Gender disparities in fear of failure among 15-year-old students: The role of gender inequality, the organisation of schooling and economic conditions

Francesca Borgonovi[1]
and
Seong Won Han[2]

1. UCL Social Research Institute
University College London
55-59 Gordon Square
London WC1H 0NU
UNITED KINGDOM
E-mail: F.borgonovi@ucl.ac.uk
ORCID ID: 0000-0002-6759-4515

2. Department of Educational Leadership and Policy
University at Buffalo
431 Baldy Hall Buffalo, NY 14260-1000
UNITED STATES
E-mail: seongwon@buffalo.edu
ORCID ID: 0000-0002-3676-2483

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Abstract

Introduction

Prior research indicates that female students express higher fear of failure than male students and that fear of failure is associated with lower social and emotional well-being and higher levels of stress, anxiety, burnout and depression. Fear of failure also leads individuals to limit their choices and take fewer risks than would be warranted given their ability and context to minimise the possibility of failing.

Methods

We examined cross-country differences in gender gaps in fear of failure as well as factors that explain gender gaps and variations of gender gaps across countries using multilevel modelling techniques. Participants were 517,047 15-year-old students from 59 countries who took part in the 2018 Programme for International Student Assessment (PISA).

Results

Within countries, students with higher reading achievement and who lacked a growth mindset reported higher fear of failure. The gender gap in fear of failure was especially high among high-achieving students and students with high-achieving peers. The size of the gender gap in fear of failure differed across countries: it was higher in countries with higher levels of economic prosperity, with lower levels of societal-level gender inequality and countries with comprehensive education systems.

Conclusions

The greater prevalence of fear of failure among female students among high-achieving students attending high-achieving schools in prosperous and more gender equal societies could help to explain the paradox of the persistent underrepresentation of females in certain occupations in contexts that are most supportive of females.

1. Introduction

Fear of failure characterises the tendency of individuals to avoid making mistakes when performing a task or an activity because failure is perceived as shameful (Atkinson, 1957; Birney et al., 1969). The level of fear is determined by the perceived level of risk of failing (i.e. how hard a task is) and by the costs associated with failure (which can include the missed opportunity of benefiting from success as well as social stigma and judgement and other negative consequences that can arise from failure [Lazarus, 1991; Warr, 2000]).

Fear of failure is an important motivational driver: individuals act to avoid experiencing failure. Failure avoidance can lead individuals to limit their choices and take fewer risks than would be optimal given their abilities. It also leads to an inefficient allocation of time because individuals dedicate time to activities beyond the point at which the returns to time investments lead to improvements in outcomes just as a way to minimise the possibility of failing. Finally, fear of failure has been found to be negatively associated with lower social and emotional well-being among students (Elliot & Sheldon, 1997) and higher levels of stress, anxiety, burnout and depression (Gustafsson, Sagar, & Stenling, 2017; Sagar, Lavallee, & Spray, 2007).

The literature indicates that fear of failure is higher among women than among men (Alkhazaleh & Mahasneh, 2016; Mcgregor & Elliot, 2005), and that women are more likely to

experience negative outcomes when they fear failure (Wach et al., 2015). These findings are consistent with research indicating that women respond less positively to competitive environments (Niederle & Vesterlund, 2007; Croson & Gneezy, 2009), tend to be more risk adverse (Byrnes, Miller, & Schafer 1999; Fisk, 2018) and have lower levels of self-efficacy and self-concept than males with similar levels of achievement (Goldman, 2016; Huang, 2013). In education, fear of failure can lead individuals to choose less demanding courses, to invest too much time studying some material, and to avoid courses and subjects in which they do not expect to succeed and others do not expect them to succeed (Beilock et al., 2004; Heckhausen, 1975; Martin, Marsh, & Debus, 2003).

In recent years, a fertile line of research has examined the role sociocultural and institutional factors play in shaping gender disparities in educational outcomes. Two key sociocultural and institutional factors are: societal-level gender inequality, and the level of differentiation and standardisation of the education system.

In this work, we extend the research on the role sociocultural and institutional factors play in shaping between-country differences in gender gaps in attitudes by exploiting new cross-country evidence on fear of failure among 15-year-old students from 59 countries that participated in the 2018 Programme for International Student Assessment (PISA). Data availability drove the choice of the target population for this study, but we believe that examining gender differences in fear of failure among 15-year-old students may be especially valuable out of all the possible snapshots one could choose. In many countries, this age corresponds to the period when students and families make decisions about further education or work (Stephens, Warren, Harner, & Owen, 2015). Students at this age begin to develop occupational values, interests and preferences (Johnson, 2001; Schulenberg, Vondracek, & Kim, 1993) and a profound understanding of the demands of different occupations (Hartung, Porfeli, & Vondraceck, 2005). Previous studies have

indicated that fear of failure determines poorer learning outcomes in mathematics, especially among girls (Wach et al., 2015). Therefore, examining gender differences in fear of failure among teenagers could help identify an important factor driving gender differences in educational and career choices.

Our contribution is threefold. First, we identify gender differences in fear of failure in the 59 countries that participated in PISA in 2018 and have available information on fear of failure. Second, we illustrate the association between societal-level gender inequality and the size of the gender gap in fear of failure. Third, we illustrate the association between educational differentiation and the size of the gender gap in fear of failure. We conclude by discussing limitations, directions for future research and implications for policy.

2. Theory

According to expectancy value theory, individuals' level of motivation while performing a task is a function of their expected performance and the value they assign to the task (Eccles & Wigfield, 2002). Affective responses arising from experiencing failure are determined by appraisal processes and, in particular, by self-evaluations that occur when an individual internalises performance outcomes (Heckhausen, 1975). Such appraisals depend first on the comparison between the performance outcome experienced by individuals and the aspirations they set for themselves. Therefore, we expect that fear of failure will be higher among students who can hold ambitious expectations such as achieving students: although among these students failure is less likely to occur, the mismatch between aspirations and reality would be larger and therefore feelings of shame would be especially pronounced.

Secondly, appraisals are determined by social comparisons and attributional processes: individuals experience failure depending on the extent to which failure is likely to be a collective

rather than a personal experience and the extent to which performance outcomes can be ascribed to personal failings rather than external circumstances. We expect that, other things being equal, fear of failure will be greater when students are surrounded by high-achieving peers, because failure is less likely to be a shared experience in these contexts. Moreover, we expect that fear of failure will be greater if students believe that intelligence is fixed, because failure in this case is causally ascribed to lack of ability of the self and therefore failure is perceived as shameful (Kukla, 1972).

In general, there is evidence that teenage girls value education to a greater extent than teenage boys across a wide variety of countries and cultural contexts (OECD, 2015; Warrington, Younger, & Williams, 2000), set more ambitious performance standards for themselves (Schoon & Polek, 2011), are more likely to attribute failure to themselves rather than external circumstances (Roberts, 1991), and experience emotions more strongly than men (Harshman & Paivio, 1987).

Research highlighted biological differences between males and females as a potential source of gender gaps. For example, it has been suggested that androgen levels in utero may influence skills and behaviours, leading to gender disparities in certain domains (see Auyeung, Lombardo, & Baron-Cohen, 2013; Valla & Ceci, 2011; Vuoksimaa et al., 2010). Similarly, testosterone, cortisol and hormonal levels are known to be associated with behaviour and preferences and to vary greatly across genders and within gender over time (Bateup et al. 2002; Chen, Katuscak, & Ozdenoren 2013). However, the influence of biological factors in shaping gender differences in attitudes, behaviours and preferences is not deterministic and depends on context and socialisation processes. For example, females who are exposed to androgen levels that are comparable to those experienced by males do not resemble males in skills and behaviours, and gender gaps in many skills, behaviours and attitudes vary greatly both over time and across

cultures (Hines, Fane, Pasterski, Mathews, Conway, & Brook, 2003; Vuoksimaa et al., 2010; Gneezy, Leonard & List, 2009). Beyond biological reasons, socialisation processes may lead males and females to adopt different behaviours and attitudes. Males and females are often treated differently by teachers, parents and peers, and such differences tend to create and reinforce stereotypes. Stereotypes turn existing differences across groups into culturally and socially transmitted deterministic beliefs that shape expectations and action (Johnson & Wilson, 2019) given specific sociocultural contexts (Gneezy, Leonard & List, 2009). Therefore, we expect that female students will be more likely, other things being equal, to express higher levels of fear of failure than male students and that they will be more sensitive to factors that determine how shameful failure is likely to be perceived by the self, such as personal academic achievement and the achievement of peers. However, we also expect this gender gap to vary across countries, depending on the level of gender inequality present in the country, the level of differentiation and standardisation of the education system and level of economic prosperity.

2.1 Societal-level gender inequality

Research indicates that the role women play in the political and economic life of different societies is associated not only with how wide gender gaps in academic achievement are (Ceci et al., 2014; Halpern, 2012; Lindberg, Hyde, Petersen, & Linn, 2010; Miller & Halpern, 2014) but also with the size of gender gaps in attitudes, expectations and self-beliefs (Else-Quest, Hyde, & Linn, 2010; Stoet & Geary, 2018; Falk & Hermle, 2018; Borgonovi & Greiff, 2020). This is especially relevant because empirical studies indicate that attitudes, expectations and self-beliefs play a role that matches and often surpasses the role of academic achievement in driving

students' decisions for further study and work and therefore they have the potential to shape the life outcomes of males and females (Guay, Larose, & Boivin, 2004).

However, empirical research reveals that although in societies with greater societal-level gender equity the gender gap in mathematics and science achievement is smaller (Breda, Jouini, & Napp, 2018; Else-Quest, Hyde, & Linn, 2010; Guiso, Monter, Sapienza, & Zingales, 2008), in such societies the gender gap in subject specific self-beliefs (Else-Quest, Hyde, & Linn, 2010); educational expectations (Stoet & Geary, 2018); preferences for risk, degree of competitiveness, trust, altruism, patience (Falk & Hermle, 2018); and attitudes towards problem solving (Borgonovi and Greiff, 2020) are wider.

These findings have been considered to reflect the influence societal-level gender equity has on how possible it is for men and women to assign value to different activities that reflect their unconstrained preferences as well as the expectations they hold of performing at required levels. A more egalitarian distribution of material and social resources might enable women and men to express gender-specific preferences, therefore leading to a wider difference in the value they assign to different outcomes and a larger gender gap in preferences, attitudes and self-beliefs (Falk & Hermle, 2018). Others stress that in education, a more egalitarian distribution of material and social resources determines performance expectancies by shaping achievement in all domains, not only those in which a particular gender is expected to perform less well because of gender stereotypes (Stoet & Geary, 2018). For example, while the gender gap in mathematics achievement in favour of males is smaller in societies with high levels of gender equity, the gender gap in reading literacy is wider in such societies and the overall effect is of an even more pronounced gender disparity in relative performance in such societies. If performance expectancies are driven by how well an individual performs in a subject compared to another

rather than by absolute performance standards (Eccles, 2009), girls in highly equal countries may come to perceive their ability in mathematics relative to reading as lower. Consequently, they develop lower performance expectancies and lower mathematics self-concept, self-efficacy, and expectations to pursue studies and occupation in math intensive fields (Möller & Marsh, 2013).

Gender equality in a society may increase performance expectancies by reducing the likelihood that women will fail. In societies with high levels of gender equality girls have higher absolute levels of performance, and tend to have higher grades and higher educational attainment than males (DiPrete & Buchmann, 2013; OECD, 2015). They also have such achievement recognised by others and, as a result, hold more ambitious expectations for their future (Correll, 2004). Moreover, women can have higher performance expectancies in societies with greater gender equity because in such societies stereotypes that portray competition and achievement striving as appropriate and attractive for men but not for women are less prevalent (Horner, 1972). However, in such societies women are less likely to be able to attribute failure to external constraints and are more likely to internalise failure and therefore perceive it as shameful. As a result, we expect that in societies with greater gender equality, after controlling for differences in ability, the gender gap in fear of failure will be wider.

2.2 Level of standardisation or differentiation of the education system

Two features importantly determine the organisation of schooling and how institutional arrangements deal with heterogeneity in students' ability levels, preferences, and expectations: standardisation and differentiation (Buchmann & Park, 2009; van de Werfhorst & Mijs, 2010; Montt, 2011). Standardised education systems attempt to reduce overall heterogeneity by requiring students to receive similar education inputs and by evaluating them using similar

benchmarks. The level of standardisation of a system therefore identifies the extent to which all students in an education system are required to possess similar knowledge and obtain prescribed levels of achievement (Bol & van de Werfhorst, 2013). Standardising inputs, such as curricula and school-level policies and practices, is one way in which education systems achieve standardisation. The alternative is standardising outputs, by organising central examinations so that all students are evaluated using the same benchmarks (Bol & van de Werfhorst, 2013).

Differentiation, by contrast, reduces heterogeneity by creating separate educational pathways for students, so that, within each path, students will have similar levels of ability, preferences and expectations (Bol & van de Werfhorst, 2013). Two key indicators of differentiation are the age at which students are sorted into different educational paths and the number of separate paths they can be sorted into. Crucially, in most systems with high levels of differentiation, it is difficult for children to move across tracks. Performance in standardised tests, grades and teacher evaluations are typical ways in which track allocation is determined (Buchmann & Park, 2009). Educational tracks that prepare children for tertiary-level education are generally more prestigious and demanding than tracks that lead to vocational training or the labour market (Kerckhoff, 2001; van de Werfhorst & Mijs, 2010).

We expect that overall levels of fear of failure will be higher in standardised systems, i.e. systems that have central examinations because such examinations are often high stakes and therefore children's educational opportunities in such systems are highly dependent on avoiding failure. For example, several studies show that the highly competitive, centralized high-stakes exam oriented education systems that are prevalent in East Asia contribute to the fact that students in these countries suffer from high levels of anxiety, fear of failure, low academic confidence, and unhappiness (Lee & Larson, 2000; Shin et al., 2018).

Females tend to be more susceptible to stress and anxiety than males and to value education to a greater extent than males (Warrington, Younger, & Williams, 2000). Therefore, we expect not only that fear of failure will be higher in countries with central examinations, but also that the gender gap will be especially large in such countries.

By contrast, we expect that in differentiated education systems, i.e. systems with early tracking and a greater number of educational programmes, overall levels of fear of failure will be lower and that the gender gap will be especially low. In such countries, students will already have been evaluated for their ability, interests and expectations. Therefore, even though they may be disappointed with the outcome, they will not experience anxiety because of future uncertainty. Secondly, we expect that females will have lower levels of fear of failure in such systems because girls tend to do better in school and therefore are more likely to be placed in prestigious academic tracks. Positive experiences in evaluative settings are associated with high levels of achievement motivation. By contrast, children whose academic career is dominated by failure experiences which lead to the development of a fear-of-failure motive: *'the children tend to avoid evaluative situations, and the evaluation of their own performance is strongly dependent on parental and adult approval'* (Dusek, 1980, p. 91). As a result, we expect that having experienced external validation for their results, they will have gained greater confidence and be less likely to fear failure in academic settings.

3. Data and methods

3.1. Programme for International Student Assessment

PISA is an international large-scale assessment that has been administered to samples of 15-year-old students every three years since 2000. PISA involves large-representative samples of students

from countries that vary widely in cultural, linguistic and social background and in how the education system is organised.

3.2. Participants

Our data come from the 2018 edition of PISA. All cases used in our analyses were extracted from the public-use files for PISA 2018. PISA participants were selected from the population of 15-year-old students in each participating country according to a two-stage random sampling procedure, so that weighted samples are representative of students who are enrolled in grade 7 or above and are between 15 years and 3 months and 16 years and 2 months at the time of the assessment administration (generally referred to as 15-year-olds in this work). In the first stage, a stratified sample of schools was drawn. In the second stage, students were selected at random in each sampled school. While 79 education systems participated in PISA 2018, our study is based on the subset of countries that asked students to report how much they fear failure in the student background questionnaire. Furthermore, since our analyses aim to identify the association between country-level characteristics and fear of failure, our sample is restricted to the subset of countries for which we were able to identify country-level information. Our analytic sample includes 517,047 students in 59 countries.

3.3. Variable description

3.3.1. Outcome variable: fear of failure

Students were asked to report, using a 4 point Likert scale, if they strongly disagreed, disagreed, agreed, or strongly agreed with the following statements about themselves: 1) when I am failing, I worry about what others think of me; 2) when I am failing, I am afraid that I might not have

enough talent; and 3) when I am failing, this makes me doubt my plans for the future. These statements were combined to create the index of fear of failure standardised to have an average of 0 and standard deviation of 1 across OECD countries. Positive values in this index indicate that a student reported a greater fear of failure than the average student in OECD countries.

3.3.2. Key independent variables

Gender is a key individual-level independent variable. This variable was reported by students in the background questionnaire. In all models we report differences in outcomes associated with being a female.

At the individual level we introduce an indicator of whether the students believe that intelligence is a fixed attribute or not – i.e. if they have a fixed or a growth mindset (Dweck, 2016). Students were asked to report the degree to which they agreed with the statement "your intelligence is something about you that you can't change very much." A growth mindset was coded 1 if a student reported "strongly disagreeing" or "disagreeing" with the statement, and 0 otherwise. As an indicator of academic achievement, we use the PISA reading achievement scores. PISA test scores are included in the PISA datasets as multiply imputed measures of proficiency ("plausible values"). PISA test scores are based on item-response-theory scaling procedures and are comparable across students taking different test forms. In PISA 2018 a set of 10 plausible values are reported and we combine them as per OECD recommendations (OECD, 2009). We rescale the PISA reading achievement scale so that it has a mean of 0 and a standard deviation of 1. We controlled for reading achievement in our analysis because in PISA 2018 reading was the main testing domain. Therefore, a wider set of assessment tasks in reading than either science or mathematics were administered and, crucially, all students were administered at least some reading tasks. By contrast, not all students were administered mathematics or science

material and mathematics and science achievement were therefore imputed. Because of the highly gendered nature of achievement in reading and mathematics, we rerun all models controlling for mathematics achievement and results are available in Supplementary Online Appendix B. Such results are in line with those presented except for the fact that females, other things being equal, have lower math achievement than males.

At the school level we introduce an indicator of the average reading performance of students attending the same school as the respondent. This indicator is an aggregated indicator at the school level of individual-level test results.

We measure societal-level gender inequality using the Gender Inequality Index (GII). The GII was developed by the United Nations Development Programme (UNDP) and indicates gender inequality in three aspects of human development – reproductive health, social and political empowerment and economic empowerment. The GII ranges from 0 to 1, with higher values indicating higher gender inequality. We run all our models using the Females' Human Development Index (HDI) as an alternative indicators of societal-level gender inequality and results are in line with those presented (results are available from the authors upon request).

We measure educational standardisation using an indicator reflecting the use of national/central examinations in the country at the lower secondary level. PISA collects data on the existence of national/central examinations at the lower secondary level (OECD, 2019a). For countries without information in PISA 2018, we extracted data from the 2015 PISA data collection (OECD, 2016).

The level of differentiation of each education system was measured by: (1) the number of school types or distinct educational programs available to 15-year-old students in each country (number of school type), and (2) the age of first selection into different school types or tracks (early tracking). Among PISA-participating countries, the number of school types ranged from

one to six. The age of first selection (early tracking) is a dummy variable, coded 1 when countries sort students into different tracks by the age of 14, and 0 otherwise. The source of data for both indicators is OECD (2019a).

3.3.3. Control variables

We include individual, school and system-level characteristics in our models.

At the individual level we control for: students' economic social and cultural status (ESCS), if the student has an immigrant background, and if the language the student speaks at home matches the language of instruction. At the school level we control for three factors: the academic orientation of the study program in which the student is enrolled, if the school is located in an urban or rural context and the socio-economic composition of students attending the school. The ESCS index is an aggregate indicator that reflects the economic, social and cultural status of students and is based on students' answers to items in the PISA background questionnaire asking them to report the educational attainment of their parents, their occupation and the availability of a range of resources within their home (OECD, 2019b). The index was standardised to have a mean of 0 and a standard deviation of 1 on average across OECD countries. We introduce a dichotomous indicator that takes value 1 if the student reports that the language he or she speaks most frequently at home is different from the language of the PISA test and value 0 if it is the same language. We introduce a dichotomous indicator that takes value 1 if students reported being born in a country that is different from the country in which they took the PISA test or reported having foreign-born parents and value 0 otherwise.

We constructed an indicator of the socio-economic composition of the school attended by the student by averaging the ESCS index of students from the PISA sample that attended the same school. Degree of urbanicity was reported by school principals. School urbanicity is coded 1 if

principals reported that their school was located in a community with more than 100,000 inhabitants and 0 otherwise. Academic orientation was obtained through the student tracking form and indicates whether the program's curricular content was general, pre-vocational or vocational. We introduce a dichotomous variable taking value 1 if the student was enrolled in a program with a pre-vocational or vocational orientation and 0 if the program was general.

Two country-level variables were used as control variables: (1) GDP per capita based on purchasing power parity (PPP) (in current US dollars); and (2) PISA sample selectivity. We used the GDP per capita indicator available through the World Bank Open Data portal (https://data.worldbank.org/). PISA contains representative samples of 15-year-old students who were enrolled in institutions at the level of lower secondary school or above. Results may reflect sample selectivity in the PISA survey to the extent that different numbers of youngsters in this age group have dropped out of school or were still in primary education—groups that may be particularly low-achievers. We calculated the PISA sample selectivity using the share of the weighted number of PISA participating students in the total population of 15-year-olds.

3.4. Analytical strategy

In a first step, we report descriptive statistics on gender differences in fear of failure in each of the 59 countries in our sample. We report results from two sets of models: the gross gender gap and the gender gap while controlling for gender differences in characteristics that may be associated with the propensity to experience fear of failure and may differ across genders. Results were obtained by estimating linear regression models for each country, before and after controlling for individual- and school-level variables. We use balanced replication weights (BRR) in all procedures to take into account the clustered nature of PISA data (students nested in schools) and obtain unbiased estimates for standard errors. BRR weights also allow to account for the

specificities of each country's sample (two-stage sampling stratified by public/private school type, for example). Estimates were obtained combining ten sets of results because PISA reading scores were included.

In a second step, we develop three-level hierarchical linear models (HLMs) where students (level 1) are nested within schools (level 2) and within countries (level 3). The country weight factor for normalized weights (multi-level analysis), SENWT (senate weight), was used to ensure that each country contributes equally to the analysis. The model specification is given below:

Level 1 (student)

$$Y_{ijk} = \pi_{0jk} + \pi_{1jk}a_{1ijk} + \pi_{2jk}a_{2ijk} + \cdots + \pi_{Pjk}a_{Pijk} + e_{ijk}$$

where Y_{ijk} is a fear of failure index for a student *i* in school *j* in country *k*; and e_{ijk} is a random error associated with each student.

Level 2 (school)

$$\pi_{pjk} = \beta_{p0k} + \sum_{q=1}^{Q_o}\beta_{pqk}X_{qjk} + r_{pjk}$$

Level 3 (country)

$$\beta_{pqk} = \gamma_{pq0} + \sum_{s=1}^{Spq}\gamma_{pqs}W_{sk} + u_{pqk}$$

All continuous covariates at student and school levels were grand mean centred. At the country level all continuous indicators were kept in their original score: the GII indicator and the PISA

sample selectivity vary between 0 and 1 and the logarithmic transformation of GDP per capita was reported. We report results from 5 sets of models. In baseline model 1 we introduce all individual, school and country-level controls. In model 2 we examine the additional association between individual-level and school-level reading achievement and fear of failure among females by introducing two interaction terms: the interaction between being a female and individual-level reading achievement and the interaction between being a female and school-level mean reading achievement. In model 3 we introduce cross-level interactions between the female dummy (level 1) and the country-level measure of gender inequality In models 4A, 4B, and 4C we introduce cross-level interactions between the female dummy (level 1) and the country-level measures of educational standardisation and differentiation. In model 5 we develop a full model with all interactions. Although there are few missing values in our sample, we take into account item-level missing values through imputations by chained equation (ICE) (Royston, 2004). The percentage of missing values on individual and school-level variables ranged from 0% to 10%. Data were primarily missing due to item nonresponse. We examined patterns of missing data to identify the appropriateness of an imputation model that assumes no selection mechanism (van Buuren, 2012) and therefore that data were essentially missing at random (Allison, 2002; Manly & Wells, 2015). The Stata 15's 'mi impute chained' command was used to generate imputed datasets. The imputation model included all the variables used in the analyses, as well as socio-demographic variables and student performance in reading as well as final student weights (Heeringa, West, & Berglund, 2010). Imputations were performed for all missing student-level and school-level characteristics. Fixed effects at country level were included in the imputation models to account for potential country specificities. Imputed values compared reasonably to observed values, and results using listwise deletion were similar to those we present using multiple imputation (see Manly & Wells, 2015). Results are presented in Supplementary Online Appendix A.

4. Results

Table 1 illustrates gender differences in fear of failure and how these vary across countries. In 56 out of the 59 countries in our sample, female students report higher fear of failure than male students. Lebanon, Montenegro, and Panama are the only countries in which fear of failure is similar among female and male students. A comparison of results reported in Models 1 and 2 reveals that differences in background characteristics generally do not explain gender differences in fear of failure: the gender gap remains quantitatively important, is statistically significant and similar in size when not controlling and when controlling for background characteristics. Table 1 also reveals that the gender gap differs across countries: it is close to zero in Panama and is over 60% of a standard deviation in Iceland.

Table 1

In Tables 2 and 3 we examine how the gender gap in fear of failure varies depending on individual, school and country-level characteristics. Model 1 in Table 2 is the baseline model and indicates that, on average across countries in our sample the gender among otherwise similar students corresponds to 30% of a standard deviation (b= 0.304, p<.001). Other things being equal, having a growth mindset appears to be associated with lower fear of failure while reading scores and attending socio-economically advantaged schools are associated with higher fear of failure, although these associations are quantitatively small. In countries with higher GDP per capita, fear of failure tends to be higher.

Results reported in Model 2 of Table 2 suggest that considering gender differences in the association between individual-level and school-level reading achievement reduces the between country-variability in gender gaps in fear of failure by almost 50% (change in the variance component). On average, among students with average reading achievement, the gender gap in fear of failure remains highly statistically significant and corresponds to 29% of a standard deviation (b= 0.293, p<.001). A difference of one standard deviation in reading achievement is associated with a higher fear of failure among both male and female students. However, among male students the difference is small and corresponds to only 3% of a standard deviation (b= 0.034, p<.001) while among female students it corresponds to 10% of a standard deviation (b= 0.034+0.067, p<.001). Moreover, female students typically have higher levels of reading achievement than male students, making them particularly susceptible to high levels of fear of failure. Other things being equal, for female students, being in a school with higher mean reading achievement is associated with a marginally higher fear of failure (b= –0.012 + .034, p<.001), while among male students fear of failure is lower when they are among higher achieving peers (b= –0.012, p<.10).

Next, we examine the role of country-level differences. Results presented in Model 3 in Table 2 reveal that in countries where the opportunities experienced by men and women differ greatly, i.e. where societal-level gender inequality is higher, both female and male students report higher levels of fear of failure (b= 1.139, p<.001). However, the association is stronger among males than among females (b= –0.640, p<.001), leading to an overall smaller gender gap in fear of failure in countries that are highly gender unequal. A difference of 0.1 in the GII index, corresponds to the difference observed, for example, between Bulgaria (GII index .218) and the United Kingdom (GII index .119) and is associated with a difference of around 11.4% of a

standard deviation in fear of failure among males and a difference of 5% of a standard deviation among females.

Table 2

In Model 4A of Table 3 we include the cross-level interaction between being a female student and attending school in a system with national/central examinations. Contrary to our hypotheses, results indicate that neither males' nor females' fear of failure is associated with the use of national/central examinations.

In Model 4B we control for early tracking (14 years or below) and in Model 4C we control for the number of programs available to 15-year-old students' indicators. Models 4B and 4C allow us to examine the degree to which the levels of differentiation are associated with gender gaps in fear of failure. Results indicate that early tracking is associated with a .093 standard deviation decrease in students' fear of failure (b= –.093, p<.10), whereas the interaction between student gender and early tracking is not statistically significant. This suggests that in education systems that have an early age of selection into different programs, students report lower levels of fear of failure at age 15 than students who attend school in systems that do not select students into different educational tracks at an early age and that the association between early tracking and fear of failure is similar across male and female students.

Model 4C results indicate that greater educational differentiation is associated with marginally lower levels of fear of failure among male students, although estimates are quantitatively small and are imprecisely estimated. However, these differences are pronounced among female students: fear of failure is lower among females the greater the number of educational programmes available in an education system. For example, compared to education

systems with only one educational programme available to 15-year-olds (i.e. comprehensive education systems), male students in education systems with two programmes report a 6% of a standard deviation lower fear of failure, although the null of no difference cannot be rejected (b= –.059, p>.10). Among female students the difference corresponds to 15% of a standard deviation and the null can be rejected at the 10% level (b= –0.059 –0.093, p<.10). However, in education systems with five or more programmes the difference is much larger: the difference among male students is 12% of a standard deviation (imprecisely estimated) but among females it is 30% of a standard deviation and is statistically significant at the 0.1% level (b= –0.123 – 0.177, p<.001). These findings indicate that there are smaller gender gaps in fear of failure in countries that have two or a higher number of programs available to 15-year-old students. Results of Models 4A, 4B, and 4C show that levels of economic development are positively associated with females' fear of failure but not with males' fear of failure: in more economically developed countries female students report higher levels of fear of failure and therefore in such countries the gender gap in fear of failure is more pronounced.

Results reported in Model 5 indicate that estimated associations remain similar when we include all factors concomitantly. Moreover, a comparison of the variance components reported in Model 1 and Model 5 reveals that considering gender specificities in associations between individual, school and country-level factors and fear of failure explains a large part of the between-country variation in fear of failure and the between-country differences of gender gaps in levels of fear of failure.

Table 3

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5. Discussion and Conclusions

Our results reveal that 15-year-old female students report considerably higher levels of fear of failure than 15-year-old male students. Crucially, high-achieving female students appear to be especially susceptible to fearing failure. Moreover, being among high-achieving peers is associated with higher levels of fear of failure among female students but not among male students. We also find that while female students generally report greater fear of failure, the gender gap varies across countries. Level of economic development, societal-level gender inequality and the number of educational programmes available to 15-year-old students shape how wide the gender gap in a country is. Other things being equal, the gender gap is larger in more prosperous countries and is more pronounced in countries with less gender equality. By contrast, it is smaller in education systems with several educational programmes available to 15-year-olds. Early tracking and the presence of national examinations are not associated with how large the gender gap is in a country.

While prior empirical research shows that gender inequalities in educational achievement are smaller in countries that have less differentiated education systems (Hadjar & Buchmann, 2016), our findings show that gender inequalities in fear of failure are larger in countries that have such systems. This suggests that researchers need to examine a broad variety of aspects of education at different stages of education to advance our understanding of gender inequalities in education and their systematic variations in related to structure of education systems.

We find greater prevalence of fear of failure among high-achieving females students attending school with high-achieving peers in prosperous and more gender equal societies. This finding could help to explain why females remain underrepresented in certain occupations even in contexts that have social norms and legislation that promote gender equity and are designed to promote the full participation of women in the economy and in the social and political sphere. For

example, Nordic European countries have high levels of gender equity, high levels of prosperity and levels of achievement are high, especially among girls. However, in these countries, few women pursue careers in science, technology, engineering and mathematics (STEM) fields, occupations that are associated with high labour market returns (Greenwood, Harrison, & Vignoles, 2011).

It has been suggested that such underrepresentation in 'favourable' conditions may mean that females in such contexts are free to express their true, underlying preferences and that their preferences may not be in line with pursuing occupations that maximise labour market returns (Falk & Hermle, 2018; Stoet & Geary, 2018). Our study suggests that other factors may be at play. Females in favourable contexts may be more ambitious than females in less favourable contexts but may also be more likely internalise failure because they would not be in a position to attribute failure to external constraints. Moreover, females are generally aware of gender stereotypes on the masculine or feminine nature of certain educational and career paths, or certain attributes that are necessary to succeed in certain occupations. Failure in more equal contexts might be perceived as especially shameful by females because it might be experienced by individual females as not living up to the ideal of female empowerment and lending support to those who endorse gender stereotypes. In contexts with greater gender equality females may also particularly value proving such stereotypes wrong and consider their individual success as a valuable contribution to breaking down remaining stereotypes. However, the high value placed on success may also increase feelings of shame associated in failure and ultimately lead them to avoid educational and career paths in which failure is possible. By contrast, among male students, failure may simply be perceived as one of the possible outcomes in a risky and uncertain world.

In addition to student gender, our study found that several individual background characteristics are associated with students' fear of failure. In particular, when students believe

that intelligence is fixed they are more likely to fear failure than students who have a growth mindset. While research has examined in detail the achievement and well-being outcomes associated with adopting a growth mindset (Dweck, 2006), this result contributes to build evidence on how beliefs about the nature of intelligence are related with motivational factors and other educationally relevant outcomes.

Fear of failing can motivate students to put a higher effort in their work and lead to better academic results. However, excessive levels of fear of failure can lead students to avoid challenging tasks and situations that are essential for their academic and personal growth. Teachers and educators could reduce fear of failure or help reduce its negative effects by setting ambitious and challenging yet reasonable goals for their students and helping their students set such goals for themselves. Working towards goals that require efforts to be achieved - but that are achievable - can help building self-confidence. Having confidence is crucial because students are to be able not to fear failure and teenage girls generally have lower levels of self-confidence than teenage boys (OECD, 2015). Teachers and educators could also help students in general, and female students in particular, experience failure in ways that are not perceived as shameful, thus removing the stigma that is often associated with failing. Learning to learn from mistakes and failure is crucial if students are to thrive in the future. Teachers and educators can guide students consider failure as valuable learning opportunities. For example, they could help reduce feelings of shame and embarrassment by sharing details of instances in which they failed, how they overcame their own failure and what lessons they learnt from it. They could also highlight how individuals have a tendency to create coherent narratives when recounting people's life stories, forgetting the many failures highly successful individuals encountered along the way and only considering their successes (Sapolsky, 2017). Teachers and educators could help students recognise such cognitive bias and highlight the pervasiveness of the experience of failure among

highly successful individuals, thus reducing the extent to which failure is perceived as shameful or embarrassing. Our work indicates that reducing fear of failure among female students is especially important because they generally experience greater fear of failure in adolescence than male students, particularly in countries where differences in the economic and political participation of men and women are largest.

5.1. Limitations

Our results suffer from some limitations. First, we rely on cross-sectional data and therefore cannot establish causal relations. Second, our results reflect the perceptions of 15-year-olds who are in school. While we account for differences across countries in the extent to which PISA samples represent the overall population of 15-year-olds in different countries, it is possible that the attitudes of non-schooled populations may be different. Finally, our study identifies gender differences in fear of failure among 15-year-old students and therefore may not reflect how it differs among younger children or among older adults. Examining fear of failure and its evolution among males and females at different age groups and in different context could help identify the impact fear of failure has on gender disparities in well-being and life chances.

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Table 1. Results of regression model estimates: Gender gap in fear of failure, by country

Country	Model 1 Girls (β)	SE		Model 2 Girls (β)	SE	
Argentina	0.210	(0.025)	*	0.222	(0.028)	*
Australia	0.441	(0.018)	*	0.414	(0.017)	*
Belarus	0.325	(0.021)	*	0.337	(0.023)	*
Belgium	0.402	(0.027)	*	0.400	(0.027)	*
Brazil	0.261	(0.027)	*	0.248	(0.027)	*
Brunei Darussalam	0.290	(0.025)	*	0.258	(0.027)	*
Bulgaria	0.198	(0.031)	*	0.211	(0.031)	*
Canada	0.528	(0.020)	*	0.512	(0.021)	*
Chile	0.205	(0.028)	*	0.222	(0.028)	*
Colombia	0.160	(0.028)	*	0.155	(0.028)	*
Costa Rica	0.184	(0.025)	*	0.177	(0.025)	*
Croatia	0.292	(0.024)	*	0.262	(0.024)	*
Czech Republic	0.379	(0.027)	*	0.370	(0.029)	*
Denmark	0.568	(0.028)	*	0.581	(0.028)	*
Dominican Republic	0.072	(0.037)	*	0.059	(0.039)	
Estonia	0.449	(0.029)	*	0.438	(0.030)	*
Finland	0.539	(0.026)	*	0.490	(0.025)	*
France	0.476	(0.033)	*	0.469	(0.032)	*
Georgia	0.118	(0.026)	*	0.133	(0.028)	*
Germany	0.423	(0.032)	*	0.410	(0.032)	*
Greece	0.326	(0.025)	*	0.326	(0.026)	*
Hungary	0.469	(0.025)	*	0.467	(0.027)	*
Iceland	0.626	(0.038)	*	0.619	(0.037)	*
Indonesia	0.093	(0.027)	*	0.084	(0.027)	*
Ireland	0.492	(0.026)	*	0.461	(0.027)	*
Italy	0.380	(0.028)	*	0.349	(0.029)	*
Japan	0.245	(0.026)	*	0.234	(0.026)	*
Kazakhstan	0.133	(0.018)	*	0.132	(0.018)	*
Korea	0.356	(0.030)	*	0.315	(0.028)	*
Latvia	0.402	(0.025)	*	0.380	(0.024)	*
Lebanon	0.045	(0.033)		0.035	(0.039)	
Lithuania	0.416	(0.027)	*	0.414	(0.026)	*
Luxembourg	0.439	(0.031)	*	0.447	(0.032)	*
Malta	0.375	(0.033)	*	0.332	(0.035)	*
Mexico	0.059	(0.029)	*	0.057	(0.029)	
Moldova	0.284	(0.026)	*	0.304	(0.025)	*
Montenegro	0.010	(0.028)		0.021	(0.028)	
Netherlands	0.504	(0.030)	*	0.485	(0.031)	*

New Zealand	0.487	(0.027)	*	0.456	(0.028)	*
North Macedonia	0.106	(0.033)	*	0.137	(0.037)	*
Panama	-0.029	(0.037)		-0.003	(0.037)	
Peru	0.057	(0.024)	*	0.050	(0.025)	*
Philippines	0.167	(0.022)	*	0.140	(0.024)	*
Poland	0.426	(0.031)	*	0.413	(0.032)	*
Portugal	0.410	(0.030)	*	0.411	(0.029)	*
Qatar	0.029	(0.020)		0.049	(0.021)	*
Romania	0.262	(0.030)	*	0.238	(0.032)	*
Singapore	0.378	(0.024)	*	0.363	(0.024)	*
Slovak Republic	0.289	(0.031)	*	0.245	(0.040)	*
Slovenia	0.473	(0.028)	*	0.446	(0.030)	*
Sweden	0.545	(0.035)	*	0.562	(0.034)	*
Switzerland	0.362	(0.033)	*	0.346	(0.035)	*
Thailand	0.146	(0.029)	*	0.111	(0.028)	*
Turkey	0.174	(0.030)	*	0.189	(0.031)	*
Ukraine	0.261	(0.022)	*	0.251	(0.023)	*
United Arab Emirates	0.116	(0.027)	*	0.110	(0.025)	*
United Kingdom	0.564	(0.026)	*	0.545	(0.026)	*
United States	0.419	(0.040)	*	0.403	(0.040)	*
Uruguay	0.119	(0.035)	*	0.134	(0.037)	*

*$p \leq .05$

Note. Model 1 includes only a student gender. Model 2 includes all the student- and school-level controls, including ESCS, immigrant status, language spoken at home, a growth mindset, reading performance, program orientation, urbanicity, and school mean ESCS.

Table 2. Between-country variation in the gender gap in fear of failure and societal level gender inequality

	Model 1			Model 2			Model 3		
	β	SE		β	SE		β	SE	
Intercept	-0.070	(0.030)	*	-0.065	(0.030)	*	-0.069	(0.027)	*
Individual level:									
Female	0.304	(0.020)	***	0.293	(0.015)	***	0.305	(0.012)	***
ESCS	0.001	(0.003)		0.000	(0.003)		0.001	(0.003)	
Immigrant status	-0.003	(0.010)		-0.002	(0.010)		-0.002	(0.010)	
Language Spoken at home	-0.008	(0.009)		-0.008	(0.009)		-0.008	(0.009)	
Growth mindset	-0.247	(0.011)	***	-0.249	(0.011)	***	-0.247	(0.011)	***
Reading scores	0.064	(0.008)	***	0.034	(0.007)	***	0.064	(0.008)	***
Female * Reading scores				0.067	(0.007)	***			
School level:									
Program orientation: (pre)vocational	-0.006	(0.010)		-0.007	(0.010)		-0.005	(0.010)	
Urban	0.011	(0.007)		0.012	(0.007)	†	0.011	(0.007)	
School mean ESCS	0.038	(0.009)	***	0.036	(0.009)	***	0.038	(0.009)	***
School mean reading scores	0.001	(0.006)		-0.012	(0.007)	†	0.001	(0.006)	
Female * School mean reading				0.034	(0.007)	***			
Country level:									
PISA sample selectivity	-0.270	(0.269)		-0.280	(0.259)		0.272	(0.311)	
Ln of GDP per capita	0.106	(0.050)	*	0.105	(0.049)	*	0.147	(0.053)	**
GII							1.139	(0.319)	***
Cross-level interaction:									
Female * GDP							0.063	(0.036)	†
Female * GII							-0.640	(0.155)	***
Number of countries	59			59			59		
Number of schools	16,582			16,582			16,582		
Number of students	517,047			517,047			517,047		
Variance components									
Level 3 intercept	0.040	***		0.037	***		0.031	***	
Level 3 gender slope	0.021	***		0.011	***		0.008	***	

***$p \leqslant .001$, ** $p \leqslant .01$, *$p \leqslant .05$, †$p \leqslant .10$
Source: PISA2018 Database. Results from three level HLM models.

Table 3. Between-country variation in the gender gap in fear of failure and educational system characteristics

	Model 4A			Model 4B			Model 4C			Model 5		
	β	SE		β	SE		β	SE		β	SE	
Intercept	-0.057	(0.045)		-0.037	(0.034)		-0.043	(0.063)		0.008	(0.043)	
Individual level:												
Female	0.314	(0.022)	***	0.319	(0.021)	***	0.415	(0.027)	***	0.373	(0.028)	***
ESCS	0.001	(0.003)		0.001	(0.003)		0.001	(0.003)		0.000	(0.003)	
Immigrant status	-0.003	(0.010)		-0.003	(0.010)		-0.003	(0.010)		-0.002	(0.010)	
Language Spoken at home	-0.008	(0.009)		-0.008	(0.009)		-0.008	(0.009)		-0.008	(0.009)	
Growth mindset	-0.247	(0.011)	***	-0.247	(0.011)	***	-0.247	(0.011)	***	-0.249	(0.011)	***
Reading scores	0.064	(0.008)	***	0.064	(0.008)	***	0.064	(0.008)	***	0.034	(0.007)	***
Female * Reading scores										0.067	(0.007)	***
School level:												
Program orientation: (pre)vocational	-0.006	(0.010)		-0.006	(0.010)		-0.006	(0.010)		-0.006	(0.010)	
Urban	0.011	(0.007)		0.011	(0.007)		0.011	(0.007)		0.012	(0.007)	
School mean ESCS	0.038	(0.009)	***	0.038	(0.009)	***	0.038	(0.009)	***	0.036	(0.009)	***
School mean reading scores	0.000	(0.006)		0.001	(0.006)		0.001	(0.006)		-0.011	(0.007)	
Female * School mean reading										0.031	(0.007)	***
Country level:												
PISA sample selectivity	-0.241	(0.261)		-0.168	(0.271)		0.003	(0.247)		0.676	(0.320)	*
Ln of GDP per capita	0.026	(0.048)		0.031	(0.047)		0.013	(0.051)		0.170	(0.055)	**
GII										1.220	(0.324)	***
Central exam	-0.026	(0.053)								-0.063	(0.050)	
Early tracking (14 yrs or below)				-0.093	(0.055)	†				-0.130	(0.054)	*
Number of programs (ref: one)												
2							-0.059	(0.109)		-0.099	(0.088)	
3							-0.005	(0.075)		0.037	(0.065)	
4							-0.028	(0.098)		0.043	(0.086)	
5 or higher							-0.123	(0.110)		-0.039	(0.079)	
Cross-level interaction:												

Female * GDP	0.152	(0.028)	***	0.155	(0.029)	***	0.125	(0.027)	***	0.024	(0.022)	
Female * GII										-0.375	(0.105)	***
Female * central exam	-0.012	(0.030)								0.004	(0.020)	
Female * early tracking				-0.029	(0.029)					0.025	(0.027)	
Female * number of programs												
*2							-0.093	(0.048)	†	-0.066	(0.033)	*
*3							-0.142	(0.039)	***	-0.109	(0.032)	***
*4							-0.106	(0.037)	**	-0.090	(0.039)	*
*5 or higher							-0.177	(0.047)	***	-0.178	(0.049)	***
Number of countries	59			59			59			59		
Number of schools	16,582			16,582			16,582			16,582		
Number of students	517,047			517,047			517,047			517,047		
Variance components												
Level 3 intercept	0.037	***		0.036	***		0.037	***		0.026	***	
Level 3 gender slope	0.012	***		0.012	***		0.009	***		0.005	***	

***$p \leq .001$, ** $p \leq .01$, *$p \leq .05$, †$p \leq .10$
Source: PISA2018 Database. Results from three level HLM models