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Can Personality Explain what is Underlying Women's Unwillingness to Compete?

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Abstract

There is ample evidence that women do not react to competition as men do and are less willing to enter a competition than men (e.g., Gneezy *et al.* (2003), Niederle and Vesterlund (2007)). In this paper, we use personality variables toto understand the underlying motives of women (and men) to enter a competition or avoid it. We use the Big Five personality factors (Goldberg (1981), McCrae and Costa JR (2003)), where especially neuroticism has been related to performance in achievement settings. We first test whether scores on the Big Five are related to performance in our experiment, and second how this is related to incentives. We can show that the sex difference in the willingness to enter a competition is mediated by neuroticism and further that neuroticism is negatively related to performance in competiton. This raises the possibility that those women who do not choose competititive incentives "know" that they should not.

Keywords: Gender, Personality, Big Five, Five-factor Model, Competition, Experiment.

JEL-Classifications: C91, D03, J16, L00

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1 Introduction

There is ample evidence that women do not react to competition as men do and are less willing to enter a competition than men (e.g., Gneezy *et al.* (2003), Niederle and Vesterlund (2007)). Even though by now many papers replicate findings of the earlier studies with different age and cultural groups (e.g., Gneezy and Rustichini (2004), Gneezy *et al.* (2009), Dreber *et al.* (2010)), to the best of our knowledge no paper thus far has tried to understand the underlying motives of women to enter a competition less willingly than men do. One way of doing this is to study personality variables that are related to performance and achievement. This is the focus of the current paper. We study the Big Five personality factors (Goldberg (1981), McCrae and Costa JR (2003)). We test whether the Big Five are related to performance in our experiment, and whether this depends on incentives. We then relate gender differences in personality to the choice of an incentive system.

We replicate the experiment by Niederle and Vesterlund (2007) with a sample of participants who have filled in various personality questionnaires before coming to the laboratory. In this experiment, subjects can earn money by solving real-effort tasks (summing up two-digit numbers). They start out with a piece-rate payment scheme, followed by a winner-takes-all competition in groups of four. In a third round, subjects can choose whether they prefer a competitive incentive scheme or a piece-rate incentive scheme for this round. Niederle and Vesterlund (2007) report a clear gender difference in choice. Women are less willing to enter a competition than men, such that – based on performance – too few women, but too many men enter the competition.

We can show that the sex difference in our sample can be explained by a difference in neuroticism. We further show that neuroticism is negatively related to performance in a competitive setting. This raises the possibility that those women who do not choose competiton "know" that they should not do so, even though their piece rate performance is high. Our results are a first step towards a clarification of the determinants of the gender difference in preferences for competitive environments.

2 Experimental Design

The experiment[1] was conducted in the experimental laboratory at Mannheim University. We had 138 subjects in total (57 male, 70 female, 11 failed to indicate their sex and thus are not part of the analyses reported here). We paid subjects at the very end of the larger study (i.e. after the session in the second week). Earnings from the experiments were performance-based, and a fixed fee was paid for filling in the questionnaires.

The questionnaires were filled in with pen and paper, while the games were programmed and conducted with the software z-tree (Fischbacher (2007)). For each of the experimental games additional individual instructions were distributed and read aloud by the experimenter. Participants had a chance to ask questions before each new game.

2.1 The tournament game

The tournament game[2] was the first game subjects played in their first experimental session. We followed the set-up by Niederle and Vesterlund (2007): participants had to do a real-effort task which was to ad up two-digit numbers. Subjects were told that the game consisted of four parts and that one of the parts would be randomly chosen for payment.

In the first round participants played the real-effort game in a piece-rate, and in the second round in a competitive incentive scheme (tournament), then they had to choose the incentive scheme they prefered for the third round. In a final step they could decide to submit their performance in the piece-rate part to competitive pay. For competitive pay subjects played randomly matched in groups of four. For our analyses, we focus only on the first decision, whether to enter a competition

[1]This experiment is part of a larger study. All subjects participated in two experimental sessions with one week in-between. A total of 24 sessions were run; twelve in each week, consisting of different experimental games. We also elicited the risk attitude of the participants, using the method by Holt and Laury (2002). The order of the experimental games remained fixed in both weeks over all sessions. In total, the experiment lasted for about one hour in the first and one hour in the second week. Subjects had spent about two hours on average for filling in the personality questionnaires previous to our experimental sessions. Questionnaires were never filled in directly before or after the experimental sessions. Subjects knew about the whole timing in advance. At the beginning of each session they received instructions containing the curse of events of the session.

[2]For translated instructions see appendix A.

in round three or not.[3]

There was no relative feedback given during the game, but subjects learned for each sum they calculated whether it was wrong or correct. After all rounds had been played, participants were asked to indicate how they would rank themselves in each part. The accuracy of this ranking was incentivized.

2.2 Measurement of personality: The Big Five

To measure personality we use the *five-factor model* or the *"Big Five"* (Goldberg (1981), McCrae and Costa JR (2003))). This model organizes personality traits in five basic dimensions: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness.[4] A list of the personality dimensions and subdimensions measured by the Big Five scale we use can be found in table 1.

Table 1: The five factors (Costa and McCrae (1992))

Neuroticism	Anxiety, Hostility, Depression, Self-Consciousness, Impulsiveness, Vulnerability to Stress
Extraversion	Warmth, Gregariousness, Assertiveness, Activity, Excitement-Seeking, Positive Emotion
Openness to Experience	Fantasy, Aesthetics, Feelings, Actions, Ideas, Values
Agreeableness	Trust, Straightforwardness, Altruism, Compliance, Modesty, Tender-Mindedness
Conscientiousness	Competence, Order, Dutifulness, Achievement-Striving, Self-Discipline, Deliberation

We use the NEO PI-R (Costa and McCrae (1992)), German version (Ostendorf and Angleitner (2004)) to measure the Big Five personality factors. It consists of 241 items rated on a 5-point-Likert-scale.

[3]Very few subjects submitted their piece-rate performance to competition.

[4]There are other labels for the five factors, we use the names by Costa and McCrae (1992).

3 Reseach question

To explain the gender differences in competitive environments Niederle and Vesterlund (2007) thought about a personal characteristic, risk attitude, as a predictor. The idea was that gender differences in risk attitude could at least partly explain gender differences in competion. In a review Eckel and Grossman (2008) show that most studies find that women are more risk averse than men. But Niederle and Vesterlund (2007) find gender differences in risk aversion to play a negligible role in the explanation of the effect that women avoid competition.

In a similar vein we consider a more general concept of personality, measured by the five factor model. Reseach in personality psychology revealed gender differences in some of the Big Five factors. In a meta-analysis Feingold (1994) found that women score higher than men on extraversion, anxiety (subfactor of neuroticism), trust and tender-mindedness (subfactors of agreeableness). In a cross-cultural study Costa Jr. *et al.* (2001) conclude that women score higher on neuroticism, agreeableness, warmth (subfactor of extraversion) and openness to feelings (subfactor of openness).[5]

In this paper we address the question whether part of the gender differences in competition can be explained by personality. Knowing that men and women differ in personality variables raised the conjecture that maybe personality mediates the gender difference in the choice to compete. If personality as a broader concept has an influence on behavior in competitive environments it is moreover interesting to know which of the Big Five factors affects behavior most.

4 Results

4.1 Gender Differences in Competitive Settings – Replication

To relate our paper to the literature in the field, we first test whether we can replicate the basic results of Niederle and Vesterlund (2007).

[5]In their study Schmitt *et al.* (2008) report gender differences in personality variables in 49 nations. They also asses the five personality factors, using Big Five Inventory (BFI). They find that women score higher on neuroticism, agreeableness, extraversion and conscientiousness. Regarding neuroticism they state that in no country men reported significantly more neuroticism than women.

Table 2: Gender differences in choice of incentives

	choice	frequency	percent
Women	piece rate	52	74.3
	tournament	18	25.7
	total	70	100
Men	piece rate	33	57.9
	tournament	24	42.1
	total	57	100

The first question is whether we also find gender differences in the choice of competitive incentives. Table 2 shows that 25,7% of women choose to compete in round 3, compared to 42.1% of men. This gender difference is (marginally) significant (Pearson chi square = 3.813, as. sig. = .051).

We have to keep in mind however that it might be rational for women not to choose competition, if they indeed perform worse than men in the task. Table 3 shows that this is actually the case in our sample: Women perform marginally significantly worse than men in piece rate (t = -1.631, p = .105) and significantly worse in forced competition (t = -2.182, p = .031), even though they improve their performance from piece rate to competition just as men do (t = -1.033, p = .304).

Table 3: Performance of men and women

	sex	N	mean	SD
Correctly solved piece-rate	female	70	9.96	3.78
	male	57	11.16	4.51
Correctly solved tournament	female	70	12.14	4.57
	male	57	14.02	5.10
Improvement (PR – tournament)	female	70	2.19	3.24
	male	57	2.86	4.11

Using the same kind of simulation as Niederle and Vesterlund do, we determine at which performance level a subject should rationally enter the competition. We do not distinguish between men and women here, because our set-up was a bit

different from that of Niederle and Vesterlund (2007).[6]

Our simulation indicates that someone solving 14 sums correctly should be (nearly) indifferent between entering the competition or not (having a 24.54% chance to win when entering the competition), while someone solving 15 sums should always enter the competition (having a 32.74% chance to win).

In contrast to Niederle and Vesterlund (2007) findings, in our sample, there are as many women as men who do not enter the competition while they should (65.4% of women vs. 55.2% of men, Pearson chi square = .596, as. sign. = .440). For those who enter while they should not we do however find the same sex difference Niederle and Vesterlund found: Significantly more men than women enter a competition while they should not (20.5% of women vs. 39.3% of men, chi square = 3.025, as. sig. = .082 (both 2-sided)).

4.2 Performance and choice

We now test whether those choosing competition differ in "substantial" variables from those not choosing competition, i.e., we test for differences in performance in piece rate and forced competition and the difference in improvement from piece rate to competition. As subjects also indicated which rank they believe to hold in forced competition, we can test for differences in performance beliefs between those who choose competition in round three and those who do not. We do this first for all participants together, and then split the data by gender to study differences between the sexes.

Table 4 shows performance in piece-rate and forced competition and improvement between those two treatments for those who do and those who do not choose competition. Even though those who choose competition perform slightly better on average than those who choose piece rate in both treatments, and improve slightly more, only the difference in forced competition is significant (improvement: t = -.902, p = .185; piece-rate: t = -1.282, p = .101, forced competition: t = -1.778, p = .039; all one-tailed).

The most important difference we do find is the belief subjects hold about their

[6]We had randomly composed groups, ensuring that always both men and women were in the laboratory. In Niederle and Vesterlund (2007) there were always equal numbers of women and men in the laboratoy and two women and two men competing in a group. We had groups of at least 8 subjects in the laboratory with a random composition of sex. Except once, there were always at least 25% of the minority sex in the lab (in one session only 22%), and competing groups were composed randomly.

Table 4: Differences in performance by choice of incentive scheme

	choice	N	mean	SD
improvement	piece-rate	85	2.28	3.94
	competition	42	2.90	3.01
correctly solved piece-rate	piece-rate	85	10.16	3.99
	competition	42	11.17	4.44
correctly solved forced competition	piece-rate	85	12.45	4.55
	competition	42	14.07	5.39

performance. Those subjects who later do choose competition have significantly more "positive" performance beliefs than those who do not choose competition (univariate ANOVA, F-test: F = 6.886, Sig. = .000).

Table 5: Differences in performance by gender

		performance		
	choice	piece rate	tournament	improvement
Women	piece rate	9.56	11.67	2.11
		(3.71)	(4.16)	(3.57)
	tournament	11.11	13.50	2.39
		(5.10)	(5.49)	(2.09)
Men	piece rate	11.12	13.67	2.54
		(4.92)	(4.94)	(4.50)
	tournament	11.21	14.50	3.29
		(4.00)	(5.39)	(3.54)

Note: averages with standard deviation in parenthesis.

We now turn to the analysis of gender differences. First, we look at the performance variables and compare separately for men and women performance in piece rate and forced competition, and improvement between those who do and who do not choose competition in round three. Then, we look at performance beliefs of men and women who choose/do not choose competition. Even though those who choose tournament perform slightly better both in piece-rate and in forced competition, and also improve more from piece-rate to forced competition,

neither for men, nor for women separately any of these differences is significant (see table 5).

Table 6: Self-Ranking and performance

measure	self ranking	N	mean	SD	min	max
correctly solved	1	42	16.19	4.71	7	29
in forced competition	2	43	12.44	4.01	4	19
	3	33	11.73	3.29	6	20
	4	9	5.22	2.22	3	10
	total	127	12.98	4.89	3	29
improvement from	1	42	4.24	3.03	-1.00	11.00
piece rate to competition	2	43	2.30	3.42	-6.00	11.00
	3	33	1.76	3.53	-8.00	8.00
	4	9	-2.11	3.14	-8.00	1.00
	total	127	2.49	3.66	-8.00	11.00

Performance beliefs however differ both for men and women significantly between those who do and those who do not choose competition (univariate ANOVA: Women: F = 12.936, sign. = .001; Men: F = 4.325, sig. = .042). In table 6 one can see that these performance beliefs are overall related to real performance: For each performance measure applied, those ranking themselves highest indeed perform best, while those ranking themselves lowest indeed perform worst.

4.3 The Impact of the Big Five Factors

We now turn to our main research question, whether personality can explain (choice) behavior in the tournament game.

4.3.1 Personality and Performance

We first analyse whether personality factors are linked to performance. To test whether this is the case for our sample, we correlate performance in all three rounds with the values in the personality variables we study. Table 8 shows the correlations.

We can see in table 8 that openness to experience is negatively related to performance in the piece-rate setting, but not to performance in the forced compe-

tition setting. Neuroticism is marginally significantly negatively related to performance in the forced competition setting and highly significantly negatively related to performance in the choice setting, while openness to experience is marginally significantly negatively related to performance in the choice setting. A relationship between performance and some of the Big Five factors, especially openness to experience for piece-rate and the choice setting and neuroticism for forced competition and the choice setting could thus be established.

Table 7: Gender differences for personality factors

	sex	N	mean	SD	SE Mean
neuroticism	female	66	99.17	21.31	2.62
	male	54	84.76	24.93	3.39
extraversion	female	66	120.39	17.58	2.16
	male	54	111.78	24.54	3.34
openness	female	66	128.44	15.45	1.90
	male	54	119.98	17.70	2.41
agreeableness	female	66	109.76	19.94	2.45
	male	54	109.68	17.49	2.38
conscientiousness	female	66	117.30	21.83	2.69
	male	54	114.70	22.08	3.01

We now test whether we can replicate the gender differences in the personality variables reported in the literature. A simple t-test shows that there are indeed gender differences in some of the personality variables in our sample. Women score significantly higher on neuroticism ($t = 3.424.$, $p = .001$), significantly higher on extraversion ($t = 2.235$, $p = .027$), and significantly higher on openness ($t = 2.795$, $p = .006$). These differences have also been mentioned in the literature (see 3).

Table 8: Correlations

	piece rate	tournament	choice	N	E	O	A
tournament	.684***						
	(.000)						
	127						
choice	679***	.855***					
	(.000)	(.000)					
	127	127					
N	-.052	-.154	-.230*				
	(.570)	(.094)	(.011)				
	120	120	120				
E	-.029	.024	-.013	-.279**			
	(.755)	(.756)	(.892)	(.002)			
	120	120	120	126			
O	-.217*	-.149	-.156	.024	.341***		
	(.017)	(.104)	(.090)	(.789)	(.000)		
	120	120	120	126	126		
A	-.105	-.123	-.125	-.158	.173	.064	
	(.252)	(.181)	(.174)	(.077)	(.053)	(.477)	
	120	120	120	126	126	126	
C	-.069	.046	.073	-.259**	.167	-.067	-.037
	(.452)	(.616)	(.430)	(.003)	(.062)	(.456)	(.677)
	120	120	120	126	126	126	126

Note: coefficients, significance and number of observations. Stars indicate levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Abbreviations: N=neuroticism, E=extraversion, O=openness to experience, A=agreeableness,C=conscientiousness.

4.3.2 Personality and Choice

It is noteworthy here that those personality factors where women, on average, score higher than men, have a negative impact on performance in a competitive (neuroticism) or piece-rate (openness) setting. Therefore, in the following we test whether women"know" that they have certain characteristics that do not help them in a competitive environment and therefore stay out of a competition; i.e., we test whether the gender difference in personality variables disappears for those women who chose to compete.

Table 9: Gender differences by choice of competition

		sex	N	mean	SD	SE mean
no	neuroticism	female	50	101.72	22.64	3.20
		male	31	86.77	24.74	4.44
	openness	female	50	127.22	13.93	1.97
		male	31	120.48	19.24	3.45
	risk attitude	female	50	6.64	1.86	.26
		male	32	6.75	1.72	.30
yes	neuroticism	female	16	91.19	14.28	3.57
		male	23	82.04	25.47	5.31
	openness	female	16	132.25	19.49	4.87
		male	23	119.30	15.78	3.29
	risk attitude	female	15	6.40	1.30	.33
		male	24	5.87	1.39	.28

Table 9 shows that this is indeed the case: While for women and men who do not choose to compete in round three, the gender difference in neuroticism is highly significant (t = 2.787, p = .008), there is no significant difference between men and women who do choose to compete. This does not hold for openness, where there is a marginally significant difference for those who do not choose to compete and a significant difference for those who do compete. Remember, however, that openness mainly influenced performance in a piece-rate setting negatively and thus, it might be rational to avoid piece-rate settings when scoring high on openness. For comparison we include risk attitude here, as this has been studied by Niederle and Vesterlund (2007). We measured risk attitude with the method developed by Holt and Laury (2002). We see that no siginficant differences in risk attitude exist

between the sexes and for those choosing or avoiding competition.

4.3.3 The Influence of Personality on the Choice to Compete

In the following, we run some regressions to test the robustness of the results so far reported and to test whether we can establish that neuroticism medaites the gender difference both in performance and in choice.

We explain the choice of competitive incentives in round 3, using a binary logistic regression, where we enter as explainatory variables in a first step sex alone, in a second step additionally all 5 personality factors, and in a third step more "substantial" measures: the number of correct answers in round 1 as a baseline performance measure, self-ranking in forced competition and improvement from piece-rate to tournament. The coefficients can be found in table 10.

One can see in table 10 that sex alone does predict the choice (step I-1), but it is mediated by neuroticism: The effect of sex disappears when we include neuroticism (and the other personality factors) in the regression (step I-2). In step I-3, when we include more variables, neuroticism remains marginally significant, and the self-ranking of the subject becomes the main and highly significant predictor of choice of competitive incentives.[7]

4.3.4 The Influence of Personality on Performance in Competition

We now turn to analyse the influence of personality on performance, where we examine performance in both types of competition: forced competition in round two and self-selected competition in round three. Besides the personality variables we use performance in the piece-rate setting to explain performance in the competitive setting. We do not use performance in forced competition , because this performance is already in a competitive setting and thus is probably influenced by the same factors that influence performance in round 3.

Beginning now with forced competion we run a regression with the number of correct answers in forced competion as dependent variable, and we enter sex in a first step as explainatory variable, then additionally all 5 personality factors, and in a third step we add the number of correct answers in piece rate (round 1). The

[7]When we exclude the subjects ranking themself as worst the results get even clearer. neuroticism and self-ranking are correlated and running the same regression as in table 10 leads to the same results in the first and the second step: sex alone beeing significant, but disapearing when including the Big Five, when neuroticism is significant, but in the third step now neuroticism is not even marginally significant and self-ranking alone can completly explain the choice.

Table 10: Logistic regression (I) on the choice to enter a competition

	Step I-1	Step I-2	Step I-3
sex	.841*	.466	.681
	(.398/.035)	(.456/.307)	(.522/.191)
neuroticism		-.023*	-.021
		(.011/.034)	(.012/.074)
extraversion		-.016	-.019
		(.011/.153)	(.013/.131)
openness		.010	.030
		(.013/.460)	(.016/.063)
agreeableness		.002	.002
		(.011/.877)	(.012/.886)
conscientiousness		-.008	.001
		(.010/.448)	(.012/.938)
correct round 1			.023
			(.062/.708)
self-ranking			-1.345***
			(.361/.000)
improvement			-.117
			(.079/.139)
Nagelkerke R^2	.052	.116	.326
N	120	120	120

Note: coefficients with standard errors/p-values in parenthesiss. Stars indicate levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

coefficients can be found in table 11.

Table 11: Regression (II) on performance in forced competition

	(II-1)	(II-2)	(II-3)
sex	.215*	.176	.123
	(.886/.019)	(1.000/.086)	(.749/.109)
neuroticism		-.089	-.062
		(.022/.401)	(.016/.438)
extraversion		.101	.039
		(.024/.341)	(.018/.624)
openness		-.130	.023
		(.029/.189)	(.022/.764)
agreeableness		-.146	-.067
		(.024/.115)	(.018/.331)
conscientiousness		.002	.076
		(.021/.983)	(.016/.290)
correct round 1			.665***
			(.082/.000)
R^2	.046	.091	.498

Note: coefficients β with standard errors/p-values in parenthesiss. Stars indicate levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

We find a gender effect on performance in forced competition (II-1), which disappears when the Big Five factors are included. None of the five factors gets significant separately, but neuroticism does have a (nonsignificant) negative effect on performance. Including performance in the piece-rate payment scheme into the regression (II-3) explains performance in the competitive payment scheme.

We finally run a regression with the number of correct answers in round three as dependent variable. We enter again as explainatory variable in a first step sex, then additionally all five personality factors and in the third step we include the number of correct answers in piece-rate and the choice to enter the competition. The coefficients can be found in table 12.

When we analyse performance in round three we again find that the effect of sex disappears when we include the Big Five factors. Here, neuroticism gets significant. Having chosen a payment scheme seems to impact performance of those negatively who are highly neurotic, independent of the payment scheme

Table 12: Regression (III) on performance in round 3

	(III-1)	(III-2)	(III-3)
sex	.206*	.117	.057
	(.860/.024)	(.959/.248)	(.712/.447)
neuroticism		-.210*	-.167*
		(.021/.048)	(.016/.037)
extraversion		.011	-.040
		(.023/.915)	(.018/.610)
openness		-.116	.030
		(.027/.237)	(.021/.686)
agreeableness		-.152	-.075
		(.023/.097)	(.017/.268)
conscientiousness		.010	.089
		(.021/.913)	(.015/.209)
correct in round 1			.658***
			(.079/.000)
choice in round 3			.068
			(.702/.330)
R^2	.042	.110	.525

Note: coefficients β with standard errors/p-values in parentheses. Stars indicate levels of significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

chosen. When performance in piece-rate and the choice in round 3 are included, performance in round 1 together with neuroticism remain significant predictors of performance.

Overall this confirms the intuition we got from the t-tests: It is generally not women who do not self-select in the competitive treatment, but those (women) who score high on neuroticism - maybe knowing that this will negatively impact their performance in a competitive setting.[8]

5 Discussion

We study gender differences with respect to the choice of competitive incentive schemes and to performance in competiton in relation to personality variables on a behavioral level. By and large, we succeed in replicating the findings by Niederle and Vesterlund (2007), even if our setting is slightly less controlled in terms of gender composition of the competing groups. While in their case, subjects could see that there were always two women and two men in a group, in our case subjects only knew the gender composition of the whole group in the lab, with considerable variance thereof. Even though, we do find that women enter the competition less frequently than men do, and men enter the competition significantly more often if they should not than women do. In contrast to Niederle and Vesterlund, we do find an overall sex difference in performance in the competitive part and in part three of the game, and we do not find a difference between men and women with respect to not entering the competition when they ought to.

Our focus is however not on the choice of an incentive scheme per se, but on personality factors underlying this choice. Our results show that there is one of the Big Five personality variables, neuroticism, that is related to performance in and choice of a competitive context.

Neuroticism represents the tendency to be anxious, insecure and emotionally unstable in general, and to be susceptible to be stressed or depressed (McCrae and John (1992), Hogan and Johnson (1997)). In a meta-analytis looking at the link between personality and psychological disorders, Kotov *et al.* (2010) found neuroticism to be related to posttraumatic stress disorder and major depression. High neuroticism is the key characteristic of bournout (Langelaan *et al.* (2006), Kim *et al.* (2009)). Neuroticism is, among others linked with difficulties in coping

[8]One could in pricipal test this with the choice in round 4, but we had hardly anybody choosing to submit his or her piece-rate performance to competition.

with conflicts and distress (Bolger and Schilling (1991), Bolger and Zuckerman (1995)). It has also been associated with impaired academic performance (e.g., Chamorro-Premuzic and Furnham (2003), Heaven *et al.* (2002)).

So it seems intuitive, that people scoring high on neuroticism perform worse than more emotionally "stable" subjects in a competitive setting, and that they fear the stress involved and rather stay out of competitive settings.

As women on average score higher on neuroticism than men, one should expect women to enter a competition less often than men do, and to perform worse when they are forced into a competitive setting. Our findings corroborate this: Those women who do enter a competition score lower on neuroticism than women who do not enter a competition, and equal to average men. Low neuroticism women thus self-select in competitive environments, while the others stay out. Men seem to be less influenced by these factors, maybe scoring just "low enough" in general (they indeed score (nonsignificantly) lower than even women who do chose competition).

What does this imply in a more general sense? It seems to be not being male or being female per se that influences whether someone likes to enter a competition or not. Rather, there are certain individual characteristics influencing performance in and preference for competitive settings which are stronger related with one gender than the other. Those scoring high on these characteristics rationally avoid competitive settings and those scoring low enough seek such settings. If we understand how these characteristics can be influenced, we might, rather than simply encouraging women to be more competitive, try to focus on these characteristics during education. Developing them in women equally as in men should be the more successful approach to achieving gender equality. Encouraging women to enter a competition despite them being high on emotional instability might just provoke failure and thus reiforce the stereotype and discourage other women to follow suit. Our paper represents just a first step towards a deeper understanding of the causes for women's lower willingness to compete. It shows in our view that looking for personality factors underlying the gender differences in economic behavior is a promising avenue, asking for more studies in the future.

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A Tournament game

Instructions

In this game you will get math problems where you have to add numbers. You will receive money only for correct answers to these problems. For your calculations you are not allowed to use a calculator, but you can use scratch paper which lies on your desk.

You will be in a group with three other participants in the laboratory. We will randomly build these groups of four. You will at no point in time be informed, with whom you are in a group.

This game is divided in four parts. For each part you will get the instructions for that part at the monitor.

Payment At the end of the experiment you will get paid for one of the four parts of the game. We will randomly determine which part is to be paid and tell you at the end of the experiment.

Generally there are two different kinds of payment: piece-rate payment and tournament. If the payment is piece-rate payment you will receive €0.50 per correct answer. In a tournament the winner in a group is the participant who solves the largest number of correct answers. The winner receives €2 per correct answer, all other participants in the group get no payment. In case of a tie, the profit is equally split between the winners.

In each part of the game you will be informed at the monitor which kind of payment there is in that part.

If you now got questions regarding these instructions, please raise your hand. One of the experimenters will come to answer your question.