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Updating, Self-Confidence and Discrimination

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ABSTRACT

Updating, Self-Confidence and Discrimination[1]

In a laboratory experiment, we show that subjects incorporate irrelevant group information into their evaluations of individuals. Individuals from on average worse performing groups receive lower evaluations, even if they are known to perform equally well as individuals from better performing groups. Our experiment leaves room neither for statistical nor taste-based discrimination. The discrimination we find is rather due to conservatism in updating beliefs. This conservatism is more pronounced in females. Furthermore, self-confident male evaluators overvalue male performers. Additionally, we use our data to simulate a job promotion ladder: Few rounds of moderate discrimination virtually eliminate females in higher positions.

JEL Classification: J16, C91, D81

Keywords: updating, conservatism, gender, discrimination, self-confidence

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1 Introduction

Consider two individuals who perform equally well. Is their performance evaluated the same way? In a laboratory experiment, we find that this is not the case if one individual belongs to a less favorable group. “Discrimination” occurs even though the evaluator knows that both individuals perform equally well and that hence group belonging is completely irrelevant. Thus, there is no room for statistical discrimination. Also, there is no interaction involved between evaluator and performer and hence no room for taste-based discrimination. Nevertheless, our laboratory study shows that evaluators take the irrelevant group belonging into account. In female evaluators, this effect is even more pronounced. We furthermore find self-confident male evaluators to overvalue male performers.

In our study the information on group belonging is given as the prior (or base-rate information), and the information on the individual as the new information. We hence analyze a simple updating problem. In the economic and psychological literature on updating, there is broad evidence that people do not update according to Bayes’ Rule: Instead, they are either too conservative by giving the prior too much weight,[2] or neglect the prior when they should not.[3] Typical updating problems are mathematically complex: They require reweighting the prior with the new information. In contrast, in our experiment Bayes’ Rule just demands to give up the prior completely. Despite the simplicity of the problem subjects do not follow Bayes’ Rule. Furthermore, females put more weight on the irrelevant prior than males. Such gender differences in updating are in line with findings from more complex updating tasks (Charness and Levin 2005; Falk, Huffman, and Sunde 2006; Dohmen et al. 2009; Möbius et al. 2011). Hence, our study shows that gender differences in updating cannot fully be explained by differences in mathematical skills.

We frame the updating problem in two different ways: In one set of treatments we use neutral labels to distinguish the performers’ groups; concretely, we call the groups “K” and “L”. In a second set of treatments we use gender as the defining property of the two groups: Subjects evaluate either a man or an equally well performing woman. Evaluators in both frames update more conservatively than rationality would prescribe. Conservatism in updating may consequently be a potential source of discrimination observed in the labor market, pertaining not only to gender but to any group with less favorable characteristics. We find that self-confidence further adds to discrimination: Self-confident male evaluators favor male, but not female performers.

[2]see e.g. Lyon and Slovic 1976; Bar-Hillel 1980; Falk, Huffman, and Sunde 2006; Möbius et al. 2011
[3]see e.g. Tversky and Kahneman 1971; Kahneman and Tversky 1972; Grether 1992; El-Gamal and Grether 1995

In the economic literature on labor market discrimination, the focus so far has been on two possible rationalizations of discriminatory behavior: Taste-based discrimination (Becker 1957) assumes that individuals have preferences against interacting with individuals of certain groups and therefore discriminate them. In contrast, according to the theory of statistical discrimination (Phelps 1972; Arrow 1973), discriminatory behavior arises due to informational frictions. Neither of these theories can explain our findings: Taste-based discrimination can be ruled out because there is no interaction between evaluators and performers. Statistical discrimination does not apply since through our design rational beliefs about all performers are identical.[4]

To investigate taste-based discrimination, Bertrand and Mullainathan (2004) conduct a randomized field experiment sending out fictitious resumés to help-wanted ads manipulating race by randomly assigning different names. They find that Caucasian-sounding names receive fifty percent more call-backs compared to African-American-sounding names. Yet resumés do not provide complete information, which makes it difficult to separate between taste-based and statistical discrimination. Reuben et al. (2010) aim at looking beyond both taste-based and statistical discrimination. They find that women are less often chosen as leaders than men - even if there are no gender differences in previous performance in a competitive real-effort task. However, although prior performance is known, uncertainty about the future performance leaves room for statistical discrimination. Furthermore, in their study the chosen leader receives money for being chosen, which may provoke taste-based discrimination. In our study, we eliminate any possibility of informational frictions and taste-driven behavior since future performance is irrelevant and no direct or indirect interaction (e.g. via payments) between evaluator and performer occurs. Our paper contributes to the literature by showing that even under perfect information and without any interaction with a potentially disliked individual, discrimination may occur.

We further explore the role of self-confidence in the above setting since we find differences in self-confidence about own performance and since previous literature indicates that highly self-confident individuals behave differently than individuals with low levels of self-confidence (e.g. Falk, Huffman, and Sunde 2006; Niederle and Vesterlund 2007). We investigate to what extent the level of self-confidence is reflected in how subjects evaluate other subjects' performances. Our results show that self-confident male evaluators value male performers more highly than female performers. We infer that self-confidence may be another factor that contributes to discrimination in the labor market.

[4] There is a vast empirical literature supporting the existence of discrimination in the labor market. For an overview, see Anderson, Fryer and Holt (2006) and Blau and DeVaro (2007). For example, employers might prefer to rely on group averages rather than bearing the costs of an interview (Anderson, Fryer, and Holt 2006).

We use the results from our study to calibrate a simple model of a job promotion ladder: In each round, employees are promoted with probabilities derived from the evaluations made in the laboratory. We demonstrate a glass ceiling effect, i.e., there are virtually no females left after few rounds of promotions. The effect is stronger when the fraction of promotion decisions made by females is higher.

The remainder of the paper is organized as follows: Section 2 introduces the design of our experiment. In Section 3, we present our results. Section 4 describes our numerical simulations of the glass ceiling effect. Section 5 concludes.

2 Design of the Experiment

The study consists of two separate stages. In the first stage, subjects perform a series of mental rotation tasks (MRTs) and are assigned to one of two groups. Second stage subjects then evaluate the performance of a randomly assigned first stage subject from one of the two groups, who differ in performance averages. The selection and assignment procedures thereby render prior information on the group performance of one of the two groups irrelevant.[5]

First Stage (Pre-Study)

In the first stage of the study, 91 subjects, called *performers*, participate (50 female, age range: 17 to 49 years, mean age: 23.12 years). 24 mental rotation tasks are presented to each subject. Each task consists of five pictures of three-dimensional objects, one being the original object, and four being rotated or mirrored versions of the original object (adapted from Peters et al. 1995; Vandenberg and Kuse 1978). Subjects indicate which two of the four objects were rotated, but not mirrored. They have two times three minutes to solve as many as possible of twelve such tasks in each of the two three minute periods. Afterwards, we ask subjects to estimate their own performance and the average male and female performance in the task. Subjects are assured that all data is treated anonymously. Each subject is paid a flat amount of EUR 2.00 for participation. An example of the task is provided in Figure 1.

[5]The study was conducted in the Bonn Econ Lab in Bonn, Germany. Subjects were recruited via ORSEE (Greiner 2003) and mainly students at Bonn University. Fischbacher’s (2007) software zTree was used to present the tasks to the subjects.

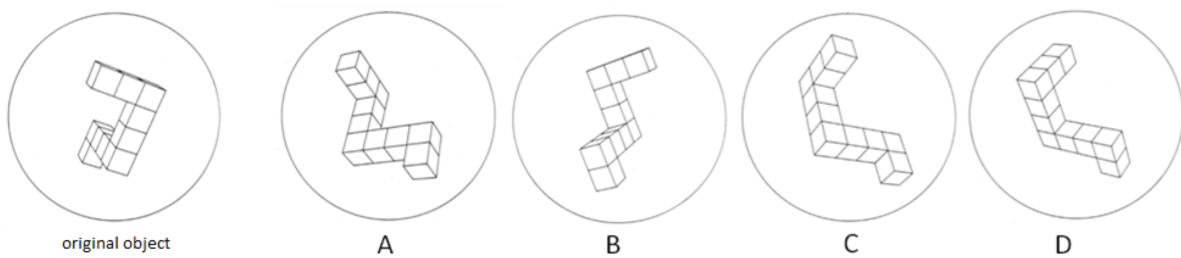


Figure 1. Example of a mental rotation task presented to the subject. The leftmost object is the original object. Subjects have to indicate which two of the four objects (A-D) are rotated but not mirrored versions of the original object. In the example, the correct solutions are B and D.

Second Stage (Main Study)

In the second stage of the study, 305 subjects, called *evaluators*, participate (153 females, age range: 19-63 years, mean age: 24.70 years). No subject participating in this part of the study participated in the first stage.

All second stage subjects are informed about the first stage of the study and that they may earn money depending on their own decisions and on the performance of a randomly assigned first stage subject.

We randomly allocate second stage subjects into four treatments: Two neutral treatments, **Neutral** and **Selected-Neutral**, as well as two gendered treatments, **Man** and **Selected-Woman**. For an overview of treatments, see Table 1.

Table 1: Treatment overview

Treatment		**Description**
Neutral treatments	Neutral	Evaluators face a randomly drawn performer from group K.
	Selected-Neutral	Evaluators face a performer from group L, who is selected as follows: - A performer from group K is randomly chosen. - If the performer from group K is top, then a performer from group L is selected who is also top. - If the performer from group K is mediocre in, a performer from group L is selected who is also mediocre.
Gendered treatments	Man	Evaluators face a randomly drawn male performer.
	Selected-Woman	Evaluators face a female performer, who is selected as follows: - A male performer is randomly chosen. - If the male performer is top, then a female performer is selected who is also top. - If the male performer is mediocre, a female performer is selected who is also mediocre.

Neutral Treatments

In both neutral treatments, subjects are informed via pie diagrams how well subjects from two groups, called group K and group L, performed in the first stage: One pie diagram shows that 43% of the subjects from group K were top, whereas 57% performed in a mediocre way. Another pie diagram shows that 14 percent of the subjects from group L were top, whereas 86% were mediocre. Subjects are further informed that "top" means subjects solved more than 13 tasks correctly and "mediocre" means subjects solved at least 9 and at most 13 tasks correctly. Second stage subjects do not perform MRTs themselves, but are presented the example from Figure 1.

Selection Process in the Neutral Treatments

The selection process of the afterwards assigned first stage performer is carefully described to the subjects. One first stage subject from group K is drawn randomly. Then, a first stage subject from group L is drawn according to the performance level of the before drawn group K subject. This means that if the randomly drawn group K subject is top, then a group L subject is selected who is also top. If the group K subject is mediocre, a group L subject is selected who is also mediocre. Subjects are informed that they will be **randomly assigned** to a performer from group K (treatment Neutral) or a selected performer from group L (treatment Selected-Neutral).

The selection procedure provides additional information about the individual that makes the fraction of top performers in each group completely irrelevant. In other words, the correlation between the performance of a group K performer and a selected group L performer is exactly one. Second stage subjects should neglect the base rate of 43% versus 14% top performers in group K and group L, respectively, once they learn about the selection procedure. Our setting is designed to leave no room for statistical discrimination between groups and different risk attitudes in different winning probability regions, because the probability of facing a top performer is 43% in all treatments. We further eliminate foundations for taste-based discrimination, which might arise from a preference for not interacting with members of a certain group - either directly or indirectly, e.g. through monetary support. Neither do evaluators interact with performers nor does the performance evaluation affect the first stage subjects in any sense.

Evaluation Procedure in the Neutral Treatments

We elicit the evaluations by letting the second stage subjects face a series of 50 choices between a certain outcome and a lottery, varying the certain outcome from EUR 0.40 up to EUR 20.00. The lottery outcome depends on the performance of the first stage subject assigned to the evaluator: If the performer is top, the evaluator wins the lottery (and receives EUR 20.00). If the performer is mediocre, the second stage subject loses the lottery (and receives EUR 0.00). The variable we use is the decision where evaluators switch from the risky option to the safe option. Before conducting the choices, subjects answer a set of control questions to insure that they understood the experiment. After the random assignment to a man or to a selected woman, each subject is asked to make the 50 choices. For the exact instructions, the control questions, and the 50 choices, see Appendix 1.

Gendered Treatments

The gendered treatments are equal to the neutral treatments, but consider gender as an attribute that defines groups. Hence, here group K and group L performers are labeled male and female performers instead. Accordingly, the treatments are named Man and Selected-Woman. The order of the naming of the groups is counterbalanced throughout the study.

After the evaluators made their choices, they are asked to answer a survey. In the survey, evaluators should hypothetically estimate their own performance in the MRTs. At the end of the experiment, one of the 50 decisions is randomly drawn for payment.

3 Results and Discussion

We start by presenting summary statistics of the first stage, showing that there are substantially more males performing very well in solving MRTs. Then, we analyze the data from the second and main part of our experiment where we investigate updating behavior: We first show that subjects are generally conservative, irrationally putting positive weight on the irrelevant prior. Splitting our sample by gender, we find that conservatism is more pronounced in females than in males. Then we demonstrate that the results essentially carry over from the neutral framing of the updating problem to a gendered one. The main difference is that self-confident males are found to strongly overvalue male performers in the gendered setting.

Performance evaluations are stated in amounts of EUR. All analyses are conducted using t-tests. We do so because we assume a normal distribution of the data: A Kolmogorov-Smirnov test cannot reject the hypothesis that evaluations are normally distributed in the sample ($p > .05$). We further apply the parametric strategy proposed by Crump, Hotz, Imbens & Mitnik (2008) to address potential multiple testing concerns.[6]

First Stage

We use our first stage sample to create groups of performers that are later on evaluated by our second-stage-subjects. We create these groups by determining the percentages of male and female performers who solve at least nine and at most thirteen MRTs correctly (mediocre performers), and of male and females performers who solve fourteen or more MRTs correctly (top performers). There were 43% male

[6]Hereby, two null hypotheses about the average treatment effect are tested. The first hypothesis is that evaluating a performer in the Selected-Neutral treatment instead of a performer in the Neutral treatment has a zero average effect for male and for female evaluators. We hold the same hypothesis concerning the gendered treatments. The second hypothesis we test is that the average treatment effect is identical for male and female evaluators, i.e. there is no heterogeneity in the average treatment effect.

top performers, and accordingly 57% male mediocre performers. Only 14% of female performers were top, whereas 86% were mediocre. According to this split, there are significantly more male than female top performers ($t(43) = 2.29$, $p = .03$).

Second Stage

We define the first decision where an evaluator switches from the risky to the safe option as the switching point. 33 subjects switch between the risky and the safe options multiple times and are therefore excluded from the analyses.[7] Summary statistics of the evaluations across treatments are provided in Table A1 in Appendix 2.

In both frames, neutral and gendered, we find that subjects switch significantly earlier in the Selected-Neutral and Selected-Woman treatments compared to the Neutral and Man treatments (neutral treatments: $t(122) = 3.77$, $p < .01$; gendered treatments: $t(125) = 3.24$, $p < .01$). This shows that subjects are too conservative, i.e. they take into account the group's average performance in the Selected-Neutral and Selected-Woman treatments, although they perfectly know that this information is irrelevant (Figure 2). Since all in the analyses included subjects answered the control questions correctly, we assume that subjects know that this information is irrelevant, but are not able to update their beliefs accordingly.[8] The effect is significant in the neutral and gender frames, which suggests that conservatism in updating is a general phenomenon, and a source of discrimination in the labor market that pertains not only to gender but to any group with less favorable average characteristics. Table A2 in Appendix 2 provides summary statistics.

[7]As a robustness check we look at average switching points of all evaluators including multiple switchers. The results are similar for both measures. Although the proportion of female evaluators, who switch multiple times, is significantly higher than among male subjects ($t(303) = 3.15$, $p < .01$), there is no gender difference in the average switching point among subjects who switch multiple times ($t(31) = 1.41$, $p = 0.17$).

[8]Only 3 out of 308 subjects did not respond correctly to the 8 control questions and were excluded from our data analyses. See Appendix 1 for the control questions.

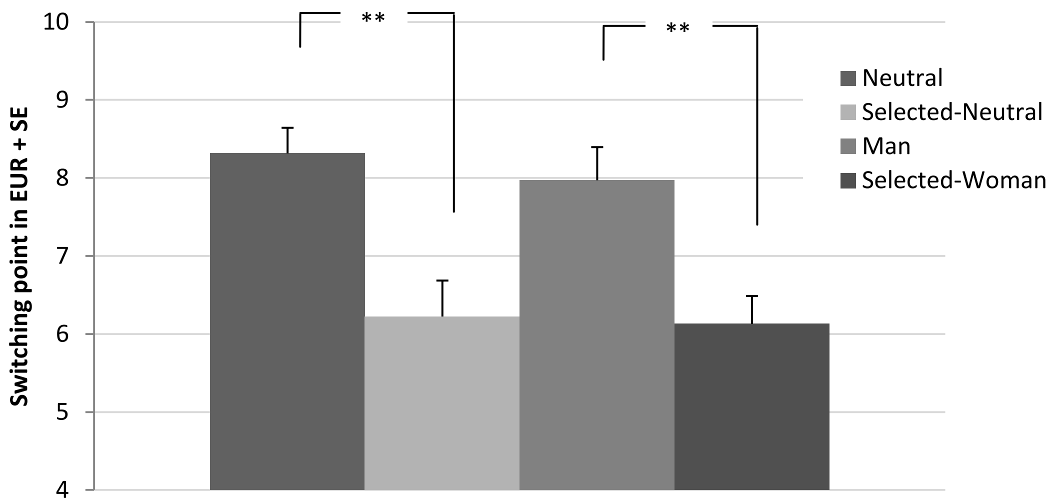


Figure 2. Evaluations in the four treatments. (SE = Standard Error; *p<.05, **p<.01)

Gender Differences in Evaluations between Treatments

Since there is a general gender difference in evaluations (t(270) = 2.44, p = .02) we further analyze evaluations separately for male and female evaluators.

We start by investigating the general evaluations between the neutral treatments, i.e. the evaluations from treatments Neutral and Selected-Neutral. Mean evaluations between these treatments display no significant differences among male evaluators (t(62) = 1.31, p = .20). In contrast, we find a highly significant difference for female evaluators (t(58) = 4.39, p < .01). Among female evaluators, the evaluation of a randomly drawn subject from group K with the higher overall fraction of top performers is, on average, EUR 3.29 higher than the evaluation of the performance of a first stage subject from group L with equal performance. Further, the size of the difference in evaluations between the two neutral treatments is significantly higher for female compared to male evaluators (t(118) = 2.06, p = .02). Hence, female subjects show a more conservative updating behavior than male subjects. An overview of differences in mean evaluations is presented in Figure 3 and Table A2 in Appendix 2.[9]

[9]Tables A3 and A4 in Appendix 2 provide coefficients estimated from OLS regressions. The results support the findings of the t-tests. In addition, we see that R^2 is .25 in the female regression as compared to only .06 in the male regression, which indicates that differences between treatments explain much more of the variation found in female subjects' evaluations.

As in the neutral treatments, in the gendered treatments females evaluate the performance of a selected woman significantly lower than the performance of a randomly drawn man (t(56) = 2.77, p = .01). For male evaluators, the difference in evaluations between the gendered treatments is also significant (t(67) = 1.96, p < .05). Although for male subjects this difference is marginally significant in the gendered treatments, it is not significantly stronger than in the neutral treatments (t(129) = 0.45, p = .33). Also, for female subjects, there is no difference in updating between the gendered and the neutral treatments (t(114) = -1.03, p = .15). An overview of differences in mean evaluations is presented in Figure 3 and Table A2 in Appendix 2.[10]

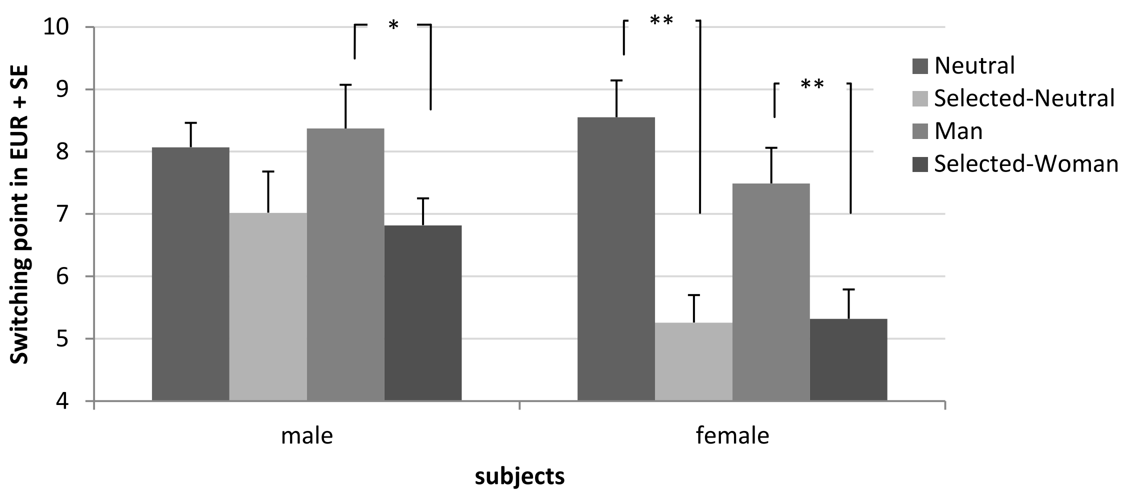


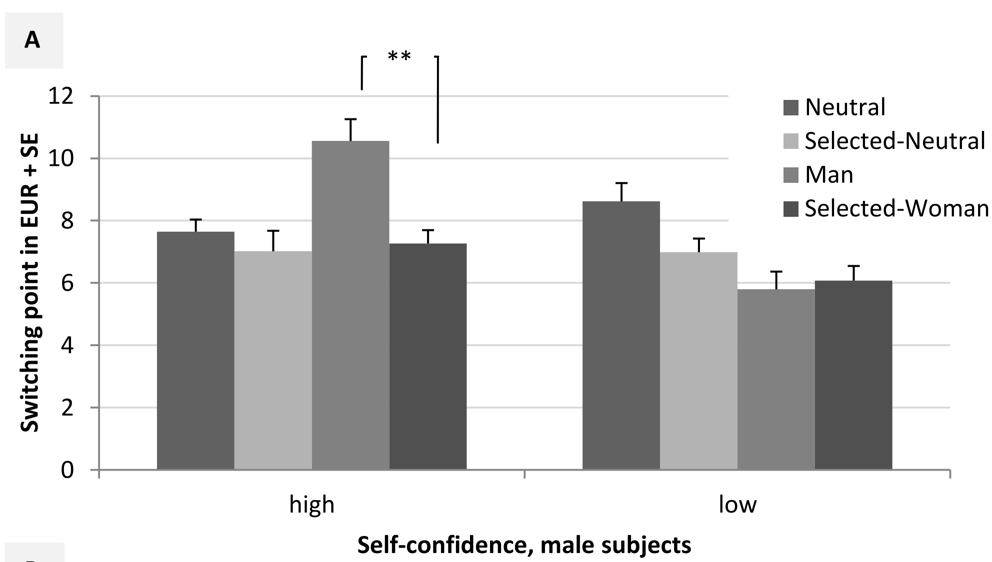
Figure 3. Evaluations by gender. (SE = Standard Error; *p<.05, **p<.01)

Our results indicate that women seem to have a general problem with updating, not depending on the framing. Instead, they stick to their prior belief based on the average group performance. For males, we also find an indication for conservatism in updating: The gendered framing seems to increase this conservatism. The fact that males as well as females are conservative in the gendered treatment suggests that conservatism in updating may be a mechanism behind gender discrimination in the labor market.

The Influence of Self-Confidence

[10]In the regressions in Tables A3 and A4, the dummy variable for the gendered treatments and its interactions with a neutral-treatment's dummy and a male dummy are insignificant.

In line with previous literature (Falk, Huffman, and Sunde 2006; Niederle and Vesterlund 2007) we find that male evaluators are more optimistic about their own (hypothetical) performance in MRTs than female evaluators ($t(303) = 5.78$, $p < .01$). We therefore investigate the influence of self-confidence on discrimination. To measure self-confidence, we take the beliefs about how many MRTs the evaluators think they would have solved themselves if they had participated in the first stage. Based on this measure, we construct two groups of evaluators. In the first group, there are evaluators whose beliefs about their own hypothetical performance are above the median belief (high self-confidence), and in the second group are those with beliefs below the median (low self-confidence), within each treatment and gender. Figure 3 and Table A5 in Appendix 2 provide the performance evaluations of second-stage subjects split by level of self-confidence. [11]



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[11]As a robustness check, we alternatively use the mean instead of the median for the sample split. We further create two additional measures of self-confidence: Firstly, a relative self-confidence measure is constructed performing a median-split on the difference between beliefs about the own performance and the performance of the corresponding performer. Secondly, we construct a self-confidence measure where we classify subjects as being self-confident if, according to their beliefs about their own performance, they would count themselves to the group of top performers; i.e. the belief about their own performance is to solve fourteen or more MRTs correctly. Results based on these alternative self-confidence measures lead to qualitatively similar results as the main measure described in the text, and are provided in Tables A6-A8 in Appendix 2.

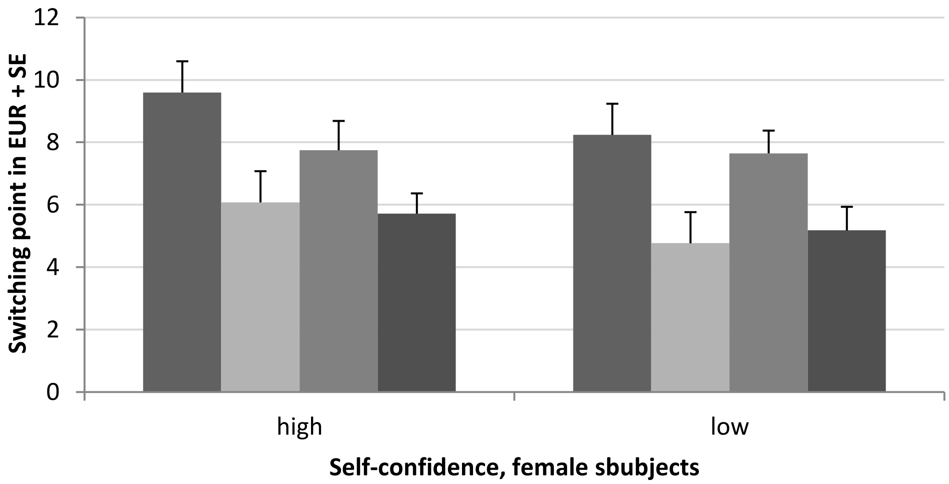

Figure 4. Evaluations by level of self-confidence of **A)** male, and **B)** female evaluators. (SE = Standard Error; *p<.05, **p<.01)

The results displayed in Figure 4 show a clear pattern indicating that highly self-confident male evaluators discriminate in the gendered treatments (t(26) = 3.08, p < .01), but not in the neutral treatments (t(24) = .87, p = .40). Importantly, the average evaluation of another man's performance (EUR 10.56) is well above the expected value of the lottery (EUR 8.60). Hence, highly self-confident male evaluators in the Man treatment on average lose money by switching to the save option too late. Comparing the mean evaluation between treatments, it can be concluded that male subjects with a high level of self-confidence overvalue the performance of other men as opposed to undervaluing the performance of a selected woman. Such an effect cannot be observed in the neutral treatments. Male subjects with relatively low levels of self-confidence do not show this effect in any of the two pairs of treatments (neutral: t(24) = 1.12, p = .28, gendered: t(26) = 0.24, p = .81).[12] Accordingly highly self-confident men seem to be sensitive to the gender frame, although they know that there are no performance differences. In contrast, less self-confident male subjects are not sensitive to this frame. This behavior among men may add to the gender discrimination observed in the labor market.

[12]The estimated coefficients in Tables A9 and A10 confirm this finding. The estimated coefficient of the fourfold interaction dummy for highly self-confident male evaluators in the Man treatment is positive and highly significant. We can also conclude that self-confidence is an important omitted variable in the regression of performance evaluations by male subjects, as in column 1 of Tables A9 and A10 adding self-confidence improves the fit of the regression from an adjusted R^2 of .03 to now .19. Also, the coefficient of the dummy variables for being in a non-selected treatment becomes significant only when adding self-confidence.

Females do not display this pattern. Self-confidence does not seem to play a role when evaluating other subjects' performance (Figure 3).[13] Self-confidence hence seems to be reflected in the behavior of men, but not of women.

4 Simulating the Glass Ceiling

In this section we investigate whether the (comparatively small) differences in male and female evaluation behavior can explain the glass ceiling phenomenon, i.e. the extremely small proportion of female employees on higher levels in most job promotion hierarchies. For this purpose we consider a simple numerical model of job promotions.

The Model

In the model there are t hierarchy levels in a firm with n employees at each hierarchy level. At each level there are male and female employees. Employees at level s are split randomly into m groups of size g. Each group is assigned a male evaluator with probability p_s and a female evaluator otherwise. Males in a group with a male evaluator are assigned a random evaluation drawn from the evaluations of males by male evaluators in the gendered treatments of our experiment. Females in a group with a male evaluator are assigned a random evaluation drawn from the evaluations of selected females made by male evaluators in the gendered treatments of our experiment. Analogously, evaluations in groups with female evaluators are drawn from the evaluations made by female evaluators in the gendered treatments.

In each group, the group member with the highest evaluation is promoted to the next hierarchy level. The number of female employees at level $s+1$ is determined by the number of females promoted at level s. We consider an (approximate) steady state, i.e., we choose the proportion p_s of female evaluators at level s approximately equal to the proportion of females promoted from level s to level $s+1$. This fixed point is determined by a simple iterative algorithm.[14] We close the model by assuming that at the lowest hierarchy level there are equally many female and male employees.

[13] Accordingly, adding self-confidence only slightly increases the adjusted R^2 from .19 to .23. It does not affect the significance of any estimated coefficient.

[14] We start with arbitrary proportions of female evaluators (e.g., no female evaluators) and calculate the number of promoted females. These resulting proportions are used as the new proportions of female evaluators. The procedure is iterated until proportions do not change significantly anymore.

Due to the asymmetry between evaluations of males and selected females in our experiment, this promotion dynamics can be thought of as a model of promotions in a job which is traditionally male-dominated. Recall also that the evaluations we collected were all on ex-ante equally-skilled subjects. Thus, we model promotions of equally-skilled and equally-sized male and female populations in a traditionally male-dominated employment fields. In order to minimize the contribution of stochastic fluctuations, we average over *z* runs of these dynamics and choose a number of employees *n* of sufficient size.[15] Considering an approximate steady state is justified by the fact that it is usually reached after about three iterations of the procedure described in Footnote 14.

Results

Table 2 depicts the approximate steady state proportions of females for different values of g and for 6 hierarchy levels and thus 5 promotions.[16]

Table 2: Approximate steady states for 6 hierarchy levels

0.500	0.416	0.339	0.273	0.216	0.169	g=2
0.500	0.380	0.277	0.194	0.132	0.090	g=4
0.500	0.353	0.230	0.141	0.082	0.045	g=6
0.500	0.332	0.189	0.095	0.045	0.019	g=8

As could be expected from our experimental results, we see a moderate decrease in the proportion of females from one hierarchy level to the next. These decreases result in a tiny proportion of females after four or five rounds of promotions. Therefore, the discrimination driven effects we observed in our experiment are strong enough quantitatively to explain a glass ceiling effect. For smaller values of *g*, i.e. when each promoted employee is only compared to few opponents, the decrease in the proportion of females becomes smaller in each step. This could be interpreted as the situation in a relatively hierarchic company. Note however that this does not correspond to a better situation for females since each

[15]This implies that the actual size of n is irrelevant as long as n and z are sufficiently large. Notably, we could as well consider a promotion pyramid where higher hierarchies are smaller than lower ones. The advantage of equally-sized levels is that computational effort is spread equally across levels.
[16]The further parameters are n=2400 and z=400.

promotion carries less meaning in such a setting. In fact, if we compare, e.g. two rounds of promotions for *g*=4 to one round for *g*=8, we see an even stronger decrease.

We conclude our numerical investigation by comparing our steady state results with two extreme cases, the cases where all promotion decisions are made, respectively, by males or by females. The results for *g*=4 are shown in Table 3.

Table 3: Comparison of steady state results with two extreme cases (g=4)

0.500	0.380	0.277	0.194	0.132	0.090	steady state
0.500	0.340	0.208	0.119	0.066	0.034	all female
0.500	0.403	0.311	0.231	0.166	0.115	all male

While all three cases are qualitatively similar[17], we see that the decrease in the number of female employees when moving up the hierarchy is most pronounced when all promotion decisions are made by females. In contrast, the proportion of females falls considerably slower than in the steady state, when all promotion decisions are made by males. This shows that the comparatively strong initial decrease in the proportion of females seen in Table 2 is driven significantly by the promotion decisions of females at intermediate hierarchy levels. This is in line with previous literature investigating the gender composition of evaluation committees (Blau and DeVaro 2007; Bagues and Esteve-Volart 2010).

5 Conclusion

This study shows that conservatism in updating erroneous beliefs is a potential source of discrimination, beyond taste-based and statistical discrimination. We investigate whether individuals are able to fully give up their prior belief concerning groups with known average performances in favor of new individual-specific information. We consider the simple case where the signal about the performance of the individual is perfect.

First, this study uncovers that females stick too much to the irrelevant prior regarding group belonging when evaluating an individual's performance. Not updating their erroneous beliefs leads to

[17] This qualitative similarity is also a robustness check for our fixed-point procedure.

discrimination against individuals who belong to a group known to have a less favorable performance average. Hence, discrimination may persist even if evaluators have perfect signals concerning individual's performance. This discriminatory behavior seems to be general and not pertaining to a particular frame, i.e. gender. Men do not display the same general pattern.

Second, we show that men also tend to stick to their irrelevant priors regarding group belonging when gender is introduced as a group label. Furthermore, male subjects with high self-confidence about their own performance overrate the performance of other men. In line with psychological research on "the false consensus effect", our results may be caused by men projecting their own self-confidence on other men. The false consensus effect states that individuals overestimate the extent to which others have similar beliefs, opinions, preferences and habits as they themselves have (e.g. Ross, Greene, and House 1977; Bauman and Geher 2002). Men might consider themselves more similar to other men than to women, and accordingly project their own self-confidence on other men.

Our simulations explore the consequences of our findings in a labor market setting. We show that the discrimination we observe adds up to a glass ceiling effect, i.e. to the virtual absence of women after few rounds of promotions. In line with empirical observations, this effect is even more pronounced when more promotion decisions are made by women.

This study considers a benchmark case, where the signal about the performance of a person is perfect. For future research it would be interesting to explore conservatism as a possible source of discrimination in other settings, notably, in the field, where signals are less perfect. It would also be interesting to investigate how much better an individual from certain groups, with less favorable characteristics, must perform in order to receive the same evaluation as others.

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Appendix 1

INSTRUCTIONS[18]

SAMPLE INSTRUCTIONS FOR GENDER TREATMENT ("SELECTED-WOMAN"):

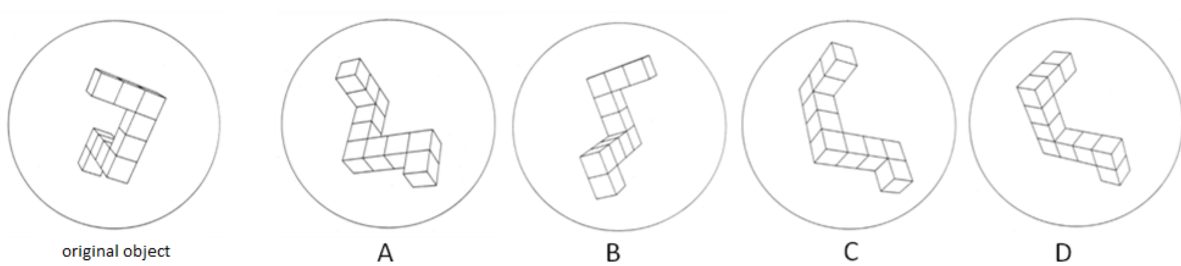
Welcome to our study. Please read the following instructions carefully.

For participating in this study you will receive 4 EUR for sure. Depending on you and another participant's performance you can earn money in addition to these 4 EUR. In this study you are anonymous and all data that you provide will be treated confidentially. If you have any questions after reading the following instructions, please raise your hand and we will come to answer your question. Please do not talk to other participants during the study – we would have to exclude you from this study then.

The study consists of two stages: **You are a second stage participant**. During the study, you will be randomly assigned to a participant who participated in the first stage.

Stage 1

This stage has already been completed by other participants. Those participants solved a number of mental rotation tasks. Here is an example for this task:



In this stage subjects had to distinguish between the two figures among A, B, C, and D that can be transferred into the original object on the left side by rotation (in our example figures B and D). The two other figures (in our example figures A and C) that cannot be transferred into the original object by rotation only, but had to be mirrored. Subjects were supposed to cross out the two figures that were rotations only. If they crossed out both correct figures, the task was solved correctly. Subjects were given 24 of these tasks, and 6 minutes to solve as many of them as possible.

Stage 2

In this stage **<u>you</u>** are the sole decision maker. You have the opportunity to earn money depending on the stage 1 performance of a first stage participant you have been randomly matched with. The payment is for you only, the first stage participant was paid for his participation already.

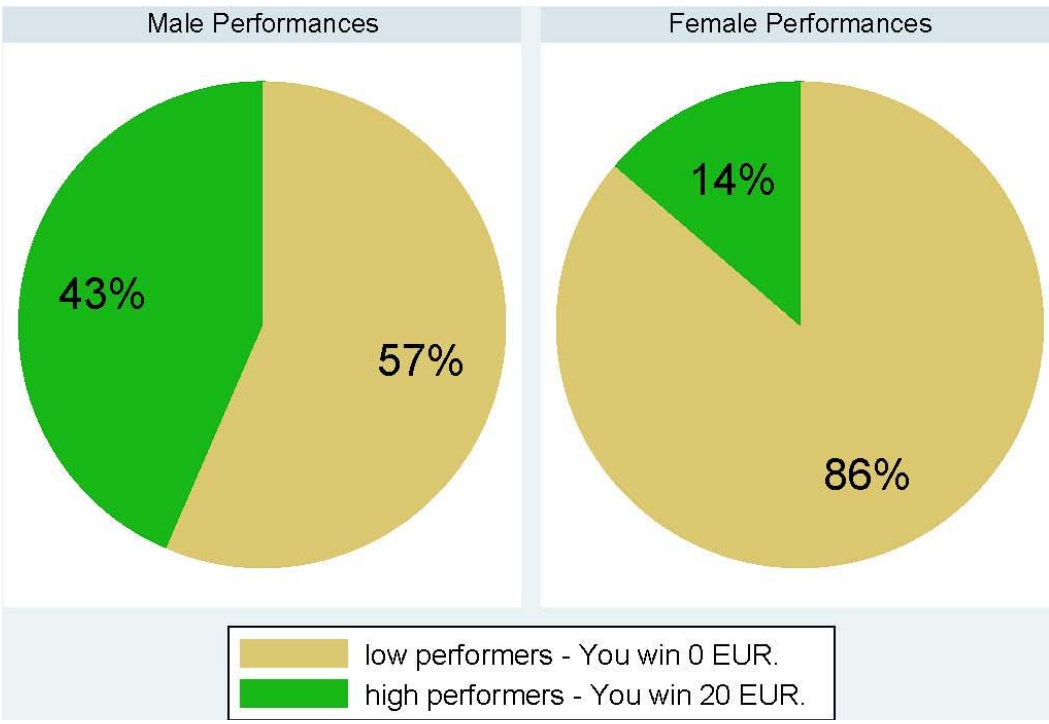
[18] The following are an English version of instructions for the treatments "Selected-Woman" and "Neutral". The original German versions are available from the authors upon request.

In the following, we only regarded participants of the first stage who solved a minimum number of tasks correctly. participants were divided into two groups, males and females.

- 43% of the male participants are top perfomers. 57% are mediocre performers.
- 14% of the female participants are top perfomers. 86% are mediocre performers.

Top performers are participants who solved 14 or more tasks correctly, whereas mediocre performers are participants who solved at least 9 tasks correctly, but not more than 13 tasks.

Below we present the distributions of the two groups in the form of a diagram.



Please answer the following control questions:

1. Imagine that there were 100 male participants in Stage 1. What is the number of male top performers?_____ participants are top performers.

2. Imagine that there were 100 female participants in Stage 1. What is the number of female top performers?_____ participants are top performers.

3. Imagine that there were 100 male participants in Stage 1. What is the number of male mediocre performers?_____ participants are mediocre performers.

4. Imagine that there were 100 female participants in Stage 1. What is the number of female mediocre performers?_____ participants are mediocre performers.

The selection of the female and male participants:

Please read the following paragraph carefully. It is important that you understand the selection process.

The **selection** of the first stage participants was as follows:

We randomly select one male participant. We call him participant M henceforth. Then we will select a female participant F as follows:

- If participant M was a top performer, we select a female participant F who also was a top performer.
- If participant M was a mediocre performer, we choose a female participant F who also was a mediocre performer.

You will get matched either to the male particioant M or the female participant F.

Later, you will choose between a fixed reward and a lottery:

- You receive 20 EUR if the participant you are matched with is a top performer
- You receive 0 EURif the participant is a mediocre performer

Please answer the following control questions:

Imagine that one male and one female participant are selected as it is described above. Please indicate by putting an X which alternative you think is correct in the following two situations.

1. If the male participant participant is a top performer, then the female participant is a

___ top performer ____ mediocre performer ___ could be either or

2. If the male participant is a mediocre performer, then the female participant is a

___ top performer ____ mediocre performer ___ could be either or

Please insert the correct answer in the following two situations.

1. If the person you got matched to is a top performer, you receive _____ EUR.

2. If the person you got matched to is a mediocre performer, you receive _____ EUR .

Decision

We now ask you to make a decision for each of the following options between getting a fixed amount of money(from 0.40 EUR going up to 20 EUR), and playing the aforementioned lottery.

At the end, one of your decisions will be randomly drawn and determine your final payoff.

Mark your answers by putting an X at the alternative you choose for each of the questions 1 to 50.

1. When a decision will be drawn in which you chose the fixed reward, you will receive this reward.
2. When a decision will be drawn in which you chose the lottery, you will receive 0 or 20 EUR, depending on the performance of your matched first stage participant.
3. If you do not put an X in the decision that was drawn, you will receive 0 EUR.

According to selection process described above, you have been matched with a female participant.

Making these decisions we ask you to take your time to think about your decisions and to take them seriously. **Also, remember that you will be paid according to one of these decisions, which is randomly drawn after the study ends.**

1) Which alternative do you choose:

☐ 0.40 EUR for sure ☐ 0 or 20 EUR depending on the performance of your female participant

2) Which alternative do you choose:

☐ 0.80 EUR for sure ☐ 0 or 20 EUR depending on the performance of your female participant

3) Which alternative do you choose:

☐ 1.20 EUR for sure ☐ 0 or 20 EUR depending on the performance of your female participant

…..

50) Which alternative do you choose:

☐ 20.00 EUR for sure ☐ 0 or 20 EUR depending on the performance of your female participant

SAMPLE INSTRUCTIONS FOR NEUTRAL TREATMENT ("NEUTRAL"):

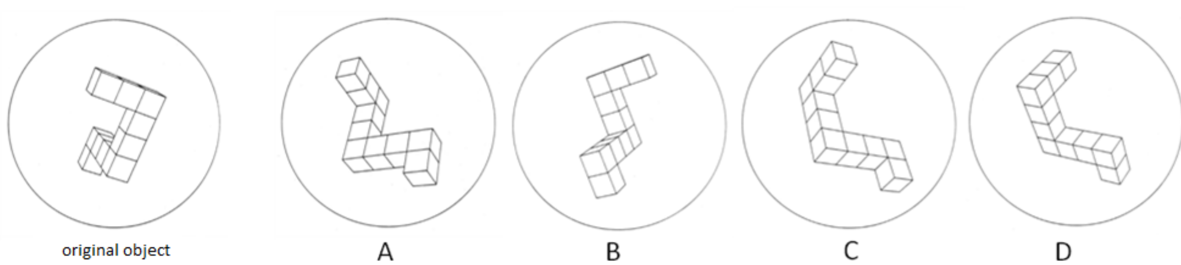
Welcome to our study. Please read the following instructions carefully.

For participating in this study you will receive 4 EUR for sure. Depending on you and another participant's performance you can earn money in addition to these 4 EUR. In this study you are anonymous and all data that you provide will be treated confidentially. If you have any questions after reading the following instructions, please raise your hand and we will come to answer your question. Please do not talk to other participants during the study – we would have to exclude you from this study then.

The study consists of two stages: **You are a second stage participant**. During the study, you will be randomly assigned to a participant who participated in the first stage.

Stage 1

This stage has already been completed by other participants. Those participants solved a number of mental rotation tasks. Here is an example for this task:



In this stage subjects had to distinguish between the two figures among A, B, C, and D that can be transferred into the original object on the left side by rotation (in our example figures B and D). The two other figures (in our example figures A and C) that cannot be transferred into the original object by rotation only, but had to be mirrored. Subjects were supposed to cross out the two figures that were rotations only. If they crossed out both correct figures, the task was solved correctly. Subjects were given 24 of these tasks, and 6 minutes to solve as many of them as possible.

Stage 2

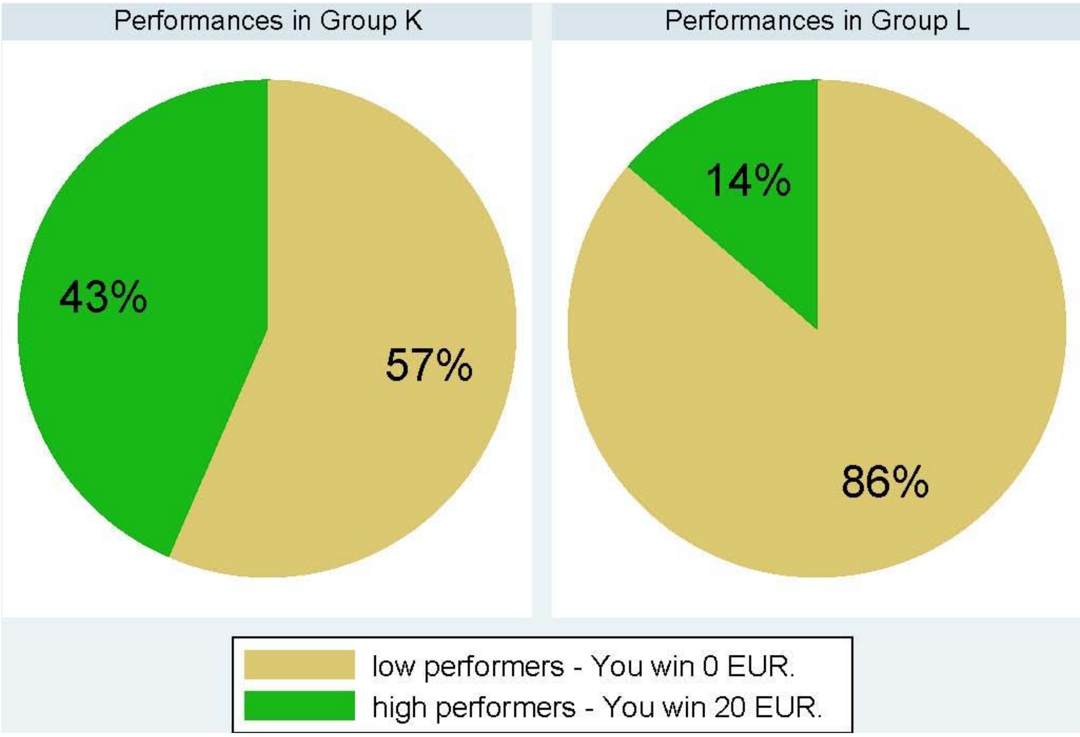
In this stage **<u>you</u>** are the sole decision maker. You have the opportunity to earn money depending on the stage 1 performance of a first stage participant you have been randomly matched with. The payment is for you only, the first stage participant was paid for his participation already.

In the following, we only regarded participants of the first stage who solved a minimum number of tasks correctly. participants were divided into two groups, K and L.

- 43% participants of group K are top perfomers. 57% are mediocre performers.
- 14% participants of group L are top perfomers. 86% are mediocre performers.

Top performers are participants who solved 14 or more tasks correctly, whereas mediocre performers are participants who solved at least 9 tasks correctly, but not more than 13 tasks

Below we present the distributions of the two groups in the form of a diagram.



Please answer the following control questions:

1. Imagine that there were 100 participants in group K in Stage 1. What is the number of group K top performers?_____ participants are top performers.

2. Imagine that there were 100 participants in group L in Stage 1. What is the number of group L top performers?_____ participants are top performers.

3. Imagine that there were 100 participants in group K in Stage 1. What is the number of group K mediocre performers?_____ participants are mediocre performers.

4. Imagine that there were 100 participants in group L in Stage 1. What is the number of group L mediocre performers?_____ participants are mediocre performers.

The selection of the participants from group K and L:

Please read the following paragraph carefully. It is important that you understand the selection process.

The **selection** of the first stage participants was as follows:

We randomly select one participant from group K. We call him participant k henceforth. Then we will select a participant L as follows:

- If participant K was a top performer, we select a participant L who also was a top performer.
- If participant K was a mediocre performer, we choose a participant L who also was a mediocre performer.

You will get matched either to the male participant K or participant L.

Later, you will choose between a fixed reward and a lottery:

- You receive 20 EUR if the participant you are matched with is a top performer
- You receive 0 EUR if the participant is a mediocre performer

Please answer the following control questions:

Imagine that one participant K and one participant L are selected as it is described above. Please indicate by putting an X which alternative you think is correct in the following two situations.

1. If participant K is a top performer, then participant L is a

___ top performer   _____ mediocre performer   ___ could be either or

2. If participant K is a mediocre performer, then participant L is a

___ top performer   _____ mediocre performer   ___ could be either or

Please insert the correct answer in the following two situations.

1. If the person you got matched to is a top performer, you receive _____ EUR.

2. If the person you got matched to is a mediocre performer, you receive _____ EUR.

Decision

We now ask you to make a decision for each of the following options between getting a fixed amount of money (from 0.40 EUR going up to 20 EUR), and playing the aforementioned lottery.

At the end, one of your decisions will be randomly drawn and determine your final payoff.

Mark your answers by putting an X at the alternative you choose for each of the questions 1 to 50.

4. When a decision will be drawn in which you chose the fixed reward, you will receive this reward.

5. When a decision will be drawn in which you chose the lottery, you will receive 0 or 20 EUR, depending on the performance of your matched first stage participant.

6. If you do not put an X in the decision that was drawn, you will receive 0 EUR.

According to selection process described above, you have been matched with a participant from group K.

Making these decisions we ask you to take your time to think about your decisions and to take them seriously. **Also, remember that you will be paid according to one of these decisions, which is randomly drawn after the study ends.**

1) Which alternative do you choose:

☐ 0.40 EUR for sure ☐ 0 or 20 EUR depending on the performance of your participant

2) Which alternative do you choose:

☐ 0.80 EUR for sure ☐ 0 or 20 EUR depending on the performance of your participant

3) Which alternative do you choose:

☐ 1.20 EUR for sure ☐ 0 or 20 EUR depending on the performance of your participant

…..

50) Which alternative do you choose:

☐ 20.00 EUR for sure ☐ 0 or 20 EUR depending on the performance of your participant

Appendix 2

TABLES

Table A1: Descriptive Statistics for Evaluators

Subjects	All		Male		Female		Gender
	Mean	Median	Mean	Median	Mean	Median	difference
Variable	(Std.dev.)	Obs.	(Std.dev.)	Obs.	(Std.dev.)	Obs.	in means
First switching point	6.84	6.8	7.28	7.60	6.35	5.60	0.93**
in EUR [a)]	(3.18)	272	(3.14)	144	(3.16)	128	[0.02]
Av. switiching point	6.98	6.8	7.39	7.60	6.57	6.00	0.82**
in EUR	(3.18)	305	(3.17)	152	(3.14)	153	[0.02]
Multiple switcher	0.11	0	0.05	0	0.16	0	-0.11**
(dummy)	(0.31)	305	(0.22)	152	(0.37)	153	[0.00]
Belief:	14.00	14.0	15.36	16	12.64	12	2.72**
Own score	(4.32)	305	(4.17)	152	(4.05)	153	[0.00]
Belief:	13.17	14.0	13.36	14	12.99	14	0.37
Participant's score	(3.11)	305	(3.25)	152	(2.97)	153	[0.30]
Diff. in beliefs:	0.83	0.0	2.01	2	-0.35	0	2.36**
Own - participant	(4.24)	305	(3.80)	152	(4.34)	153	[0.00]
Belief:	14.16	14.0	13.92	13	14.41	14	-0.49
Av.male score	(2.92)	305	(2.99)	152	(2.83)	153	[0.15]
Belief:	10.87	10.0	10.97	11	10.77	10	0.20
Av.female score	(2.87)	305	(2.99)	152	(2.74)	153	[0.55]
Task usefulness	6.52	7.0	6.64	7	6.41	7	0.23
(1 = low to 10 = high)	(2.33)	305	(2.35)	152	(2.31)	153	[0.37]
Age	24.70	24.0	25.36	25	24.04	24	1.32**
	(4.59)	305	(5.27)	152	(3.69)	153	[0.01]

** (*): Difference is significant on the 5 (10) percent level (two-sided t test).

a: When considering the first switching point, subjects with more than one switching point are excluded in all tables.

Table A2: Performance Evaluations

Treatment	**Subjects**	First switching point in EUR **All**	**Male**	**Female**	Average switching point in EUR **All**	**Male**	**Female**
Man	Mean	7.97	8.37	7.49	7.86	8.30	7.42
	(Std.err.)	(0.46)	(0.70)	(0.57)	(0.41)	(0.67)	(0.49)
	Median	7.6	8.0	6.8	7.6	8.0	7.2
	Obs.	42	23	19	48	24	24
Selected woman	Mean	6.13	6.82	5.32	6.32	7.11	5.47
	(Std.err.)	(0.33)	(0.43)	(0.47)	(0.32)	(0.46)	(0.43)
	Median	5.6	7.2	4.8	5.6	7.6	4.8
	Obs.	85	46	39	94	49	45
Difference in means [a)]		1.84^{**}[.00]	1.55^{*}[.05]	2.17^{**}[.01]	1.53^{**}[.01]	1.19 [.14]	1.95^{**}[.01]
Zero ATE [b)]			$\chi^2(2) = 12.16$ [.00]**			$\chi^2(2) = 11.16$ [.00]**	
Constant ATE [b)]			$\chi^2(1) = 0.32$ [.57]			$\chi^2(1) = 0.53$ [.46]	
Neutral	Mean	8.32	8.07	8.55	8.29	8.04	8.51
	(Std.err.)	(0.36)	(0.39)	(0.59)	(0.34)	(0.40)	(0.53)
	Median	8.2	7.8	8.4	8.2	7.8	8.4
	Obs.	62	30	32	70	32	38
Neutral selected	Mean	6.23	7.02	5.26	6.51	7.07	5.93
	(Std.err.)	(0.43)	(0.66)	(0.44)	(0.41)	(0.64)	(0.49)
	Median	5.6	6.8	5.0	6.0	6.8	5.6
	Obs.	62	34	28	69	35	34
Difference in means [a)]		2.09^{**}[.00]	1.05 [.20]	3.29^{**}[.00]	1.78^{**}[.00]	0.97 [.22]	2.58^{**}[.00]
Zero ATE [b)]			$\chi^2(2) = 22.07$ [.00]**			$\chi^2(2) = 14.46$ [.00]**	
Constant ATE [b)]			$\chi^2(1) = 4.48$ [.03]**			$\chi^2(1) = 2.39$ [.12]	

** (*): Difference is significant on the 5 (10) percent level. p-values in brackets.
a: Two-sided t test.
b: Tests for treatment effect heterogeneity as in Crump, Hotz, Imbens, and Mitnik (2008). The first (second) is testing whether facing a selected person has a zero (an identical) average effect for male and female subjects.

Table A3: Regression Analysis of Performance Evaluations by Gender

	Switching Point		
Subjects	**Male**	**Female**	**All**
Non-select TM * Gender TM * Male			1.61 (1.52)
Non-select TM * Male			-2.24** (1.02)
Gender TM * Male			-.26 (.99)
Non-select TM * Gender TM	.33 (1.10)	-1.04 (1.03)	-1.12 (1.07)
Male			1.75** (.74)
Non-select TM	1.16** (.71)	3.24** (.72)	3.30** (.71)
Gender TM	-.11 (.76)	.05 (.61)	.07 (.65)
Age	.07 (.12)	-.16** (.07)	.007 (.09)
Constant	5.13* (2.97)	9.02** (1.73)	5.09** (2.26)
Obs.	133	118	251
R squared	.06	.25	.14

Estimated coefficients from OLS regressions with bootstrapped standard errors in parentheses (1000 replications). Non-select TM is a dummy variable equal to one for the treatments *Man* and *Neutral*, and zero otherwise. Gender TM is a dummy that equals one for the gendered treatments *Man* and *Selected-Woman*.

Table A4: Regression Analysis of Performance Evaluations by Gender

	Average Switching Point		
Subjects:	**Male**	**Female**	**All**
Non-select TM * Gender TM * Male			.86 (1.47)
Non-select TM * Male			-1.62 (1.00)
Gender TM * Male			.49 (.99)
Non-select TM * Gender TM	.05 (1.03)	-.64 (.92)	-.63 (.95)
Male			1.15 (.71)
Non-select TM	1.07 (.67)	2.61** (.68)	2.58** (.70)
Gender TM	.14 (.73)	-.40 (.61)	-.46 (.66)
Age	.07 (.12)	-.16** (.06)	-.004 (.09)
Constant	5.33* (2.96)	9.80** (1.54)	6.02** (2.17)
Obs.	140	141	281
R squared	.04	.20	.11

Estimated coefficients from OLS regressions with bootstrapped standard errors in parentheses (1000 replications). Non-select TM is a dummy variable equal to one for the treatments *Man* and *Neutral*, and zero otherwise. Gender TM is a dummy that equals one for the gendered treatments *Man* and *Selected-Woman*.

Table A5: Performance Evaluations by Relative Level of Self-Confidence

		First switching point in EUR				Average switching point in EUR			
		Male subjects		**Female subjects**		**Male subjects**		**Female subjects**	
	Self-confi-dence[c)]	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**
Man	Mean	10.56	5.80	7.75	7.65	10.56	5.91	7.38	7.71
	(Std.err.)	(0.94)	(0.68)	(0.70)	(1.17)	(0.94)	(0.61)	(0.72)	(0.88)
	Median	9.6	5.6	8.4	6.8	9.6	5.6	8.0	6.8
	Obs.	10	8	8	8	10	9	9	11
Selected-Woman	Mean	7.27	6.08	5.72	5.18	7.27	6.38	6.13	5.18
	(Std.err.)	(0.60)	(0.68)	(0.78)	(0.76)	(0.60)	(0.65)	(0.73)	(0.65)
	Median	7.8	5.6	4.8	4.4	7.8	6.4	5.6	4.2
	Obs.	18	20	13	18	18	22	15	22
Difference in means [a)]		3.29**	-0.28	2.03*	2.47*	3.29**	-0.47	1.25	2.53**
	[p-value]	[.00]	[.81]	[.09]	[.08]	[.00]	[.67]	[.27]	[.03]
Zero ATE [b)]		$\chi^2(2)$=8.69[.01]**		$\chi^2(2)$=6.95[.03]**		$\chi^2(2)$=8.93 [.01]**		$\chi^2(2)$=6.83[.03]**	
Constant ATE [b)]		$\chi^2(1)$=5.84[.02]**		$\chi^2(1)$=0.07[.80]		$\chi^2(1)$=6.90 [.01]**		$\chi^2(1)$=0.73[.39]	
Neutral	Mean	7.65	8.62	9.6	8.24	7.65	8.80	9.46	8.31
	(Std.err.)	(0.55)	(0.63)	(0.94)	(0.73)	(0.55)	(0.60)	(0.82)	(0.70)
	Median	7.6	8.4	9.6	8.4	7.6	8.4	9.6	8.4
	Obs.	15	11	12	15	15	12	14	18
Selected-Neutral	Mean	7.02	6.99	6.08	4.77	7.02	7.10	6.62	5.34
	(Std.err.)	(0.42)	(1.16)	(0.65)	(0.76)	(0.42)	(1.09)	(0.75)	(0.79)
	Median	7.6	7.6	6.4	4.2	7.6	7.6	6.8	4.6
	Obs.	11	15	10	12	11	16	13	14
Difference in means [a)]		0.63	1.63	3.52**	3.47**	0.63	1.70	2.84**	2.97**
	[p-value]	[.40]	[.28]	[.01]	[.00]	[.40]	[.22]	[.02]	[.01]
Zero ATE [b)]		$\chi^2(2)$=2.37 [.31]		$\chi^2(2)$=20.3[.00]**		$\chi^2(2)$=2.70 [.26]		$\chi^2(2)$=14.5[.00]**	
Constant ATE [b)]		$\chi^2(1)$=0.45 [.50]		$\chi^2(1)$=0.00[.98]		$\chi^2(1)$=0.56 [.46]		$\chi^2(1)$=0.01[.93]	

** (*): Difference is significant on the 5 (10) percent level. p-values in brackets.
a: Two-sided t test.
b: Tests for treatment effect heterogeneity as in Crump et al. (2008). The first (second) is testing whether facing a selected person has a zero (an identical) average effect for highly and less self-confident subjects.
c: Self-confidence is high (low) if the belief about own score is above (below) the median belief by gender.

Table A6: Performance Evaluations by Relative Level of Self-Confidence (Robustness Check)

		First switching point in EUR				Average switching point in EUR			
		Male subjects		**Female subjects**		**Male subjects**		**Female subjects**	
	Self-confidence [c)]	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**
Man	Mean	10.56	6.68	7.38	7.65	10.56	6.69	7.17	7.71
	(Std.err.)	(0.94)	(0.72)	(0.57)	(1.17)	(0.94)	(0.66)	(0.53)	(0.88)
	Median	9.6	6.0	7.6	6.8	9.6	6.4	7.6	6.8
	Obs.	10	13	11	8	10	14	13	11
Selected-Woman	Mean	7.38	6.08	5.45	5.18	7.7	6.38	5.74	5.18
	(Std.err.)	(0.55)	(0.68)	(0.60)	(0.76)	(0.62)	(0.65)	(0.59)	(0.65)
	Median	8.0	5.6	4.8	4.4	8.0	6.4	4.8	4.2
	Obs.	26	20	21	18	27	22	23	22
Difference in means [a)]		3.18**	0.6	1.93**	2.47*	2.86**	0.31	1.43	2.53**
	[p-value]	[.01]	[.56]	[.05]	[.08]	[.02]	[.76]	[.11]	[.03]
Zero ATE [b)]		$\chi^2(2)$=8.89[.01]**		$\chi^2(2)$=8.65 [.01]**		$\chi^2(2)$=6.59 [.04]**		$\chi^2(2)$=8.68 [.01]**	
Constant ATE [b)]		$\chi^2(1)$=3.08[.08]*		$\chi^2(1)$=0.11 [.74]		$\chi^2(1)$=3.06 [.08]*		$\chi^2(1)$=0.67 [.41]	
Neutral	Mean	7.65	8.48	8.82	8.24	7.65	8.38	8.68	8.31
	(Std.err.)	(0.55)	(0.57)	(0.91)	(0.73)	(0.55)	(0.57)	(0.79)	(0.70)
	Median	7.6	8.4	9.6	8.4	7.6	8.4	9.0	8.4
	Obs.	15	15	17	15	15	17	20	18
Selected-Neutral	Mean	7.03	7.02	6.08	4.80	7.03	7.14	6.62	5.50
	(Std.err.)	(0.73)	(1.31)	(0.65)	(0.56)	(0.73)	(1.22)	(0.75)	(0.64)
	Median	6.0	7.6	6.4	4.6	6.0	7.6	6.8	4.8
	Obs.	21	13	10	18	21	14	13	21
Difference in means [a)]		0.62	1.46	2.74**	3.44**	0.62	1.24	2.06*	2.81**
	[p-value]	[.53]	[.29]	[.04]	[.00]	[.53]	[.34]	[.08]	[.01]
Zero ATE [b)]		$\chi^2(2)$=1.54 [.46]		$\chi^2(2)$=19.9[.00]**		$\chi^2(2)$=1.31 [.52]		$\chi^2(2)$=12.3[.00]**	
Constant ATE [b)]		$\chi^2(1)$=0.25 [.62]		$\chi^2(1)$=0.23[.63]		$\chi^2(1)$=0.14 [.71]		$\chi^2(1)$=0.26[.61]	

** (*): Difference is significant on the 5 (10) percent level. p-values in brackets.
a: Two-sided t test.
b: Tests for treatment effect heterogeneity as in Crump et al. (2008). The first (second) is testing whether facing a selected person has a zero (an identical) average effect for highly and less self-confident subjects.
c: Self-confidence is high (low) if the belief about own score is above (below) the mean belief by gender.

Table A7: Performance Evaluations by Beliefs About Own Relative Performance (Robustness Check)

		First switching point in EUR				Average switching point in EUR			
		Male subjects		**Female subjects**		**Male subjects**		**Female subjects**	
	Self-confidence [c)]	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**
Man	Mean	10.28	6.89	7.69	7.32	10.28	6.89	7.5	7.33
	(Std.err.)	(1.00)	(0.76)	(0.61)	(0.97)	(1.00)	(0.71)	(0.54)	(0.83)
	Median	9.2	6.0	8.0	6.8	9.2	6.4	7.8	6.8
	Obs.	10	13	9	10	10	14	12	12
Selected-Woman	Mean	6.51	7.18	4.89	5.70	6.88	7.37	5.03	5.78
	(Std.err.)	(0.53)	(0.73)	(0.69)	(0.64)	(0.63)	(0.68)	(0.67)	(0.57)
	Median	6	8.0	3.8	4.8	6.4	8.0	4.0	4.8
	Obs.	25	21	18	21	26	23	19	26
Difference in means [a)]		3.77**	-0.29	2.80**	1.62	3.40**	-0.48	2.47**	1.55
	[p-value]	[.00]	[.79]	[.02]	[.17]	[.01]	[.64]	[.01]	[.13]
Zero ATE [b)]		χ^2(2)=11.3[.00]**		χ^2(2)=11.2[.00]**		χ^2(2)=8.68 [.01]**		χ^2(2)=10.6[.00]**	
Constant ATE [b)]		χ^2(1)=6.92[.01]**		χ^2(1)=0.62[.43]		χ^2(1)=6.49 [.01]**		χ^2(1)=0.48[.49]	
Neutral	Mean	7.40	8.65	9.67	7.11	7.20	8.78	9.41	7.39
	(Std.err.)	(0.61)	(0.48)	(0.66)	(0.93)	(0.60)	(0.47)	(0.60)	(0.86)
	Median	7.6	8.2	9.6	6.4	7.6	8.4	9.6	6.8
	Obs.	14	16	18	14	15	17	21	17
Selected-Neutral	Mean	6.02	8.02	5.06	5.46	6.02	8.07	5.65	6.21
	(Std.err.)	(0.51)	(1.19)	(0.62)	(0.64)	(0.51)	(1.12)	(0.70)	(0.70)
	Median	5.6	7.6	5.4	4.8	5.6	7.6	5.6	5.6
	Obs.	17	17	14	14	17	18	17	17
Difference in means [a)]		1.38*	0.63	4.61**	1.65	1.18	0.71	3.76**	1.18
	[p-value]	[.09]	[.64]	[.00]	[.15]	[.15]	[.57]	[.00]	[.30]
Zero ATE [b)]		χ^2(2)=3.21 [.20]		χ^2(2)=27.9[.00]**		χ^2(2)=2.55 [.28]		χ^2(2)=17.8[.00]**	
Constant ATE [b)]		χ^2(1)=0.25 [.62]		χ^2(1)=4.19[.04]**		χ^2(1)=0.10 [.75]		χ^2(1)=3.23[.07]*	

** (*): Difference is significant on the 5 (10) percent level. p-values in brackets.

a: Two-sided t test.

b: Tests for treatment effect heterogeneity as in Crump et al. (2008). The first (second) is testing whether facing a selected person has a zero (an identical) average effect for highly and less self-confident subjects.

c: Self-confidence classified as high (low) if beliefs about own minus the participant's score is above (below) the mean.

Table A8: Performance Evaluations by Absolute Self-Confidence (Robustness Check)

		First switching point in EUR				Average switching point in EUR			
		Male subjects		**Female subjects**		**Male subjects**		**Female subjects**	
	Self-confidence c)	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**
Man	Mean	9.30	6.23	7.75	7.31	9.30	6.30	7.38	7.44
	(Std.err.)	(0.87)	(0.62)	(0.70)	(0.87)	(0.87)	(0.54)	(0.72)	(0.66)
	Median	9.2	5.6	8.4	6.8	9.2	6.2	8.0	6.8
	Obs.	16	7	8	11	16	8	9	15
Selected-Woman	Mean	7.05	6.29	5.45	5.18	7.32	6.68	5.74	5.18
	(Std.err.)	(0.48)	(0.93)	(0.60)	(0.76)	(0.54)	(0.85)	(0.59)	(0.65)
	Median	7.6	5.8	4.8	4.4	7.6	7.8	4.8	4.2
	Obs.	32	14	21	18	33	16	23	22
Difference in means a)		3.29**	-0.28	2.03**	2.47*	3.29**	-0.47	1.25	2.53**
	[p-value]	[.02]	[.97]	[.04]	[.08]	[.05]	[.77]	[.12]	[.02]
Zero ATE b)		$\chi^2(2)$=4.96[.08]*		$\chi^2(2)$=9.71[.01]**		$\chi^2(2)$=3.77 [.15]		$\chi^2(2)$=9.06[.01]**	
Constant ATE b)		$\chi^2(1)$=2.40[.12]		$\chi^2(1)$=0.01[.91]		$\chi^2(1)$=2.68 [.10]*		$\chi^2(1)$=0.22[.64]	
Neutral	Mean	8.13	7.80	8.82	8.24	7.98	8.23	8.68	8.31
	(Std.err.)	(0.49)	(0.31)	(0.91)	(0.73)	(0.49)	(0.50)	(0.79)	(0.70)
	Median	7.8	7.8	9.6	8.4	7.6	8.0	9.0	8.4
	Obs.	24	6	17	15	25	7	20	18
Selected-Neutral	Mean	7.06	6.90	6.08	4.80	7.06	7.11	6.62	5.50
	(Std.err.)	(0.59)	(2.16)	(0.65)	(0.56)	(0.59)	(1.92)	(0.75)	(0.64)
	Median	6.8	5.6	6.4	4.6	6.8	7.6	6.8	4.8
	Obs.	26	8	10	18	26	9	13	21
Difference in means a)		0.63	1.63	3.52**	3.47**	0.63	1.70	2.84*	2.97**
	[p-value]	[.17]	[.73]	[.04]	[.00]	[.24]	[.63]	[.08]	[.01]
Zero ATE b)		$\chi^2(2)$=2.08 [.35]		$\chi^2(2)$=19.92[.00]**		$\chi^2(2)$=1.74 [.42]		$\chi^2(2)$=12.31[.00]**	
Constant ATE b)		$\chi^2(1)$=0.01 [.94]		$\chi^2(1)$=0.23[.63]		$\chi^2(1)$=0.01 [.93]		$\chi^2(1)$=0.26[.61]	

** (*): Difference is significant on the 5 (10) percent level. p-values in brackets.

a: Two-sided t test.

b: Tests for treatment effect heterogeneity as in Crump et al. (2008). The first (second) is testing whether facing a selected person has a zero (an identical) average effect for highly and less self-confident subjects.

c: Self-confidence is high (low) if the subjects believes he/she is a top performer himself/herself.

Table A9: Regression Analyses of Performance Evaluations by Relative Level of Self-Confidence for Switching Point (One-Time Switchers Only)

	Switching Point		
Subjects:	**Male**	**Female**	**All**
Non-select TM * Gender TM * Self-confident * Male			4.06** (1.62)
Non-select TM * Self-confident * Male			-.43 (1.86)
Gender TM * Self-confident * Male			2.33 (1.78)
Non-select TM * Male			-2.30* (1.21)
Gender TM * Male			-1.63 (1.20)
Self-confident * Male			-1.49 (1.45)
Non-select TM * Gender TM	-2.56* (1.40) (	-.64 1.69)	-1.62* (.90)
Non-select TM * Self-confident	-1.27 (1.29)	.77 (1.63)	-.42 (1.22)
Gender TM * Self-confident	.84 (1.35)	-.30 (1.44)	-1.11 (1.18)
Male			2.28** (1.04)
Non-select TM	2.14** (.99)	3.02** (1.06)	3.87** (.95)
Gender TM	-.33 (1.04)	.03 (1.03)	.76 (.95)
Self-confident	.41 (.98)	.93 (1.05)	1.56 (.97)
Age	.17 (.15)	-.17* (.10)	.07 (.13)
Constant	2.28 (3.69)	8.95** (2.53)	2.93 (3.25)
Obs.	108	96	204
R squared	.25	.29	.24

Estimated coefficients from OLS regressions with bootstrapped standard errors in parentheses (1000 replications). Non-select TM is a dummy variable equal to one for the treatments *Man* and *Neutral*, and zero otherwise. Gender TM is a dummy that equals one for the gendered treatments *Man* and *Selected-Woman*. Self-confidence is a dummy equal to one if the belief about the own MRT score is above the median belief by gender.

Table A10: Regression Analysis of Performance Evaluations by Relative Level of Self-Confidence for Average Switching Point

	Average Switching Point		
Subjects:	**Male**	**Female**	**All**
Non-select TM * Gender TM * Self-confident * Male			3.95** (1.59)
Non-select TM * Self-confident * Male			.13 (1.66)
Gender TM * Self-confident * Male			2.08 (1.60)
Non-select TM * Male			-2.12** (1.07)
Gender TM * Male			-1.17 (1.06)
Self-confident * Male			-1.79 (1.31)
Non-select TM * Gender TM	-2.83** (1.32) (	-.10 1.46)	-1.47* (.84)
Non-select TM * Self-confident	-1.25 (1.32)	.41 (1.53)	-.81 (1.12)
Gender TM * Self-confident	.67 (1.36)	.008 (1.45)	-.89 (1.06)
Male			2.02** (.95)
Non-select TM	2.11** (.97)	2.68** (1.04)	3.51** (.90)
Gender TM	-.16 (1.02)	-.37 (.99)	.32 (.86)
Self-confident	.26 (1.00)	1.02 (1.09)	1.64* (.92)
Age	.17 (.15)	-.15* (.08)	.06 (.12)
Constant	2.52 (3.63)	9.04** (2.09)	3.64 (2.87)
Obs.	113	116	229
R squared	.24	.24	.20

Estimated coefficients from OLS regressions with bootstrapped standard errors in parentheses (1000 replications). Non-select TM is a dummy variable equal to one for the treatments *Man* and *Neutral*, and zero otherwise. Gender TM is a dummy that equals one for the gendered treatments *Man* and *Selected-Woman*. Self-confidence is a dummy equal to one if the belief about the own MRT score is above the median belief by gender.