It's a Match! Or is it? A lab experiment on Mentorship*

Priyanka Chakraborty†
Southern Methodist University

11 November 2019

Abstract

Mentorship programs are pervasive in workplaces and help in harnessing interpersonal networks. Firms experiment with different models of mentorship, change them when they are unsuccessful or abstain from formal programs altogether. The incentives of mentors to give costly advice and matching of mentors and mentees are understudied and could help firms formulate and implement such programs better. In this paper, I employ an incentivized laboratory experiment with a novel game designed to mimic workplace mentorship to isolate key features of mentorship programs. I investigate under what conditions mentors, who have an informational advantage over their mentees, offer costly advice and push mentees to enter a competitive but high paying environment knowing their aversion to it. I examine if information on the ability of mentees and information on common traits in matching between mentor-mentee pairs make mentors more likely to give advice. I also explore if there is gender bias in advice giving and if so, what drives it. My results show mentors are more likely to offer advice when matched with a mentee on a common trait. Evidence emerges of a tendency in mentors to offer advice suitable for themselves instead of tailoring it to the needs of their mentees.

JEL Codes: C91, C92, D91, J16, M54

Keywords: Advice, Gender differences, mentorship, experiment, personnel

*I thank Tim Salmon and Danila Serra for useful comments and discussions. I thank Gary Bolton and Elena Katok for their approval to use the UTD LBOE lab for experimental sessions. I thank Philip Brookins for his useful comments on ztree programming. Approval for all experiments in this paper was obtained from the IRB's at both SMU and UTD. All subjects were taken through consent forms prior to participation.

†Southern Methodist University, Department of Economics, 3300 Dyer Street, Suite 301 Umphrey Lee Center, Dallas, TX 75275-0496. pchakraborty@smu.edu

1 Introduction

Mentorship programs, formal and informal [1], which broadly comprise career advice, training or serving as a role model provided by more senior workers are pervasive in the workplace. Evidence from psychology notes such programs could help with mentee career development and work attitudes (see Allen et al., 2004 for a meta-analysis) and promote women's participation and retention in the labor market (Dennehy and Dasgupta, 2017). More than 70 percent of Fortune 500 companies have some type of mentorship programs [2]. Formal programs in firms usually assign senior managers as mentors for junior colleagues (e.g. IBM, Liberty Mutual, Deloitte, General Electric and Boeing), match mentors and mentees through algorithms (e.g. Toyota, Xerox and ConAgra use a platform called Mentor Scout) or bring together a pool of potential mentors and mentees and allow self-selection. For example, Paypal, which purportedly has one of the better corporate mentorship programs, has for years used an algorithm to match employees with senior staff. However, neither mentors nor mentees were happy with this setup, leading Paypal to opt for a new model in 2017 where employees sign up for speed mentoring sessions and try to find a mentor [3]. Firms experiment with these different models of mentorship, changing them when they are unsuccessful, and given these pitfalls, many companies shy away from formal programs altogether [4]. This not only squanders the opportunity for knowledge transfer when people retire [5] but is also detrimental for women and minorities who are less likely to receive mentorship and advice though most likely to benefit from them [6]. There isn't much economic research on the design of such programs and understanding incentives for mentors to give advice and the matching of mentors and mentees better would benefit firms and employees.

[1] Relationships where mentor and mentee are matched by a third party (e.g. organizational member, mentoring program staff) and are part of an officially sanctioned mentoring program are typically considered formal mentoring. Relationships that develop naturally or spontaneously without outside assistance are considered informal mentoring. (Allen and Eby, 2011)

[2] https://www.wsj.com/articles/SB123301451869117603

[3] https://www.wsj.com/articles/employee-mentorship-program-gets-a-reboot-1514376000

[4] https://www.theatlantic.com/business/archive/2017/06/corporate-mentorship-programs/528927/

[5] https://www.washingtonpost.com/news/on-small-business/wp/2017/05/09/why-the-looming-silver-tsunami-could-put-25-million-jobs-at-risk/

[6] See LeanIn.Org and McKinsey & Company, *Women in the Workplace 2017* which reports that people with mentors are more likely to get promoted, that women are 24% less likely than men to get advice from senior leaders and that 62% of women of color say the lack of an influential mentor holds them back. Also, the 2017 Heidrick & Struggles survey reports that women and minorities were the most likely to say that the mentoring relationship was extremely important.

While mentorship programs may result in gains for the organization, the mentor has to carve time out of his own schedule and expend energy in giving advice. Moreover, the mentor often needs to push mentees to do certain activities (for example networking, public presentations of projects, applying for grants, addition to human capital through competitive exams like the CFA) which mentees themselves are reluctant to do but which might be pivotal in accelerating their careers. I capture this idea in my study by modelling the mentoring process as being one where the mentor has to pay a cost to help the mentee [7]. When a mentor has inside information about the importance of an activity for the mentee's success but also knows about the aversion the mentee has against undertaking this activity, would he pay this cost to give advice? This is my primary research question, one that has not been explored and is an important contribution to the literature on the design and effectiveness of mentorship programs and advice giving. In this paper, I examine under what circumstances would someone perform the job of a mentor which is paying the cost of providing advice to help others. I look at the effect that information on the ability of the mentee and common traits with the matched mentee have on mentor's costly advice giving. I also examine gender bias in advice giving.

I employ an incentivized laboratory experiment with a novel game which simulates workplace mentorship and advice giving. In my experiment, the mentor-mentee relationship is as follows: the main task of the mentor is to advise mentees, who engage in a real effort task, to choose between two payment schemes to get paid by. One is modelled to mimic the key features of a competitive payment scheme where the mentees get payment for their performance and earn a bonus but only if they meet a certain threshold in production. The other is one where mentees simply get paid for their performance without needing to meet a production threshold requirement or having the opportunity to earn a bonus. By design, mentees are induced to develop an aversion to choosing the competitive payment scheme. Mentors are aware of this aversion. Mentors also have some inside information about whether the production thresholds of the upcoming rounds are achievable or not. This design creates an environment in which I can examine when mentors help their

[7] Apart from time and energy demands, there could be other potential costs to mentoring like being displaced by successful mentees or viewed as giving unfair advantage to mentees (see Ragins and Scandura, 1999). Of course, there are benefits to mentoring as well, like personal satisfaction, but I abstract away from this in my study.

mentees by offering costly advice, whether they advise the competitive payment when they see achievable thresholds and whether they pay higher costs to send higher strengths of recommendation.

One novel element of this design is it allows me to explore the role that information on common traits in matching play in individuals' willingness to give advice. I do this by having a treatment that reveals if mentors have anything in common, or not with their mentees and another treatment where mentors no longer see the presence or absence of common traits. If I find that the behavior of mentors, in terms of the willingness to give costly advice, changes with and without the match characteristics information in these treatments, I can cleanly attribute it to the provision of such information. Another novel element of this design is that not only can I identify gender bias in advice, but also disentangle possible channels causing the bias. Gender bias is often found in the workplace [8] and could emerge here in the form of mentors giving different advice to male and female mentees. I introduce the Chakraborty and Serra (2019) mechanism [9] where I can reveal the mentee's gender to the mentor without making it obvious. I have a treatment where mentors know only the gender of the mentee. If I find that in this treatment, mentors are less likely to give advice or give different kinds of advice to men and women mentees, there is an indication of gender bias. This is similar to finding women face such a bias in the field. However, the limitation of field data is it can't tell us why there is such a gender bias. There could be multiple channels. This bias may be an explicit one and exist because mentors think women aren't as good as men, purely as a prejudice (see taste-based discrimination in Becker, 1957) or based on ability (see statistical discrimination in Aigner and Cain, 1977). It is also possible that this an implicit bias [10] say a 'paternalistic bias' where mentors are trying to reflect women's preferences because they think women don't like competitive environments as much as men. Niederle and Vesterlund (2010) have provided robust evidence that women opt for competitive environments far less than men do, even though they are as able as men. If mentors give less advice to women without information on ability, but as much advice to both men and women with information

[8] There is strong evidence on gender based discrimination in hiring, promotion and job assignments (see e.g., Neumark et al. 1996; Riach and Rich 2002)

[9] Described in Section 2.1.1.

[10] Bertrand et al., (2005) develop a third theory of discrimination suggesting gender biases are automatically activated as soon as evaluators learn the sex of a person leading to unintentional and implicit discrimination.

on ability, this is evidence of statistical discrimination where they assume women are of lower ability. If mentors only give less advice to women and still offer advice to low ability men in the treatments with information on both gender and ability of mentees, this would be evidence either of taste based discrimination or an implicit bias, perhaps a 'paternalistic bias' due to beliefs about men and women's liking for competitive environments. If gender bias exists in advice giving, it is important to find out why it exists in order to address the issue and find what interventions might solve the problem. If mentors treat women differently because they don't realize men and women have the same ability, then provision of information on ability should correct the bias. If mentors treat women differently because of taste-based or implicit biases, then training mentors to recognize and address such biases needs to be incorporated into mentoring programs.

Since mentorship programs are designed and implemented differently in different firms and each firm has its own specific environment, it is very difficult to address these questions using observational data and field experiments. However, a lab experiment provides an excellent controlled environment to study such behavior and makes clear identification on my research questions possible. Moreover, the concept of "electronic" or "virtual mentoring" (e-mentoring) [11] has emerged with the growth of internet technology, social media and online communication. For example, LinkedIn provides a platform to connect mentors and mentees [12] and many workplaces use blended forms of electronic and traditional mentoring. This closes the distance between the lab and the field and makes the examination of advice giving by mentors using a computer technology platform, as designed in my study, useful and relevant.

My study on mentorship complements and contributes to three strands of literature, namely advice giving, identity and matching and gender differences. There is an extensive experimental literature on the effect of naive advice [13]. Several lab and field studies have

[11] E-mentoring refers to the process of using electronic means as a primary channel of communication between mentors and mentees. The key difference between e-mentoring and traditional mentoring being reflected in the face time between mentors and mentees (Hamilton and Scandura, 2003; Ensher and Murphy, 2007).

[12] https://techcrunch.com/2017/11/15/linkedin-rolls-out-its-career-advice-mentoring-program-to-us-uk-and-india/

[13] Schotter (2003) provides a summary of the effect of uninformed word-of-mouth advice on decision making and finds even naive advice improves decisions.

looked at the effect of expert advice, where advice giving is costless (e.g., Brandts et al., 2014; Baldiga and Coffman, 2016, Cooper and Kagel, 2016; Blau et al., 2010). Brandts et al., 2014 find that advice increases high performing women's entry into tournaments while reducing that of low performing men. Baldiga and Coffman, 2016 find that giving a vote of confidence and tying payments of sponsor-sponsees increases men's willingness to enter tournaments but not women.

However, these studies have not explored under what conditions more informed individuals give advice, especially when it's costly to do so. With professional service firms growing in size and complexity, mentorship becomes a key tool to support and guide young professionals and keep organizations competitive [14]. With senior employees doing more administrative work under greater scrutiny, it becomes essential to understand if and under what conditions they would be willing to undertake the time and energy demands to advise mentees and guide them toward career advancement. The economic literature on identity, matching and mentoring is sparse [15]. Athey et al., (2000) build a theoretical model and show that "type-based" mentoring is important and that an employee receives more mentoring when more upper-level employees have the same type (gender or ethnicity). My study is the first to experimentally look at whether (and when) mentors opt in to give costly advice and if their advice giving is different subject to matching on common traits. I identify five different layers of social identity (gender, origin, hobbies, political inclinations, religiosity) to explore in the mentor-mentee matches.

My results can be summarized as follows: I find that mentors offer costly advice at least 45 percent of the time, despite there being no clear benefit to mentoring. Conditional on offering advice, they advise their mentees to enter the competitive environment at least 60 percent of the time. Information about the presence or absence of a common trait with a mentee has a significant effect on advice giving. Mentors are more likely to offer any advice and stronger recommendations when informed of a common trait with their

[14] https://hbr.org/2008/01/why-mentoring-matters-in-a-hypercompetitive-world

[15] Psychologists and sociologists have documented that mentoring relationships within firms are more likely to form between members of the same group (e.g., Noe, 1988; Morrison and Van Glinow, 1990; Kanter, 2008). Ibarra (1992) demonstrates that the structure of social networks depends on gender and race. Mentoring, may be more natural and more effective when people share common interests (such as sports), cultural experiences, language, or when people have significant interactions in a community outside the workplace.

mentees compared to no information. While there are no significant treatment effects due to provision of ability information, I find that mentors are significantly more likely to offer advice suitable for themselves in accordance with their own abilities instead of tailoring it for their mentees. This is an interesting aspect of mentoring that surfaces unexpectedly in this study. This might also explain why I don't find significant evidence of gender bias in advice giving. I find some indication that giving mentors information about women's ability might lead them to advising women against entering the competitive environment and hence work against women. In the conclusion (Section 4), I discuss the policy implications of my findings and discuss the possibility of future research to explore unexpected results that surface in this study.

The paper proceeds as follows. Section 2.1 outlines the experiment, and Section 2.2 describes the treatments and hypotheses tested. Section 3 provides the data analysis.

2 The Mentorship Experiment

2.1 Experiment Design

The experiment consists of a short survey followed by 3 active stages (Stages 1 to 3).

2.1.1 Survey

I ask subjects to fill in a brief survey at the very beginning of the session, before Stage 1. The survey is designed to extract five identities that might matter in mentor-mentee matches namely, gender, geography, political inclinations, religiosity and hobbies [16]. The primary identities I am interested in are gender and geography since firms can easily identify or solicit this information. However, e-mentoring programs or networking to find mentors may often use other identities like political inclinations, religiosity and hobbies to match mentors and mentees. Thus, I also examine the role of these identities in advice giving. This could help in developing a signaling mechanism where mentees can send a signal of interest to mentors, facilitating matches in such markets. Coles et al., (2010) find a signaling mechanism facilitates matches in dating and job markets.

[16] I also ask subjects to state how important each of four identities, geography, political inclinations, religiosity and hobbies are for them to gather their beliefs about these identities.

I use the Chakraborty and Serra (2019) method [17] to reveal subjects' genders to other participants without making gender artificially salient in the game. The answer to the gender question led to a pre-determined list of either male or female names. The male subjects saw a list of male names and the female subjects saw a list of female names. I informed subjects that for the duration of the experiment they would be identified with a fictitious name, and I invited them to pick a name from the gender-specific list they saw on their screen. I did not allow two or more subjects to choose the same name, so each name disappeared from the list in real time when picked by another participant. This leads to each participant being identified by a gendered label but without highlighting gender.

2.1.2 Stage 1 (No Mentoring)

Stage 1 is a pre-mentoring production stage where all subjects engage in 7 rounds of a real effort task. The task consists of correctly identifying the letters and numbers in a picture. I call this the 'Captcha Task' [18] because it is similar to the Captcha procedure on websites. In my study I wanted a gender-neutral task where men and women would be equally confident since I am exploring channels of gender bias like discrimination and beliefs where mentors might give different advice to men and women mentees even when they perform equally well. I therefore chose a language task, as it has been shown (e.g., Dreber et al., 2014; Niederle 2016) that language-based tasks are less likely than math-based tasks to generate gender differences in both self-confidence and performance in competitive environments.

In each round of Stage 1 of the experiment, subjects have 4 minutes to solve up to 20 Captchas. In each round, subjects receive 2 ECUs for every correct Captcha plus a 20 ECU bonus if they meet the production threshold for that round but 0 ECU if they don't. Even though there is no actual competition, this payment scheme is designed to contain the key

[17] We used Bertrand and Mullainathan (2004)'s list of distinctively white sounding names only. Distinctive names are those that have the highest ratio of frequency in the corresponding racial group. We do not ask subjects to use their real names as we did not want to lift anonymity nor did we want the potential confounding bias of race, nationality or ethnicity associated with the actual name of the subject to play a role in the experiment.

[18] This a novel language task that I created using Python and Ztree programming software. I developed a Python code to generate pictures, containing a mixture of letters (both uppercase and lowercase) and numbers, of varying lengths and colors. I then incorporated the pictures in Ztree to create the 'Captcha Task'.

features of a tournament [19]. Each round has a different number of 6-element (easy) and 8-element (hard) pictures for subjects to identify, making some rounds more challenging than others. Moreover, the level of difficulty is determined randomly for each participant in this stage [20]. I do this to create more variation in individual performance as well as give greater scope of subjective discretionary behavior on part of mentors when giving advice.

A key feature of this stage is the setting of the production thresholds. Each of the 7 rounds have a different threshold. The thresholds were set based on performance of participants in a pilot session [21] of the experiment so I could calibrate to be mostly unachievable. The goal is subjects develop an aversion towards but not complete disillusionment with the competitive payment scheme. At the end of each of the seven rounds, subjects only learned whether they successfully met the threshold or not. At the end of this stage I provide subjects with a history of all 7 rounds showing them their performance and the required threshold for each. I don't give feedback about the exact thresholds between rounds in Stage 1 to prevent learning or formation of beliefs about thresholds between rounds. At the end of Stage 1, I reveal the exact thresholds to induce the idea of high (but not unachievable) thresholds and hence an aversion toward the competitive payment scheme.

At the end of the experiment, two rounds from this Stage are randomly chosen for payment. Since there is a strong possibility of zero earnings, especially for participants who faced harder rounds, I select two random rounds for payment to decrease variance in earnings for subjects.

2.1.3 Stage 2 (Mentoring)

At the beginning of Stage 2, half of the subjects are randomly assigned the role of 'Mentor' and the other half, 'Mentee' [22]. They keep their role for the duration of Stage 2. In this

[19] The pre-set thresholds in a sense represent an 'automated' opponent whose ability I can control.

[20] 70% of participants face more challenging rounds namely 6 hard and 1 easy round out of the 7 rounds in this stage. 30% of participants face less challenging rounds namely 3 hard and 3 easy round out of the 7 rounds in this stage.

[21] Conducted at UTD prior to the running the main experimental sessions.

[22] I randomize the assignment of mentors instead of best performers of Stage 1 becoming mentors to get a good mix of mentors of different abilities and beliefs and avoid ending up with only extreme outcomes in advice giving. There is a strong likelihood that mentors who are best performers always advocate for the competitive payment scheme (since they fared well with it in Stage 1) instead of recommending it when it's good for the mentees. There is also a strong possibility that such mentors have a disregard for their mentees (who are mostly of lower ability than themselves) and never advocate the competitive payment for

stage, mentees engage in 5 more rounds of the 'Captcha Task'. However, they can now choose between two payment schemes to get paid by. Payment Scheme A is the same competitive payment scheme as in Stage 1. Payment Scheme B is a piece-rate payment scheme with a payment of 2 ECU for every Captcha correctly solved without any threshold requirements or bonus earnings. In each round in Stage 2, mentees have to choose between Payment Scheme A and B to be paid by before they begin the 'Captcha Task' for that round. In each of these 5 rounds, mentees are matched with a different mentor. The matching algorithm makes sure that a different mentor-mentee pair are randomly matched in each round [23]. Once matched, the algorithm checks for number and kind of characteristics (from the survey questionnaire) the pair have in common. The matching algorithm is the same in the three treatments with mentoring (*MaxInfo*, *MedInfo* and *MinInfo*) but only in one of them (*MaxInfo*), the match information is revealed to the mentor-mentee pair. The mentor-mentee pair are told if they share a common trait or not [24].

The first key feature of this design is the introduction of the inside information for the mentors. While the mentee does not know the threshold required in a round to receive the bonus under Payment Scheme A, the mentor they are matched with is shown a noisy signal (S) [25] about the threshold (T) and is able to provide a recommendation to the mentee regarding which payment scheme to choose. The uncertainty on the threshold corresponds well with real-life mentoring. The mentor has some imprecise inside information about the workplace, say promotion criteria. Both mentor and mentee know the ability of the mentee and the mentor could push the mentee toward the competitive activity (apply for promotion) through advice. The noisy signal, S, that mentors see is a random draw from the range of [T-2, T+2]. The second key feature for this stage is the setting of production thresholds. The production thresholds are now set to be more easily attainable. Mentees

the mentees. These effects might be more realistic and merit exploring in subsequent studies on mentorship.

[23] This random matching algorithm is carefully constructed taking into account information about subject characteristics from the pilot session at UTD. I checked to see if there were certain characteristics that occurred more often to create a hierarchy of matches to be displayed but did not find any.

[24] If the mentor-mentee pair have multiple characteristics in common, then one of them is randomly picked to be displayed. Randomizing the information that is displayed allows me more variation to check how matches affect advice-giving.

[25] I explain how to interpret the signals to the Mentors in instruction handouts (attached in the Appendix) before the tasks begin.

are not aware of the lowered thresholds [26]. The third key feature of this stage is I ask the mentees to answer a question regarding their preference for choosing Payment Scheme A over B in between Stages 1 and 2. This allows me to capture the beliefs (aversion) of the mentees regarding the competitive payment scheme [27]. I can now explicitly reveal to the mentors the beliefs (aversion) of the mentees toward the competitive payment scheme [28]. I do this by showing the mentors the average answer of mentees to their likelihood of choosing A over B. This is an aggregate measure in each session. Hence, mentors now see thresholds that are lower on average, hence achievable more often and that mentees can potentially meet the threshold and earn a high payoff by choosing Payment Scheme A. However, they also know that mentees have an aversion to choosing A since they are shown the average answer of mentees to choosing A over B. This allows me to examine when mentors help out their mentees and whether information on ability, match and gender of mentees makes it more likely for mentors to give advice.

Mentors are shown information about their mentee in each round (depending on the treatment). This is described in Section 2.2. Sending a recommendation is costly for Mentors. The cost is between 10 and 13 ECU depending on the strength of the recommendation, which is on a scale from 1 to 4. Mentors get paid a bonus of 10 ECU if the mentee follows their recommendation of the Payment Scheme. This bonus is based only on whether mentees follow the recommendation, and not based on the mentees' final earnings when following the recommendation. This scheme of payments is designed to take care of a number of things. In the field, the net benefit of mentoring may be positive or negative. What I wanted for my study is for the net benefit of mentoring to be negative in expectation, in order to identify the willingness to help out others. Giving advice is costly for the mentors but there is a potential benefit to recoup some of the cost if mentees follow the advice. This might give a reaon for mentees to not be convinced mentors are giving them the right ad-

[26] The information about thresholds in the instructions is very carefully constructed to ensure that mentees' expectations about threshold setting does not change between Stages 1 and 2.

[27] The average likelihood of mentees to choose A over B is reported in Table V in the results section.

[28] In Stage 1, I take all subjects through the 7 rounds of competitive payment so that in Stage 2, those who become mentors have first-hand knowledge of the aversion toward the competitive payment. However, high and low ability subjects may form differing beliefs toward the competitive payment scheme, and this may inform their advice as mentors. Hence, I explicitly reveal to the mentors the average answer of all mentees to their likelihood of choosing A over B.

vice. There is uncertainty on the mentor's side regarding how intense (and costly) a signal to send to the mentee since he doesn't know the exact threshold and whether the mentee will perform well enough to cross the threshold and get the bonus. Moreover, the mentee know that the mentor has a noisy signal about the threshold and that the mentor is paid a bonus based on whether the mentee follows the advice and hence she doesn't know whether to trust the mentor's advice. Hence there is some tension and uncertainty regarding the giving and accepting of advice which enables me to see when and how much mentors exert themselves to convince the mentees to take up A instead of B.

In each round, once mentees see their mentor's recommendation (if any) and the strength of the recommendation, they choose payment scheme A or B before beginning the 'Captcha Task'. Mentees are not told the threshold during a round, but they are shown a record of all the thresholds used in each round after the stage is completed. For this stage, for any round in which mentees choose Payment Scheme A, if any, they only find out if they met the threshold after all 5 rounds are concluded. This is done to prevent any updating of beliefs about thresholds between rounds.

While mentees complete the 'Captcha Task', mentors engage in a separate 'Puzzle-solving Task' [29] (a language task developed in Chakraborty and Serra 2019). Mentors receive a fixed wage [30] of 60 ECU per round for engaging in this task regardless of how many puzzles they solve. The 'Puzzle Task' serves the dual purpose of giving the mentors something to do while mentees solve their task (hence preventing fatigue or boredom from affecting advice giving in subsequent rounds) and allows me to pay them a fixed wage.

At the end of the experiment, two rounds from this Stage is randomly chosen for payment. I select two random rounds for payment to keep the incentives for choosing Payment scheme A the same for mentees in both Stages 1 and 2.

[29] Each task consists of finding a 4-letter word in a 6x6 matrix. The Mentors have 4 minutes to solve up to 20 puzzles in each round.

[30] A fixed wage prevents a mentor's performance in the puzzle task from potentially affecting his/her advice in subsequent rounds and hence creating a confound.

2.1.4 Stage 3 (Risk Lottery)

Stage 3 is a procedure based on the Holt and Laury (2002) mechanism to measure risk preferences of subjects. All subjects play the lottery individually. They are asked to make decisions for 10 situations. Each of their choices is a choice between "Lottery C" and "Lottery D". If they choose Lottery C, they are able to win either 8 ECU or 10 ECU. If they choose Lottery D, they are able to win either 1 ECU or 20 ECU. For the first choice, each lottery will give them a 90% chance at the lesser of the prizes and a 10% chance of the better outcome. Each subsequent choice increases the likelihood of getting the good outcome while lowering the chance of the bad outcome. At the end of Stage 3 of the experiment, one of these situations is randomly selected for payment, all situations being equally likely.

2.2 Treatments

My experimental treatments are set up to allow me to clearly investigate: 1) the effect on advice giving of information on ability and common traits in matching; 2) gender bias in advice giving and decompose the source of the bias and 3) advice taking behavior of mentees. To this end, I have a four-arm between subject design as detailed in Table I. Subjects fill out the short survey eliciting gender, geography, political inclinations, religiosity and hobbies. Then they participate in seven rounds of the 'Captcha Task' in Stage 1. This is the same in all four treatments. Stage 2 is different for the four treatments. In the first three treatments, T1 (*MaxInfo*), T2 (*MedInfo*) and T3 (*MinInfo*), half of the subjects are randomly assigned the role of "Mentor" and the other half, "Mentee", at the beginning of Stage 2. In each of the five rounds of Stage 2, before making a recommendation, the mentors are shown some information relevant to their decision-making. This information varies between T1, T2 and T3.

In T1 (*MaxInfo*), mentors are shown a full set of information, namely the name which implies gender of the mentee, his/her ability [31], the signal of the threshold, the average answer of all mentees to the question they responded to of how likely they are to choose

[31] Ability of the mentee is measured by average number of Captchas correctly completed by the mentee in Stage 1.

Payment Scheme A over Payment Scheme B and a common trait shared with the mentee (if any) in each round. Moreover, mentors can be essentially told that they have nothing in common with their mentee if they don't share any common traits. (*MedInfo*) is the same as T1 except mentors are no longer told of the presence, absence or kind of match information on the mentor-mentee pair in each round. T3 (*MinInfo*) is the same as T2 except mentors are no longer see the ability of the mentee in each round. I refer to the fourth treatment T4 as the Baseline. In this treatment, in Stage 2, all subjects engage in 5 more rounds of the 'Captcha Task'. They can choose between Payment Scheme A and Payment Scheme B. There is similar threshold setting and revelation as in the other treatments but no mentoring or advice.

There is strong experimental evidence that people are not purely self-interested. Pro-social other regarding behavior has been observed in dictator game experiments (e.g., Kahneman et al., 1986; Forsythe et al., 1994) Models of other regarding behavior posits individuals derive utility from the material well-being of society (Andreoni and Miller, 2002), from reducing inequality due to inequality aversion (Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000) or simply the warm glow of giving (Andreoni, 1990). In my experimental design, advice is costly, and the potential benefits of mentoring are outweighed by the cost. My payoff structure makes it optimal for mentors to never give advice. However, given strong evidence that suggests individuals are not purely money-maximizers, I expect mentors to give advice. Moreover, if mentors care about their mentees, and if information about ability, common traits and gender of mentee make them care more or less, we might see advice being given of different kinds and degrees.

This leads me to my first hypothesis:

Hypothesis 1 (Costly Advice Giving) *Mentors offer costly advice.*

If subjects are pure money maximizers, they should never offer advice as mentors since they either break even or lose money by advising. However, if they do offer advice, it may be indicative of their trying to help their mentees. If mentors do offer advice, the next question is, under what conditions do they extend this costly advice? My treatments are designed specifically to clearly differentiate the importance of different information to a mentor's willingness to extend advice. My first research question is to understand the importance of ability information and match information to a mentoring relation. This leads me to my second and third hypotheses.

Hypothesis 2 (Advice Giving with Ability Information) *Mentors are more likely to offer advice with information on the ability of their mentees than without.*

While *MaxInfo* and *MedInfo* provide mentors information on the ability of mentees, *MinInfo* does not and a comparison of advice giving in these three treatments allows me to test if mentors are more likely to give advice with ability information than without.

Hypothesis 3 (Advice Giving with Match Information) *Mentors are more likely to offer advice to mentees with common traits than without.*

In the *MaxInfo* treatment, mentors and mentees receive information on whether they have a common trait or not. If this information is important to mentors, then we might see the presence of common traits change the likelihood of the mentor giving advice within this treatment. In the *MedInfo* treatment, mentors no longer receive any information on the presence or absence of common traits. If this information is important to mentors, then we might see the likelihood of the mentors giving advice change from *MaxInfo* to *MedInfo*. The *MaxInfo* treatment also allows me to explore if conditional on mentors sharing some common trait with their mentees, if certain kinds of traits resonate more with mentors and increase their likelihood of giving advice. The nature of my design provides a richness of data to check for different components of advice, namely mentors' likelihood of giving any advice, their likelihood of giving advice A (competitive payment scheme), their likelihood of giving the right advice to their mentees and the strength of the recommendation.

My second research question is to identify if there is gender bias in advice giving and if so, what drives it. This leads me to my fourth hypothesis.

Hypothesis 4 (Gender Bias in advice) *Mentors give different advice to men and women mentees.*

Gender bias could emerge here in the form of mentors giving different advice to male and female mentees. This can be observed in this experiment by looking at mentors' likelihood of offering advice, advice A and the right advice to their men and women mentees. In the *MinInfo* treatment, mentors do not get any information on the ability of their mentees. If mentors treat men and women mentees differently in terms of the likelihood of giving advice and kind of advice given, without information on their ability, this would indicate a gender bias in advice giving. If such a bias exists, there are multiple possible reasons why. In the *MaxInfo* and *MedInfo* treatments, mentors get information on the ability of their mentees. If mentors give the same advice to men and women mentees with information on their ability, this would indicate that gender bias in advice giving stems from only statistical discrimination where mentors don't believe men and women have the same ability. However, if mentors give different advice to men and women mentees even with information on their ability, this could indicate that the gender bias in advice is due to taste based discrimination or is an implicit bias for example a 'paternalistic bias' in mentors' beliefs where they think women mentees might not like competition even if they are as able as men.

While my experiment is designed around mentor behavior and is not about mentee behavior, it would be interesting to examine the way mentees behave with and without advice which allows me a measure of the importance of mentoring relations. This leads me to my fifth hypothesis.

Hypothesis 5 (Behavior of Mentees) *Mentees behave differently with and without advice.*

The Baseline treatment has subjects choosing between Payment Schemes A and B without mentoring. Comparing Baseline with the other treatments allows me to see how mentees behave with and without advice. If mentees are more likely to choose A with advice, this is indicative that mentoring relations are important for mentees to make better decisions. Moreover, I can examine what makes mentees more likely to follow advice, conditional on receiving it.

2.3 Implementation

I have conducted seven experimental sessions at the Laboratory for Behavioral Operations and Economics (LBOE) at University of Texas Dallas (UTD). Subjects were recruited using an online recruitment web site (SONA) maintained by the lab. Participants are all volunteers and are drawn from the general student body of UTD including undergraduates and students from several professional Master's programs on campus. I involved a total of 192 participants, of which about 40% are women, as shown in Table II. Each subject participated in only one session and one treatment. The experiment consisted of an initial brief survey and name-assignment stage, followed by three active stages. Subjects were presented with the instructions for each stage on their computer screen immediately before that stage began. Additionally, at the beginning of Stage 1, they received hand-outs and verbal instructions about the captcha task, and at the end of Stage 1 they received further verbal and written instructions (hand-outs) about the rules applying to Stage 2 of the experiment [32]. Two randomly selected rounds from each Stage 1 and 2 and one decision from Stage 3 of the experiment were used for actual payments. Experimental earnings were converted from ECUs to dollars at the exchange rate of $1 for 5 ECU. The experiment was programmed in z-Tree (Fischbacher, 2007). In order to guarantee anonymity, at no point during the experiment did I ask subjects to reveal their names and, although actual names were used during the payment process for accounting purposes, I informed subjects that I would not register their names and therefore would not be able to link them to the choices made in the experiment. Most sessions lasted around an hour and a half to two hours. Subjects were paid in cash. They received $30 in average earnings including a $5 participation fee. Mentors on average received $35 while Mentees received $27.

3 Experimental Results

Before presenting and discussing my main findings, I will assess performance in the 'Captcha Task' in Stage 1 of the experiment. This is to understand how men and women perform in this task and if there are any gender differences in performance. Table III reports the

[32] Experimental instructions for Stage 1 and Stage 2 (MaxInfo and Baseline) available in the Appendix,

average number of captchas correctly solved in Stage 1 of the experiment. Table IV provides panel regressions of performance in Stage 1. Overall, women don't perform as well as men in this task and get fewer successes. These differences are small (less than 1 captcha per round). This also holds when I include control dummies for whether it was the last 3 rounds of Stage 1 (Round_{last3}), whether the individual was successful in crossing the threshold in the previous round (Success_{lag}) and treatment dummies for *MaxInfo*, *MedInfo* and *MinInfo*. The experiment was designed to make certain that men and women's performance would be the same so that there would be no reason for giving different advice to men and women mentees unless mentors have a gender bias. However, I do find women underperforming slightly meaning there could be justification for mentors providing different advice to men and women. This makes it important to control for ability of mentees when testing my hypotheses for gender bias in regression analyses.

Next, I want to assess how likely subjects are to choose Payment Scheme A over B after Stage 1. This is to understand if subjects were induced to have an aversion to Payment Scheme A since the thresholds in Stage 1 were designed to be, on average, high. Moreover, this aversion was meant to be conveyed to mentors through the average answer of mentees to the question of how likely they were to choose Payment Scheme A over B on a scale of 1-5, 1 being extremely unlikely and 5 being extremely likely. Table V reports the average likelihood of mentees (subjects) of choosing A over B on a scale of 1-5 in treatments 1-3 (Treatment 4) [33]. Overall, the average likelihood of choosing A over B is low in all treatments (between 1.3 and 2.1 out of 5). Regression analysis in Table VI shows there is no significant difference between men and women in choosing A over B. This means the design was successful in creating the intended aversion to choosing A over B in Stage 1.

I will now present the results of the experiments by providing a set of summary statistics of overall advice giving in Table VII. Mentors offer advice at least 45 percent of the time. Conditional on offering advice, they offer advice A at least 61 percent of the time and the right advice at least 60 percent of the time. I define 'Right Advice' for mentees as advising A if ability$\geqq$signal and B if ability$<$signal. The 'Right Advice' dummy is 1 if ability$\geqq$signal and advice is A, or if ability$<$signal and advice is B and 0 otherwise. Table VIII shows that

[33] Note, mentors only see the average answer of all mentees to their likelihood of choosing A over B in each session.

when mentors give advice, they mostly send recommendations of the lowest cost (Cost 10) followed by recommendations of the highest cost (Cost 14). The decision to give advice is clearly bimodal, i.e., either mentors give minimum strength or maximum strength advice. I will not conduct tests on these simple summary statistics as these tests are mis-specified given the nature of the data. Formal tests of the hypotheses will be conducted using properly specified regressions but having an understanding of these summary statistics can be helpful in properly interpreting the regressions.

My first hypothesis posits mentors offer costly advice. Table VII shows that mentors do indeed offer costly advice at least 45 percent of the time in all treatments, in line with studies on other-regarding preferences and giving in dictator games. Figure 1 shows the percentage of times mentors offer advice in each treatment.

Thus I find in favor of my first hypothesis.

Result 1 *(Costly advice giving) In all treatments with mentoring, mentors choose to offer costly advice at least 45 percent of the time.*

This is indicative that mentors care about helping their mentees.

My next hypothesis examines if advice giving increases with information on mentees' ability. Table IX contains a set of random effects panel regressions with standard errors clustered at the subject levels. I report estimates where the dependent variable is a dummy equal to 1 if mentors give advice (Col. 1), give advice A, conditional on giving advice (Col. 2), give the right advice, conditional on giving advice (Col. 3) and give stronger advice (Col. 4) and 0 otherwise. I control for individual characteristics of the mentor which could affect his/her advice giving like gender (Female), number of times they met the threshold in Stage 1 (Stage 1 Successes), risk aversion [34] and whether the mentor gave the advice that was right for himself/herself (Right Advice$_{mentor}$). The 'Right Advice$_{mentor}$' dummy is 1 if mentor's ability$\geq$signal and advice is A, or if mentor's ability$<$signal and advice is B and 0 otherwise. I also control for information that mentors get across all three treatments, namely the gender of their mentee (Female Mentee), the signal of the threshold (Signal) and the average likelihood of mentees' choosing A over B (LikelyA).

[34] Risk aversion is measured by the number of times subjects chose the safe option, Option 2, in Stage 3.

I find there are no significant treatment effects on the likelihood to give advice or the kind of advice given. Thus, I reject this hypothesis.

Result 2 *(Advice Giving with Ability Information) There is no significant difference in advice giving with and without information on ability of mentees.*

While there are no treatment effects, I find that mentors are significantly more likely to give the right advice to their mentees when it is the right advice for themselves (p-value 0.000). For most of the advice giving in *MaxInfo* and *MedInfo* (where mentors can see the ability of their mentees), the interest of the mentor and the mentee are aligned i.e. the right advice for the mentees is the same as the right advice for the mentors themselves [35]. However, in the 'conflict cases' comprising 34% of advice giving, right advice for mentors is different from right advice for mentees. In 72% of the conflict cases, mentors give the advice to their mentees that is wrong for the mentees, but right for themselves while in only 28% of the conflict cases, mentors give advice that is right for the mentees, while wrong for themselves. This suggests a possible explanation for why I don't find differences in advice giving with and without ability information. Mentors seem to be advising their mentees based on their own ability rather than the mentee's ability. This is an interesting aspect of mentoring that surfaces unexpectedly in this study. It shows a tendency in mentors to offer advice suitable for themselves instead of tailoring it to the needs of their mentees.

My next hypothesis deals with the importance of having common traits to advice giving. I examine if mentors are more likely to give advice with information on common traits and if they give different information depending on the trait. My next results find in favor of these hypotheses.

In *MaxInfo*, mentors get information on the presence (or absence) of common traits with their mentees and the kind of trait, when matched with a mentee. Table X gives summary statistics of distribution of traits within this treatment. Figure 2 shows mentors are more likely to offer advice to mentees they share a common trait with than mentees they don't have anything in common with. This is confirmed in regression analysis in Table XI, where within Treatment 1, information about a common trait significantly increases the likelihood

[35] Mentors give the right advice to their mentees 62% of the time. Out of this, 85% of the time, their interest and their mentees' interest align.

to give advice (see the estimated coefficient and p-value obtained for Common Trait in Col 1). Further, this finding is confirmed in regression analysis in Table XII when looking at mentors' likelihood to give advice with or without a match. The estimates in Col 1 in particular confirm that mentors are significantly more likely to give advice with information of a match (see the estimated coefficient and p-value obtained for MaxInfoxCommon in Col 1) or without being informed of presence or absence of matches at all (see the estimated coefficient and p-value obtained for MedInfo in Col 1) than with information of no match.

In these regressions, I control for individual mentor characteristics like gender, number of successes in Stage 1, risk aversion and whether the mentor gave the advice that was right for himself/herself. Mentors get mentee's ability information as well the signal of the threshold. I use the absolute difference between the mentee's ability and the signal ($|\text{Ability}_{mentee}\text{-Signal}|$) as a control in the likelihood of giving advice, the right advice and the strength of advice. I use the relative difference between the mentee's ability and the signal (Ability_{mentee}-Signal) as a control in the likelihood of giving advice A.

I also examine if particular kinds of traits work better in eliciting advice from mentors. I look at gender matches (Match_{gender}), matches on geography ($\text{Match}_{geography}$) and matches on political inclinations ($\text{Match}_{politics}$) since these are the most frequent. Regression analysis in Table XIII shows a gender match between mentors and mentees increases the likelihood of giving advice A and the right advice and a match on political inclinations increases the likelihood of mentors giving advice A.

I summarize these findings as follows:

Result 3 *(Advice Giving with Match Information) The presence of common traits significantly increases advice giving for mentors. They are significantly more likely to offer any advice when sharing a common trait with their mentees than when they are informed of having nothing in common with their mentees. A gender match between mentors and mentees increases the likelihood of giving advice A and the right advice and a match on political inclinations increases the likelihood of mentors giving advice A.*

I now turn to examining gender bias in advice towards men and women mentees. My design allows me to not only see if gender bias exists but also to identify possible channels causing it. The first is explicit statistical discrimination where mentors simply treat men and women mentees differently because they don't believe women are as good as men. This is captured by mentor behavior in *MinInfo* where mentors don't know the ability of their mentees. Other channels could be discrimination in the form of a 'paternalistic bias' where mentors don't believe women like competition as much as men even if they have the same ability as men or pure taste-based discrimination against women. This is captured by comparing gender bias in *MinInfo* with *MedInfo* and *MaxInfo*. I first examine if mentors treat men and women differently with no information on their ability. I conduct a series of random effects panel regressions with standard errors clustered at the subject level with the dependent variable being mentors giving advice and the kind and strength of advice given and the independent variables being individual characteristics and treatment specific information provided to mentors. Table XIV shows the following: there is no significant gender bias in terms of giving any advice or advice A to male or female mentees. However, women mentees are significantly less likely to get stronger recommendations without information on their ability (*MinInfo*). This seems to be mostly driven by women mentors giving weaker recommendations to women mentees. Next, I examine if mentors treat men and women mentees differently even with information on their ability. Providing information on ability appears to remove the gender bias in strength of recommendations with women getting the same degree of push as men (shown in Table XVI). With information on ability in *MedInfo*, female mentees are less likely to get advice A, even after controlling for the difference between the ability and signal information mentors see (reported in Table XV). However, this result disappears when pooling *MaxInfo* and *MedInfo* (reported in Table XVI) both of which have information on ability.

Hence, I don't find significant evidence for gender bias in advice for mentees. It is possible that this design fails to capture the full extent of gender bias in advice due to the tendency of mentors to give advice in accordance with their own instead of mentees' ability or even gender, as noted earlier.

Result 4 *(Gender Bias in advice) Mentors give as much advice to women as men mentees with or without information about mentees.*

The general indication is that despite expectations, men and women aren't being treated very differently by mentors.There is one treatment (*MedInfo),* in which mentors know the ability of the mentee along with the gender, where there is some indication that women are less likely to be told to enter the competition. It might be that providing information about ability to mentors works against women because it gives mentors a plausible excuse to tell women not to enter the competition. They can attribute their advice to the ability and not the gender, even though they interpret the ability of men and women differently. This channel of gender bias might especially surface in my design since mentors provide advice to men and women at separate intervals and any specific mentor might never encounter a man and a woman mentee with the exact same ability. However, I don't find women being told to enter competition less in *MaxInfo* where plausibly this channel might also exist since mentors know ability, along with the gender and the match information. So, I don't have strong evidence in favor of this channel of gender bias. This suggests future studies should explore this channel since this experiment was not designed to provide any insights into it.

In addition to the main questions about behavior of mentors and advice giving, it is also useful to examine is the behavior of mentees. I examine whether mentees choose the competitive payment scheme A more with advice than without. I find that subjects are significantly more likely to choose A when given advice A. Figure 3 shows mentees choose A only 15 percent of the time without being advised A but this number goes up to 55 percent when given advice A. I conduct a series of random effects panel regressions with standard errors clustered at the subject level and the dependent variable being mentees (or subjects in Baseline) choosing A in Stage 2. The regression table XVII shows an increase in mentee's likelihood of choosing A comes from being given advice A. Also, a significant predictor of choosing A are the Number of Successes in Stage 1.

Last, I look at whether mentees follow the advice they were given. I conduct a series of random effects panel regressions with standard errors clustered at the subject level and the dependent variable being mentees following advice. The regression table XVIII shows no significant difference in advice following between treatments. The strength of advice given is a significant predictor of mentees following advice as is their own risk aversion. On average, mentored mentees achieve earnings of \$27.06 in *MaxInfo*, \$25.94 in *MedInfo*, and \$30.3 in

MinInfo while non-mentored mentees achieve earnings of $32.48 in *Baseline.* This seems to be an indication that mentors might be hurting more than helping the mentees with their advice. This experiment was not designed to determine if mentors actually helped mentees since mentees get an updated belief about thresholds when given advice and there is an endogeneity in mentees following advice. Recommendation in this experiment takes the simple form of mentors suggesting between alternative payment schemes to mentees on a first name basis. However, this finding makes it important to explore whether advice helps or hurts mentees in subsequent studies.

I summarize these findings as follows:

Result 5 *(Behavior of Mentees) Subjects are more likely to choosing the competitive payment A with advised A. They are more likely to follow stronger advice.*

4 Conclusion

In this study, I use controlled experiments to simulate real-life situations of mentoring. I examine when someone would perform the job of a mentor and pay a cost to help their mentees, particularly with regard to pushing them into a competitive but high paying environment knowing they have an aversion to it. My experiment is designed to simultaneously test for key facets of mentoring, namely the importance of information on abilty and common traits to the likelihood of advice giving and the identification and decomposition of gender bias in advice.

My results provide useful insights into advice giving and the design of mentorship programs. I find that while information on mentees' ability does not change advice giving, information about the presence or absence of a common trait with a mentee has a significant effect on advice giving. Mentors are more likely to offer any advice when informed of a common trait with their mentees. They are also significantly more likely to provide advice to mentees when they are not informed of presence or absence of common traits than when they are informed of no common traits. A match based on gender or political inclinations between mentors and mentees increases the likelihood of them advising mentees to enter the competitive environment. This has important policy applications for mentoring programs.

Depending on the structure of mentoring programs of firms, mentees should be matched on some common trait solicited by the mentoring program. It is important for mentors to have something in common with their mentees. Firms should conduct team building exercises for mentor-mentee pairs to develop this sense of kinship if they have nothing in common from the solicited characteristics.

Some unexpected results open up new avenues in mentorship for further discussion and study. I expected treatment effects on advice giving due to different information available on ability of mentees and this doesn't seem to matter. A compelling possible explanation is that mentors are giving advice in accordance with their own ability, which is not changing across treatments. This sets up questions about whether mentors are behaving correctly. Should they be basing advice on their own ability and experience or should they be tailoring their advice to suit their mentees' abilities? On the one hand, bad advice defeats the purpose of mentoring relations, leading mentees down unsuitable or unprofitable career paths. On the other hand, mentors often need to guide mentees into competitive situations and tasks for their career advancement. Mentors inducing overconfidence in their mentees may be beneficial to the mentees in the long run [36]. Indeed my findings show mentees undertake the competitive payment scheme significantly more with advice than without. However, given the correlation between mentee and mentor ability in my study, it's not clear which effect is more likely.

Mentors giving advice suitable for themselves might be a reason I do not find sufficient evidence on the questions on gender bias in advice giving I set out to answer. In this framework where mentors don't benefit from giving advice, telling mentees what the mentors themselves would do might be a simple way to bypass the ethical issues raised by giving advice based on a host of information on mentee charactersitics. I do find some indication of an entirely different channel of gender bias. Giving mentors information about womens' ability may give them a plausible reason to justify subjectivity and advise women to enter the competitive environment less than men. This raises an interesting question. Does providing information on a woman's ability further gender bias by giving license to treat

[36] Men's overconfidence is a primary determinant of their excessive participation in competition leading to professional opportunities that offer higher incomes (Niederle and Vesterlund 2007, 2010; Gneezy et al., 2003).

her differently? Is it the case that women are held to a higher standard than men, despite knowledge of their abilities, because evaluators doubt how the women got there (perhaps faced easier tasks than themselves)? Reuben et al., (2014) find in a lab experiment that providing information about candidates' past performance reduces employer bias against women but does not eliminate it. Player et al., (2019) find in a psychology study of leadership that men are judged more on their potential while women are judged more on their performance. Hengel (2017) finds evaluators apply higher standards to women's writing in academic peer review. Future work could explore these features of advice giving and gender bias that surface in this study on mentorship.

References

Aigner, D. J. and G. G. Cain (1977). Statistical theories of discrimination in labor markets. *ILR Review 30*(2), 175–187.

Allen, T. D. and L. T. Eby (2011). *The Blackwell handbook of mentoring: A multiple perspectives approach.* John Wiley & Sons.

Allen, T. D., L. T. Eby, M. L. Poteet, E. Lentz, and L. Lima (2004). Career benefits associated with mentoring for protégés: A meta-analysis. *Journal of Applied Psychology 89*(1), 127.

Andreoni, J. (1990). Impure altruism and donations to public goods: A theory of warm-glow giving. *The Economic Journal 100*(401), 464–477.

Andreoni, J. and J. Miller (2002). Giving according to garp: An experimental test of the consistency of preferences for altruism. *Econometrica 70*(2), 737–753.

Athey, S., C. Avery, and P. Zemsky (2000). Mentoring and diversity. *American Economic Review 90*(4), 765–786.

Baldiga, N. R. and K. B. Coffman (2016). Laboratory evidence on the effects of sponsorship on the competitive preferences of men and women. *Management Science 64*(2), 888–901.

Becker, G. S. (1957). *The Economics of Discrimination.* University of Chicago press.

Bertrand, M., D. Chugh, and S. Mullainathan (2005). Implicit discrimination. *American Economic Review 95*(2), 94–98.

Blau, F. D., J. M. Currie, R. T. Croson, and D. K. Ginther (2010). Can mentoring help female assistant professors? interim results from a randomized trial. *American Economic Review 100*(2), 348–52.

Bolton, G. E. and A. Ockenfels (2000). Erc: A theory of equity, reciprocity, and competition. *American Economic Review 90*(1), 166–193.

Brandts, J., V. Groenert, and C. Rott (2014). The impact of advice on women's and men's selection into competition. *Management Science 61*(5), 1018–1035.

Chakraborty, P. and D. Serra (2019). Gender differences in top leadership roles: Does aversion to worker backlash matter?

Coles, P., J. Cawley, P. B. Levine, M. Niederle, A. E. Roth, and J. J. Siegfried (2010). The job market for new economists: A market design perspective. *Journal of Economic Perspectives 24*(4), 187–206.

Cooper, D. J. and J. H. Kagel (2016). A failure to communicate: an experimental investigation of the effects of advice on strategic play. *European Economic Review 82*, 24–45.

Dennehy, T. C. and N. Dasgupta (2017). Female peer mentors early in college increase women's positive academic experiences and retention in engineering. *Proceedings of the National Academy of Sciences*.

Dreber, A., E. von Essen, and E. Ranehill (2014). Gender and competition in adolescence: task matters. *Experimental Economics 17*(1), 154–172.

Ensher, E. A. and S. E. Murphy (2007). E-mentoring. *The handbook of mentoring at work*, 299–322.

Fehr, E. and K. Schmidt (1999). A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics 114*(3), 817–868.

Forsythe, R., J. L. Horowitz, N. E. Savin, and M. Sefton (1994). Fairness in simple bargaining experiments. *Games and Economic behavior 6*(3), 347–369.

Gneezy, U., M. Niederle, and A. Rustichini (2003). Performance in competitive environments: Gender differences. *The Quarterly Journal of Economics 118*(3), 1049–1074.

Hamilton, B. A. and T. A. Scandura (2003). E-mentoring:: Implications for organizational learning and development in a wired world. *Organizational Dynamics 31*(4), 388–402.

Hengel, E. (2017). Publishing while female. are women held to higher standards? evidence from peer review.

Holt, C. A. and S. K. Laury (2002). Risk aversion and incentive effects. *American Economic Review 92*(5), 1644–1655.

Ibarra, H. (1992). Homophily and differential returns: Sex differences in network structure and access in an advertising firm. *Administrative Science Quarterly*, 422–447.

Kahneman, D., J. L. Knetsch, and R. Thaler (1986). Fairness as a constraint on profit seeking: Entitlements in the market. *The American Economic Review*, 728–741.

Kanter, R. M. (2008). *Men and women of the corporation: New edition.* Basic books.

Morrison, A. M. and M. A. Von Glinow (1990). *Women and minorities in management.*, Volume 45. American Psychological Association.

Neumark, D., R. J. Bank, and K. D. Van Nort (1996). Sex discrimination in restaurant hiring: An audit study. *The Quarterly Journal of Economics 111*(3), 915–941.

Niederle, M. (2016). *Gender effects in economic experiments*, Volume 2. Princeton University Press.

Niederle, M. and L. Vesterlund (2007). Do women shy away from competition? do men compete too much? *The Quarterly Journal of Economics 122*(3), 1067–1101.

Niederle, M. and L. Vesterlund (2010). Explaining the gender gap in math test scores: The role of competition. *Journal of Economic Perspectives 24*(2), 129–44.

Noe, R. A. (1988). Women and mentoring: A review and research agenda. *Academy of Management Review 13*(1), 65–78.

Player, A., G. Randsley de Moura, A. C. Leite, D. Abrams, and F. Tresh (2019). Overlooked leadership potential: The preference for leadership potential in job candidates who are men vs. women. *Frontiers in Psychology 10*, 755.

Ragins, B. R. and T. A. Scandura (1999). Burden or blessing? expected costs and benefits of being a mentor. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior 20*(4), 493–509.

Reuben, E., P. Sapienza, and L. Zingales (2014). How stereotypes impair womenâĂŹs careers in science. *Proceedings of the National Academy of Sciences 111*(12), 4403–4408.

Riach, P. A. and J. Rich (2002). Field experiments of discrimination in the market place. *The Economic Journal 112*(483), F480–F518.

Schotter, A. (2003). Decision making with naive advice. *American Economic Review 93*(2), 196–201.

5 Tables and Figures

Table I: Treatments

	Mentor	Gender	Threshold Signal	Ability	Match
MaxInfo (T1)	Yes	Yes	Yes	Yes	Yes
MedInfo (T2)	Yes	Yes	Yes	Yes	No
MinInfo (T3)	Yes	Yes	Yes	No	No
Baseline (T4)	No	No	No	No	No

Table II: Sessions

	Subjects	Mentors	Mentees
MaxInfo (T1)	48	24	24
MedInfo (T2)	54	27	27
MinInfo (T3)	60	30	30
Baseline (T4)	30		
Total	192	81	81

Table III: Average number of correctly solved captchas in Stage 1.

	Total	Men	Women
MaxInfo (T1)	11.06	11.20	10.87
MedInfo (T2)	12.12	12.38	11.51
MinInfo (T3)	11.75	12.12	11.07
Baseline (T4)	11.01	11.24	10.76

Table IV: Performance in Stage 1.

	(1)	(2)	(3)	(4)	(5)	(6)
	P	P	P	S	S	S
Female	-0.822***	-0.829***	-0.729**	-0.047**	-0.070**	-0.062**
	(0.005)	(0.005)	(0.013)	(0.042)	(0.012)	(0.028)
Round_{last3}		0.744***	-0.739***		-0.148***	-0.148***
		(0.000)	(0.000)		(0.000)	(0.000)
Success_{lag}		-0.084	-0.136		-0.199***	-0.203***
		(0.683)	(0.499)		(0.000)	(0.000)
MaxInfo			0.141			0.040
			(0.759)			(0.328)
MedInfo			1.020**			0.100**
			(0.015)			(0.013)
MinInfo			0.718*			0.065*
			(0.066)			(0.077)
Constant	11.872***	11.917***	11.354***	0.311***	0.487***	0.427***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	1344	1152	1152	1344	1152	1152
R-Squared	0.014	0.030	0.045	0.002	0.063	0.068

Panel regressions. Dependent variable: Col (1)-(3): Number of correctly solved captchas, Col (4)-(6): Success (1-met threshold, 0-didn't meet threshold). Controls: dummy for last 3 rounds of Stage 1 (Round_{last3}), success in crossing the threshold in the previous round (Success_{lag}) and treatment dummies. Standard errors are clustered at the individual level. p-values are reported in parentheses. There are 192 participants. *** p<0.01, ** p<0.05, * p<0.1

Table V: Average likelihood of choosing payment scheme A over B.

	Total	Men	Women
MaxInfo (T1)	1.8	1.5	2.2
MedInfo (T2)	2.1	2.42	1.25
MinInfo (T3)	1.7	2.13	1.36
Baseline (T4)	1.3	1.19	1.36

The likelihood is measured on a scale of 1-5 where 1 is 'Extremely unlikely to choose A' and 5 is 'Extremely likely to choose A'.

Table VI: Likelihood of choosing A over B on a scale of 1-5.

	(1)	(2)	(3)
Female	-0.362	-0.150	-0.109
	(0.131)	(0.556)	(0.664)
Stage 1 Successes		0.603***	0.596***
		(0.000)	(0.000)
Risk Aversion		0.010	0.024
		(0.867)	(0.700)
MaxInfo			0.721
			(0.126)
MedInfo			0.869*
			(0.051)
MinInfo			0.594
			(0.194)
Observations	111	111	111

Probit regressions. Dependent variable: Likelihood of choosing A over B in Stage 2. p-values are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table VII: Percentage of times mentors offer advice in each treatment.

	Advice (%)	Advice A (%)	Right Advice (%)
MaxInfo (T1)	45	61.11	62.96
MedInfo (T2)	55.6	65.33	60.00
MinInfo (T3)	46	65.22	69.57

Table VIII: Percentage of mentors who give different strength of advice by treatment.

	Strength 1 (Cost 10)	Strength 2 (Cost 11)	Strength 3 (Cost 12)	Strength 4 (Cost 13)
MaxInfo (T1)	26.67	3.33	6.67	8.33
MedInfo (T2)	20.00	4.44	8.89	22.22
MinInfo (T3)	27.33	3.33	2.00	13.33

Table IX: Regression Analysis of likelihood of giving advice over all three treatments

	(1)	(2)	(3)	(4)
	Any Advice	Advice A	Right Advice$_{mentee}$	Strong Advice
MaxInfo	-0.048	-0.015	-0.080	-0.058
	(0.596)	(0.891)	(0.507)	(0.876)
MedInfo	0.058	0.018	-0.116	0.497
	(0.595)	(0.876)	(0.265)	(0.171)
Female	0.106	0.080	0.008	-0.476*
	(0.156)	(0.352)	(0.940)	(0.092)
Stage 1 Successes$_{mentor}$	0.002	0.105***	0.049	-0.237*
	(0.952)	(0.008)	(0.228)	(0.073)
Risk Aversion	-0.008	-0.044*	-0.012	-0.002
	(0.726)	(0.085)	(0.533)	(0.969)
Female Mentee	0.028	-0.071	-0.038	0.065
	(0.613)	(0.321)	(0.635)	(0.690)
Signal	0.056***	-0.058**	-0.064***	0.035
	(0.000)	(0.012)	(0.004)	(0.443)
LikelyA	0.051	0.059	-0.069	0.293
	(0.707)	(0.681)	(0.641)	(0.526)
Right Advice$_{mentor}$			0.465***	
			(0.000)	
Observations	405	198	198	198

Estimates generated by probit regressions. Standard errors are clustered on the individual. Robust pval in parentheses *** p<0.01, ** p<0.05, * p<0.1. Col (1) is giving any advice, Col (2) is giving advice A, conditional on giving advice, Col (3) is giving the right advice to the mentee, conditional on giving advice and col (4) is giving strong advice (strength=4) conditional on giving advice. Right Advice$_{mentor}$dummy is 1 if mentor's ability$\geq$signal and advice is A, or if mentor's ability<signal and advice is B and 0 otherwise. LikelyA is the average answer of mentees' likelihood of choosing A over B that is reported to the mentors. Stage 1 Succeses$_{mentor}$is the number of succeses the mentor had in Stage 1.

Table X: Distribution of match characteristics in MaxInfo.

	Total (%)	Men (%)	Women (%)
Nothing common	25.83	21.43	32.00
Geography	32.50	35.71	28.00
Politics	17.50	20.00	14.00
Religion	13.33	10.00	18.00
Hobbies	10.83	12.86	8.00

Table XI: Regression Analysis of likelihood of giving advice with common traits

	(1)	(2)	(3)	(4)
	Any Advice	Advice A	Right Advice$_{mentee}$	Strong Advice
Common Trait	0.299***	0.160	-0.024	0.207
	(0.005)	(0.461)	(0.859)	(0.642)
Female	0.198	-0.719	-0.132	0.056
	(0.128)	(0.201)	(0.229)	(0.927)
Stage 1 Successes$_{mentor}$	-0.009	0.176**	-0.032	0.008
	(0.850)	(0.041)	(0.642)	(0.977)
Risk Aversion	0.000	-0.063***	-0.017	-0.140
	(0.985)	(0.037)	(0.419)	(0.237)
Right Advice$_{mentor}$			0.735*	
			(0.054)	
Female Mentee	0.043	0.250	0.078	-0.251
	(0.683)	(0.115)	(0.639)	(0.355)
LikelyA	-0.523	-2.240	-4.841***	4.947
	(0.695)	(0.187)	(0.005)	(0.393)
$\|Ability_{mentee}$-Signal$\|$	-0.009		0.735*	-0.004
	(0.728)		(0.054)	(0.966)
Ability$_{mentee}$ $\geq$Signal		0.123***		
		(0.001)		
Ability$_{mentee}$-Signal			0.193	
			(0.517)	
Observations	120	54	54	54

Estimates generated by probit regressions. Standard errors are clustered on the individual. Robust pval in parentheses *** p<0.01, ** p<0.05, * p<0.1. Col (1) is giving any advice, Col (2) is giving advice A, conditional on giving advice, Col (3) is giving the right advice to the mentee, conditional on giving advice and col (4) is giving strong advice (strength=4) conditional on giving advice. Common trait dummy is 1 if mentor-mentee share a common trait and 0 otherwise. Right Advice$_{mentor}$dummy is 1 if mentor's ability$\geq$signal and advice is A, or if mentor's ability<signal and advice is B and 0 otherwise.

Table XII: Regression Analysis of likelihood of giving advice with and without information of common traits

	(1)	(2)	(3)	(4)
	Any Advice	Advice A	Right Advice$_{mentee}$	Strong Advice
MedInfo	0.393***	0.173	-0.027	0.749
	(0.000)	(0.383)	(0.877)	(0.172)
MaxInfoxCommon	0.317***	0.196	0.056	-0.011
	(0.004)	(0.254)	(0.697)	(0.980)
Female	0.026***	0.070	-0.027	-0.246
	(0.018)	(0.498)	(0.820)	(0.470)
Stage 1 Successes$_{mentor}$	-0.015	0.060	0.022	-0.327**
	(0.697)	(0.153)	(0.676)	(0.032)
Risk Aversion	0.011	-0.065***	-0.056	-0.010
	(0.629)	(0.007)	(0.039)	(0.891)
Right Advice$_{mentor}$			0.329**	
			(0.022)	
Female Mentee	0.063	-0.090	-0.044	0.028
	(0.366)	(0.324)	(0.711)	(0.893)
$\|$Ability$_{mentee}$-Signal$\|$	-0.022		0.124***	0.008
	(0.212)		(0.000)	(0.887)
Ability$_{mentee}$ $\geq$Signal		0.062***		
		(0.000)		
Ability$_{mentee}$-Signal			0.083	
			(0.523)	
MaxInfoxCommon-MedInfo=0	-.205	.093	.231	-.387*
	(0.374)	(0.722)	(0.448)	(0.081)
Observations	255	129	129	129

Estimates generated by probit regressions. Standard errors are clustered on the individual. Robust pval in parentheses *** p<0.01, ** p<0.05, * p<0.1. Col (1) is giving any advice, Col (2) is giving advice A, conditional on giving advice, Col (3) is giving the right advice to the mentee, conditional on giving advice and col (4) is giving strong advice (strength=4) conditional on giving advice.

Table XIII: Regression Analysis of likelihood of giving advice by types of traits

	(1)	(2)	(3)	(4)
	Any Advice	Advice A	Right Advice$_{mentee}$	Strong Advice
Match$_{gender}$	0.091	0.328*	0.339*	-0.257
	(0.443)	(0.087)	(0.076)	(0.463)
Match$_{geography}$	-0.025	-0.041	-0.013	0.534
	(0.857)	(0.819)	(0.936)	(0.336)
Match$_{politics}$	-0.063	0.267*	0.191	0.432
	(0.677)	(0.095)	(0.315)	(0.385)
Female	0.061	-0.138	-0.297*	0.166
	(0.699)	(0.383)	(0.074)	(0.791)
Right Advice$_{mentor}$			0.723***	
			(0.000)	
Stage 1 Successes$_{mentor}$	-0.021	0.257**	-0.099	-0.036
	(0.695)	(0.018)	(0.163)	(0.891)
Risk Aversion	0.002	-0.074***	-0.028	-0.087
	(0.946)	(0.010)	(0.109)	(0.464)
Female Mentee	0.020	0.250	0.035	-0.251
	(0.846)	(0.115)	(0.837)	(0.395)
$\|$Ability$_{mentee}$-Signal$\|$	0.009		0.271***	-0.046
	(0.773)		(0.000)	(0.690)
Ability$_{mentee}$ $\geq$Signal		0.123***		
		(0.001)		
Ability$_{mentee}$-Signal		0.157***		
		(0.001)		
Observations	89	46	46	46

Estimates generated by probit regressions. Standard errors are clustered on the individual. Robust pval in parentheses *** p<0.01, ** p<0.05, * p<0.1. Col (1) is giving any advice, Col (2) is giving advice A, conditional on giving advice, Col (3) is giving the right advice to the mentee, conditional on giving advice and col (4) is giving strong advice (strength=4), conditional on giving advice.

Table XIV: Regression Analysis of giving advice without ability information (T3).

	(1)	(2)	(3)
	Any Advice	Advice A	Strong Advice
Female Mentee	0.026	-0.034	-2.122***
	(0.838)	(0.816)	(0.000)
Female	-0.072	0.076	-3.661***
	(0.601)	(0.543)	(0.000)
$Match_{gender}$	0.139	-0.045	-2.344***
	(0.257)	(0.739)	(0.000)
Signal	0.056**	-0.033	0.083
	(0.017)	(0.460)	(0.438)
Stage 1 $Successes_{mentor}$	0.089	0.384**	0.518
	(0.263)	(0.004)	(0.267)
Risk Aversion	-0.024	-0.042	0.008
	(0.518)	(0.280)	(0.926)
Observations	150	69	69

Estimates generated by probit regressions. Standard errors are clustered on the individual. Robust pval in parentheses *** p<0.01, ** p<0.05, * p<0.1. Col (1) is giving any advice, Col (2) is giving advice A, conditional on giving advice, Col (3) is giving strong advice (strength=4), conditional on giving advice.

Table XV: Regression Analysis of giving advice with ability information (T2).

	(1)	(2)	(3)	(4)
	Any Advice	Advice A	Right Advice$_{mentee}$	Strong Advice
Female Mentee	0.108	-0.313***	-0.027	0.106
	(0.336)	(0.004)	(0.863)	(0.742)
Female	0.233**	0.262*	0.259**	-0.559
	(0.041)	(0.060)	(0.039)	(0.175)
Match$_{gender}$	0.016	-0.074	-0.122	-0.278
	(0.886)	(0.453)	(0.320)	(0.333)
Stage 1 Successes$_{mentor}$	-0.024	0.060	0.058	-0.538***
	(0.698)	(0.304)	(0.266)	(0.001)
Risk Aversion	0.033	-0.089	-0.065	-0.016
	(0.469)	(0.108)	(0.257)	(0.896)
$\|$Ability$_{mentee}$-Signal$\|$	-0.009		0.083**	0.023
	(0.728)		(0.042)	(0.760)
Ability$_{mentee}$-Signal		0.012		
		(0.586)		
Observations	135	75	75	75

Estimates generated by probit regressions. Standard errors are clustered on the individual. Robust pval in parentheses *** p<0.01, ** p<0.05, * p<0.1. Col (1) is giving any advice, Col (2) is giving advice A, conditional on giving advice, Col (3) is giving the right advice to the mentee, conditional on giving advice and col (4) is giving strong advice (strength=4) conditional on giving advice.

Table XVI: Regression Analysis of giving advice with ability information (T1 and T2).

	(1)	(2)	(3)	(4)
	Any Advice	Advice A	Right Advice$_{mentee}$	Strong Advice
Female Mentee	0.048	-0.093	-0.072	-0.086
	(0.510)	(0.318)	(0.519)	(0.674)
Female	0.164*	0.042	0.009	-0.346
	(0.096)	(0.688)	(0.940)	(0.343)
Match$_{gender}$	0.000	-0.010	-0.087	-0.315
	(0.996)	(0.917)	(0.432)	(0.118)
Stage 1 Successes$_{mentor}$	-0.000	0.056	0.034	-0.263*
	(0.999)	(0.173)	(0.461)	(0.055)
Risk Aversion	0.017	-0.063**	-0.063***	0.018
	(0.531)	(0.005)	(0.023)	(0.826)
$\lvert$Ability$_{mentee}$-Signal$\rvert$	-0.017		0.115***	0.016
	(0.312)		(0.000)	(0.759)
Ability$_{mentee}$-Signal		0.061***		
		(0.000)		
Observations	255	129	129	129

Estimates generated by probit regressions. Standard errors are clustered on the individual. Robust pval in parentheses *** p<0.01, ** p<0.05, * p<0.1. Col (1) is giving any advice, Col (2) is giving advice A, conditional on giving advice, Col (3) is giving the right advice to the mentee, conditional on giving advice and col (4) is giving strong advice (strength=4), conditional on giving advice.

Table XVII: Regression Analysis of mentees choosing A

	(1)	(2)
	Choose A	Choose A
Given Advice A	0.420***	0.412***
	(0.000)	(0.000)
Given any advice	-0.236	-0.237
	(0.156)	(0.148)
MaxInfo	-0.206	-0.204
	(0.156)	(0.148)
MedInfo	0.227*	0.163
	(0.054)	(0.142)
MinInfo	0.118	0.127
	(0.316)	(0.240)
Female		0.052
		(0.557)
Stage 1 Successes		0.117***
		(0.001)
Risk Aversion		-0.032
		(0.155)
Observations	273	273

Estimates generated by probit regressions. Dependent variable: Mentee chooses A.Robust pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1.

Table XVIII: Regression Analysis of mentees following advice

	(1)	(2)
	Follow Advice	Follow Advice
MaxInfo	0.038	0.031
	(0.710)	(0.757)
MedInfo	0.110	0.050
	(0.170)	(0.573)
Female		0.096
		(0.225)
Stage 1 Successes		-0.012
		(0.678)
Risk Aversion		-0.041**
		(0.022)
Strength of Advice		0.070***
		0.009
Observations	198	198

Estimates generated by probit regressions. Dependent variable: Mentee follows Advice. Robust pval in parentheses
*** p<0.01, ** p<0.05, * p<0.1.

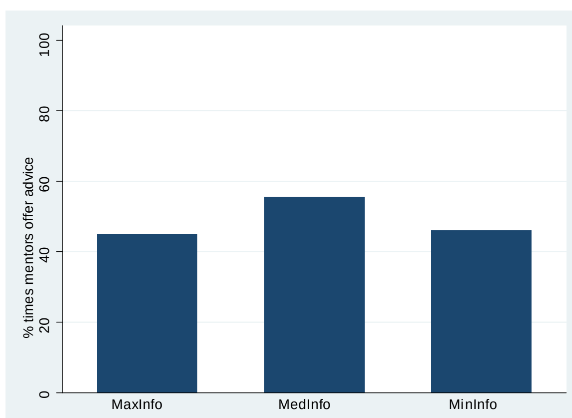

Figure 1: % times mentors offer advice in each treatment.

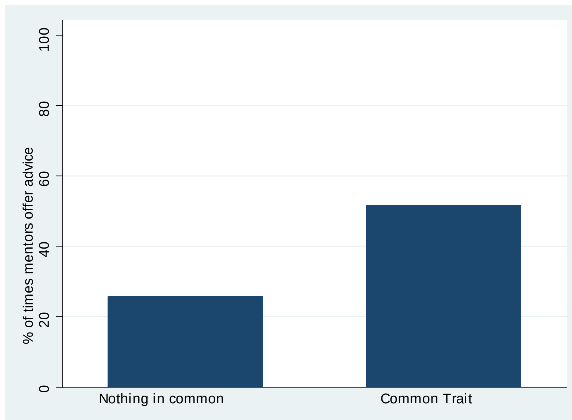

Figure 2: % times mentors offer advice with and without a common trait.

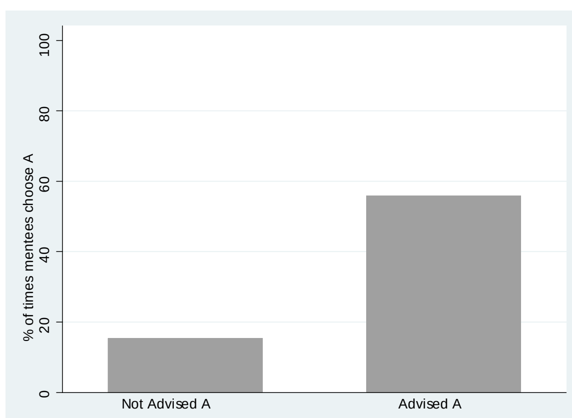

Figure 3: % times mentees choose A with and without advice

6 Appendix

EXPERIMENTAL INSTRUCTIONS: Stage 1 instructions are the same for all four treatments.

INSTRUCTIONS-STAGE 1

In Stage 1, you will engage in 7 rounds of a task. This task consists of correctly identifying the letters and numbers in a picture. This is similar to the CAPTCHA procedure on many websites. In order to earn money, you will have to correctly identify the letters and numbers in the CAPTCHA and enter those on the screen. You will then have to press "submit" to submit your answer and move to the next CAPTCHA. In each round of Stage 1 of the experiment, you will have 4 minutes to solve up to 20 CAPTCHAS. There will be CAPTCHAs with 6 elements to identify and others with 8. Each round will have a different number of 6-element and 8-element pictures for you to identify. This means some rounds will be more challenging than others. The level of difficulty will be determined randomly for each participant in this stage. Consequently, some people will face a greater number of challenging rounds than others.

Please note that the CAPTCHAs may contain both letters and numbers. The letters are all UPPERCASE and must be entered in uppercase to receive credit. Please make sure you use the Caps Lock when you enter the letters. The numbers are from 1-9 (zero is excluded).

In each round, you will be paid as follows:

You can solve as many CAPTCHAs as you like but you will have to meet a certain threshold to receive payment. If you correctly solve at least as many CAPTCHAs as the threshold for a round, you will receive a payment of 2 ECUs for every correct CAPTCHA plus a 20 ECU bonus. If you do not correctly solve enough CAPTCHAs to meet the threshold requirement, you will receive 0 ECU for that round. Each of the 7 rounds will have a different threshold and you will not know what the threshold is during a round. You will learn at the end of each round whether you successfully met the threshold, but you will only learn what the thresholds were at the conclusion of all 7 rounds. The thresholds will be set based on performance of participants in prior sessions.

At the end of this stage we will provide you with a history of all 7 rounds showing you your performance and the required threshold for each. At the end of the experiment, two rounds from this Stage will be randomly chosen for payment. You will receive separate instructions for Stages 2 and 3 after you finish Stage 1 of the experiment.

Please press continue to take a look at the next screen for an example of the CAPTCHA task. On the screen you will see the task summary and solve a practice CAPTCHA. You will then have to press CONTINUE to start Stage 1. Please try the sample CAPTCHA to make certain you understand how it works and then press continue so that the paying rounds can begin. If you have any questions about the screen, please raise your hand and I will come to you.

INSTRUCTIONS-STAGE 2 (MaxInfo treatment)

Stage 2 of the experiment is about to begin.

In this Stage, you will be randomly assigned the role of either “Mentor” or “Mentee”. You will keep your role for the duration of Stage 2.

In Stage 2, the Mentor and the Mentee will perform separate tasks.

The Mentee will engage in 5 more rounds of the CAPTCHA task. In each round of Stage 2 of the experiment, the Mentee will have 4 minutes to solve up to 20 CAPTCHAS. The rounds will again have varying numbers of have 6-element and 8-element pictures meaning that rounds will vary in their level of difficulty.

While this is the same as in Stage 1, the way the Mentee gets paid is now different.

Mentees can now choose how they want to be paid. They can choose between what we will call Payment Scheme A and Payment Scheme B.

Payment Scheme A: This scheme is the same as the one experienced in Stage 1. In each round, the Mentee will have to meet a certain threshold to receive payment with the threshold varying across rounds. If the Mentee meets the threshold for a particular round, they will receive a payment of 2 ECU for every CAPTCHA they correctly solve + a bonus of 20 ECU. If they don't meet the threshold for a particular round, they will receive 0 ECU.

Payment Scheme B: This scheme is slightly different. The Mentee can solve as many CAPTCHAs as they like, and they will receive a piece rate payment of 2 ECU for every CAPTCHA they correctly solve. They will not have to meet any threshold requirement to receive these earnings, but they will also not be eligible to receive a bonus.

The Mentor will engage in 5 rounds of a puzzle-solving task. Each task consists of finding a 4-letter word in a 6x6 matrix. The Mentor will receive a fixed wage of 60 ECU per round for engaging in this task regardless of how many puzzles they solve. The Mentor will have the opportunity to provide a recommendation to the Mentee regarding which payoff scheme they might choose.

As a way of helping you understand payment schemes A and B and the nature of the choice (Mentee) or recommendation (Mentor) you have to make, you can see now see on your screens a table showing you what you would have earned in either scheme from stage 1 based on your performance and the thresholds.

You will also see on your screens the role, "Mentor" or "Mentee", you have been assigned.

Those of you who are "Mentees" have a question on your screen regarding your preference for choosing A over B.

Please answer the question and then press submit and we will continue with the instructions.

For the next 5 rounds, the Mentee will be matched with a different Mentor in each round. While the mentee will not know the threshold required in a round to receive the bonus under Payment Scheme A, the Mentor will have some information about the threshold which will be in the form of a signal regarding what the threshold is and be able to provide a recommendation to the mentee regarding which payment scheme to choose. The signal (S) Mentors will receive will be based on the real threshold (T) in that round. The signal, S, that they see will be a random draw from the range of [T-2, T+2].

- If, for example, the Mentor sees a signal S=12 they know that it is drawn from the range [T-2, T+2]. Consequently, they will know that the true threshold is somewhere between 10 and 14. This is because the signal of 12 could be equal to T+2, in which case 12=T+2, meaning that T=10. Or it could be 12=T-2, meaning that T=14. It could also be equal to any value between those extremes. So, the actual threshold is somewhere in the range [10, 14]. All numbers in that range are equally likely to be the true threshold.
- Here is another example. Suppose that the Mentor receives a signal S=9 from

the range [T-2, T+2]. In this case, the true threshold is in the range is [7, 11]. This is because the signal 9=T-2 gives T=11. And the signal 9=T+2 gives T=7. Hence the range [7, 11]. Such range means that the true signal that the participant faced could have been any number between 7 and 11.

Before making a recommendation, if any, the Mentor will also see the Mentee's average number of CAPTCHAs correctly completed from Stage 1. The mentor-mentee pair may also be shown some characteristic they have in common from the opening questionnaire. The Mentor will also be shown the average answer of all mentees to the question they just responded to of how likely they are to choose Payment Scheme A over Payment Scheme B.

After observing the information, the Mentor can choose to provide a recommendation to the Mentee. If they choose to provide a recommendation, the Mentor will Recommend which payment scheme, A or B, they think the Mentee should choose.

Sending a recommendation is costly for the Mentor. The cost is between 10 and 13 ECU depending on the strength of the recommendation, which is on a scale from 1 to 4. If the Mentor sends a recommendation of strength 1, he or she will have to pay a cost of 10 ECU. If the Mentor sends a recommendation of strength 2, the cost for the Mentor will be 11 ECU. If the chosen strength of the recommendation is 3, the Mentor will have to pay a cost of 12 ECU. Finally, if the chosen strength of the recommendation is 4, the Mentor will have a pay a cost of 13 ECU.

The Mentor gets paid a bonus of 10 ECU if the Mentee follows their recommendation of the Payment Scheme. This bonus is based only on whether the Mentee follows the recommendation, and not based on the Mentee's final earnings when following the recommendation.

Once the Mentee sees their Mentor's recommendation (if any) and the strength of the recommendation, the Mentee will have to choose payment scheme A or B before beginning to solve the CAPTCHA puzzles. Again, Mentees will not be told the threshold during a round, but they will be shown a record of all the thresholds used in each round after the stage is completed. For this stage, for any round in which Mentees choose Payment Scheme A, if any, they will only find out if they met the threshold after all 5 rounds are concluded.

Therefore, the earnings from this stage of the experiment are determined as follows:

The Mentee gets

- Under Payment Scheme A: 2 ECU per correct CAPTCHA + bonus of 20 ECU (if threshold met)
- Under Payment Scheme B: 2 ECU per correct CAPTCHA (no bonus)

The Mentor gets: Fixed wage + Bonus - Cost

(60 ECU) (10 ECU if recommendation followed) (10 to 13 ECU)

At the end of the experiment, two rounds from Stage 2 will be randomly chosen for payment.

If you feel you understand the rules for this stage, please press the continue button on your screen to begin the rounds for stage 2.

INSTRUCTIONS-STAGE 2 (Baseline treatment)

Stage 2 of the experiment is about to begin.

In this Stage, you will engage in 5 more rounds of the CAPTCHA task. In each round of Stage 2 of the experiment, you will have 4 minutes to solve up to 20 CAPTCHAS. The rounds will again have varying numbers of have 6-element and 8-element pictures meaning that rounds will vary in their level of difficulty.

While this is the same as in Stage 1, the way you get paid is now different.

You can now choose how you want to be paid. You can choose between what we will call Payment Scheme A and Payment Scheme B.

Payment Scheme A: This scheme is the same as the one experienced in Stage 1. In each round, you will have to meet a certain threshold to receive payment with the thres hold varying across rounds. If you meet the threshold for a particular round, you will receive a payment of 2 ECU for every CAPTCHA they correctly solve + a bonus of 20 ECU. If you don't meet the threshold for a particular round, you will receive 0 ECU.

Payment Scheme B: This scheme is slightly different. You can solve as many CAPTCHAs as you like, and you will receive a piece rate payment of 2 ECU for every CAPTCHA you correctly solve. You will not have to meet any threshold requirement to receive these earnings, but you will also not be eligible to receive a bonus.

As a way of helping you understand payment schemes A and B and the nature of the choice you have to make, you can see now see on your screens a table showing you what you would have earned in either scheme from stage 1 based on your performance and the thresholds.

You have a question on your screen regarding your preference for choosing A over B.

Please answer the question and then press submit and we will continue with the instructions.

You will have to choose payment scheme A or B before beginning to solve the CAPTCHA puzzles. Again, you will not be told the threshold during a round, but you will be shown a record of all the thresholds used in each round after the stage is completed. For this stage, for any round in which you choose Payment Scheme A, if any, you will only find out if you met the threshold after all 5 rounds are concluded.

Therefore, the earnings from this stage of the experiment are determined as follows:

- Under Payment Scheme A: 2 ECU per correct CAPTCHA + bonus of 20 ECU (if threshold met)
- Under Payment Scheme B: 2 ECU per correct CAPTCHA (no bonus)

At the end of the experiment, two rounds from Stage 2 will be randomly chosen for payment.

If you feel you understand the rules for this stage, please press the continue button on your screen to begin the rounds for stage 2.