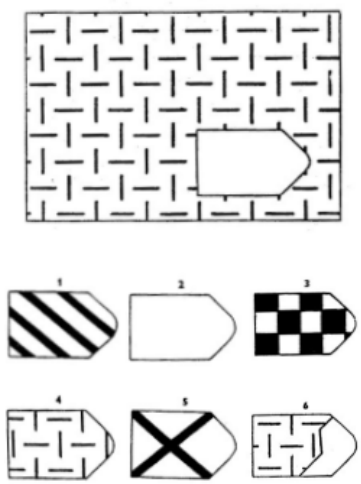
SUBMIT RESPONSES

## Part 1 Instructions

Part 1 is based on an Intelligence Quotient (IQ) test that is commonly used to measure people's intelligence levels.

**Numerous studies have shown that performance in similar intelligence tests are related to important areas of life, such as higher salaries, better job positions, and higher life satisfaction (Gottfredson, 2003; Neisser et al., 1996; Strenze, 2007; Bergman et al., 2015).**

In this task, you will be shown 20 patterns with a missing element. You will be asked to select one option that best completes the pattern. An example pattern is provided below, where option 4 is the correct answer.



(Refresh the page if any of these images fail to load)

You will have 4 minutes to complete a set of 20 patterns. Each correct answer will add 1 point to your score and wrong answers will not affect your score.

All the participants in this study will face the same sequence of patterns.

Your bonus payment will be determined by your performance in the task. **It is in your best interest to perform the task to the best of your ability.**

NEXT

## Part 1 Understanding Check

To check that you have understood the instructions, please answer the following questions. You may go back and read the instructions as many times as you want.

What task will you be completing?

- ○ Number Multiplication Task
- ○ IQ Task
- ○ Picture Recall Task
- ○ Anagram Task
- ○ Number Finding Task

What do you have to do in the task to get the correct answer?

- ○ Select one element that best complete a pattern.
- ○ Solve anagrams with numbers.
- ○ Add a series of 2-digit numbers.
- ○ Count the number of lines in a pattern.

Your bonus payment in Part 1 is expected to be higher the better your performance is.

- ○ True
- ○ False

BACK CHECK ANSWERS

## Part 1

Please proceed to the IQ Task.

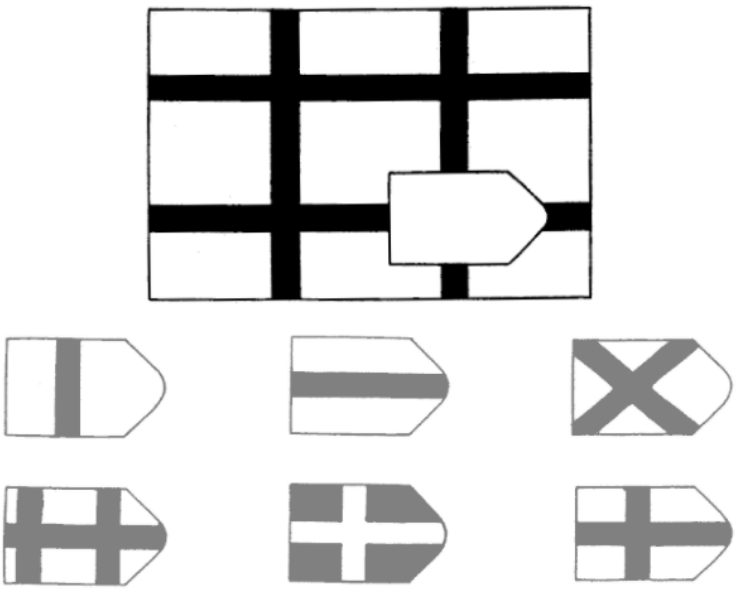
**You will not be able to pause the task, so please make sure that you are available for the next 4 minutes without any interruption.**

BEGIN TASK

Time remaining: **3:57**

### Question 1

Which option best completes the pattern?



(Refresh the page if any of these images fail to load)

SUBMIT ANSWER

## Part 1 Bonus Payment

Your bonus payment in Part 1 will be determined in the following way.

We will match you to **19 other participants who have completed the same IQ Task, selected at random**. You will be given a quartile rank from 1 to 4 based on your performance in this group of 20. This is summarized in the table below.

| Position out of 20 | Quartile Rank | Payment |
|---|---|---|
| 1 – 5 | **1** | £0.20<br>per correct answer |
| 6 – 10 | **2** | £0 |
| 11 – 15 | **3** | £0 |
| 16 – 20 | **4** | £0 |

Hence, a quartile rank of 1 means your score was in the top 5 of scores (you were ranked 1 – 5), while a quartile rank of 4 means you were ranked 16 – 20. Ties will be broken randomly.

If your quartile rank is 1, then you will earn **£0.20 for each correct answer**. If your quartile rank is anything other than 1, then you will earn **£0** regardless of how many correct answers you have provided.

NEXT

## Part 1 Prediction

**Before we conclude Part 1, please state your prediction about your performance in the task.**

Specifically, please assign the following 10 tokens across each of the four quartile ranks.

- Assign **more tokens** to a given quartile rank if you believe that you are **more likely to attain that quartile rank**.
- Assign **fewer tokens** to a given quartile rank if you believe that you are **less likely to attain that quartile rank**.
- The **total** number of tokens assigned across all four quartile ranks **must add to 10**.

**Payment:** You may receive an additional **£0.10** based on the accuracy of your prediction. The rule to determine your payment is designed such that you can secure the largest chance of receiving £0.10 by **reporting your most-accurate prediction**.

**Prediction**

| | Token(s) |
|---|---|
| **Quartile Rank 1:** | 5 |
| **Quartile Rank 2:** | 4 |
| **Quartile Rank 3:** | 1 |
| **Quartile Rank 4:** | 0 |
| | **Total: 10** |

BACK

SUBMIT DECISION

## B.3 Instructions for Advisee (Part 2)

### Overview of Study

**As a reminder, here is a brief summary of what happened in Part 1:**

**In Part 1, you were asked to complete an IQ Task.**
You were presented with a pattern with a missing element. You were asked to pick the correct element from the options provided. You were given 4 minutes to solve as many problems as you can.

To determine your bonus payment in Part 1, your performance was compared against those of 19 other participants who have completed the same IQ Task, selected at random.

**You were given a quartile rank from 1 to 4 based on your performance relative to these 19 participants.** If your quartile rank was 1, you received £0.20 for each correct answer. Otherwise, you received £0. This is summarized in the table given below.

| Position out of 20 | Quartile Rank | Payment |
|---|---|---|
| 1 – 5 | **1** | £0.20 per correct answer |
| 6 – 10 | **2** | £0 |
| 11 – 15 | **3** | £0 |
| 16 – 20 | **4** | £0 |

**In Part 2, you will now be asked to make several simple decisions.**

Just a reminder that **either Part 1 or Part 2** will be randomly picked to determine your bonus payment. Since nobody knows which part will be selected for payment, you should pay close attention to Part 2 as your decisions here may determine your earnings.

NEXT

## Part 1 Understanding Check

To check that you have understood the instructions from Part 1, please answer the following questions. You may go back and read the instructions as many times as you want.

What task did you complete in Part 1?

- ○ Number Finding Task
- ○ Number Multiplication Task
- ○ IQ Task
- ○ Anagram Task
- ○ Picture Recall Task

What did you have to do in the task to get the correct answer?

- ○ Add a series of 2-digit numbers.
- ○ Solve anagrams with numbers.
- ○ Select one element that best complete a pattern.
- ○ Count the number of lines in a pattern.

How was your bonus payment in Part 1 determined based on your performance?

- ○ I earned £0.20 for each correct answer only if I was ranked in quartile 1 or 2 (scoring in the top 10 out of 20 participants), and £0 otherwise.
- ○ I earned £0.20 for each correct answer only if I was ranked in quartile 1 (scoring in the top 5 out of 20 participants), and £0 otherwise.
- ○ I earned £0.20 for each correct answer regardless of my performance.

BACK CHECK ANSWERS

## Part 2 Overview

For Part 2, all participants in this experiment have been randomly assigned the role of either a "Manager" or a "Worker".

**You have been assigned the role of a Worker.**

You have been matched with a Manager.

You will be asked to make several decisions relating to your role as a Worker. More instructions will be given in the screens to follow.

NEXT

## Part 2 Instructions

In Part 2, **we will re-assess your quartile rank** using your score in the IQ Task you have previously completed in Part 1.

While your performance has not changed, **the group of 20 participants you are compared to will be different from Part 1**.

Therefore, you will be given a **new quartile rank from 1 to 4, which may either be the same or different as before**.

**You can choose how your bonus payment will be determined in Part 2 based on your new Part 2 rank.**

You can choose to receive either:

i. **£0.20** for each correct answer **if your new Part 2 quartile rank is 1**, and **£0** otherwise, OR
ii. **£0.05** for each correct answer **irrespective of your new Part 2 quartile rank.**

This is to check your attention. How will your bonus payment be determined in Part 2?

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NEXT

## Part 2 Decision

Please choose how your bonus payment will be determined based on your **new** Part 2 rank.

Specifically, you can choose between receiving either:

i. **£0.20** for each correct answer **if your new Part 2 quartile rank is 1**, and **£0** otherwise, OR
ii. **£0.05** for each correct answer **irrespective of your new Part 2 quartile rank.**

**Your Decision:**

OPTION (i) OPTION (ii)

BACK

## Part 2 Information and Feedback Instructions

**Your Manager received information about your PREVIOUS Part 1 quartile rank** (NOT your NEW Part 2 quartile rank).

This information came in **one** of three possible formats:

A. With a 65% chance, your Manager was told your **exact** Part 1 quartile rank (1, 2, 3, or 4).
B. With a 30% chance, your Manager was told whether your Part 1 rank was in the **top half** (quartile 1 or 2) or **bottom half** (quartile 3 or 4).
C. With a 5% chance, your Manager was told that your Part 1 quartile rank was **any possible rank between 1 and 4**.

Hence, **(A) is the most informative** information, **while (C) is the least informative** information your Manager could have received.

These are the three possible formats of information, but your Manager received information in only **one** of these formats.

**Your Manager has decided how they would like to convey that information to you.**

Note that:

1. Your Manager **may choose to send you the information they received as it is**.
   (For example, they **may** tell you that your quartile rank was 3 if they know your exact quartile rank was 3.)

2. Your Manager **may choose to give you less precise information**.
   (For example, they **may** tell you that you were in the bottom half if they know your exact quartile rank was 3.)

3. However, your manager **cannot lie or give you inaccurate information**.
   (That is, they **cannot** tell you that you were in the top half if they know that your quartile rank was 3.)

NEXT

## Part 2 Understanding Check

To check that you have understood the instructions, please answer the following questions. You may go back and read the instructions as many times as you want.

It is possible for your Manager to give you LESS PRECISE information about your Part 1 quartile rank than the one they received.

- ○ True
- ○ False

It is possible for your Manager to give you INACCURATE or FALSE information about your Part 1 quartile rank.

- ○ True
- ○ False

Did you Manager receive information about your PREVIOUS Part 1 quartile rank or your NEW Part 2 quartile rank?

- ○ My PREVIOUS Part 1 quartile rank
- ○ My NEW Part 2 quartile rank

BACK CHECK ANSWERS

**[NON-INSTRUMENTAL TREATMENT ONLY]**

## Part 2 Payment Decision

We now ask you to choose again **how your bonus payment will be determined in Part 2** before receiving your Manager's message.

Please choose between receiving either:

i. **£0.20** for each correct answer **if your new Part 2 quartile rank is 1**, and **£0** otherwise, OR
ii. **£0.05** for each correct answer **irrespective of your new Part 2 quartile rank.**

**This decision will be used to determine your bonus payment in Part 2.**
Your previous decision would be overwritten by your decision here.

**Your Decision:**

OPTION (i) OPTION (ii)

**[BOTH TREATMENTS]**

## Part 2 Information and Feedback

**Your Manager has sent the following message to you:**

**Your Part 1 rank was in the top half (quartile 1 or 2).**

**Remember this message is from a real person whom you have been matched with.**

This is to check your attention. What message did your Manager send?

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NEXT

## Part 2 Prediction I

We now ask you to predict your **new** **Part 2 quartile rank** in light of your Manager's message.

Specifically, please assign the following 10 tokens across each of the four quartile ranks.

- Assign **more tokens** to a given quartile rank if you believe that you are **more likely to attain that quartile rank**.
- Assign **fewer tokens** to a given quartile rank if you believe that you are **less likely to attain that quartile rank**.
- The **total** number of tokens assigned across all four quartile ranks **must add to 10**.

**Your Manager has sent the following message to you:**

**Your (PREVIOUS) Part 1 rank was in the bottom half (quartile 3 or 4).**

### Prediction of NEW Part 2 quartile rank:

| | Token(s) |
|---|---|
| **Quartile Rank 1:** | 0 |
| **Quartile Rank 2:** | 3 |
| **Quartile Rank 3:** | 4 |
| **Quartile Rank 4:** | 3 |
| | **Total: 10** |

**Payment:** You may receive an additional **£0.10** based on the accuracy of your prediction. The rule to determine your payment is designed such that you can secure the largest chance of receiving £0.10 by reporting your most-accurate prediction.

BACK

SUBMIT DECISION

**[INSTRUMENTAL TREATMENT ONLY]**

## Part 2 Payment Decision

We now ask you to choose again **how your bonus payment will be determined in Part 2** in light of the your Manager's message:

### Your Part 1 rank was in the top half (quartile 1 or 2).

Please choose between receiving either:

i. **£0.20** for each correct answer **if your new Part 2 quartile rank is 1**, and **£0** otherwise, OR
ii. **£0.05** for each correct answer **irrespective of your new Part 2 quartile rank.**

**This decision will be used to determine your bonus payment in Part 2.**
Your previous decision would be overwritten by your decision here.

**Your Decision:**

OPTION (i) OPTION (ii)