The impact of advice on selection into competition[1]

Jordi Brandts[2]
Universitat Autònoma de Barcelona
Instituto de Analisis Economica
Barcelona GSE

Valeska Groenert[3]
Universitat Autònoma de Barcelona

Christina Rott[4]
Universitat Autònoma de Barcelona

February 2012

Abstract: We conduct a laboratory experiment, in which subjects decide whether to enter a tournament, in which they have to perform a real effort task. In one treatment subjects receive advice on whether to participate in the tournament. Advice is given by subjects who have already had some experience with the same decision and have some informational advantage. We show that advice significantly improves the entry decision of subjects. The total costs of wrong entry decisions go significantly down and the payoffs of those who receive advice go up. This is mainly driven by the fact that high ability women enter the tournament significantly more often while low ability men enter significantly less often. Though the gender gap in tournament entry is reduced, it still persists. Overall, advice given tends to be 'good' advice. Finally, we find that women are slightly more hesitant than men to advice entry into tournament.

Keywords: experiments, advice, gender gap in competitiveness
JEL Classification Numbers: C91; J2; J16

[1]Valeska Groenert gratefully acknowledges support from the Spanish Ministry of Science and Innovation through grant "Consolidated Group-C" ECO2008-04756 and FEDER.

[2]jordi.brandts@uab.cat; Department of Business Economics, UAB, Instituto de Analisis Economica and Barcelona GSE; 08193 Bellaterra (Spain)

[3]valeska.groenert@uab.cat; MOVE (Markets, Organizations and Votes in Economics), UAB; 08193 Bellaterra (Spain); Tel: +34 93 581 4653.

[4]christina.rott@uab.cat; Department of Business Economics, UAB; 08193 Bellaterra (Spain)

1 Introduction

The underrepresentation of high performing women in top level jobs continues to be a major concern of politics and has received much attention by researchers in economics and other fields. For some time research on this topic focused on explanations related to differences in human capital, discrimination, and child-rearing. More recently, the literature has explored an additional explanation: gender differences in competitiveness. One aspect of these differences is that frequently women will participate less often in competitions. In particular, high ability women participate less than would be socially optimal. In a seminal paper, Niederle and Vesterlund (2007; NV07 henceforth) show that, when having the choice between a competitive compensation scheme (one that depends on relative performance in a simple addition task) and a non-competitive one (one that depends only on own performance in that task), women opt for the competitive scheme far less than men do.[5]

Subsequently, a number of papers has explored designs to reduce this gender gap. One set of papers considers the effect of affirmative actions, such as quotas or other forms of positive discrimination (Niederle, Segal, and Vesterlund 2009, Balafoutas and Sutter 2012). It is argued that these measures are effective and do not harm efficiency. Wozniak et al (2010) show that providing information on relative performance can also reduce the gender gap. However, each of the mechanisms analysed in the aforementioned papers have their problems. Affirmative actions are highly controversial and it is therefore difficult to find majorities for them. One concern is that they do not lead to efficient allocations, possibly promoting weak performing women at the cost of high performing men. Another concern is that they actually do not serve women because women who obtain a job under an affirmative action scheme may be stigmatized of being selected only because of this action. Providing relative performance feedback does not have these problems, but is in most settings unrealistic because nobody holds this particular information. For example, it is in the vast majority of cases impossible to provide potential applicants for a job with information of how their qualifications and characteristics compare with those of other potential applicants.

The idea behind our experiment is inspired by the literature on naive advice and by mentoring programs that often exist in real-world settings.[6] Our aim is to study whether receiving advice from a person who has experienced the same particular competitive situation can have similar effects as providing relative performance feedback or affirmative actions. However, we do not design our experiment in a way that we would expect to maximize female entry

[5]For their setting, this finding appears to be quite robust as the results in a number of papers with similar designs show (see for example Dargnies 2009, Balafoutas and Sutter 2012, Cason et al 2010, Niederle et al 2010, Sutter and Rützler 2010, Wozniak et al 2010). Moreover, the gender gap in selection into competition has also been demonstrated under a variety of different circumstances (see for example Gupta et al 2011, Gneezy et al 2009, Dohmen and Falk 2011) and in the field (Flory et al 2010).

[6]It is beyond the scope of this paper to discuss the insights from the literature on naive advice. We refer the interested reader to Schotter (2003).

into competition. Instead, in our experiment both male and female subjects, receive advice from an advisor as to whether to participate in a competition. We believe it is crucial to understand how advice can affect competitive choices of women and men before suggesting a design that may change these choices in a particular way.

For purposes of maximal comparability our basic experimental design closely follows the design in NV07. Participants are faced with a real effort task, which consists of adding up series of five two-digit numbers. They have five minutes to solve as many problems as possible. Subjects complete this task once under a piece-rate scheme (where they receive a fixed amount per problem correctly solved) and once under a tournament scheme (where they are matched in groups of four and only the best performer receives payment). Then in a third round, they are given the choice between being paid under the piece-rate or the tournament scheme. Before taking this decision, subjects in our advice treatment receive a message from an advisor, telling them whether he or she recommends entry. Advisors are subjects that have completed the same tasks once before and who have received feedback about the performance of their own groups. They also receive information about their advisee's performance in the first two rounds.

Our results show that advice indeed improves the selection into competition by various measures. While in the treatment without advice there are no significant differences in ability between those who enter the competition and those who do not, in the treatment with advice those who enter are of significant higher ability. Following NV07, we also calculate the cost of taking the 'wrong' entry decision. There are two types of 'mistakes', low ability subjects (whose expected payoff would be higher under the piece-rate) who enter the competition and high ability subjects (whose expected payoff would be higher in the tournament) who do not. The total costs from these mistakes are significantly lower in our treatment with advice than in the treatment without advice. Examining which subjects improve their entry decisions, we find that it is in particular the low-ability men (who enter less under advice) and the high-ability women (who enter more). As in NV07, these are the groups that mainly contribute to the costs of wrong entry decisions. About half of the low-ability men enter and about half of high-ability women do not enter. In our treatment with advice, these fractions are down to roughly one third, which is a significant change.

Analyzing how advice is given, we find that advice tends to be 'correct' in the sense that nearly all those who, based on their previous performance, should enter (from an expected payoff maximizing point of view) receive advice to do so. Conversely, most subjects that should not enter receive advice not to do so. It is also true that women are more hesitant in giving the advice to enter. They require more problems being solved in the previous tasks before recommending entry. We attribute this gender difference in advice to the higher degree of risk aversion women tend to display.

The rest of the paper is organized as follows. Section 2 discusses theory and sets out our main research questions. Section 3 describes the experimental design, Section 4 contains all results, and Section 5 concludes.

2 Theory and research questions

With our experiment we address the following questions.

Does advice affect the entry decision? Do the advisees' entry decisions differ systematically from the advisors' entry decisions? If so, whose decisions are affected (men, women, strong performer, weak performers etc.) and does advice improve the entry decisions?

If so, how does advice the entry decisions, in particular does it improve them? Ideally, one would hope that advice encourages strong performers to enter more often, while it discourages weak performers. As NV07 show, it is in the first place the weak performing men that enter too often and the strong performing women that enter too little. If indeed, advice improves entry decisions, this poses the question whether it can be a suitable device to reduce the gender gap in competitiveness.

Does advice affect the entry decisions of men and women in different ways? Is one gender more inclined to follow the advice than the other? How do men and women react to the advice to enter, and how do they react to the advice not to enter?

Do men and women give advice in different ways? As we argue below, we expect an advisor's recommendation to be mainly driven by his/her risk attitude. If this is true and women are more risk-averse than men, then upon learning about the performances of their advisees, women would recommend entry less often than men.

Do men and women react to advice in different ways? Is one gender more inclined to follow the advice than the other? Do they react differently to the advice to enter versus not to enter?

The decision to participate in a competition may be influenced by a variety of factors. We will focus on the following ones, which are the ones that may be altered through advice.

(1) Risk attitude. Entering a tournament, thereby forgoing the certain piece-rate compensation, is a risky choice. Therefore, a more risk-loving (or, less risk-averse) person is more apt to participate in a tournament. The fact that on average women tend to be more risk-averse than men contributes to the gender gap in the participation rate. Thus reducing risk may help reduce this gender gap, as is also demonstrated by Wozniak et al (2010). In their setting information about relative performance makes the gender gap insignificant. We hypothesize that advice in our setting may indirectly have the same effect. Before giving advice, advisors receive information about the performance of their group members (including their own performance). Advisees in turn know that their advisors have this information. Thus, they may take the advice to enter or not to enter as a signal for their standing relative to the performance of their advisor's group. Since there is no reason why their group should be different from the one of their advisor, it is reasonable for them to assume that their standing relative to the other members of their own group is similar.

In our setting risk attitude may also be influenced directly through the reasons advisors are able to select from. For example, receiving the advice to enter together with the reason: "In the competition you can gain much more" stresses the possibility of a positive outcome and might help a hesitant person to become a bit more daring.

(2) Confidence about relative performance. All else equal, the more confident a person is about their own performance relative to the performance of others, the more likely that person is to participate in a competition. For example, one person who solved nine problems might think that this should be a very good performance, while another person may consider this performance a bad. Receiving the advice to enter the competition may help building confidence about ones relative standing, while receiving advice not to enter the competition may lower confidence. The logic is the same as for the effect of advice on the riskiness of the choice: advice can be interpreted as a signal about one's relative performance.

(3) Preferences for competition. One individual may enjoy the 'thrill' of participating in a competition while another person may perceive this as negative stress. Since individuals tend to be influenced in their preferences by other people's preferences, advice might affect these preferences for competition. Receiving the advice (not) to enter the competition might be taken as a signal that the advisor himself does not like to be in a competition and that might make the advisee more 'competition-affine' ('competition-adverse'). We expect this possible effect of advice to be the weakest one, because preferences tend to change over a longer time period through a multiple of different influences. Here, advisees receive one-time anonymous advice and we do not think it is likely that this can change preferences substantially. There may be a possibility to influence these preferences through a real mentoring program, where there is a longer relationship to a mentor and face-to-face interactions. However, examining this possibility is beyond the scope of our paper.

The decision to enter may also be influenced by an individual's desire or aversion to receive feedback on his or her relative performance. This, however, should not play a role in our experiment because all subjects, whether or not they participate in the tournament, receive this feedback (and they know in advance, i.e. before taking the entry decision, that they will receive it).

The decision whether to recommend entry may in principle be influenced by the same three factors. However, we believe that the dominant factor is risk attitude. The advisor's own preferences for competition cannot play a role since the advisor does not subsequently get to compete. For the same reason, confidence in own relative performance cannot play a role either. In contrast, confidence in the advisee's relative performance may play a role, but since advisors have some information about relative performance, the variation from different confidence levels should be small. Given that men tend to be more risk-loving than women, if indeed risk attitude guides the decision to recommend entry, one would expect women to be more hesitant in advising entry.

3 Experimental design

In our experiment subjects are asked to select the payment scheme for a real effort task they subsequently solve. They can select to be paid either according to a piece-rate scheme or to enter a competition and being paid according to a tournament (winner takes all) scheme. We run two treatments, one in which subjects take their entry decision (whether or not to enter the tournament) without having received advice (as in NV07) and one in which they receive some advice. After having completed all tasks, each subject from the treatment without advice is randomly matched with one subject from the treatment with advice and is asked to advise his or her partner in his or her entry decision. We will refer to the two treatments as the advisors treatment and the advisee treatment. The advisors treatment is also our control treatment for the entry decision. Advisors give their advice at the very end of their experimental session and when they take their entry decisions, they do not know yet that there follows an advice stage.

The real effort task is a simple addition task, where participants have five minutes to add up sets of five two-digit numbers. Subjects solve this task without using a calculator but may use scratch paper that we provided. The task begins with a set of five numbers shown on their computer screen (see screenshot provided with the instructions in the appendix). After having entered a sum and pressed 'continue,' five new numbers are generated. At the bottom of the screen subjects are informed about the numbers of correct and incorrect answers they have given so far. At the top right they see their remaining time.

As in NV07, before asking them to select a payment scheme, subjects first solve the task under the piece-rate scheme and then under the tournament scheme. By doing so subjects gain some experience with the task itself and the different payment schemes and we obtain a good proxy of their ability levels in this task. This first part of the experiment is the same in both treatments. Before being asked to complete the task a third time, subjects in the advisors treatment are then asked to select a payment scheme – piece-rate or tournament. There then follows a few other tasks, which we will explain in due course, and finally subjects in the advisors treatement are asked to give advice a subject from the other treatment in their tournament entry decision. Before being asked to choose a payment scheme to be applied to the third task, subjects in the advisees treatment receive advice from their advisor. They then take their entry decision, complete the third task and the additional tasks, which we will explain later.

In each session we run both treatments with the same number of subjects in each treatment. This allowed us to (randomly) match each subject from the advisors treatment with exactly one subject from the advisees treatment. When giving advice, the advisors had already completed task 3, as well as received information about the performance of the other members of their group and about the task 1 and 2 performance of their advisee. The advisor then sent a recommendation to his advisee ('enter' or 'don't enter') and was able to provide some reasons for the advice he or she gave. Advisees knew that their advisor was a member of the other group who had just completed the same tasks and that their advisor had information about the performance of his own group.[7] We had one room for the advisors and one for the advisees. The rooms are separated by a large window so that subjects were actually able to see (but not hear) the other group.

The exact sequencing of the advice-stage was as follows. Advisors received feedback on the performance of their group. At this point, the advisors did not know yet that they had to give advice to somebody. They were then instructed about the advice stage. At the same time, the advisees were instructed about the advice stage. The advisees then sent information about their task 1 and 2 performances to their advisees. Upon receiving this information from their advisee, the advisor had to send a message, recommending the advisee whether or not to enter. The advisors were then asked to give their advisee a reason for their recommendation. We provided three different reasons for each recommendation ('enter' or 'don't enter') from which the advisors could select as many as they wished to.[8]

The experiment was conducted in December 2011 and January 2012 at the Universitat Autònoma de Barcelona. Subjects were recruited from a pool of subjects who had expressed their interest to participate in paid experiments by signing up via an online recruitment system. A total of 224 subjects, 112 men and 112 women, participated in the experiment. For the purpose of the tournament tasks, subjects were divided into groups of four. Each group was composed of two men and two women. We made sure that subjects were not aware of the fact that we controlled the gender composition.[9] However, as in NV07, subjects knew that their group was seated in the same row as themselves and they were able to see each other.

For their participation, subjects received a show-up fee of 5 Euro plus 4 Euro for completing the task 1-4. Subjects of the advice treatment had a waiting period of approximately 15 minutes at the beginning of the experiment and were paid 2 Euro for this waiting period.[10] In addition we chose one of tasks 1-4 at random and paid participants according to their performance in that task. Finally, we paid subjects for a self-evaluation task ('task 5') and the advisors for giving advice ('task 6'). The following briefly describes each task and its compensation scheme.

Task 1 (Piece-rate): 5-minute addition task. Participants receive 0.5 Euro

[7] However, advisees did not know how advisors were compensated.

[8] Ideally, we would have liked the advice to be free-form. However, since our experiments were conducted in Spanish we were concerned that subjects could reveal their gender to their matched partner, which could have led to effects stemming from the gender-pairing.

[9] We were concerned that this could have led to what the psychology literature has termed a 'stereotype threat.' The idea is that if a task is stereotypically be thought of as one in which one gender is better than the other (though this is not the case), then somebody from the 'weak gender' might underperform simply because he or she is aware of this. Irriberri and Rey-Biel (2012) show how information on gender can impact performance.

[10] We synchronized the advisors and the advisees so that they all entered the advice stage at the same time. For this, advisors had to have completed tasks 1-5 while the advisees only had to have completed tasks 1 and 2.

for each solved problem.

Task 2 (Tournament): 5-minute addition task. Participants are matched in groups of four. The subject with the best performance receives 2 Euro for each solved problem.

Task 3 (Selection of compensation scheme): 5-minute addition task. Before the task, participants choose whether they want to receive the piece-rate or enter a tournament, in which they compete against the task 2 performances of the other members of their group.

Task 4 (Selection of compensation scheme for task 1): Participants are paid an additional time for their task 1 performance. They choose between receiving the piece-rate or submitting their performance to a tournament, in which they compete with the task 1 performances of the other members of their group.

Task 5 (Self evaluation): Participants have to guess their group rank of their task 1 and 2 performances. They receive 1 Euro for each correct guess.

Task 6 (Advice): Subjects in the advisors treatment recommend their matched partner whether or not to enter the tournament in task 3 and may select some reasons for their advice. For their advice, advisors receive 50% of their advisee's task 3 payoff.

4 Experimental results

This section presents the results of our experimental study. We first verify that the performance in task 1 (piece rate) and task 2 (tournament rate) is similar for women and men and in generation 1 and 2. Then we turn to our main research question, which is whether advice improves the entry decision. Subsequently we go into more detail, examining how advice affects the entry decision. In particular, we analyze whether advice affects the entry decisions of men and women differently. Finally, we turn our focus to the advisors and examine the way women and men give advice, before we analyse how women and men react to advice.

4.1 Performance in task 1 (piece rate) and task 1 (tournament)

Throughout the paper, whenever we talk about performance we mean the number of problems solved, and whenever we say a subject 'solved' a problem, we take it to mean that the subject solved the problem correctly.

Men perform slightly better than women in the first two tasks: task 1 (piece rate) and task 2 (tournament). Pooling the data for generation 1 and 2, women solve on average 6.64 and 8.59 problems in task 1 and task 2, respectively.[11] The average number of problems solved by men is 7.42 in task 1 and 9.42 in task 2.[12] Using the Bonferroni correction, the gender difference in performance

[11]The corresponding standard deviations of performance in task 1 and 2 are 3.22 and 3.48.
[12]The corresponding standard deviations of performance in task 1 and 2 are 3.99 and 4.33.

is not significantly different from zero ($p > 0.114$ for any of the two tasks, two-sided t-test).

Figure 1: CDF of number of correctly solved problems by gender

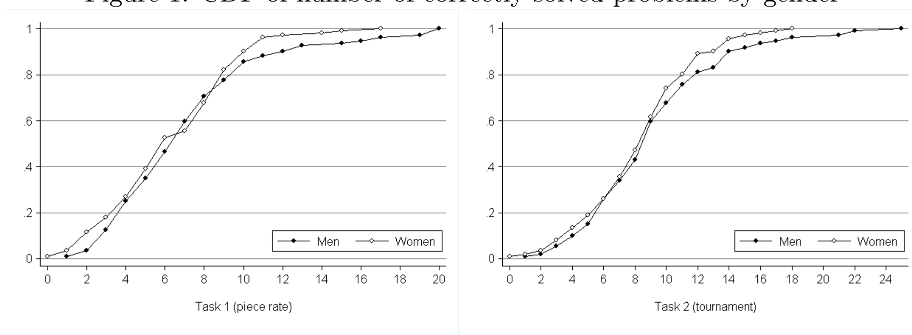
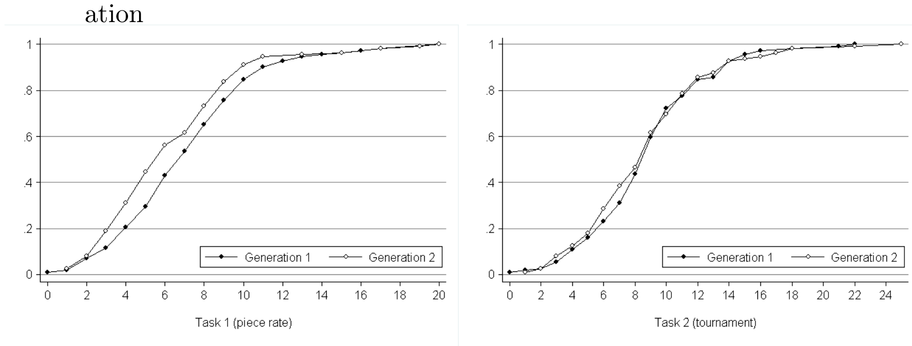


Figure 2: CDF of number of correctly solved problems by generation



Comparing for performance in generation 1 and 2, we find that overall, the performance is not different. However, generation 1 performs better than generation 2 in task 1. In generation 1, participants solve on average 7.45 and 9.07 problems in task 1 and task 2.[13] The average number of problems solved in generation 2 in task 1 and task 2 is 6.60 and 8.94.[14] Participants in generation 1 do not perform differently from participants in generation 2 in task 2 ($p = 0.800$, two-sided t-test). However, in task 1, participants in generation 1 outperform participants in generation 2 slightly ($p = 0.081$, two-sided t-test). With the Bonferroni correction, the result becomes insignificant. A further indication that the difference in task 1-performance is a random (though somewhat unlikely) event, is that this difference constitutes less than one quarter of the standard deviation. In the following, unless otherwise noted, reported test results are those from a two-sided t-test. Throughout, Mann-Whitney tests confirm the results unless otherwise noted.

[13]The corresponding standard deviations are 3.63 and 3.79 in task 1 and task 2.

[14]The corresponding standard deviations of performance are 3.60 and 4.10 in task 1 and task 2.

The cumulative distribution functions for the number of solved problems in task 1 (piece rate) and task 2 (tournament) are presented in figures 1 and 2. Figure 1 displays the cumulative distributions for women and men separately; Figure 2 displays them for generation 1 and generation 2. The graphs give the probability that women, men, participants in generation 1 or 2 solve that many or less problems. As is evident, for all four subgroups the performance distributions are similar.
Gender differences in performance under each of the two compensation schemes in task 1 and task 2 are insignificant on the generation level ($p > 0.194$ for all four tests). The same holds for generation differences if we test among men and women separately ($p > 0.193$ for all three tasks). All together, we conclude that there are no relevant performance differences between women and men and/or generation 1 and generation 2, as we expected.

As in NV07, performance in task 1 and task 2 is highly correlated (Spearman rank correlations of 0.741 for women and 0.649 for men) and subjects perform significantly better in task 2 than in task 1 ($p = 0.000$ for women and men separately).[15] We attribute this improvement mainly to a learning effect rather than the change from piece rate to tournament frame, see also NV07.

Because differences in performance between women and men are small and insignificant, the probabilities of winning the tournament conditional on a certain performance level are similar for women and men. We calculate these probabilities of winning for each performance level using all 224 observations.[16]
Given a specific performance level, a risk-neutral participant should enter the competition in task 3 if her expected payoff from entering the tournament is higher than the sure gain from choosing the piece rate. In our case, a risk-neutral participant should enter the tournament if the probability of winning the tournament is higher than 25% because the reward in the competition if won (2 Euro) is four times the piece rate (0.5 Euro). We can calculate the break-even-performance ex-ante, i.e. before a participant decides whether to enter the tournament, using the task 2 performance (assuming that task 2 performance is a good predictor of task 3 performance) and ex-post, i.e. using the actual performance in task 3.[17]
A female participant who solves ten problems in task 2 wins the tournament with a probability of 27.72% and a male participant with ten correct answers

[15] The same is true if we test for correlation and performance differences in generation 1 and 2 and for women and men in generation 1 and 2 separately (Spearman rank correlations between 0.574 and 1.000 for all six tests; $p = 0.000$ for all six tests).

[16] The probability calculation is done asuming that a participant with a given performance level is randomly matched with one participant of the same gender and two participants of the other gender. Thus the composition of each possible group is the same as in the experiment: two women and two men. We use this approach not only for calculating the probability of winning, but also for the probability of obtaining each of the four possible ranks given a certain number of solved problems.

[17] We could also use task 1 for the ex-ante probability, but evidently task 2 performance is a better predictor for task 3 performance.

wins it with 29.53%. For nine solved problems, the probabilities of winning decrease to 14.59% for a woman and 15.43% for a man, whereas they increase to 39.99% for a woman and 42.96% for a man if the participant gives eleven correct answers in task 2.[18] The ex-post probabilities are virtually the same.[19] For lower and higher performance levels in task 2 and task 3, the probabilities decrease and increase, respectively: With eight or less correct answers, the probabilities of winning are less than 7% for both women and men; with twelve or more correct problems, the probabilities of winning are higher than 52% for women and men.

4.2 Effect of advice on the entry decision

This subsection presents our main result. We show how advice improves the entry decision with respect to performance. We then have a closer look at how exactly advice affects the entry decision conditional on performance. We find that the improvement is mainly achieved by good women, who select more frequently into the tournament, and poorly performing men, who stay out more often. Finally, we find that while advice reduces the overall gender gap, it still persists.

4.2.1 Improvement of the entry decision

When deciding on the compensation scheme in task 3, participants have information on their own performances in task 1 and task 2 (and the change from task 1 to task 2). Recall that in generation 2, participants receive advice from a participant in generation 1 who has completed all four tasks and the self-assessment and who knows the performance of the other three group members of her own group in task 1 and task 2. Factors that are important for the decision whether to enter the tournament or not are past performance, belief about future performance, belief about the own (present or future) performance in relation to the performance of the other group members in task 2 (confidence), risk preferences, and preferences for competition. The advice is an additional factor that is assumed to have an impact on the entry decision in generation 2. A risk-neutral participant who wants to maximize expected payoffs should choose the tournament in task 3 if her probability of winning is higher than 25%, or if she expects to solve eleven or more problems. Not only from the individual but also from the social perspective, the payoffs are maximized if the high ability participants enter the tournament, and if the low ability participants choose the piece rate. For those who solve ten problems, either decision (piece rate or tournament) gives roughly the same expected earnings. Ideally, the performance of

[18]In task 1, women win the tournament with a probability of 26.30% if they solved eight problems. For men, this probability is 24.88%. With seven solved problems, the probabilities are 15.25% for women and 15.43% for men. The probability of winning with nine correct answers is 41.34% and 41.94% for women and men.

[19]This is because we condition the probabilities on the performance level and because the subjects who enter the tournament compete against the task 2 performance of their group members.

those who enter the tournament should thus be better than the performance of those who do not enter the tournament. If this is the case, decisions are good in the sense of maximizing expected earnings.

Table 1: Performance by choice of compensation scheme in task 3

	Generation 1 (without advice)			
	Women		Men	
Average performance	*Piece rate*	*Tournament*	*Piece rate*	*Tournament*
ex-ante				
Task 1 (piece rate)	6.692	7.706	7.609	8.091
Task 2 (tournament)	8.308	9.412	8.565	10.151
Task 2 - Task 1	1.615	1.706	0.957	2.061
ex-post				
Task 3 (choice)	8.974	10.120	8.783	10.730
	Generation 2 (with advice)			
	Women		Men	
Average performance	*Piece rate*	*Tournament*	*Piece rate*	*Tournament*
ex-ante				
Task 1 (piece rate)	5.829	7.048	**5.087**	**8.182**
Task 2 (tournament)	**7.743**	**9.857**	**6.565**	**11.272**
Task 2 - Task 1	1.914	2.810	**1.478**	**3.091**
ex-post				
Task 3 (choice)	**7.943**	**10.140**	**7.000**	**11.730**

Average number of solved problems for each subgroup.
Sample is 112 women and 112 men.
Bold value pairs are statistically significantly different.

The ex-ante performance can be measured as the number of problems solved in task 1 (piece rate), in task 2 (tournament) or as the improvement from task 1 to task 2. As measure for the ex-post performance, we use the number of problems solved in task 3 (performance after the choice of compensation scheme). The average values are presented in table 1 for women and men in generation 1 and generation 2 separately. For each of the four subgroups, the average number of solved problems is calculated separately for those who chose the piece rate and those who chose the tournament in task 3.

By any measure of performance, women and men who choose the tournament perform better than women and men who choose the piece rate. However, the difference is not significant for participants in generation 1 ($p > 0.169$ for women and men for each of the four performance measures). That means that, in our control group, the high and the low ability participants do not separate well into those who enter into the competition and those who stay out. This result is in line with the findings in NV07. In generation 2, where participants get advice, participants take their own performance much better into account: Men who enter the tournament perform significantly better than men who choose the piece rate ($p < 0.001$ for each of the four performance measures); women who enter the tournament perform significantly better than women who choose the piece rate if we base the analysis on the performance in task 2 (tournament) or task 3 (choice of compensation scheme) ($p < 0.065$ for both measures). The difference is not statistically significant if we use the task 1 (piece rate) performance or the improvement from task 1 to task 2 as a measure ($p > 0.128$). The results show that, based on performance, the advice improves the entry decisions notably. Participants who get advice choose the compensation scheme more in line with their performance than participants who do not get advice, i.e. mainly the well performing participants enter into the tournament whereas the low ability subjects decide for the piece rate. Note also that the performance of women and men who enter the tournament in task 3 is with almost any performance measure better in generation 2 than in generation 1 and worse among those who choose the piece rate, see table 1.

Table 2: Expected cost of over- and under-entry in task 3 (choice) tournament for generation 1 (without advice) and generation 2 (with advice)

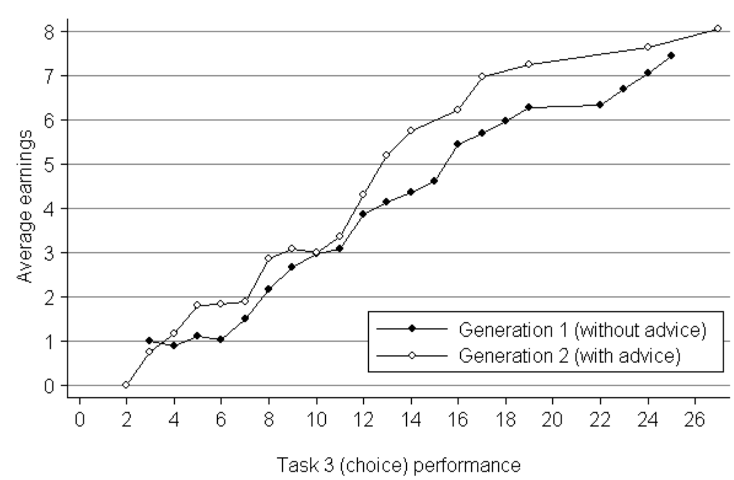
	Generation 1		Generation 2	
	Women	Men	Women	Men
Calculation based on task 2 performance (ex-ante)				
Under-entry	8 of 14	4 of 17	5 of 15	2 of 19
Over-entry	8 of 33	17 of 34	10 of 36	12 of 33
Total expected costs	79.2	**96.0**	65.1	**37.7**
Average expected costs	5.0	**4.6**	4.3	**2.7**
Total expected costs	**175.2**		**102.7**	
Average expected costs	**4.7**		**3.5**	
Calculation based on task 3 performance (ex-post)				
Under-entry	11 of 17	5 of 18	7 of 18	2 of 23
Over-entry	10 of 32	16 of 33	8 of 35	11 of 31
Total expected costs	85.3	**94.2**	68.1	**34.8**
Average expected costs	4.1	**4.5**	4.5	**2.7**
Total expected costs	**179.5**		**103.0**	
Average expected costs	**4.3**		**3.7**	

Under-entry: Number of those who do not enter out of those who should enter.
Over-entry: Number of those who do enter out of those who should not enter.
Total/average expected costs: Expected costs of under- and over-entry.
Bold value pairs are statistically significantly different.
Participants with eleven or more solved problems should enter the tournament, subjects who solve nine or less problems should chose the piece rate in task 3 to maximize expected earnings. Participants who solve ten problems are not included in the analysis.

We can quantify the improvement in the entry decision in terms of the reduction of the expected costs due to 'wrong' decisions. We count an entry decision as 'wrong' if it does not maximize the subject's expected earnings. Note that the level of the cost depends on the design of the experiment and therefore we are not interested in the absolute values but in comparing cost levels across groups (generation and gender). A participant's expected earnings from entering the tournament are equal to the (expected) number of solved problems times the corresponding probability of winning the tournament times 2 Euro.

In the piece rate, the (expected) earnings are equal to the (expected) number of problems solved times 0.5 Euro. Therefore, expected earnings from entering the tournament are higher if the probability of winning is larger than 25%. Using either task 2 or 3 performance, this is the case if a participant solves at least eleven problems. We calculate for each subject with eleven or more correct answers the cost of underentry, which is the difference between the expected earnings from entering the tournament and the earnings with the piece rate, i.e. the 'missed' expected earnings from not having entered the tournament. Conversely, (expected) earnings are higher under the piece rate if the probability of winning is smaller than 25%, which is the case for participants who solve at most nine problems. The cost of overentry is calculated by taking the difference between the expected earnings under piece rate and tournament, i.e. we calculate 'missed' expected earnings from not having chosen the piece rate. We adopted this cost calculation from NV07.[20]

Figure 3: Average earnings if the number of correctly solved problems in task 3 is at most a given level



The costs due to under- and over-entry are summarized in table 2. The calculations in the first six rows are done using the task 2 (tournament) performance, i.e. the costs are the ex-ante costs. The values in the last six rows are based on the task 3 (choice) performance, i.e. the costs are the ex-post costs. Columns (1) and (2) report the expected costs of under- and over-entry for women and men and the total/average expected costs in generation 1. Columns

[20]Note, however, that the way we calculate the probabilities of winning differs from the approach in NV07. While we calculate probabilities from the actual performance distribution in our sample, they use a bootstrap method. We do not expect the results to be significantly different.

(3) and (4) report the expected costs of under- and over-entry for women and men and the total/average expected costs in generation 2. The total expected costs are significantly lower for the subjects who get advice (generation 2) than for the participants who are not provided with advice (generation 1) ($p < 0.074$ for each of the two performance measures, one-sided t-test), supporting our previous finding that with advice, subjects make their entry decisions more in accordance with their performance. The larger part of the cost reduction is due to the improvement of the entry decision of men: The costs for under- and over-entry for men are significantly lower in generation 2 than in generation 1 ($p < 0.060$, one-sided t-test).

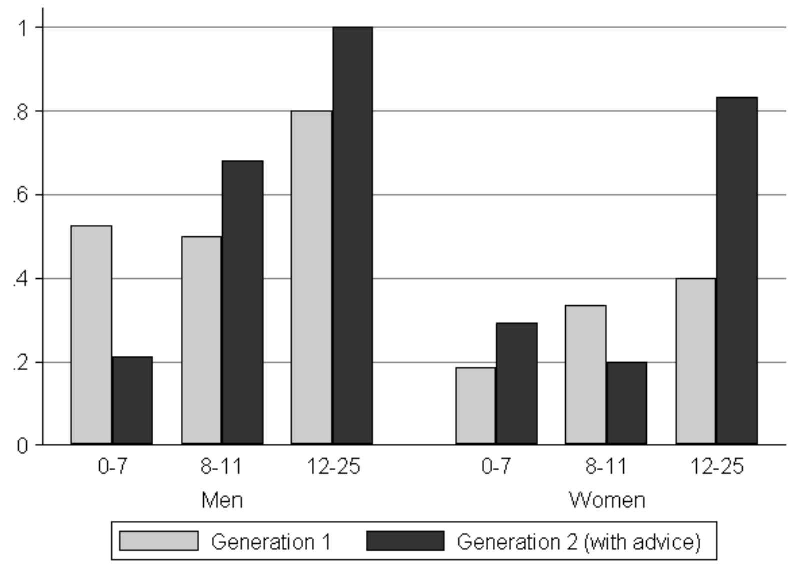
The improved entry decisions are also reflected in actual earnings for task 3. These earnings should be higher if participants enter the task 3 tournament more according to their performance, as is the case in generation 2 (with advice). The average earnings of those who solve at most a certain number of problems in task 3 are shown in figure 3.[21] For instance, the average earnings of those who solve fourteen or less problems is 4.4 in generation 1 and 5.8 in generation 2. It can be seen in figure 3 that the average earnings in generation 2 (with advice) exceed the average earnings in generation 1 (without advice) for almost all performance levels.

4.2.2 Effect on the entry decision of the extreme performance levels

To examine how the advice improves the entry decision we look at the entry decision of women and men conditional on their performance levels. We use the task 2 (tournament) performance as the ex-ante performance benchmark for the entry decision. Alternatively, one could use the task 1 (piece rate) performance or the change from task 1 to task 2 for the entry evaluation. Because of the learning effect from task 1 to task 2, the task 2 performance should be most important for the decision. We split participants into three groups: (1) The 'poorly' performing participants, (2) the 'middle' performing participants, and (3) the 'well' performing participants. The first group consists of participants who solve between zero and seven problems in task 2 (35% of the total population of 224 participants). Subjects in the second group solve between eight and eleven problems (43%) and the last group includes those who solve between twelve and twenty five problems (22%).

[21]We calculate the cumulative average earnings because on one hand the (naturally) occurring differences in performance between generations makes the interpretation of the sum of all payoffs difficult. On the other hand, comparing generation averages for each performance level is not meaningful either because of the low number of observations at each level or because the earnings can vary between zero and two times the number of solved problems if a participant enters into the tournament.

Figure 4: Proportion of men and women who enter the competition for a given range of correct answers in task 2 by generation



The participants in the low performance group are very unlikely to solve ten or more problems in task 3 and should therefore not choose the competition. In the middle group, one could argue that a subject with eight correct answers or more could possibly reach a sufficiently good performance for the tournament in task 3 or also fall behind and better choose the piece rate in task 3. Participants in the high performance group are very likely to maintain the performance on a sufficiently high level.

The proportion of men and women who choose the tournament is shown for each of the three performance groups and for generation 1 (without advice) and generation 2 (with advice) separately in figure 4. The improvement in the fraction of participants who enters the tournament in generation 2 as compared to generation 1 is particularly striking for the group of low ability men and for the group of the best women. Whereas 52.63% of the men who solve seven or less problems in task 2 and who do not get advice enter the tournament (10 out of 19), only 21.05% of the men in the same performance group who get advice choose the tournament (4 out of 19). The entry of men in the low performance group is statistically significantly lower if they get advice ($p = 0.046$, one-sided Fisher's exact test). Among the high ability women who solve twelve or more problems in task 2, 40.00% of the women who do not get advice enter into the tournament (4 out of 10) as opposed to 83.33% of the women who get advice (10 out of 12). High ability women enter statistically significantly more into the tournament if they receive advice ($p = 0.048$, one-sided Fisher's exact test). The improvement in the entry decision in these two groups of participants (low ability men and high ability women) is the driving force of the overall effect of

advice on the entry decision.
Figure 4 further illustrates that the effect of advice is stronger among men than among women. On one hand, men who solve twelve or more problems enter the competition without exception in generation 2 (12 out of 12) as opposed to 80.00% in generation 1 (12 out of 15). On the other hand, women who solve seven or less problems do not appear to be significantly affected by advice: In generation 1, 18.75% of women (3 out of 16) enter the competition whereas the fraction is 29.17% in generation 2 (7 out of 24). In the middle ability group, only 20% of the women who get advice (4 out of 20) enter the tournament as compared to 33.33% in generation 1 (10 out of 30) and men choose the competition more frequently with adivce: 68% choose the tournament in generation 2 (17 out of 25) while the fraction is 50% (11 out of 22) in generation 1. We examine in the next section whether this could be due to poor quality of biases in the advice.

4.2.3 Effect on the gender gap in tournament entry

The gender gap in the entry decision of participants in generation 1 is also quite obvious in figure 4. In generation 1, the fraction of men who choose the tournament exceeds the fraction of women for all performance groups. Among participants who solve less than eight or more than eleven problems , these differences are statistically significant ($p < 0.088$ for both groups, Fisher's exact test). In the middle performance group, the difference is not significant ($p = 0.263$, Fisher's exact test). In contrast, in generation 2, the gender gap disappears among participants with extreme performance levels, i.e. participants who solve less than eight or more than eleven problems ($p > 0.478$, Fisher's exact test), but a gender gap emerges among participants who are in the middle group ($p = 0.002$, Fisher's exact test).[22]
Though the overall gender gap is reduced through advice, it still persists. Whereas 33 of the 56 men in generation 1 (without advice) enter into the competition in task 3, only 17 of the 56 women do so. This difference is statistically significant ($p = 0.002$, Pearson chi2 test). In generation 2 (with advice), 33 men and 21 women choose the tournament as compensation scheme in task 3. Though a small reduction, it does not make the gender gap disappear ($p = 0.023$, Pearson chi2 test).
Another possibility to split observations into two sub-groups is to take the break even level, above which participants should enter the tournament and below which participants should choose the piece rate in order to maximize expected earnings (assuming that the performance does not change from task 2 to task 3). For task 2, this is ten solved problems. In generation 1 (generation 2), 25% (26.79%) of the women and 30.36% (33.93%) of the men solve eleven or more

[22] Since with 43% of all participants (97 out of 224) a large fraction of the observations lies in this performance range the increase in the gender gap has an important impact on the overall gender gap. In the low performance group, women enter into the tournament actually more frequently than men: 7 out of 24 women choose the tournament (29.17%) and 4 out of 19 men select into competition (21.05%).

problems in task 2 and should choose the tournament from the payoff maximizing point of view. Those participants who solve exactly ten problems, which are 16.07% (8.93%) of women and 8.93% (7.14%) of men, do well with either decision. Participants who solve no more than nine problems, 58.93% (64.29%) of women and 60.71% (58.93%) of men, should choose the piece rate. Without advice, there is a gender gap in the entry decisions of participants who solve nine or less problems ($p = 0.043$, Pearson chi2 test) and among participants who solve at least eleven problems ($p = 0.075$, Fisher's exact test). These results are the same as in NV07. Only women and men who solve ten problems do not enter differently in generation 1 ($p = 0.580$, Fisher's exact test). With advice, the gender gap disappears in the groups of participants who solve fewer ($p = 0.445$, Pearson chi2 test) or more ($p = 0.199$, Fisher's exact test) than ten problems . But the gap is very strong among the small group of nine participants who solve ten problems ($p = 0.048$, Fisher's exact test).[23]

4.3 Provision of advice and reaction to advice

In this subsection, we first turn our focus to the advisors. The first question we address is whether the advice given is 'good,' i.e. in line with the information advisors receive from their advisees. This is important in order to guarantee that advice works in the right direction and this is what we would expect after having observed the improvement in the entry decision of participants who receive advice. Afterwards, we go into more depth and check whether women and men give different advice. Finally, we turn our attention again to the advisees and analyze whether women and men react differently to advice.

4.3.1 Correctness of advice

The analysis in the previous subsection shows that advice improves the selection into competition, i.e. that, conditional on performance, participants in generation 2 (the advisees) enter better into the tournament in task 3 than subjects in generation 2 (the advisors). To obtain this improvement the advice must be 'good' in the sense that advisors recommend the well performing participants to enter the tournament and discourage participants who solve fewer problems. Before giving advice, advisors are provided with the information on the performance of all members of their own group in task 1 (piece rate) and task 2 (tournament). Additionally, the participants in generation 2 inform their advisor on the number of problems they solved in task 1 and task 2. As one would expect, both types of information are important for the advice.

[23] Using the ex-post performance from task 3, results change slightly in that the gender gap among participants who should choose the piece rate is not significant, neither in generation 1 ($p = 0.156$, Pearson chi2 test) nor in generation 2 ($p = 0.258$, Pearson chi2 test). Men who provide eleven or more correct answers enter significiantly more the tournament than women with the same performance range in either generation ($p < 0.045$ for any of the two generations, Fisher's exact test). In generation 1, significantly more men than women enter the tournament with a performance level of ten correct answers ($p = 0.072$, Fisher's exact test) while there is no gender difference among the corresponding five participants in generation 2.

Advice is overall in line with the performance information provided by the advisees. 88.41% of the advisors (61 out of 69) who get the information that the advisee's number of correct answers was nine or less in task 2 (tournament) recommend to choose the piece rate in task 3. Only 66.66% of the advisors (22 out of 33) whose advisee informs them that the performance in task 2 was eleven or more correct answers recommend entry. However, the average task 2 performance information is significantly higher if advisors give the advice to enter the tournament (p = 0.000). Women and men do not give different advice conditional on these performance ranges (p = 1.000 if the performance information is nine or less, p = 0.465 if the performance information is eleven or more, Fisher's exact test). The difference between task 2 and task 1 performance is significantly higher in generation 2 than in generation 1 (p = 0.038). This improvement in performance is perceived positively by the advisors: Advisors who recommend to enter the tournament observe a significantly bigger change from task 1 to task 2 performance of the advisee than advisors who suggest to select the piece rate (p = 0.025).

As expected, the information about the performance in the own group plays an important role. If the advisee's reported task 2 performance is smaller than the number of correct answers of the best performing subject in the advisor's own group, 80.46% of the advisors (70 out of 87) suggest to choose the piece rate. If the advisee's reported task 2 performance is better than the best performance level in the own group, 86.67% of the advisors (13 out of 15) recommend entering the tournament. For the same number of correct answers, the advice is quite balanced between piece rate and tournament (6 out of 10 advisors recommend the tournament). In none of the three constellations of reported performance and own group performance, there is a gender gap in the choice of advice ($p > 0.485$ for each constellation, Fisher's exact test).

4.3.2 Gender differences in advice giving

At a first glance, there seems to be no gender differences with respect to the provision of advice. Women and men do overall not advice statistically differently (p = 0.418, Pearson chi2 test). There is no gender gap if we use the information on the advisee's performance and split the observations into two subgroups: Those who should advice to choose the piece rate and those who should recommend the tournament from the earnings maximizing perspective. We also do not observe that women and men advice differently putting the advisee's performance information in relation to the best performance in the advisor's own group. However, if we analyze the advice given by women and men who receive at least a certain reported performance information level, we find that women are throughout the entire performance range slightly more hesitant to advice tournament entry.

Figure 5: Proportion of women and men who advice to enter the competition if the information on the number of correctly solved problems is at least a given level

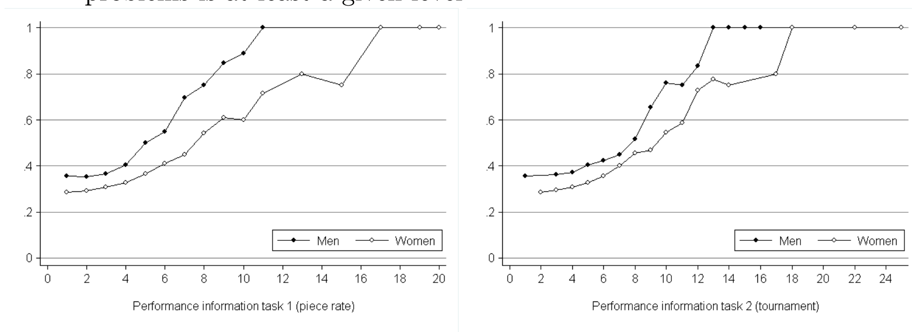


Figure 5 shows the proportion of women and men who give the advice to choose the tournament if they receive the information that their advisee solved a given number of problems or more. The graph on the left hand in figure 5 presents the proportions of women and men given the performance information for task 1 (piece rate) and the graph on the right hand in figure 5 shows the proportion of women and men conditional on the performance information for task 2 (tournament). For instance, among the advisors whose information about the advisee's performance in task 2 is that she solved ten problems or any value larger than that 54.55% of the women and 76.19% of the men recommend to enter the tournament. For any minimum performance information level, women are more hesitant to advice selection into competition than men except for very high performance levels. Whereas men recommend uniformly to choose the tournament if the information about task 2 (task 1) is at least thirteen (eleven) correct answers, women do so only if the information is eighteen (seventeen) solved problems or more. A possible explanation for the previous test results (no gender gap in advice provision) could be that by chance the information about the advisee's number of correct answers in task 2 (task 1) is on average 0.7 (0.9) less with men than with women. The difference in the performance information between women and men is marginally significant for task 1 ($p = 0.098$, one-sided t-test).

There are two further indicators that women are more averse to recommend entry into competition than men. One is the time that women and men need to reach a decision for their advice and the other is the reasons they select for the advice. On average, participants who advice to enter the tournament need 6.5 seconds longer to reach a decision than subjects who recommend to choose the piece rate. This difference is statistically significant ($p = 0.077$, one-sided t-test). Women are in general faster when giving advice: While men need on average 26.7 seconds to decide between piece rate and tournament advice, women make a decision in 21.6 seconds ($p = 0.072$, one-sided t-test). Women are also faster than men among advisors who recommend to choose the piece rate for task 3: While women decide in 19.2 seconds, men need 5.9 seconds more ($p = 0.042$, one-sided t-test). However, the difference is no more significant when it comes to advising entry into tournament: In this case, women need 27.3 seconds to come up with the advice 'tournament' and men 29.6 seconds ($p = 0.392$, one-sided t-test). The hesitation of women becomes clearer when looking at the time women and men need to choose reasons for the advice. While women are on average 5.7 seconds faster than men if the advice is 'piece rate' ($p = 0.095$, one-sided t-test), men are slightly faster than women if it comes to choosing reasons for the advice 'tournament'.

Advisors can choose as many reasons as they wish for their advice(including none). If the advice is 'tournament', they can choose among emphazising the preference for competition, encouraging the advisee's confidence in her performance and/or emphazising the preference for risk. For the advice 'piece rate', the reasons go in the other direction: emphazising the disutility from competition, discouraging the advisee's confidence in her performance and/or emphazising the preference for a sure outcome. All over, advisors who recommend to enter the tournament provide more reasons: The most commonly chosen reason is emphasizing risk preferences/disutilities (35 out of 36 if advice is 'tournament', 63 out of 76 if advice is 'piece rate'), followed by encouraging/discouraging the advisee's confidence (30 out of 36 if advice is 'tournament', 42 out of 76 if advice is 'piece rate') and preference for/disutility from competition (17 out of 36 if advice is 'tournament', 4 out of 76 if advice is 'piece rate'). There are no significant gender differences as to the selection of a particular reason ($p > 0.444$ for any reason separately for advice 'tournament' and 'piece rate', Fisher's exact test) with one exception: If the advice is 'piece rate' significantly more men discourage the advisee to believe in her ability ($p = 0.058$, Pearson chi2 test).

4.3.3 Reaction to advice

In the previous section, we saw that the gender gap in selection into competition disappears among low ability (solving seven or less problems) and high ability (solving twelve or more problems) subjects if they get advice, see Figure 4. The division into the three performance groups is done based on the task 2 performance. In the middle performance range (eight to eleven correct answers), the gender gap increases substantially because men enter much more into the tournament than women if they receive the advice to do so. An explanation could be that men in the middle ability group more often than women receive the recommendation to enter the tournament (this would be by chance since advisors have no information about the gender of their advisee). This is not the case: In all three performance groups, the two advice types are equally spread and there is no difference in the advice that women and men receive conditional on their performance range. In particular in the middle performance group, 68% of the men (17 out of 25) and 70% of the women (14 out of 20) are advised to choose the piece rate. The difference between women and men lies here in the reaction to the advice. Whereas in the low and high ability group, women and men do not react significantly differently to advice ($p > 0.474$ for the two performance groups separately and for advice 'piece rate' and 'tournament',

two-sided t-test), men and women in the middle ability group react differently to each type of advice (p = 0.015 for the advice 'tournament' and p = 0.057 for the advice 'piece rate', two-sided t-test). On one hand, women shy away from competition no matter what the advice is. 66.67% of the middle ability women (4 out of 6) who receive advice to choose the tournament do not enter and 85.71% (12 out of 14) follow the advice to take the piece rate in task 3. On the other hand, men follow the advice uniformly when they are advised to enter the competition. 52.94% of the men (9 out of 17) who solve between eight and eleven problems in task 2 and who get the advice to choose the piece rate do enter the into tournament in task 3.
Interestingly, the hesitation of women to enter the tournament and the willingness of men to compete are also reflected in the time they need to decide on the compensation scheme after having received the advice. While both, men and women, need on average more or less 21 seconds to decide on the compensation scheme the time distribution changes if we condition on the advice the advisees receive. If they receive advice to choose the piece rate women decide on the compensation scheme in 19.9 seconds whereas men need 3.5 seconds longer. If the advice is to enter into the competition men take a decision in 16.1 seconds while women need 7.5 seconds longer. This difference is significant (p = 0.070, one-sided t-test). The time differences become even larger restricting the analysis on the middle ability group of individuals. We can interpret the time a participant needs to choose a compensation scheme after having received the advice as proxy for the conflict between the advice and the individual initial 'tastes' for competition. The decision times illustrate nicely how the respective advice seems to be in conflict or in line with initial gender-specific 'tastes'.

5 Conclusions

We add to the basic experimental setting of NV07 the feature that subjects receive advice as to whether to enter a tournament. Compared to our control treatment without advice, we show that advice significantly improves entry decisions. High ability subjects enter more often, low ability subjects less often. The costs of mistakes in the entry decisions go down. Examining how advice is given, we find that advisors tend to give 'good' advice and women are more hesitant in recommending entry.

6 Appendix

Only Generation 1:

En el experimento de hoy, te pediremos que completes seis tareas diferentes. El método que usamos para determinar tus ingresos varía entre las tareas. Antes de cada tarea, describiremos en detalle como se determina la remuneración de esa tarea. El total de tus ingresos al final del experimento es la suma de los siguientes componentes: Recibirás (1) 5,00 Euro por participar en el experimento. (2)

4,00 Euro por completar las Tareas 1-4. (3) Adicionalmente, de las Tareas 1-4, escogeremos una de las cuatro tareas al azar y te pagaremos basado en tu resultado en esta tarea. (4) Te pagaremos por las Tareas 5 y 6. Una vez que hayas terminado todas las tareas determinaremos cual de las primeras cuatro tareas cuenta para la remuneración tirando un número entre 1 y 4. Después de que haya terminado el experimento, te pedimos que te esperes en tu mesa, vendremos a tu mesa y te pagaremos tus ingresos en privado. Durante todo el experimento, el uso de los móviles está prohibido.

Es importante que no hables con ninguno de los otros participantes hasta que termine el experimento. Te pedimos que no mires las pantallas de los otros participantes. Puedes preguntarnos en cualquier momento. Si tienes una pregunta, levanta la mano y alguien de nosotros vendrá a tu mesa para responder a la pregunta.

Ahora recibirás las instrucciones para la Tarea 1.

Only Generation 2:

El experimento de hoy empezará con un periodo de espera de aproximadamente 15 minutos. Después de esos 15 minutos te daremos las instrucciones para los siguientes pasos. Te pedimos que esperes en silencio en el asiento que te ha sido asignado y que no hables con ninguno de los otros participantes o por el móvil. Si quieres puedes leer algo o hacer otra cosa en silencio. Al final del experimento, recibirás 2,00 Euro por haber esperado en silencio.

En el experimento de hoy, te pediremos que completes cinco tareas diferentes. El método que usamos para determinar tus remuneraciones varía entre las tareas. Antes de cada tarea, describiremos en detalle como se determina la la remuneración de esa tarea. El total de tus ingresos al final del experimento es la suma de los siguientes componentes: Recibirás (1) 5,00 Euro por participar en el experimento y (2) 2,00 Euro por esperar durante el periodo de espera. (3) 4,00 Euro por completar las Tareas 1-4. (4) Adicionalmente, de las Tareas 1-4, escogeremos una de las cuatro tareas al azar y te pagaremos basado en tu resultado en esa tarea. (5) Te pagaremos por la Tarea 5. Una vez que hayas terminado todas las tareas determinaremos cual de las primeras cuatro tareas cuenta para la remuneración tirando un número entre 1 y 4. Después de que haya terminado el experimento, te pedimos que te esperes en tu mesa, vendremos a tu mesa y te pagaremos tus ingresos en privado. Durante todo el experimento, el uso de los móviles está prohibido.

Es importante que no hables con ninguno de los otros participantes hasta que termine el experimento. Te pedimos que no mires las pantallas de los otros participantes. Puedes preguntarnos en cualquier momento. Si tienes una pregunta, levanta la mano y alguien de nosotros vendrá a tu mesa para responder a la pregunta.

Generation 1 and 2:

Tarea 1 – Remuneración por unidad

En la Tarea 1, deberás calcular sumas de cinco números de dos cifras (véase “Pantalla de la Tarea 1”). Tendrás 5 minutos para calcular la suma correcta de una serie de este tipo de problemas. No puedes usar una calculadora para determinar la suma. Pero puedes anotar los números en los papeles de borrador y usar los papeles de borrador que te hemos entregado. Para mandar una respuesta pulsa el botón “Siguiente” con el ratón. Cuando mandes una respuesta el ordenador te comunicará inmediatamente si la respuesta es correcta o no y se creará una nueva secuencia de cinco números. Tus respuestas a los problemas son anónimas.

Si la Tarea 1 es la que resulta seleccionada al azar para la remuneración, te pagaremos 0,50 Euro por cada problema que hayas resuelto correctamente en los 5 minutos. Tus ingresos no disminuyen si das una respuesta incorrecta a un problema. Llamaremos a este modo de remuneración, remuneración por unidad.

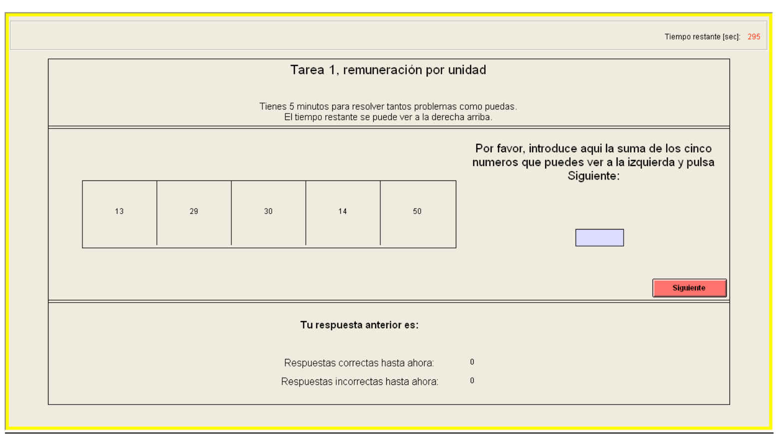
¿Hay alguna pregunta?

Test

Para asegurar que entiendes correctamente como se calcula la remuneración de la Tarea 1, te pedimos que respondas a la siguiente pregunta. Los números usados en la pregunta son simplemente a título ilustrativo y no indican un buen resultado en esta tarea. Después de pulsar “Continuar”, la tarea empezará en seguido.

Supón que has resuelto 2 problemas correctamente y 3 problemas incorrectamente, ¿cuáles son tus ingresos para la Tarea 1 si es escogida para los ingresos?

Pantalla de la Tarea 1



Tarea 2 – Competición

Como en la Tarea 1, tendrás 5 minutos para calcular la suma correcta de una serie de cinco números de dos cifras escogidos al azar. Pero en esta tarea, tu remuneración depende de tu resultado en relación con el resultado de un grupo de otros participantes. Cada grupo está compuesto de cuatro personas; los otros tres miembros de tu grupo están en la misma fila que tú. Si la Tarea 2 es la que resulta seleccionada al azar, tus ingresos dependen del número de problemas que resuelves tú en comparación con los otros tres miembros de tu grupo. La persona que resuelva el número más grande de problemas correctamente recibirá 2,00 Euro por cada problema que haya resuelto correctamente, mientras los otros miembros del grupo no reciben remuneración. Si hay empate la persona que gana se determinará al azar. Calificamos a este modo de remuneración, remuneración por competición. No se te informará de cómo te haya ido la competición hasta que hayas terminado las cinco tareas.

¿Hay alguna pregunta?

Test

Para asegurar que entiendes correctamente como se calcula la remuneración de la Tarea 2, te pedimos que respondas a las siguientes preguntas. Los números usados en la pregunta son simplemente a título ilustrativo y no indican un buen resultado en esta tarea. Después de pulsar "Continuar", la tarea empezará en seguido.

Supón que has resuelto 2 problemas correctamente y 3 problemas incorrectamente, y que todos los demás de tu grupo han resuelto 1 problema correctamente. ¿Cuáles son tus ingresos para la Tarea 2 si es escogida para determinar los ingresos?

Supón que has resuelto 2 problemas correctamente y 3 problemas incorrectamente, y que una persona de tu grupo ha resuelto 3 problemas correctamente. ¿Cuáles son tus ingresos para la Tarea 2 si es escogida para determinar los ingresos?

Tarea 3 – Selección del modo de remuneración

Como en las dos tareas anteriores, tendrás 5 minutos para calcular la suma correcta de una serie de cinco números de dos cifras escogidos al azar. Pero ahora debes escoger cual de los dos modos de pago, remuneración por unidad o remuneración por competición, prefieres aplicar a tu resultado en la tercera tarea.

Si la Tarea 3 es seleccionada para la remuneración, entonces tus ingresos para esta tarea se determinan como sigue. Si escoges la remuneración por unidad, recibes 0,50 Euro por cada problema que resuelves correctamente. Si escoges la remuneración por competición tu resultado será evaluado en relación con el resultado de los otros tres participantes de tu grupo de la competición en la Tarea 2. La competición en la Tarea 2 es la que acabas de completar. Si resuelves más problemas correctamente que los otros tres miembros de tu grupo en la Tarea 2, recibes 2,00 Euro por problema correcto que es cuatro veces la cantidad de la remuneración por unidad. No recibirás un ingreso para esta tarea si escoges la competición y no resuelves más problemas correctamente ahora que los otros miembros de tu grupo han resuelto en la competición en la Tarea 2. Si hay empates la persona que gana se determinará al azar. No se te informará de cómo hayas salido de la competición hasta que hayas terminado las cinco tareas.

Only Generation 2:

(a) Consejo

Antes de decidir sobre el modo de remuneración, recibirás consejo sobre qué modo de remuneración escoger. La persona que te dará consejo es una persona del grupo en el otro aula que ya ha terminado las Tareas 1-4 y que sabe cómo les fue a los otros miembros de su propio grupo en la Tarea 1 y 2. Cada miembro de tu grupo recibirá consejo de una persona distinta, asignada al azar. Primero, deberá mandarle a la persona que te aconseja la información sobre el número de problemas que hayas resuelto correctamente en las Tareas 1 y 2. Después, la persona que te aconseja te dirá si opina que deberías entrar en la competición y probablemente también te dará una razón para su consejo.

La pantalla siguiente te pedirá introducir los números de problemas que hayas resuelto correctamente en las Tarea 1 y 2. Después, tendrás que esperar un momento para recibir el mensaje de la persona que te aconseja.

(b) Decisión sobre el modo de remuneración

La pantalla en la que aparece el consejo te pedirá escoger si quieres aplicar la remuneración por unidad o la remuneración por competición a tu resultado. Después, tendrás 5 minutos para calcular la suma correcta de una serie de cinco números de dos cifras escogidos al azar.

Only Generation 1:

La pantalla siguiente te pedirá escoger si quieres aplicar la remuneración por unidad o la remuneración por competición a tu resultado. Después, tendrás 5 minutos para calcular la suma correcta de una seria de cinco números de dos cifras escogidos al azar.

¿Hay alguna pregunta?

Test

Para asegurar que entiendes correctamente como se calcula la remuneración de la Tarea 3, te pedimos que respondas a las siguientes preguntas. Los números usados en la pregunta son simplemente a título ilustrativo y no indican un buen resultado en esta tarea.

Supón que has seleccionado la remuneración por unidad y que has resuelto 3 problemas correctamente y 1 problema incorrectamente. ¿Cuáles son tus ingresos para la Tarea 3 si es escogida para los ingresos?

Supón que has seleccionado la competición y que has resuelto 2 problemas correctamente y 3 problemas incorrectamente, y que todos los demás de tu grupo han resuelto 1 problema en la Tarea 2 correctamente. ¿Cuáles son tus ingresos para la Tarea 3 si es escogida para determinar los ingresos?

Supón que has seleccionado la competición y que has resuelto 2 problemas correctamente y 3 problemas incorrectamente, y que una persona de tu grupo ha resuelto 3 problemas en la Tarea 2 correctamente. ¿Cuáles son tus ingresos para la Tarea 3 si es escogida para los ingresos?

Generation 1 and 2:

Tarea 4 – Decisión remuneración de Tarea 1

En la cuarta tarea del experimento, no tienes que sumar números. En vez de eso, te pagaremos otra vez por el número de problemas que hayas resuelto en la Tarea 1 – remuneración por unidad. Pero ahora debes decidir cuál de los modos de remuneración quieres aplicar al número de problemas que hayas resuelto. Puedes escoger entre ser pagado según remuneración por unidad o según remuneración por competición.

Si la cuarta tarea es la seleccionada para la remuneración, tus ingresos para esta tarea se determinan como sigue. Si escoges la remuneración por unidad recibes 0,50 Euro por problema que hayas resuelto correctamente en la Tarea 1.

Si escoges remuneración por competición, tu resultado será evaluado en relación con el resultado de los otros tres participantes de tu grupo en la Tarea 1 – remuneración por unidad. Si has resuelto más problemas correctamente en la Tarea 1 que los otros tres miembros de tu grupo, recibes cuatro veces la remuneración de la remuneración por unidad que es equivalente a 2,00 Euro por problema correcto. No recibirás un ingreso para esta tarea si escoges la competición y no has resuelto más problemas correctamente que los otros miembros de tu grupo en la Tarea 1. Si hay empate la persona que gana se determinará al azar.

La pantalla siguiente te dirá cuantos problemas has resuelto correctamente en la Tarea 1, y te pedirá escoger si quieres que se aplique la remuneración por unidad o la remuneración por competición a tu resultado.

¿Hay alguna pregunta?

Test

Para asegurar que entiendes correctamente como se calcula la remuneración de la Tarea 4, te pedimos que respondas a las siguientes preguntas. Los números usados en la pregunta son simplemente a título ilustrativo y no indican un buen resultado en esta tarea.

Supón que has seleccionado la remuneración por unidad y que has resuelto 2 problemas correctamente y 1 problemas incorrectamente en la Tarea 1. ¿Cuáles son tus ingresos para la Tarea 4 si es escogida para los ingresos?

Supón que has seleccionado la competición y que has resuelto 2 problemas correctamente y 3 problemas incorrectamente en la Tarea 1, y que todos los demás de tu grupo han resuelto 1 problema en la Tarea 1 correctamente. ¿Cuáles son tus ingresos para la Tarea 4 si es escogida para los ingresos?

Supón que has seleccionado la competición y que has resuelto 2 problemas correctamente y 3 problemas incorrectamente en la Tarea 1, y que una persona de tu grupo ha resuelto 4 problemas correctamente en la Tarea 1. ¿Cuáles son tus ingresos para la Tarea 4 si es escogida para los ingresos?

Tarea 5 – Auto evaluación

En esta penúltima tarea te pedimos estimar la posición de tus resultado en la Tarea 1 y 2. Como hay cuatro miembros en tu grupo tu posición puede tener un valor entre 1 y 4 donde 1 es tu posición si has resuelto (correctamente) el número más grande de problemas en tu grupo y 4 es tu posición si has resuelto el número más pequeño.

Por cada estimación correcta recibirás 1,00 Euro. Si tu estimación no es correcta, no recibirás ingresos para esa estimación. Si hay empates en las posiciones, contaremos cada respuesta que podría ser correcta como correcta. Por ejemplo, si el resultado en el grupo era 5, 5, 4, 4, entonces una respuesta "cuarta posición" y una de "tercera posición" es correcta para alguien que haya resuelto 4 problemas correctamente y una respuesta de "primera posición" y "segunda posición" es correcta para alguien que haya resuelto 5 problemas correctamente. Los números usados en este ejemplo son simplemente a título ilustrativo y no indican un resultado real en la Tarea 1 y 2.

¿Hay alguna pregunta?

Test

Para asegurar que entiendes correctamente como se calcula la remuneración de la Tarea 5, te pedimos que respondas a las siguientes preguntas. Los números usados en la pregunta son simplemente a título ilustrativo y no indican un buen resultado en esta tarea.

Supón que has resuelto 3 problemas correctamente y que los otros miembros de tu grupo han resuelto 1, 2 y 3 problemas respectivamente en la Tarea 1. Supón además que has estimado que tienes la "segunda posición". ¿Cuáles son tus ingresos para esta estimación?

Only Generation 2:

Tarea 6 – Consejo

En el aula de al lado hay otros grupos que también hacen las Tareas 1-4 (las mismas que acabas de hacer). En este momento, ellos han terminado la Tarea 1 y 2, pero aún no han empezado con la Tarea 3, es decir, su siguiente tarea es decidir entre la remuneración por competición y la remuneración por unidad. Estarás asignado al azar con una persona de los otros grupos - le llamaremos "la persona que recibe el consejo" – y tu tarea es aconsejar a la persona que recibe el consejo en relación a su decisión entre remuneración por competición y remuneración por unidad. Antes de que des tu consejo, la persona que recibe el consejo te mandará la información sobre el número de respuestas correctas que haya tenido en la Tarea 1 y 2.

El primer paso es que le mandes a la persona que recibe el consejo un mensaje diciendo si le aconsejas entrar en la competición. En el segundo paso, puedes dar una razón para el consejo que hayas escogido. Te daremos una lista de razones. Puedes seleccionar tantas razones como quieras (incluyendo ninguna, en el caso que prefieres no seleccionar ninguna de las razones propuestas).

Como remuneración para esta tarea, recibirás el 50% de la remuneración de la Tarea 3 de la persona que recibe tu consejo. Es decir que si la persona que recibe el consejo decide escoger la remuneración por unidad recibes 0,25 Euro (50% de 0,50 Euro) por problema que resuelva correctamente. Si la persona que recibe tu consejo decide escoger la remuneración por competición y su número de respuestas correctas en la Tarea 3 es mayor que el número de respuestas correctas de los otros miembros de su grupo en la Tarea 2, recibes 1,00 Euro (50% de 2,00 Euro) por cada problema que resuelva correctamente. Finalmente, si la persona que recibe tu consejo decide escoger la remuneración por competición y su número de respuestas correctas en la Tarea 3 no es mayor que el número de respuestas correctas de los otros miembros de su grupo en la Tarea 2, no recibirás ningún ingreso. Ojo: Te pagaremos también si la persona que recibe tu consejo no recibe un ingreso por la Tarea 3 (porque la Tarea 3 no ha sido la seleccionada al azar para los ingresos).

¿Hay alguna pregunta?

Test

Para asegurar que entiendes correctamente como se calcula la remuneración de la Tarea 6, te pedimos que respondas a las siguientes preguntas. Los números usados en la pregunta son simplemente a título ilustrativo y no indican un buen resultado en esta tarea.

Supón que la persona que recibe tu consejo ha seleccionado la remuneración por unidad. Supón además que la persona que recibe tu consejo ha resuelto 3 problemas correctamente y 3 problemas incorrectamente. ¿Cuáles son tus ingresos para la Tarea 6?

Supón que la persona que recibe tu consejo ha seleccionado la remuneración por competición. Supón además que la persona que recibe tu consejo ha resuelto 2 problemas correctamente y 1 problema incorrectamente, y que todos los demás de su grupo han resuelto 1 problema en la Tarea 2 correctamente. ¿Cuáles son tus ingresos para la Tarea 6?

Supón que la persona que recibe tu consejo ha seleccionado la remuneración por competición. Supón además que la persona que recibe tu consejo ha resuelto 2 problemas correctamente y 3 problemas incorrectamente, y que una persona de su grupo ha resuelto 3 problemas en la Tarea 2 correctamente. ¿Cuáles son tus ingresos para la Tarea 6?

7 References

Cason T.N., Masters, W.A., and R.M. Sheremeta (2010), Entry into winner-take-all and proportional-prize contests: an experimental study, Journal of Public Economics 94, 604-611.

Dargnies, M.P. (2011), Men too sometimes shy away from competition: The case of team competition, working paper, availabel at SSRN: http://ssrn.com/abstract=1814989 or http://dx.doi.org/10.2139/ssrn.1814989

Dohmen, T. and A. Falk (2011), Performance pay and multi-dimensional sorting: productivity, preferences, and gender, AER 101, 556-590.

Flory, J.A., Leibbrandt, A. and J.A. List (2010), Do competitive work places deter female workers? A large-scale natural field experiment on gender differences in job-entry decisions, NBER working paper no. 16546.

Gneezy, U., Leonard, K.L. and J.A. List (2009), Gender differences in competition: evidence from a matrilineal and a patriarchal society, Econometrica 77, 1637-1664.

Gupta, N.D., Poulsen, A. and M.-C. Villeval (2011), Gender matching and competitiveness: experimental evidence, Economic Inquiry, forthcoming, http://dx.doi.org/10.1111/j.1465-7295.2011.00378.x

Irriberri, N. and P. Rey-Biel (2011), Let's (Not) Talk about Sex: The Effect of Information Provision on Gender Differences in Performance under Competition, working paper.

Niederle, M. and L. Vesterlund (2007), Do women shy away from competition? Do men compete too much?, QJE 122, 1067-1101.

Niederle, M. and L. Vesterlund (2011), Gender and competition, Annual Review of Economics, 3, 601-630.

Wozniak, D., Harbaugh, W.T. and U. Mayr (2010), Choices about competition: Differences by gender and hormonal fluctuations, and the role of relative performance feedback, working paper, University of Oregon.

Balafoutas L. and M. Sutter (2012), Affirmative action policies promote women and do not harm efficiency in the laboratory, Science 335, no. 6068, 579-582.

Niederle, M., Segal, C. and L. Vesterlund (2009) How costly is diversity? Affirmative action in light of gender differences in competitiveness, working paper, Stanford University.

Schotter, A. (2003), Decision making with naive advice, AER 93(2), 196-201.

Sutter, M. and D. Rützler (2010), Gender differences in competition emerge early in life, IZA discussion paper no. 5015