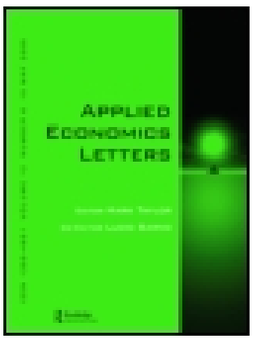

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Gender differences in selection into self-competition

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ABSTRACT

While previous studies demonstrated that, in many settings, women tend to be less willing than men to engage in interpersonal competition, this study focuses on selection into *self*-competition. Competing against own past performances can be an integral part of life, including job and sports. Using data obtained from a lab-in-the-field experiment, we find empirical evidence that women are, on average, more reluctant than men to compete against their own past performance. Our results suggest that this difference can be mainly explained by gender differences in risk preferences.

KEYWORDS

Competition; gender differences; experiment; risk preferences

JEL CLASSIFICATION

C93; C91; C93; J16

I. Introduction

Many experimental studies show that men are, on average, more competitively inclined than women (Croson and Gneezy 2009) and recent research suggests that this gender difference in competitiveness may have practically relevant consequences. For example, a substantial portion of the gender gap in study track choice could be attributed to gender differences in competitiveness as measured in a laboratory setting (Buser, Niederle, and Oosterbeek 2014). In a natural field experiment, women disproportionately shied away from employment advertisements that promoted more competitive compensation schemes (Flory, Leibbrandt, and List 2015).

While competitive environments are usually associated with situations where at least two individuals pursue goals that are not simultaneously achievable (Deutsch 1949), it is also possible that individuals compete against themselves. We refer to the latter type of competition as *self*-competition (SC). At first glance SC might be considered an exotic case, but actually it is quite relevant in practice. Some people might be intrinsically motivated to self-compete[1] and others may work for firms that (extrinsically) incentivize employees by compensation schemes that are based on outperforming their own past performance. SC may even be part of job descriptions.[2]

We complement previous experimental research by investigating gender differences in the willingness to compete against one's own past performance instead of another individual's performance. We explore if the prior finding that women tend to be less competitively inclined than men in interpersonal competition (IC) extends to the selection into SC. Experimental studies focusing on IC show, for instance, that women are more likely to shy away from selecting into mixed-gender tournaments if tasks are associated with male stereotypes and are therefore perceived to be favourable for men, e.g. math tasks instead of verbal tasks (Niederle and Vesterlund 2007). Such aspects of IC are – by definition – not relevant for selection into SC and, furthermore, in SC, one knows the competitor (oneself) much better than in IC. Hence, the pattern of men's and women's selection into SC might differ from selection into IC.

To investigate gender differences in selection into SC, we conducted a lab-in-the-field experiment, run in 2014. We employed a new treatment, *SC*, where individuals competed against their own prior performance.

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[1]Golf, for instance, seems to be strongly associated with self-competition (SC): 'I began to see golf as a metaphor for living, for in golf you are basically on your own, competing against yourself and always trying to do better'. (Sean Connery, The Telegraph, August 25th, 2008).

[2]A prime example is an internet job advertisement of an Australian superstore that contained the following sentence: 'So, if you have a winning attitude and love to compete against yourself on a daily basis when it comes to sales – what are you waiting for?'

We followed previous research and employed a simple math task (Niederle and Vesterlund 2010) and a standard measure of interpersonal competitiveness as benchmark. Observing behaviour for both SC and IC with the same individual allows us investigating gender difference in SC and its potential determinants and examining whether individuals make different choices with regard to SC and IC.

II. Experimental design

We conducted an experiment in a shopping mall in a large German city for 3 days in June and October 2014. To adjust to the low-tech and time-constrained environment, the experiment was carried out with paper and pencil and we focused on *selection* rather than performance in competition. Adult mall visitors were approached and asked whether they would like to participate in a 10–15 min experiment on 'decision-making behaviour of adults' in return for earnings of at least €5.00.

We started with a brief survey on participant's socio-economic background, including sex, age, education, occupation, and parents' occupation. Among the 225 participants there are 101 men and 124 women (men and women do not significantly differ with respect to age, education, occupation, or parents' self-employment, details reported in Appendix 1). Furthermore, risk preferences were elicited through self-reported measures, which have been demonstrated to be valid (Dohmen et al. 2011) and robust (Lönnqvist et al. 2015). We asked for risk preferences with respect to money (as the experiment involves monetary gains) and general risk preferences (capturing residual elements of risk preferences).[3]

Subsequently, participants were exposed to three treatments: piece-rate (PR), *SC*, and *IC*. The order of treatments was randomized, but *PR* was always before *SC*.

In all treatments, participants collected points by performing a math task that is similar to an implementation by Mayr et al. (2012). For 30 s, participants verified up to 20 simple single-digit equations (e.g. '7 + 2 + 3–6 = 5. Is the result true or false?'). The sets of 20 equations were each randomly composed and randomly assigned. Equations were mathematically equally difficult. One out of two equations was wrong. A correctly verified equation added and an incorrect verification subtracted one point. The task description presented to participants included three representative examples, which they solved without incentives. Since females and males were found to perform on average equally well in such tasks (Mayr et al. 2012; Niederle and Vesterlund 2007, 2010), gender differences in choices of payment schemes should not result from gender differences in task performances. Treatments differed in how the payment scheme was determined; payoff levels are equivalent to those in prior research (e.g. Mayr et al. (2012).

In the *PR treatment*, participants verified equations with a non-competitive payment scheme, i.e. a PR of €0.25 for each point.

In the *SC treatment*, participants could choose between performing the verification task under the PR (€0.25 for each point) or a competitive payment scheme with the own prior performance as competitive benchmark, i.e. €0.50 per point if the overall score was higher than in the PR treatment, €0 otherwise. To prevent strategic behaviour in SC, we conducted the PR treatment without telling participants about the upcoming SC treatment.

In the *IC treatment*, individuals instead could choose between the piece-rate scheme (€0.25 for each point) and a competitive payment scheme (€0.50 per point if the overall score was higher than that of a randomly selected previous anonymous participant, €0 otherwise).

At the end of the experiment, we randomly determined, using a dice, which of the played treatments, PR, SC, or IC, was paid.

III. Results

Figure 1 reports shares of men and women choosing competitive payment instead of PR for SC and, as a benchmark, for *IC*. While the majority of women prefer PR in the SC treatment, the majority of men prefer competition ($diff_{SC}$ = 13.8%, z = 2.06, p = 0.039). The gender difference in SC does not differ significantly from the difference in IC (13.8% versus 10.3%, χ^2 = 0.19, p = 0.661).

[3]On a 7-point scale from 'does not apply at all' to 'fully applies', participants evaluated the following statements: 'In case of monetary investments, I am willing to take risks'. And 'In general, I am willing to take risks'.

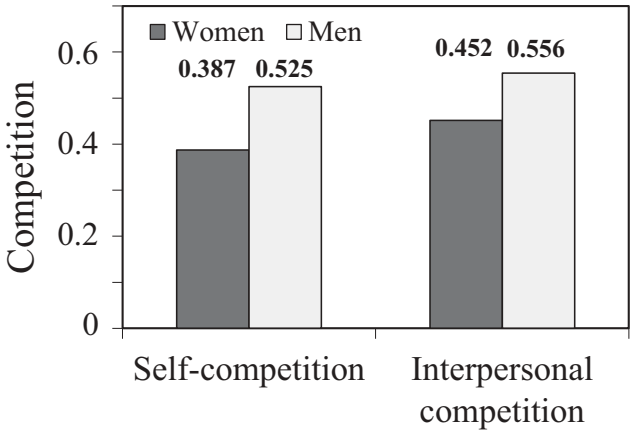

Figure 1. Gender differences in selection into competition.

Exploiting within-subject variation with respect to the difference between SC and IC, we can go beyond simple effect size comparisons. In fact, we observe only weak positive relationships between SC and IC, which are of similar size for men (ρ = 0.31, $p < 0.001$) and women (ρ = 0.28, $p < 0.001$). A different choice with respect to SC vis-á-vis IC may result from differences in information that is available in both treatments. In IC, individuals do not know anything about their (in our case, anonymous) competitor, i.e. gender or performance of the prospective competitor. In contrast, in SC, individuals have perfect information about the competitor (i.e. themselves) and have a possibly imperfect guess (because no feedback is given) regarding their past performances in the PR treatment. Furthermore, outperforming past performance is mostly chance if individuals already had performed as well as they could. Hence, risk attitudes may play a particularly pronounced role in SC and the gender difference in selection into SC may therefore result from gender differences in risk attitudes.

Consistent with previous research (Croson and Gneezy 2009), we find that women are, on average, less willing to take risks in general (4.43 versus 4.88, t = 2.40, p = 0.017) and particularly with respect to money (2.52 versus 3.31, t = 3.81, $p < 0.001$). Regression analyses reported in Table 1 (and in more detail in Appendix 2) explore to what extent these gender differences in risk attitudes explain the gender difference in SC. We control for age and parents' occupation as well as for the order of treatments and individuals' performance in the PR condition.[4] Model 2 compared with Model 1 illustrates that including control variables does not substantially affect the gender difference. Models 3and 5 illustrate that including risk preferences, in general and more so with respect to money, substantially reduces and renders statistically insignificant the estimated effect of gender. An extended Blinder-Oaxaca decomposition (Fairlie 2005) reported in Table 2 (Column 1) reveals that more than 60% of the gender difference in SC (0.138) is explained by gender differences in risk preferences (0.034 + 0.049 = 0.083). Other variables including the controls (age, education, parents' occupation) do not contribute much to explaining the gender difference.

Table 1. Logistic regression of gender on selection into self-competition.

Model	1	2	3	4	5
Gender: male	0.138*	0.130+	0.088	0.078	0.063
	(0.066)	(0.067)	(0.066)	(0.067)	(0.066)
Risk taking (general)			0.096***		0.077**
			(0.022)		(0.023)
Risk taking (money)				0.073***	0.048*
				(0.020)	(0.021)
Performance		−0.003	−0.002	−0.004	−0.002
		(0.012)	(0.012)	(0.012)	(0.012)
Other controls	No	Yes	Yes	Yes	Yes

Notes: N = 225. Marginal effects and SE (in parentheses) . Dependent variable: selection into self-competition; other controls: age classes, parental self-employment, order of treatments.
Significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$.

[4]We control for mother's, father's, and both parents' self-employment, because under the assumption that self-employed individuals are more competitive (Bönte and Piegeler 2013) this could indicate more competitive parents. We control for the order of treatments, because Buser (2016) finds men reacting to losing a two-person tournament by subsequently picking a more challenging target while women lower their performance. Despite not having feedback, individuals may have a guess about their performance, such that behaviour in one treatment might be affected by the preceding treatment. We also control for differences in performance in the piece-rate condition. In our data, however, men and women do not differ in performances in PR (as in other) conditions (male = 5.61, female = 5.45, diff = −0.16, S.E. 0.36, t = −0.45, p = 0.66), implying that performance in *PR* cannot explain gender difference in selection into SC.

Table 2. Extended Blinder-Oaxaca decomposition of the gender effect on selection into selfcompetition.

	Based on Model 5 from Table 1	Additionally including interpersonal competition	
	1	2	3
Total gender effect	0.138	0.138	0.138
Unexplained	0.046	0.092	0.018
Total explained	0.092	0.046	0.120
Risk taking (general)	0.034+		0.039*
	(0.018)		(0.019)
Risk taking (money)	0.049*		0.041+
	(0.025)		(0.024)
Interpersonal competition		0.032**	0.027*
		(0.011)	(0.011)
Total controls	0.009	0.014	0.013

Notes: The last two columns explore the extent to which gender differences in interpersonal competition related to gender differences in selfcompetition. Standard errors and statistical tests only provided for individual components, i.e. risk taking and interpersonal competition.
Significance levels: ***$p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$.

In addition, Table 2 reports decompositions of the gender difference in SC with respect to gender difference in IC, to further explore implications of the weak correlation between both types of competition. Although these results should not be interpreted causally, they demonstrate that the gender difference in IC contributes to the gender difference in SC to a lesser extent than gender differences in risk attitudes (Column 2 versus 1). This contribution even declines when controlling for differences in risk preferences (Column 3).

IV. Conclusions

We find that women are, on average and as found in IC, less likely to select into SC than men. We demonstrate that gender differences in individual characteristics and, in particular, risk preferences are likely to explain the gender difference in selection into SC. Results also suggest that gender differences in SC and IC are just weakly related. This is consistent with our expectation that interpersonal aspects, like gender-specific beliefs about the abilities of others, are less influential for selection into SC.

While this study focuses on the selection into SC with IC primarily serving as a benchmark, the within-subject comparison in our study provides a starting point for future research investigating in more detail the relationship between and the distinctiveness of both types of competition. Moreover, future research could examine the effects of SC on performance and whether the gender difference in SC is influenced by the type of experimental tasks.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Appendix 1. Sample demographics (N = 225)

		Gender comparison		
Characteristics	Relative frequency	Female	Male	Difference
Gender: Male (versus Female)	55.1%			
Age				$\chi^2(4) = 5.81$, $p = 0.214$
18–25	27.1%	28.2%	25.7%	$\chi^2(1) = 0.17$, $p = 0.677$
26–35	21.8%	25.8%	16.8%	$\chi^2(1) = 2.63$, $p = 0.105$
36–45	20.4%	19.4%	21.8%	$\chi^2(1) = 0.20$, $p = 0.653$
46–55	17.8%	17.4%	17.8%	$\chi^2(1) = 0.00$, $p = 0.988$
>56	12.9%	8.9%	17.8%	$\chi^2(1) = 3.97$, $p = 0.046$
Primary and secondary education (highest degree obtained)				$\chi^2(4) = 2.62$, $p = 0.624$
No degree	2.7%	3.2%	2.0%	$\chi^2(1) = 0.33$, $p = 0.564$
Hauptschule (~Basic school degree)	9.3%	8.1%	10.9%	$\chi^2(1) = 0.53$, $p = 0.468$
Realschule/Mittlere Reife (~High school diploma)	20.4%	23.4%	16.8%	$\chi^2(1) = 1.47$, $p = 0.225$
Fachabitur (~A-Level but subject-restricted)	17.3%	15.3%	19.8%	$\chi^2(1) = 0.78$, $p = 0.377$
Abitur (~A-Level)	50.2%	50%	50.5%	$\chi^2(1) = 0.01$, $p = 0.941$
Tertiary education: University (incl. University of Applied Sciences)	30.7%	28.2%	33.7%	$\chi^2(1) = 0.77$, $p = 0.379$
Further education: Vocational education and training	46.9%	46.0%	48.0%	$\chi^2(1) = 0.09$, $p = 0.762$
Occupation				$\chi^2(5) = 5.49$, $p = 0.359$
Employee at private firm	34.7%	35.5%	33.7%	$\chi^2(1) = 0.08$, $p = 0.775$
Employee at public firm or administration	13.7%	16.1%	10.9%	$\chi^2(1) = 2.29$, $p = 0.257$
Self-employed	11.6%	8.9%	14.9%	$\chi^2(1) = 1.95$, $p = 0.163$
In education	23.6%	21.8%	25.7%	$\chi^2(1) = 0.49$, p = 0.485
Other	7.6%	6.5%	8.9%	$\chi^2(1) = 0.48$, $p = 0.488$
Not available	8.9%	11.3%	5.9%	$\chi^2(1) = 1.97$, $p = 0.161$
Parents' self-employment				$\chi^2(3) = 0.49$, $p = 0.922$
Neither mother nor father self-employed	72.4%	71.0%	74.3%	$\chi^2(1) = 0.30$, $p = 0.583$
Only mother self-employed	4.0%	4.0%	4.0%	$\chi^2(1) = 0.00$, $p = 0.978$
Only father self-employed	14.7%	16.1%	12.9%	$\chi^2(1) = 0.47$, $p = 0.492$
Mother and father self-employed	8.9%	8.9%	8.9%	$\chi^2(1) = 0.00$, $p = 0.992$

Appendix 2. Logistic regression of gender on selection into self-competition (with all coefficients)

Model	1	2	3	4	5
Gender: male	0.138*	0.130+	0.088	0.078	0.063
	(0.066)	(0.067)	(0.066)	(0.067)	(0.066)
Risk taking (general)			0.096***		0.077**
			(0.022)		(0.023)
Risk taking (money)				0.073***	0.048*
				(0.020)	(0.021)
Performance		−0.003	−0.002	−0.004	−0.002
		(0.012)	(0.012)	(0.012)	(0.012)
Age: 26–35		−0.047	0.019	−0.024	0.023
		(0.096)	(0.094)	(0.094)	(0.092)
Age: 36–45		0.048	0.057	0.027	0.044
		(0.097)	(0.093)	(0.094)	(0.091)
Age: 46–55		−0.067	−0.039	−0.057	−0.036
		(0.101)	(0.097)	(0.099)	(0.096)
Age: >56		−0.035	−0.012	−0.060	−0.033
		(0.113)	(0.110)	(0.110)	(0.108)
Parents: only mother self-employed		0.022	0.039	−0.013	0.009
		(0.146)	(0.139)	(0.141)	(0.137)
Parents: only father self-employed		−0.248	−0.191	−0.209	−0.177
		(0.174)	(0.173)	(0.182)	(0.178)
Parents: mother and father self-employed		−0.005	0.038	−0.011	0.021
		(0.119)	(0.113)	(0.115)	(0.111)
Interpersonal competition as second treatment		0.066	0.049	0.038	0.032
		(0.069)	(0.067)	(0.068)	(0.066)

Notes: N = 225. Marginal effects and SE (in parentheses). Dependent variable: selection into self-competition; other controls: age classes, parental self-employment, order of treatments. Significance levels: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.1$.