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Björn Bartling, Ernst Fehr, Michel André Maréchal and
Daniel Schunk

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Björn Bartling
Blümlisalpstrasse 10,
CH-8006 Zürich
Phone: +41 44 634 37 22
Email: bartling@iew.uzh.ch

Ernst Fehr (corresponding author)
Blümlisalpstrasse 10,
CH-8006 Zürich
Phone: +41 44 634 37 09
Fax: +41 44 634 49 07
Email: efehr@iew.uzh.ch

Michel André Maréchal
Blümlisalpstrasse 10,
CH-8006 Zürich
Phone: +41 44 634 51 91
Email: marechal@iew.uzh.ch

Daniel Schunk
Blümlisalpstrasse 10,
CH-8006 Zürich
Phone: +41 44 634 37 04
Email: dschunk@iew.uzh.ch

0. Experimental Design: Household Experiments

Competition is a cornerstone of economic life. Some environments are, however, more competitive than others and individuals are often confronted with the decision whether to self-select into a competitive environment. An important example is occupational choice: a self-employed lawyer is in constant competition for clients, whereas a lawyer working as a civil servant in a public authority is not. Likewise, some people vigorously compete for promotion to better paid jobs associated with a high prestige while others don't. Understanding who self-selects into competitive environments and who shies away from them is thus important. In this paper, we test the hypothesis that individuals with a preference for egalitarian outcomes are more reluctant to self-select into competitive environments. Our hypothesis is based on (i) the observation that payoff inequalities among winners and losers arise as a natural by-product of competition; and (ii) the empirical literature showing that a nonnegligible share of children and adults is willing to incur costs to reduce earnings inequalities (see, e.g., Christopher Dawes et al. 2007; Ernst Fehr, Helen Bernhard and Bettina Rockenbach 2008).

We analyze data from several economic experiments implemented in a household survey study with mothers of preschool children. We measure competitiveness by giving our subjects the choice between competing in a tournament or receiving a piece rate for a real effort task (for a similar design, see Muriel Niederle and Lise Vesterlund 2007). In addition, all participants went through a series of simple, binary distributional choices affecting their own earnings and those of another anonymous participant. They also participated in incentivized lottery choices, enabling us to assess their risk preferences. Finally, since our experiments are integrated into a household survey, we have a rich set of additional information about the participants, including socioeconomic background and personality traits. Our data therefore allow for a within-person analysis of the relationship between social

preferences and self-selection into competition, while controlling for a number of other potential factors.

We find a statistically significant negative relationship between preferences for egalitarian choices (choices that reduce favorable or unfavorable payoff inequality) and self-selection into competition. A preference for egalitarian outcomes can be based on two underlying motives: behindness aversion (aversion to negative payoff inequality) and aheadness aversion (aversion to positive payoff inequality). We categorize subjects according to these two motives and investigate the extent to which these motives are related to self-selection into competition. While we find a significantly negative relationship between aheadness aversion and self-selection into competition, we fail to find such a relationship between behindness aversion and self-selection into competition. This second result contrasts with our hypothesis, which suggests that not only aheadness averse, but also behindness averse subjects, are less competitive. We thus cannot confirm this part of our hypothesis. In addition, we find significant evidence that less risk averse and overconfident subjects, as well as those with higher task-related skills, self-select into competition. Finally, we provide evidence that competitiveness is also a matter of personality characteristics such as the Big Five trait *Agreeableness*¹.

Recent experimental studies examine the motives related to self-selection into different incentive schemes, e.g., Thomas Dohmen and Armin Falk (2006) and Sabrina Teyssier (2008). Dohmen and Falk (2006), for example, analyze the choice between a fixed and a variable payment, which was either a piece rate, tournament, or revenue sharing scheme. They find that self-selection is multidimensional, being based on ability, preferences, overconfidence, gender, and personality. Specifically, they find that subjects who behave reciprocally in a sequential trust game are less likely to self-select into tournaments. In

¹ The Big-Five questionnaire measures personality traits by asking subjects how much they agree with different statements about themselves. A 15-item version of the questionnaire was used, where each trait is assessed with three statements. Subjects indicate their level of agreement on a seven-point scale, and responses for each personality trait are added to achieve a score for that trait.

contrast, our paper measures social preferences in a nonstrategic setting instead of focusing on reciprocity. However, to the extent to which back-transfers in the trust game are based on aheadness aversion, the results in Dohmen and Falk (2006) are consistent with ours.

I. Experimental Design: Household Experiments

This paper is based on data from a larger pilot study that explores the feasibility of integrating economic experiments into the German Socio-Economic Panel (SOEP), a large representative survey of private households in Germany. The experiments were adapted to take the time, technical, and spatial constraints implied by moving from the standard laboratory environment to the field (daycare centers and the mothers' households) into account. The study was conducted between May and November 2008 by specially trained, experienced interviewers from the same professional survey company that collects the data for the SOEP.

The sampling procedure was as follows. First, request letters were sent to a stratified random sample of 95 daycare centers in the metropolitan area of Munich (Germany), of which 23 agreed to participate. If a center participated, it forwarded information leaflets and consent forms to all mothers of five- to six-year-old children at the center. In total, 118 mother and child pairs participated in the study. The data used in this paper is based on the sample of mothers only. The mothers went through a computer assisted personal interview in their households. In the first part, each mother filled out a survey about her child and about her own personality, cognitive abilities, and socioeconomic status. The experiments were conducted in the second part of the interview. To minimize the interviewer's influence, the laptop computer was turned towards the subjects during the experiment in such a way that the interviewer could not see the actual choices made. Feedback on the outcomes of the experiments was given at the end of the interview only. The earnings from the experiments were paid out with a check that was sent by mail.

In a first experiment, we elicited social preferences using four simple binary choices that affected the participant’s income as well as that of another anonymously matched participant. The exact payoffs in the different games are shown in Table 1. The *prosociality game* and the *costly prosociality game* consisted of choices between egalitarian and unequal distributions that favored the decision maker. Equalizing payoffs (i.e. increasing the other subject’s payoff to the egalitarian level) implied no financial cost in the *prosociality game*, while the decision maker had to incur costs to raise the other’s payoff in the *costly prosociality game*.

TABLE 1: Distribution games

Game	Distribution A	Distribution B
(all payoffs are in Euros)	self : other	self : other
<i>Prosociality</i>	10 : 10	10 : 6
<i>Costly prosociality</i>	10 : 10	16 : 4
<i>Envy</i>	10 : 10	10 : 18
<i>Costly envy</i>	10 : 10	11 : 19

In contrast, the unequal distributions favored the other subject in the *envy game* and the *costly envy game*. The decision maker in the *envy game* could decrease the other subject’s payoff without incurring any cost to enforce an egalitarian outcome, while enforcing the egalitarian outcome was costly in the *costly envy game*. Each subject had to make all four choices (in a randomized order), but only one was determined randomly for actual payment at the end of the interview.

In a second experiment, subjects could self-select into either a tournament or a piece rate payment scheme for a real effort task. The task was adapted from Niederle and Vesterlund (2007) and consisted of adding up series of three two-digit numbers for 90 seconds. First, each subject went through a 60 second practice round. Subjects were then asked to indicate whether they believe that other subjects would have a higher or lower

number of correct answers on average. Subjects next chose between the two payment schemes. In the piece rate scheme, a subject was paid 2€ for every correctly solved exercise, while a subject in the tournament was competing against another randomly assigned participant of this study, and paid 6€ per correct answer in case she won against the other participant, but nothing if she lost.² Each subject then had 90 seconds to solve as many of the exercises as possible. Paper and pencil were provided as a help, but the use of calculators was not allowed.

In a third experiment, we used the same procedure and protocol as Dohmen et al. (2007) to elicit risk preferences. We measured risk preferences by eliciting certainty equivalents using the price list method. Subjects made 20 choices between a lottery and fixed payments. We informed the subjects that one of their choices would be selected randomly for potential earnings, and that another random device would decide with probability 1/9 whether the earnings from the lottery choice experiment would actually be paid out.

II. Experimental Results

Among the 118 women, 95 subjects chose the equal distribution in the *prosociality* and in the *costly prosociality game*; they are classified as aheadness averse. Eighty-eight subjects chose the egalitarian distribution in the *envy* and in the *costly envy game*; they are classified as behindness averse. Seventy-five subjects chose the egalitarian outcome in all four games and we classify them as egalitarian. While egalitarian subjects decided to compete in 55 percent of the cases, subjects who were not classified as egalitarian chose to compete in 72 percent of the cases. A Pearson χ^2 test rejects the null hypothesis of independence between egalitarianism and choosing to compete ($p=0.06$). To what extent can this finding be attributed to aheadness or behindness aversion? While aheadness averse subjects chose to

² Since the opponent was not present, we told the subjects that at the end of the study we would draw the opponent's performance from an ex ante distribution (which was collected in an experiment in April 2008). Fehr et al. (2002) use a similar method to integrate sequential and interactive experimental games into a representative household survey.

compete in 55 percent of the cases, subjects who made the unequal choice at least once in the *prosociality games* chose to compete in 87 percent of the cases. A Pearson χ^2 test rejects the null hypothesis of independence between aheadness aversion and choosing to compete ($p < 0.01$). We also find that behindness averse subjects chose to compete less often (59 percent) than subjects who chose the unequal distribution (67 percent) at least once in the *envy games*. However, a Pearson χ^2 test shows that this association is insignificant ($p = 0.46$).

We complement the nonparametric statistics with a regression analysis, controlling simultaneously for other factors that potentially influence self-selection into competition. We use Probit models and regress the choice for competition on dummies indicating whether the subject is egalitarian, aheadness averse, or behindness averse. The dummy *Egalitarian* in columns 1 and 2 of Table 2 has a value of one if a subject chose the egalitarian outcome in all four games. Both specifications also include our risk aversion measure, a dummy indicating whether the subject believes she is better than the average of all other subjects (*Confidence*), the *Overconfidence* dummy,³ performance in the practice round (as a proxy for task-related ability), and a number of additional socioeconomic control variables as indicated in the caption of Table 2. Column 2 additionally controls for cognitive skills and the Big Five personality dimensions. Consistent with the nonparametric tests, we find that the coefficient for *Egalitarian* is highly significant.

³ If a subject believed others have a lower number of correct answers on average, but she subsequently failed to perform above average, she was classified as overconfident.

TABLE 2: Regression models

	(1)	(2)	(3)	(4)
Egalitarian	-0.314** (0.139)	-0.309** (0.137)		
Aheadness Aversion			-0.569*** (0.124)	-0.634*** (0.144)
Behindness Aversion			-0.050 (0.147)	-0.001 (0.156)
Risk Aversion	-0.036*** (0.012)	-0.039*** (0.014)	-0.039*** (0.011)	-0.044*** (0.013)
Confidence	-0.082 (0.096)	-0.104 (0.091)	-0.119 (0.109)	-0.164 (0.111)
Overconfidence	0.589*** (0.135)	0.664*** (0.122)	0.607*** (0.121)	0.658*** (0.145)
Ability	0.131*** (0.045)	0.115*** (0.041)	0.162*** (0.044)	0.165*** (0.050)
Cognitive Skills		0.011 (0.008)		0.011 (0.008)
Extroversion		-0.002 (0.015)		-0.004 (0.019)
Conscientiousness		0.029 (0.023)		0.041* (0.025)
Agreeableness		-0.039* (0.021)		-0.061** (0.025)
Openness		-0.002 (0.017)		0.028 (0.023)
Neuroticism		-0.019 (0.019)		-0.017 (0.020)
Observations	117	117	117	117

Notes: The table reports probit marginal effect estimates (standard errors in parentheses) evaluated at the medians of all covariates. The dependent variable is a dummy variable indicating whether the subject has chosen to compete. Age, age squared, cohabitation status, employment details, educational details, household income, household income squared, household size, and home ownership are included as additional controls. The regressions contain only 117 observations, since one subject did not want to take part in the lottery choices. Significance levels are denoted as follows: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Ceteris paribus, a person with median characteristics in the explanatory variables is about 30 percent less likely to self-select into competition if she made the egalitarian choice in all four games. Columns 3 and 4 of Table 2 include dummies for aheadness and behindness averse subjects.⁴ Our results are consistent with the nonparametric results and show a very strong association between aheadness aversion and the decision to shy away from competition, but they provide no evidence for a negative association between behindness aversion and self-selection into competition.⁵ We summarize these findings as follows:

Result 1: *Egalitarian subjects self-select less often into competitive environments. This finding is primarily driven by aheadness averse subjects.*

Our regression results also show that more risk-averse subjects are less likely to compete. This result makes sense because the tournament involves more risk than the piece rate. We also find that overconfidence subjects are more likely to compete. It is crucial to control for task-related ability differences because egalitarian individuals could be less able and thus less willing to compete. We used each individual's performance during the practice round as a control and found that its coefficient is always positive and highly significant, showing that more able people are significantly more likely to compete. Moreover, cognitive skills are related to behavior in various economic experiments (e.g., Daniel Benjamin et al. 2006). Potential correlations between cognitive skills and subjects' competition decisions could thus result in a spurious relationship between social preferences and self-selection into

⁴ Note also that our data rule out altruism (or surplus seeking) as an inhibitor of competitiveness. Altruistic subjects value the partner's payoff positively and are thus *not* behindness averse. Thus, altruistic subjects are even more likely to enter the tournament.

⁵ We also hypothesized that those aheadness averse subjects who are confident to win the competition should be even less likely to enter the competition; in contrast, behindness averse subjects who are confident to win should be more likely to enter competition than behindness averse subjects who are not confident to win. We tested both hypotheses by including interactions terms between *Confidence* and *Aheadness* as well as *Behindness aversion* into our regression model. Our hypotheses are partly supported: being confident to win reduces the coefficient of *Aheadness aversion* on average by 0.40 ($p=0.048$), and it increases the coefficient of *Behindness aversion* on average by 0.20 ($p<0.228$) (Ai and Norton 2003).

competition. We therefore include cognitive skills as a control variable in the model specifications reported in columns 2 and 4 of Table 2, but find no significant relationship between cognitive skills and the tendency to compete. We summarize these findings as follows.

Result 2: *Less risk averse subjects and overconfident subjects, as well as those with higher task-related skills, are more likely to self-select into competitive environments.*

We finally include the Big Five personality dimensions *Extroversion*, *Conscientiousness*, *Agreeableness*, *Openness*, and *Neuroticism* in our regression analysis (see columns 2 and 4). Table 2 shows that selection into competition is also a matter of personality: subjects scoring high on the personality characteristic *Agreeableness* are less likely to self-select into the tournament. *Agreeableness* is associated with characteristics such as altruism, trust, modesty, and prosocial attitudes (see William G. Graziano and Nancy H. Eisenberg 1997). This finding is summarized in our last result.

Result 3: *Subjects scoring high on the personality trait Agreeableness are less likely to self-select into competitive environments.*

III. Conclusion

We integrated economic experiments into a household survey study and analyzed the relationship between social preferences and competitiveness in a sample of mothers of preschool children. We tested the hypothesis that egalitarian subjects are less inclined to self-select into competitive environments, which can produce winners and losers and thus potentially large payoff inequalities. Controlling for a number of psychometric and socioeconomic factors, we find a strong and statistically significant negative relationship between egalitarian choices and self-selection into competition. Exploring the extent to which

this result can be linked to aheadness or behindness aversion, we find that aheadness aversion is the main motive explaining our results. In contrast, we find no significant relationship between behindness aversion and self-selection into competition. We are somewhat surprised by the fact that behindness aversion plays no role, while aheadness aversion has a big effect; future research will have to show how general this result is. Perhaps behindness aversion will be more important in other subject pools. Our study further shows that several additional factors are related to the decision to compete. Less risk averse and overconfident subjects, as well as subjects with higher task-related skills, self-select more often into competitive environments. Moreover, the Big Five personality trait *Agreeableness* was found to be negatively correlated with self-selection into competition.

Interestingly, a growing literature demonstrates systematic gender differences in competitiveness (for a survey see Rachel Croson and Uri Gneezy, forthcoming). For example, Niederle and Vesterlund (2007) find that 73 percent of men but only 35 percent of women decide to compete in a tournament. The literature also finds that women (i) are more risk averse, less overconfident, and behave in a more egalitarian manner than men (see Brad Barber and Terrance Odean 2001; Croson and Gneezy, forthcoming) and (ii) consistently score higher on *Agreeableness* in Big Five personality tests (David Schmitt et al. 2008). Combining our results with these findings on gender differences, we propose the hypothesis that gender differences in distributional preferences and personality traits can at least partly explain observed gender differences in competitiveness. A rigorous test of this hypothesis is left for future research.

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