Gender and overconfidence: are girls really overconfident?*

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Previous research finds that people are overconfident, and that men are more overconfident than women. Using a very precise confidence measure, this article shows however, that while boys are overconfident, girls are actually underconfident regarding their mathematics performance. We conducted a survey where 14 year old high school students were asked what grade they thought they would get in a mathematics test a week later. These results were then compared to their actual grade. Boys were overconfident about their grades, while girls were underconfident.

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I. Introduction

That people tend to overestimate their abilities is well documented (e.g., Croson and Gneezy 2009). Men also tend to be more overconfident than women (Estes and Jinos 1988; Soll and Klayman 2004; Niederle and Vesterlund 2007). However, Nekeby et al., (2008) find that women who self-select into a male-dominated environment may be at least as overconfident as men.

In this study, we asked 14 year old Swedish high school students what grade they thought they would get in a mathematics test a week later. These results were compared to their actual grade and we find evidence of boys being overconfident, while girls are underconfident. Compared to previous research we have a very good measure of confidence, where we can really measure if the respondents perform better or worse that they believe.

Our study is a complement to previous research in the fact that we study young subjects in a society characterized by a high degree of gender equality.[1] Also, we partly contest previous results because we actually find that girls are underconfident regarding their mathematics performance, while previous studies find that also women tend to be overconfident, although less so than men (Estes and Jinos 1988; Soll and Klayman 2004; Niederle and Vesterlund 2007). This finding is important since it may help to explain why women tend to be underrepresented in certain educations and types of work, as such it may help to explain the gender wage gap and labor market segregation. Also, it points to the importance of making school children better aware of their abilities.

II. Data and Results

Our sample consists of 78 students (43 girls and 35 boys) aged 14 in a high school in Karlstad in Sweden. The students were asked what grade they thought they would get in a mathematics test a week later. The question was *On the upcoming exam in*

[1] E.g. The Global Gender Gap Report 2008 ranks Sweden as the third most gender equal country in the world, see also Jakobsson and Kotsadam (2010).

mathematics, what grade do you expect to get? The answers to the question are presented in Table 1. As we can see, 47% of the girls and 63% of the boys thought they would get one of the two highest grades (VG or MVG) on the exam. Actually, no girls thought they would get the highest grade on the exam.

Table 1. Students estimation of their grade on the upcoming exam, in per cent

	Fail (IG)	Pass (G)	Good (VG)	Very good (MVG)	Total	Observations
Total sample	3	44	51	3	100	78
Girls	2	51	47	0	100	43
Boys	3	34	57	6	100	35

A week later, the students took the mathematics exam and the actual grades are presented in Table 2. As we can see, 56% of the girls and 49% of the boys got one of the two highest grades on the exam (VG or MVG).

Table 2. Actual grade on the exam, in per cent

	Fail (IG)	Pass (G)	Good (VG)	Very good (MVG)	Total	Observations
Total sample	5	42	45	8	100	78
Girls	2	42	47	9	100	43
Boys	9	43	43	6	100	35

Tables 1 and 2 give at hand that there seems to be a difference in the estimated grade and the actual grade, where girls underestimate their grade and boys seem to overestimate it. From this information we constructed a confidence measure (Confidence) that measures if the respondent underestimates, correctly estimates or overestimates test performance. If the respondent thought she would get a higher grade than she actually got on the exam the variable was coded as -1, if she thought she would get the same grade as the grade she actually got the variable was coded as 0, if the respondent overestimated her grade it was coded as 1. The distributions for the total sample, girls, and boys respectively are shown in Table 3. Here we see clear indications that girls tend to underestimate their mathematical ability, whereas boys tend to overestimate their ability.

Table 3. Distribution of Confidence, in per cent

	Underestimate	Correct estimate	Overestimate	Total	Observations
Total sample	18	67	15	100	78
Girls	23	72	5	100	43
Boys	11	60	29	100	35

In order to statistically confirm these differences we run an ordered probit regression with Confidence as the dependent variable. Marginal effects after ordered probit are presented in Table 4.

Table 4. Marginal effects after ordered probit

	Underestimate	Correct estimate	Overestimate
Boys	-0.182***	0.007	0.175***
	(0.066)	(0.047)	(0.068)

78 observations, Pseudo R2=0.058, log likelihood=-63.683.
Standard errors in parenthesis.
*** significant at 1%.

As compared to girls, boys are associated with a statistically significant 18 percent lower probability to underestimate their test grade, as well as an 18 percent higher probability to overestimate it.[2] Thus, we find clear evidence of overconfidence among boys, and underconfidence among girls

III. Discussion

Previous research find that people generally are overconfident in as diverse arenas as investment decisions, running, answering quiz questions, and in solving fictitious mathematical problems. And while both men and women are overconfident, men are generally more overconfident than women. This article shows, however, that while boys are overconfident, girls are actually underconfident regarding mathematics knowledge. We conducted a survey where high school students were asked what grade they thought they would get in a mathematics test a week later. These results were then compared to their actual grade. Boys were overconfident about their grade, while girls were underconfident.

Finding this result in a particularly gender equal country with young participants is somewhat surprising. Previous research has found that more men than women describe themselves as competitive, and that this described difference increases with age (e.g., Campbell 2002), while Dreber et al. (2009) find no difference in competitiveness among young Swedish boys and girls. This lack of gender

[2] Using ordered logit regressions does not change the results (available upon request).

difference does not seem to carry over to overconfidence. Confidence is important for labour market outcomes and our result give an additional reason for the gender wage gap in Sweden. Moreover, although Sweden has a large degree of gender equality as compared to other countries, its labour market is highly segregated which is often explained by referring to the high level of female employment to start with. While this is probably the most important reason, our results suggest a complementary mechanism of self-selection due to different levels of confidence.

More research is needed with respect to under which conditions this stereotype about confidence is correct regarding actual behavior. There is also room for research on the extent that the culture may matter in this respect.

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