Willingness to compete in childhood, school preferences, and job aspirations

Ernesto Reuben
New York University Abu Dhabi and Center for Behavioral Institutional Design, e-mail: ereuben@nyu.edu

Alena Tsiulya
Heinrich-Heine-Universität Düsseldorf, e-mail: tsiulya@dice.hhu.de

Abstract

We study whether the willingness to compete is associated with children's school preferences and job aspirations long before they make any educational or occupational choices. In a classroom experiment with over 1,000 children aged 7 to 8, children chose whether to compete in an incentivized task and reported how much they like school and what job they want when they grow up. We characterize their aspired occupations using ratings from an independent sample of adults. Children who choose to compete like school more. They also aspire to occupations where being competitive is more important for success. This association is specific to competition. It does not extend to the importance of being risk-tolerant, intelligent, or generous, nor to the importance of math, and it is weak for status. Unlike in older samples, boys and girls choose to compete at similar rates, even though girls already like math less. Hence, the gender gap in math precedes any gender gap in the willingness to compete.

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1. Introduction

Since the seminal work of Niederle and Vesterlund (2007), a large body of research has studied individual differences in the willingness to compete.[1] An important reason for this interest is that the willingness to compete predicts choices that shape people's education and careers. Adolescents who choose to compete are more likely to pursue prestigious and math-intensive study profiles (Buser et al., 2014). Adults who choose to compete earn higher incomes and are more likely to hold high-level positions (Buser et al., 2026). Business school graduates who choose to compete earn more at graduation (Reuben et al., 2024).[2] However, these choices are the endpoint of a long process. Children develop preferences for school subjects and aspirations about their future occupations long before they make any choices. These early preferences and aspirations matter. Interest in a subject predicts later course and track choices (Simpkins et al., 2006), and most scientists report that their interest in science began before middle school (Maltese and Tai, 2010). Children begin to rule out occupations that do not fit their gender as early as ages 6 to 8 (Gottfredson, 1981), and aspirations in adolescence predict educational and occupational attainment (Beal and Crockett, 2010; Schoon and Polek, 2011). Existing studies show that the willingness to compete predicts choices at the time they are made. They do not tell us whether it is already associated with the preferences and aspirations that precede these choices.

This question is difficult to answer using data on adolescents and adults. By the time they make educational choices, students have spent many years in school. During these years, they receive grades and other feedback on how they compare with their classmates. These experiences shape students' confidence and their later educational choices (Elsner and Isphording, 2017; Murphy and Weinhardt, 2020). They can also affect willingness to compete, for example, through winning or losing competitions (Buser and Yuan, 2019) or through peer influence (Shan and Zölitz, 2025). Hence, the association between willingness to compete and educational orientations may develop over the school years. Young children have had much less of this experience. In the schools we study, children aged 7 to 8 do not receive grades in the traditional sense. Instead, parents receive reports that indicate whether their child's progress is below, in line with, or above expectations. By studying children at this age, we can see whether willingness to compete is associated with educational and occupational orientations early in life, before children make choices and before they accumulate years of school evaluations. The answer is not obvious. Young children might not understand the trade-offs involved in the

[1] For surveys of this literature, see Niederle and Vesterlund (2011), Lozano et al. (2023), and Buser (2026a).

[2] Among undergraduate students in the United States, willingness to compete is associated with higher expected earnings (Reuben et al., 2017) and, for women, with majoring in engineering or business (Kamas and Preston, 2018). Fallucchi et al. (2020) report that preferences for competition predict the choice to play professional sports. We discuss studies involving adolescents in more detail below.

decision to compete, and their aspirations change as they grow older (Chambers et al., 2018, 2020). Nevertheless, economic preferences measured with incentivized tasks in childhood and adolescence predict behavior outside the experiment (Castillo et al., 2011; Sutter et al., 2013; Breitkopf et al., 2024).

In this paper, we study whether children's willingness to compete at ages 7 to 8 is associated with how much they like school and individual school subjects, and with the occupations they aspire to. We conducted a classroom experiment with over 1,000 children in the second and third grades of primary schools in Abu Dhabi. To measure willingness to compete, we adapted the design of Niederle and Vesterlund (2007) for children's age. Children had two minutes to solve simple sums. Before starting, they chose to be paid for each correct sum or to compete against a randomly drawn classmate and be paid a higher amount per correct sum, but only if they won the competition. Children earned stars, which they exchanged for toys at the end of the session. We also measured the children's risk tolerance, their confidence in their relative performance, and their cognitive ability. In a questionnaire, children reported how much they like school, math, language, and art, and what job they would like to have when they grow up.

It is not straightforward to measure how competitive an occupation is. There are no commonly accepted measures of how competitive firms or industries are (Lozano et al., 2023). To characterize the occupations named by the children, we rely on adult raters. A simple approach would be to ask raters how important being competitive is for success in each occupation. However, the importance of competing depends on the broader context in which an occupation is practiced. It depends on the status of the position. For example, being competitive likely matters more for the head of a company than for a clerk in the same company. It also depends on the field. For example, being competitive likely matters more for a CEO than for a school principal. Consistent with this, fields differ in how strongly pay and promotions depend on performance, even for the same type of job. Among business school graduates, jobs in finance and consulting have stronger pay-for-performance and more often have up-or-out promotion systems than jobs in other industries (Reuben et al., 2024). Similarly, performance pay is much less common in the public sector than in the private sector, even among workers in the same occupation (Bryson et al., 2017). Hence, we proceed in two steps. First, raters assigned each occupation to a field, such as business, education, or healthcare, and indicated whether it is a high-status job within that field. Second, raters rated how important being competitive is for success in each combination of field and status. Combining the two steps gives us a measure of how important being competitive is for success in each of the children's aspired occupations. We obtain analogous measures for being risk-tolerant, intelligent, and generous, and, in a separate survey, for math. The first step also gives us a measure of each occupation's status. Status and the importance of being competitive are related but far from identical. Across the occupations in our analysis, their correlation is 0.54.

Our approach follows Buser et al. (2026). Whether the decision to compete reflects a preference for competition or other characteristics is debated (Gillen et al., 2019; van Veldhuizen, 2022; Buser and Oosterbeek, 2023; Lozano and Reuben, 2025; Buser, 2026a). We do not attempt to resolve this question. Following Buser (2026a), we simply refer to the choice to enter a competition as the willingness to compete. We ask whether the decision to compete is associated with children's school preferences and job aspirations. For each outcome, we first compare children who chose to compete with those who did not. We then control for performance, confidence, risk tolerance, and cognitive ability. This second comparison shows whether the association persists beyond these characteristics.

We begin by examining which children chose to compete. Overall, 72% of children chose to compete. Children who solved more sums, were more confident relative to their performance, and were more willing to take risks were more likely to compete. These determinants closely resemble those observed among adolescents and adults. Hence, children's decisions respond to their performance, beliefs, and risk attitudes as expected. Unlike in most studies with adolescents and adults (e.g., Niederle and Vesterlund, 2007; Buser et al., 2014), but consistent with several studies with young children (Samak, 2013; Andersen et al., 2013; Cárdenas et al., 2012; Khachatryan et al., 2015), boys and girls chose to compete at similar rates (74% and 71%, respectively).

We find that children who chose to compete like school more than those who did not. The difference equals 0.21 standard deviations. It barely changes when we control for performance, confidence, risk tolerance, and cognitive ability, and it is similar for boys and girls. There is also suggestive evidence that children who chose to compete like math more. However, this association is weaker and is not statistically significant once we add the controls. We find no association between the decision to compete and the liking of language or art.

We further find that children who chose to compete aspire to occupations in which being competitive is rated as more important for success. The difference equals 0.15 standard deviations of the rating across occupations. The difference remains statistically significant after adding controls and is similar for boys and girls. This association is specific to being competitive. Children who chose to compete do not aspire to occupations in which being risk-tolerant, intelligent, or generous is rated as more important. They also do not aspire to occupations in which math is rated as more important. Lastly, as one would expect, the association between the decision to compete and the status of the aspired occupation is positive, but it is weak.

These results speak to what the decision to compete captures. Buser et al. (2014) show that adolescents who are more willing to compete choose more prestigious study profiles. In their setting, however, the prestige of a study profile is perfectly correlated with its math intensity. Our occupation ratings allow us to separate the importance of being competitive from status and from the importance of math. In children's aspirations, the decision to compete is associated

with the importance of being competitive, but not with the importance of math and only weakly with status. Hence, it seems to reflect an orientation toward competition itself rather than toward prestige. The association with liking school in general is consistent with a broader interpretation, such as a willingness to take on challenges (Buser and Oosterbeek, 2023; Buser, 2026a). Our results also suggest that the use of a math task, as in most studies, is not what drives the decision to compete. Consistent with this, the gender gap in liking math does not go hand in hand with a gender gap in the willingness to compete. Girls already like math 0.30 standard deviations less than boys, even though boys and girls choose to compete at similar rates. Hence, the gender gap in math precedes any gender gap in the willingness to compete. This suggests that the gender gap in math among adolescents and adults is unlikely to stem from the gender gap in the willingness to compete.

Our paper contributes to several literatures. First, we contribute to the literature linking the willingness to compete to educational and labor market outcomes (e.g., Buser et al., 2014, 2026, for surveys, see Lozano et al. 2023; Buser 2026a). We provide evidence for children much younger than in previous studies and who have not yet made any educational or occupational choices. Hence, we show that the association is already present early in life, before children make any choices and before they accumulate years of school evaluations. Second, we contribute to the discussion of what the decision to compete captures (e.g., Gillen et al., 2019; van Veldhuizen, 2022; Lozano and Reuben, 2025). Rather than decomposing the decision itself, we use the characteristics of the occupations children aspire to. This allows us to distinguish an orientation toward competition from an orientation toward prestige or math. Third, we contribute to the literature on children's willingness to compete (Samak, 2013; Andersen et al., 2013; Cárdenas et al., 2012; Khachatryan et al., 2015; Sutter and Glätzle-Rützler, 2015; Sutter et al., 2016; Almås et al., 2016b). This literature has focused on gender differences and the role of family background. We show that, already at ages 7 to 8, the decision to compete is related to children's orientations toward school and work. Lastly, we contribute to the literatures on children's economic preferences (Castillo et al., 2011; Sutter et al., 2013; Breitkopf et al., 2024) and on the formation of children's aspirations (Gottfredson, 1981; Chambers et al., 2018).

Our paper most closely relates to studies linking adolescents' willingness to compete to their educational choices and occupational preferences. Several studies show that willingness to compete predicts secondary school students' study choices. In the Netherlands, adolescents who choose to compete are more likely to select prestigious and math-intensive study profiles (Buser et al., 2014). Similar results hold in Switzerland, both among high-ability students and across the entire ability distribution (Buser et al., 2017, 2022). In rural China, middle school students who are more willing to compete are more likely to take a demanding high school entrance exam (Zhang, 2013). However, these associations are not found in all samples. Among Norwegian ninth graders, willingness to compete is only weakly associated with choosing the academic track

(Almås et al., 2016a). Two studies relate willingness to compete to occupational preferences. Almås et al. (2016b) find that Norwegian adolescents aged 14 to 15 who chose to compete find occupations such as lawyer or stockbroker relatively more attractive, even when asked to assume that all occupations pay the same. Klinowski and Niederle (2026) use data on 15-year-olds in 77 countries from PISA 2018. They find that a self-reported measure of competitiveness is associated with interest in high-paying occupations, the status of the occupations students expect to have, and math test scores. Our study differs from these papers in three ways. First, the children in our study are much younger. At ages 7 to 8, they are years away from making any educational or occupational choices and have little experience with school evaluations. Second, unlike Klinowski and Niederle (2026), we measure willingness to compete with an incentivized choice. Hence, we relate self-reported attitudes toward school and occupational aspirations to observed behavior rather than to other self-reported measures. This distinction matters because associations found between self-reported measures do not necessarily carry over to incentivized behavior (Chapman et al., 2026). Third, we use an independent sample of adults to rate the aspired occupations on the importance of being competitive, the importance of math, and occupational status. These ratings allow us to distinguish the importance of being competitive from the other two characteristics. By contrast, status and math intensity cannot be separated in Buser et al. (2014), and Almås et al. (2016b) rely on their own classification of occupations as competitive.

The rest of the paper is organized as follows. In Section 2, we describe the study design. In Section 3, we present descriptive statistics. In Section 4, we present our results. Finally, we conclude in Section 5.

2. Study Design

We rely on two data sources: a classroom experiment with school-age children involving a few incentivized tasks and a questionnaire, and an incentivized online survey of adult respondents, which we use to characterize the occupations children aspire to. For each, we first describe the measures we use and then the sample and procedures.

2.1. Classroom experiment

The experiment included two incentivized tasks, a brief cognitive-ability test, and a questionnaire. We provide the instructions for these tasks in Appendix A.[3] We describe them in the

[3]The experiment was part of a larger project on the transmission of attitudes and traits from parents to children, which also included an online survey of the children's parents and additional tasks for the children. The project was preregistered on the Open Science Framework before data collection began (https://osf.io/m69cv) and was approved by the Institutional Review Board of New York University Abu Dhabi (#HRPP-2023-87), the Abu Dhabi Department of Education and Knowledge (ADEK), and the Emirates Schools Establishment (ESE). It

order in which they enter our analysis.

Incentivized tasks and cognitive ability

In both incentivized tasks, children earned stars depending on their choices and performance, which they exchanged for toys at the end of the session. Before each task, children watched an instructional video and then answered a set of control questions to ensure they understood the instructions.

Willingness to compete. To measure children's willingness to compete, we use a variation of the design used by Niederle and Vesterlund (2007), adapted to be age-appropriate. Children had two minutes to solve up to 12 sums. The sums increased in difficulty, from sums of two one-digit numbers to sums of two two-digit numbers. Before starting, each child chose to be paid under one of two payment schemes, labeled *Compete* and *Not compete*. Under *Not compete*, children earned one star for each problem solved correctly. Under *Compete*, each child's performance was compared to that of a randomly drawn classmate, irrespective of the payment scheme the classmate chose. Children who solved more problems than this classmate earned two stars for each problem solved correctly, while the rest earned no stars. Ties were broken randomly. Hence, a risk-neutral child who expects to solve more problems than a random classmate with a probability above one-half earns more stars in expectation by choosing *Compete*. The variable *compete* is a dummy variable equal to one if a child chooses *Compete*. Children were told their performance and whether they won the competition at the end of the experiment.

Unlike in Niederle and Vesterlund (2007), children did not first perform the task under each payment scheme before choosing. Instead, as in Gneezy et al. (2009) and Andersen et al. (2013), children chose their payment scheme and then performed the task under that scheme. We made this simplification to keep the task short enough for young children's attention spans and to avoid fatigue.

As is common in this literature, we also measure children's performance and their beliefs about their relative performance. The variable *performance* is the number of problems a child solved correctly (0 to 12). Immediately after the task, we elicited children's beliefs about their relative performance by asking them, "How many sums do you think you solved correctly compared to your classmates?" Children answered by marking a point on an arrow that ranged from "The worst result – fewer sums" to "The best result – most sums." This question was not incentivized. The variable *confidence* codes the mark's position on a continuous scale from -1 (the worst result) to 1 (the best result).

was funded by the Abu Dhabi Early Childhood Authority. The preregistration covers the data collection but not the analyses in this paper. In this paper, we use only the parts of the data collection described in this section. The remaining parts of the project are available in the online repository.

Willingness to take risks. To measure children's risk attitudes, we use a variation of the task developed by Alan et al. (2017). Each child received four sticky stars and decided how many to place in a circle and how many in a square. Stars placed in the circle were safe. Stars placed in the square doubled if a spinning wheel landed on green and were lost if it landed on red, each with a 50% probability. The wheel was spun once per class at the end of the session. Compared with Alan et al. (2017), we used a circle and a square instead of a bowl, and a spinning wheel instead of drawing a colored ball from a bag. We made these changes for practical reasons. The variable *risk tolerance* is the number of stars placed in the square (0 to 4), with higher values indicating greater willingness to take risks.

Cognitive ability. To measure cognitive ability, children completed ten items from Raven's Progressive Matrices (Raven, 1938; Raven and Raven, 2003). Each item presents a geometric pattern with a missing piece, and children select the piece that completes the pattern from several options. Given the children's age, we used only the ten easiest matrices and did not time the test. We define the variable *cognitive ability* as the number of correctly completed matrices (0 to 10). We include cognitive ability as a control because it is related to how well participants understand incentivized decisions and to the amount of noise in their choices (Andersson et al., 2016), which can be a particular concern with young children.

Questionnaire

Liking of school subjects. We asked children how much they liked school ("Do you like school?") and, in a separate question, how much they liked math, language, and art.[4] Children answered on a five-point scale, with labels: "I don't like it at all," "I don't like it," "It's okay," "I like it," and "I like it a lot." We coded answers from 1 to 5, with higher values indicating greater liking.

Job aspirations. We asked children, "What job would you like to have when you grow up?" and had them write their answer in an empty box. Research assistants helped children who had difficulty spelling their answers. Before analyzing the responses, we grouped entries that referred to the same occupation but differed in spelling or wording. For example, "footballer," "football player," "soccer player," and "player just like Messi" were all grouped as footballer. When a child listed more than one occupation, we used the first. This procedure yielded 184 distinct occupations, which we subsequently characterized using the Occupation Ratings Survey described below.

Sample and procedures

Abu Dhabi has a highly diverse population, with expatriates making up more than 80% of residents. This diversity is reflected in the school system, where schools follow a range of

[4]The language subject was English in the English booklets and Arabic in the Arabic booklets.

national and international curricula. British and American curricula are particularly common, while some public schools follow an Arabic curriculum.

To recruit schools, we compiled a list of public and private schools from the websites of the respective school authorities. In March and April 2024, we invited 118 schools for which contact information was available. Of these, 67 had valid contact information, 22 replied to our invitation, and 15 agreed to participate after we met with them to explain the study. Of these 15 schools, 3 are public and teach mostly in Arabic, while 12 are private and teach in English. Each school distributed a parental consent form through its usual communication channels (e.g., email or messaging applications), and only children with written parental consent took part in the study.[5] In total, 1,101 children took part in the study. Children in second and third grade are typically seven to eight years old.

We collected data between mid-May and June 2024 in the children's classrooms during regular school hours. We ran 50 sessions, with an average of 21.9 children per session. Sessions in different classrooms ran simultaneously. A research team of up to 20 people conducted the sessions, including 16 research assistants trained for this purpose. The class teacher or a teaching assistant was also present throughout. Sessions lasted between 90 and 120 minutes.

Children completed all parts of the study using paper and pencil in printed booklets, one for each part. To ensure all children received the same instructions, a prerecorded audio track with animations read the instructions and questions aloud. Children were asked not to talk to each other, not to read their answers aloud, and to turn the page only when instructed, so the whole class progressed at the same pace. The session consisted of three parts. Children first completed the questionnaire, then the cognitive ability test, and finally the incentivized tasks: the competition task followed by the risk-taking task.[6]

Children did not receive any feedback about their performance or the outcome of the tasks until the end of the session. At that point, they exchanged the stars they had earned for toys, with more stars allowing them to choose more valuable toys. The toys ranged in value from approximately \$1 to \$25. Additional details about the experiment's procedures are provided in Appendix A.

[5]Children without parental consent took part in an alternative activity organized by the school. In addition to parental consent, all participating children gave their assent at the beginning of the session by raising their hand after being told that participation was voluntary.

[6]The incentivized tasks concluded with a third task designed to measure grit (Alan et al., 2019), which we do not use in this paper. Because it was conducted after the competition and risk-taking tasks, it could not affect the children's choices in them. Also, as part of the broader project, sessions were randomly assigned to a condition in which children were reminded before each incentivized task that their parents could be informed of their choices. In Appendix C, we show that our results are qualitatively and quantitatively unchanged when we control for this condition.

2.2. Occupation ratings survey

To characterize the occupations children aspire to, we conducted an online survey with adult respondents.[7] We designed and ran this survey after the data collection with children, and it was not preregistered. We use the survey results to characterize each occupation on two factors: its perceived status and the importance of various individual traits, such as being competitive, for success.

Two features of the design warrant explanation. First, rather than asking respondents to rate each occupation directly, we asked them to classify occupations into broad occupational categories. We then asked them to rate the importance of various traits for success within each category. We use this procedure because we view competition as a characteristic of a field of work as a whole, stemming from how the field is organized and how people advance in it, rather than as a characteristic of a specific job or employer. A child who wants to be a football player and one who wants to be a tennis player both aspire to a career in which success depends on outperforming others. Classifying occupations into categories also has two practical advantages. Some of the children's answers are vague or idiosyncratic, making it easier for respondents to say which field such an answer belongs to than to judge it directly. In addition, it reduces the number of items respondents need to rate from 184 occupations to 22 category-status combinations. This allows each combination to be rated by the full sample of respondents rather than a subset.

Second, we distinguish between high-status and non-high-status jobs within each occupational category. Competition is not equally important at all levels within a field: in a hierarchy, higher positions are attained by outperforming others and carry larger rewards (Lazear and Rosen, 1981; Rosen, 1986). Moreover, the link between willingness to compete and career choices is closely tied to prestige. Buser et al. (2014) show that high school students who are more willing to compete choose more prestigious study profiles, and Buser et al. (2026) show that adults who are more willing to compete are more likely to hold higher-ranking positions. Therefore, asking respondents about status lets us capture differences in the importance of individual traits within categories and to construct a separate measure of the status of children's job aspirations.

Characterizing occupations

In the first part of the survey, respondents were told that more than 1,000 children ages 7 to 8 had been asked what job they would like to have when they grow up. Respondents saw 20 of these jobs. Their task was to assign each job to the most appropriate occupational category. The 20 jobs each respondent saw were randomly drawn from the 184 occupations named by

[7]The survey was approved by the Institutional Review Board and the Social Science Experimental Laboratory of New York University Abu Dhabi (#HRPP-2020-37).

the children. On average, 28 respondents classified each occupation. For each occupation, respondents first chose one of 11 occupational categories (see Table B1 in Appendix B). If they were unsure or could not make a reasonable guess, they could answer "I don't know." Respondents were also asked to indicate the social status of the occupation within the category they chose. The possible answers were "A high status job," "Not a high status job," and "I don't know."

In the second part of the survey, respondents were told that certain traits may confer advantages or disadvantages when pursuing success in different occupations. The traits were being competitive, intelligent, generous, and risk tolerant. Their task was to evaluate how important each trait is for success in each of the 11 occupational categories. For each category, respondents evaluated high-status and non-high-status jobs separately. For example, one question asked: "Consider high-status jobs within the category Business, Management and Entrepreneurship Occupations, how important for success is being:" Respondents then rated each of the four traits on a five-point scale ranging from "Not at all important" (1) to "Extremely important" (5). In total, each respondent gave 88 ratings: 4 traits for 2 status levels in each of the 11 categories.

We combine the two parts to construct occupation-level measures. For each occupation, we calculate the share of respondents who assign it to each category-status combination, excluding those who answered "I don't know" to either the category or the status question. The variable *job competition* is the average importance of being competitive across category-status combinations, weighted by these shares. Hence, occupations that respondents place in categories where being competitive is considered important receive a higher score, ranging from 1 to 5. We construct analogous scores for intelligence, generosity, and risk tolerance. Finally, the variable *job status* is the percentage of respondents who classify the occupation as high status. We describe the construction of these measures in detail in Appendix B.

Sample and procedures

We recruited respondents through Prolific in March 2025. The sample consists of 249 respondents from the United States and the United Kingdom, with an average age of 39 years and roughly equal numbers of men and women.[8] The survey took about 15 minutes, and respondents received a fixed payment of £2.

Because neither part of the survey has objectively correct answers, we incentivized respondents with a coordination game (as introduced by Krupka and Weber (2013) to elicit social norms).

[8]Although our respondents do not reside in Abu Dhabi, we believe their perceptions of the occupations named by the children are reasonable. Abu Dhabi is highly international, and many of its schools follow British or American curricula. The vast majority of occupations named by children are widely recognized (e.g., doctor, teacher, engineer, or police officer). For the few occupations specific to the local context, such as working for ADNOC, the national oil company, we provided respondents with a short description.

Coordinating on the most common answer incentivizes respondents to report what they believe is the shared perception of an occupation rather than an idiosyncratic view. In each part, one of a respondent's answers was randomly selected at the end of the study, and the respondent earned a bonus of £1 if it matched the most common answer among other respondents. Before starting the first part, respondents answered two comprehension questions about the task and the bonus. Respondents who failed to answer both questions correctly in two attempts were excluded from the study.

3. Descriptive Statistics

In this section, we describe children's choices in the incentivized tasks, their liking of school subjects, and their job aspirations. For each variable, we report the mean, standard deviation, and number of observations for the full sample and separately for boys and girls.[9] We also report p-values from tests of whether boys and girls differ. We obtain these p-values by regressing each variable on a dummy variable for girls, with school fixed effects and standard errors clustered at the school level. Because we have only 15 schools, we use the wild cluster bootstrap to compute the p-values (Cameron et al., 2008).[10]

3.1. Incentivized tasks

Of the 1,101 children in the sample, 8 did not make a valid choice in the competition task. We exclude them from the analysis. Hence, our sample consists of 1,093 children: 542 boys and 551 girls. Another 23 children did not give a valid answer to the confidence question. We have 1,070 observations for this variable. Panel A of Table 1 shows the descriptive statistics for the incentivized tasks and cognitive ability.

Children often chose to compete. Overall, 72% of children chose *Compete*. The high rate of competition entry is notable. By design, the average child has a one-half chance of solving more sums than a randomly selected classmate. A risk-neutral child should choose to compete only if their chance of winning exceeds one-half. Hence, many children chose to compete even though they were more likely to lose than to win.

Boys and girls chose to compete at similar rates. Overall, 74% of boys and 71% of girls chose *Compete* ($p = 0.210$). The absence of a gender gap aligns with several studies of young children. Samak (2013) finds no gender gap in competition entry among preschool children in the United States. Andersen et al. (2013) find no gender gap among children aged 7 to 12 in India. In

[9] In the questionnaire, we also asked children for a few background characteristics, including whether their mother and father attended university and how many brothers and sisters they have. We use these variables as additional controls in Appendix C. The results are robust to including these controls.

[10] We use the restricted wild cluster bootstrap with Webb weights and 99,999 replications (Roodman et al., 2019).

Table 1. Summary statistics

	All			Boys			Girls			
	Mean	SD	N	Mean	SD	N	Mean	SD	N	p-value
Panel A. Incentivized tasks and cognitive ability										
Compete	0.72	0.45	1093	0.74	0.44	542	0.71	0.46	551	0.210
Performance	7.46	2.86	1093	7.86	2.94	542	7.06	2.73	551	0.001
Confidence	0.49	0.61	1070	0.55	0.60	527	0.44	0.61	543	0.001
Risk tolerance	1.41	0.87	1093	1.48	0.85	542	1.35	0.89	551	0.076
Cognitive ability	7.10	1.79	1093	7.05	1.92	542	7.15	1.65	551	0.022
Panel B. Liking of school subjects										
School	4.38	0.93	1077	4.22	1.06	532	4.54	0.75	545	<0.001
Math	4.23	1.02	1077	4.39	0.95	532	4.08	1.06	545	<0.001
Language	4.15	1.00	1077	3.99	1.07	532	4.31	0.90	545	<0.001
Art	4.68	0.73	1077	4.55	0.87	532	4.81	0.53	545	<0.001

Notes: This table reports means, standard deviations, and the number of observations for the full sample and by gender. Panel A includes the 1,093 children who made a valid choice in the competition task. *Compete* is a dummy variable equal to one if the child chose to compete. *Performance* is the number of sums solved correctly (0 to 12). *Confidence* is the child's belief about their performance relative to their classmates (−1 to 1). *Risk tolerance* is the number of stars placed in the risky option (0 to 4). *Cognitive ability* is the number of Raven matrices completed correctly (0 to 10). Panel B includes the 1,077 children who answered all four liking questions. Liking is measured on a five-point scale from "I don't like it at all" (1) to "I like it a lot" (5). The rightmost column displays p-values from a regression of each variable on a dummy variable for girls, with school fixed effects. The p-values are computed using the wild cluster bootstrap, clustering at the school level (Webb weights, 99,999 replications).

their patriarchal society, a gap emerges only around puberty. Cárdenas et al. (2012) finds no gender gap among children aged 9 to 12 in Colombia, and Khachatryan et al. (2015) finds no gender gap among children aged 7 to 16 in Armenia. Other studies, however, find that boys are more willing to compete than girls even at young ages (Sutter and Glätzle-Rützler, 2015; Sutter et al., 2016).

On average, children solved 7.46 of the 12 sums. Boys solved 0.80 more sums than girls ($p = 0.001$). Children were also optimistic about their relative performance. On a scale from −1 to 1, where 0 corresponds to the middle of the class, average confidence was 0.49. Boys were more confident than girls (0.55 versus 0.44, $p = 0.001$). In the risk task, children placed an average of 1.41 of their 4 stars in the risky square. Boys placed slightly more stars in the square than girls (1.48 versus 1.35). This difference is marginally significant ($p = 0.076$). Lastly, girls completed slightly more Raven matrices than boys (7.15 versus 7.05, $p = 0.022$).

Overall, boys were more confident than girls and somewhat more willing to take risks. These gender differences are common in the literature (Croson and Gneezy, 2009; Niederle and Vester-

lund, 2011). Boys also solved more sums than girls. This difference is less typical. For example, Niederle and Vesterlund (2007) find no gender difference in performance in a similar addition task among adults. However, a gender gap in math performance that favors boys emerges early in primary school (Martinot et al., 2025). Despite these differences, and unlike in many studies with adolescents and adults, boys and girls do not differ in their decision to compete.

3.2. Liking of school subjects

For the analysis of liking school, math, language, and art, we restrict the sample to the 1,077 children who answered all four questions. Panel B of Table 1 presents the descriptive statistics for this sample.

Children reported liking school and all three subjects. Average liking ranges from 4.15 for language to 4.68 for art on a scale from 1 to 5. Many children chose the highest answer, "I like it a lot." The share of children who chose this answer is 60% for school, 54% for math, 47% for language, and 79% for art.

Boys and girls differ in how much they like school and each subject. Girls liked school more than boys (4.54 versus 4.22). Girls also liked language (4.31 versus 3.99) and art (4.81 versus 4.55) more than boys. By contrast, boys liked math more than girls (4.39 versus 4.08). All four differences are statistically significant ($p < 0.001$) and are similar in magnitude. Measured in standard deviations, the gender differences range from 0.30 for math to 0.36 for art. The same pattern holds for the share of children who chose "I like it a lot." Among girls, this share is 67% for school, 46% for math, 54% for language, and 86% for art. Among boys, it is 53%, 62%, 40%, and 73%, respectively. These patterns are similar to those found among young children in other countries. In the United States, children in first and second grade already associate math with boys (Cvencek et al., 2011). Across countries, more boys than girls report liking math (Mullis et al., 2020).

3.3. Aspired occupations

We begin by describing how adult respondents rated the occupational categories. Figure 1 shows the average importance of each trait for success in each category. The left panel shows ratings for high-status jobs, and the right panel shows ratings for non-high-status jobs.

Respondents rated the importance of the traits very differently across categories. Respondents rated being competitive as most important in sports and fitness. It is also rated as very important in business and media. It is rated as least important in teaching and animal care. Being intelligent is rated as most important in STEM and in medical and healthcare occupations. Being generous is rated as more important in teaching and animal care than in most other categories. Being risk-tolerant follows a pattern similar to being competitive, but its ratings are

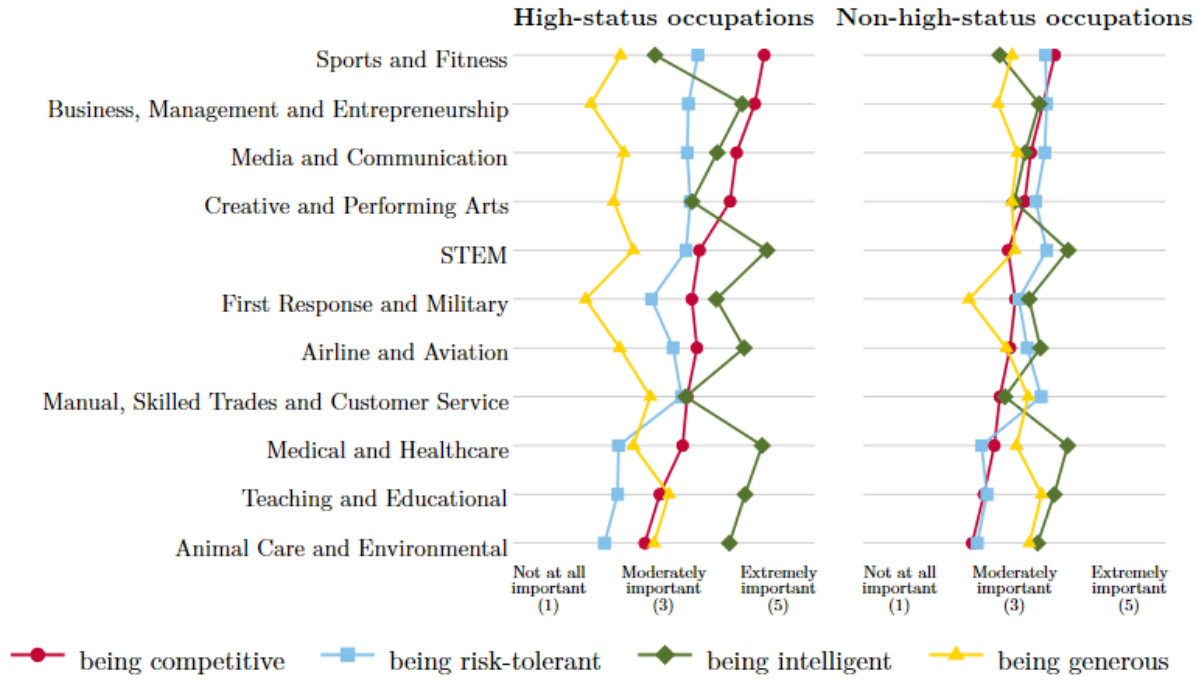


Figure 1. Importance of traits for success by occupational category

Notes: The figure shows the average rating of how important being competitive, risk-tolerant, intelligent, and generous is for success in each occupational category. Ratings are on a five-point scale ranging from "Not at all important" (1) to "Extremely important" (5). The left panel shows ratings for high-status jobs. The right panel shows ratings for non-high-status jobs. Ratings are based on the 249 respondents of the occupation ratings survey.

lower.

Status also matters. In every category, respondents rated being competitive as more important for high-status occupations than in non-high-status occupations. For non-high-status occupations, the ratings of the four traits are also closer together. This pattern is consistent with the idea that higher positions within a field are attained by outperforming others.

We next turn to the occupations the children named. Of the 1,093 children in our sample, 1,018 named an occupation for which we have ratings. This sample consists of 503 boys and 515 girls.[11] Table 2 lists the ten most frequently named occupations and their ratings. Together, these ten occupations were named by 686 of the 1,018 children (67%).

The ratings for these ten occupations align with common sense. As one would expect, being competitive is rated as most important for success as a footballer and least important for success as a teacher or a vet. Similarly, being intelligent is rated as most important for success as a scientist, a doctor, or an astronaut, and least important for success as a footballer. Being risk tolerant is rated as least important for success as a vet or a doctor, while being generous is rated

[11] Of the remaining 75 children, 21 left the question blank. The other 54 named one of 34 occupations for which more than 25% of adult respondents answered "I don't know" to the category or the status question. We exclude these occupations because many respondents could not classify them. The remaining 150 occupations are the basis of our analysis.

Table 2. Most common occupations

	Importance for success of being				
Occupation	Competitive	Risk-tolerant	Intelligent	Generous	% high status
Artist	3.53	3.40	3.18	2.66	0.36
Astronaut	3.60	3.29	4.64	2.35	1.00
Doctor	3.34	2.24	4.67	2.43	1.00
Engineer	3.46	3.42	4.58	2.59	0.78
Footballer	4.50	3.58	2.82	2.42	0.76
Pilot	3.51	3.17	4.31	2.30	0.90
Police officer	3.31	2.93	3.61	1.91	0.57
Scientist	3.57	3.31	4.77	2.51	1.00
Teacher	2.72	2.34	4.09	3.26	0.55
Vet	2.79	2.08	4.20	2.80	0.86
10 most common occupations	3.45	2.90	3.95	2.56	0.73
All occupations	3.45	2.98	3.85	2.58	0.67

Notes: This table reports the ten occupations named most often by the children. Occupations are listed in alphabetical order. The first four columns report the importance of being competitive, risk-tolerant, intelligent, and generous for success in the occupation (on a scale from 1 to 5). The last column reports the fraction of adult respondents who classify the occupation as high status. The last two rows report averages across the 686 children who named one of the ten occupations and across all 1,018 children with a rated occupation.

as most important for success as a teacher. Not surprisingly, all respondents classified doctor, astronaut, and scientist as high-status occupations. By contrast, only 36% of respondents classified artist as a high-status occupation.

The table also shows that the importance of being competitive and the status of an occupation reflect different characteristics. For example, respondents rated being competitive as most important for success as a footballer. Yet fewer respondents classified footballer as a high-status occupation than doctor, pilot, or vet. Conversely, all respondents classified doctor as a high-status occupation. However, being competitive is rated as only moderately important for success as a doctor (3.34), close to the average across all occupations (3.45).

Lastly, Table 3 reports the ratings of the children's aspired occupations separately for boys and girls. There are large gender differences. Boys aspire to occupations in which being competitive is rated as more important for success than girls do (3.66 versus 3.25, $p < 0.001$). This difference corresponds to 0.77 standard deviations. Boys also aspire to occupations in which being risk-tolerant is rated as more important for success (3.19 versus 2.77, $p < 0.001$). By contrast, girls aspire to occupations in which being intelligent (3.95 versus 3.75, $p = 0.004$) and being generous (2.72 versus 2.44, $p < 0.001$) are rated as more important for success. Lastly, boys aspire to occupations that are somewhat more often classified as high status. On average, 70% of respondents classified the occupations named by boys as high status, compared with 64% for

Table 3. Characteristics of aspired occupations by gender

	All			Boys			Girls			
	Mean	SD	N	Mean	SD	N	Mean	SD	N	p-value
Job competition	3.45	0.53	1018	3.66	0.56	503	3.25	0.41	515	<0.001
Job risk tolerance	2.98	0.53	1018	3.19	0.42	503	2.77	0.55	515	<0.001
Job intelligence	3.85	0.68	1018	3.75	0.72	503	3.95	0.62	515	0.004
Job generosity	2.58	0.39	1018	2.44	0.35	503	2.72	0.38	515	<0.001
High job status	0.67	0.26	1018	0.70	0.24	503	0.64	0.28	515	0.007

Notes: This table reports means, standard deviations, and the number of observations for the 1,018 children who named an occupation for which we have ratings. *Job competition*, *job risk tolerance*, *job intelligence*, and *job generosity* represent the perceived importance of being competitive, risk-tolerant, intelligent, and generous for success in the child's aspired occupation. *High job status* is the fraction of adult respondents who classify the child's aspired occupation as high status. The rightmost column displays p-values from a regression of each variable on a dummy variable for girls, with school fixed effects. The p-values are computed using the wild cluster bootstrap, clustering at the school level (Webb weights, 99,999 replications).

the occupations named by girls ($p = 0.007$).

4. Results

In this section, we analyze how the decision to compete relates to children's liking of school subjects and their job aspirations. We first describe which children chose to compete. We then compare the liking of school subjects and the job aspirations of children who chose to compete with those of children who did not. For each outcome, we make this comparison twice. First, we compare children who chose to compete with those who did not, without accounting for any other characteristics. Second, we account for differences in performance, beliefs, risk tolerance, and cognitive ability, which also affect the decision to compete. The first comparison shows how the decision to compete is associated with each outcome. The second shows whether this association remains once we account for other characteristics that affect the decision to compete.

4.1. Willingness to compete

We begin by examining which children chose to compete. As shown in Section 3, boys and girls chose *Compete* at similar rates. However, the decision to compete also likely depends on other characteristics. Children who solve more sums, believe they did better than their classmates, or are more willing to take risks have more reasons to choose *Compete*.

To analyze this decision, we run a series of linear regressions with the decision to compete as the dependent variable, as is common in this literature. The dependent variable equals 100 if the child chose *Compete* and 0 otherwise. Thus, the coefficients are in percentage points.

As independent variables, we include a dummy variable for girls and measures of the child's performance, beliefs, risk tolerance, and cognitive ability. To facilitate comparison, we standardize performance, risk tolerance, and cognitive ability to have a mean of zero and a standard deviation of one.

To account for children's beliefs, we use overconfidence rather than confidence. Specifically, we first standardize confidence and performance. Overconfidence is then the standardized confidence minus the standardized performance. A positive value indicates that a child's confidence exceeds their performance, both measured in standard deviations. For example, a child whose confidence is one standard deviation above the mean and whose performance is half a standard deviation above the mean has an overconfidence of 0.5. Because both variables are standardized, overconfidence has a mean of zero by construction. Hence, it measures whether a child is more or less overconfident than the average child, but it does not measure whether a child's beliefs are accurate. We use this measure of overconfidence because it separates beliefs from performance. With overconfidence in the regression, the coefficient on performance captures the role of performing better while believing one does. The coefficient on overconfidence captures the role of being more confident than one's performance warrants.[12]

All regressions include school fixed effects, and standard errors are clustered at the school level. Since we have only 15 schools, we compute p-values with the wild cluster bootstrap (Cameron et al., 2008) and report the standard errors implied by these p-values.[13] We report the results in Table 4.

In column I, the only independent variable is the child's gender. Girls are 4.04 percentage points less likely than boys to choose *Compete*. This difference is not statistically significant ($p = 0.210$). In column II, we control for performance. Children who perform better are significantly more likely to compete ($p = 0.032$). A one-standard-deviation increase in performance is associated with a 5.36 percentage-point increase in the likelihood of choosing *Compete*. Because boys solved more sums than girls, controlling for performance reduces the gender gap to 2.74 percentage points.

In column III, we further control for overconfidence and risk tolerance. Children who are more confident relative to their performance are significantly more likely to compete ($p = 0.028$). A one-unit increase in overconfidence, that is, a one-standard-deviation increase in confidence relative to performance, is associated with a 5.28 percentage-point increase in the likelihood of competing. Children who are more willing to take risks are also significantly more likely to compete ($p = 0.003$). A one-standard-deviation increase in risk tolerance is associated with a

[12]For the 23 children who did not give a valid answer to the confidence question, we set overconfidence to zero and include a dummy variable for missing confidence. This dummy variable is always included in regressions that control for overconfidence.

[13]We use the restricted wild cluster bootstrap with Webb weights and 99,999 replications (Roodman et al., 2019).

Table 4. Determinants of the decision to compete

	I	II	III	IV
Girl	−4.04	−2.74	−1.57	−1.58
	(3.07)	(2.94)	(2.94)	(2.96)
Performance		5.36**	8.65***	8.63**
		(2.26)	(2.75)	(2.94)
Overconfidence			5.28**	5.29**
			(2.15)	(2.14)
Risk tolerance			4.71***	4.71***
			(1.33)	(1.33)
Cognitive ability				0.10
				(0.95)
Obs.	1093	1093	1093	1093
R^2	0.057	0.069	0.092	0.092

Notes: This table presents linear regressions of the decision to compete. The dependent variable equals 100 if the child chose *Compete* and 0 otherwise. *Girl* is a dummy variable equal to one for girls. *Performance*, *risk tolerance*, and *cognitive ability* are standardized to have a mean of zero and a standard deviation of one. *Overconfidence* is the standardized value of confidence minus the standardized value of performance. Regressions in columns III and IV include a dummy variable for missing confidence (not reported). All regressions include school fixed effects. Standard errors in parentheses are implied by wild cluster bootstrap p-values, clustering at the school level (Webb weights, 99,999 replications). *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, based on the bootstrap p-values.

4.71 percentage-point increase in the likelihood of competing. The coefficient on performance increases from 5.36 to 8.65 once we control for overconfidence. This increase is expected. In column III, the coefficient on performance captures performing better and believing so. After controlling for these variables, the gender gap shrinks to 1.57 percentage points. Lastly, in column IV, we add cognitive ability. Its coefficient is close to zero and is not statistically significant ($p = 0.920$). Its inclusion does not change the other coefficients.

Overall, the determinants of the decision to compete in our sample closely resemble those found in studies with adolescents and adults (Niederle and Vesterlund, 2007; Buser et al., 2014; van Veldhuizen, 2022; Reuben et al., 2024). Children who perform better, are more confident relative to their performance, and are more willing to take risks are more likely to compete. This similarity was not a given for children as young as 7 or 8. It shows that children's decisions respond to their performance, beliefs, and risk attitudes in the same way as those of older participants. Hence, it suggests that children understood the task and took their decisions seriously.

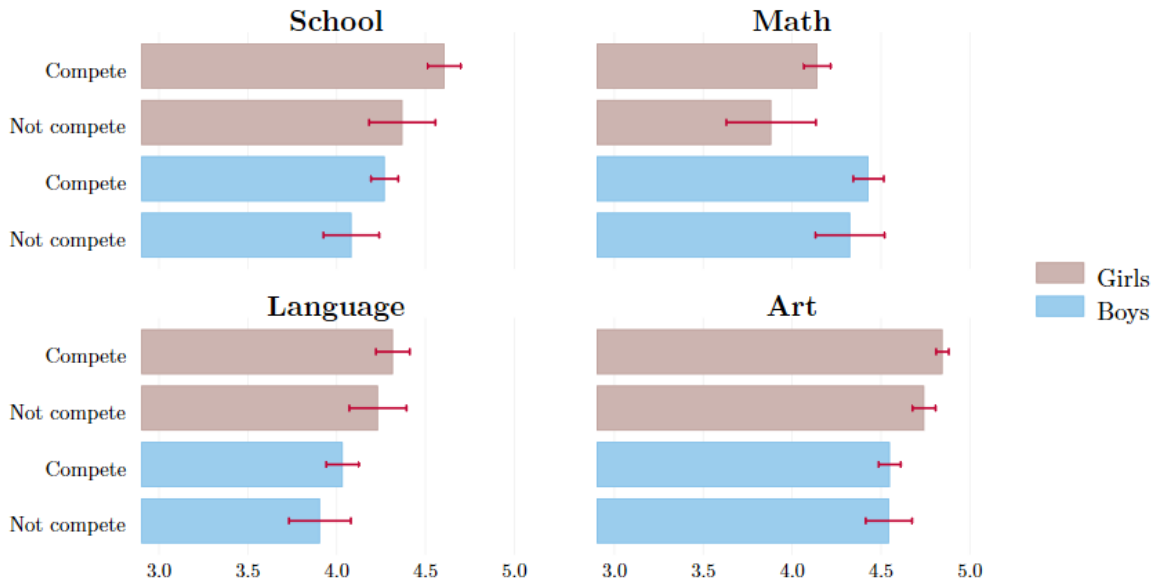


Figure 2. Liking of school subjects by decision to compete and gender

Notes: The figure shows the average liking of school, math, language, and art for children who chose *Compete* and those who chose *Not compete*, separately for girls and boys. Liking is measured on a five-point scale from "I don't like it at all" (1) to "I like it a lot" (5). Averages are estimated using a regression with school fixed effects. Error bars show 95% confidence intervals based on standard errors clustered at the school level. To make differences easier to see, the horizontal axis starts at 3. The sample consists of 1,077 children who answered all four liking questions.

4.2. Liking of school subjects

We next examine whether the decision to compete is associated with how much children like school and individual school subjects. Among adolescents, willingness to compete predicts the choice of more math-intensive and more prestigious study tracks (Buser et al., 2014, 2017, 2022). Children aged 7 to 8 have not yet made such choices. However, they already like some subjects more than others. These preferences may shape later choices. Liking and interest in a subject predict later course and track choices (Simpkins et al., 2006; Esposito et al., 2026), and tastes are the main determinant of college major choice (Wiswall and Zafar, 2015). Moreover, most scientists report that their interest in science began before middle school (Maltese and Tai, 2010). We therefore ask whether children who chose to compete like school, and math in particular, more than those who did not.

We start with a simple comparison. Figure 2 shows the average liking of school and of each subject for children who chose *Compete* and for those who chose *Not compete*, separately for girls and boys. Children who chose to compete like school more than those who did not. This holds for both girls and boys. For math, girls who chose to compete like math more than girls who did not. For boys, the difference is smaller. For language and art, the differences between children who chose to compete and those who did not are generally small, except for girls' liking of art.

Table 5. Decision to compete and liking of school subjects

Panel A. Liking of school					**Panel B. Liking of math**				
	I	II	III	IV		I	II	III	IV
Compete	0.21*	0.20*	0.23**	0.20**	Compete	0.20*	0.14	0.18*	0.14
	(0.10)	(0.10)	(0.10)	(0.09)		(0.11)	(0.08)	(0.10)	(0.08)
Girl			0.35***	0.36***	Girl			−0.32***	−0.28***
			(0.06)	(0.06)				(0.07)	(0.06)
Controls	No	Yes	No	Yes	Controls	No	Yes	No	Yes
Obs.	1077	1077	1077	1077	Obs.	1077	1077	1077	1077
R^2	0.044	0.057	0.073	0.087	R^2	0.055	0.080	0.080	0.099
Panel C. Liking of language					**Panel D. Liking of art**				
	I	II	III	IV		I	II	III	IV
Compete	0.09	0.07	0.11	0.07	Compete	0.06	0.10	0.08	0.11
	(0.07)	(0.08)	(0.06)	(0.07)		(0.06)	(0.06)	(0.06)	(0.06)
Girl			0.29***	0.32***	Girl			0.37***	0.33***
			(0.05)	(0.06)				(0.06)	(0.05)
Controls	No	Yes	No	Yes	Controls	No	Yes	No	Yes
Obs.	1077	1077	1077	1077	Obs.	1077	1077	1077	1077
R^2	0.073	0.080	0.095	0.104	R^2	0.019	0.039	0.052	0.066

Notes: This table presents linear regressions of the children's liking of school (Panel A), math (Panel B), language (Panel C), and art (Panel D). Liking is standardized to have a mean of zero and a standard deviation of one. *Compete* is a dummy variable equal to one if the child chose *Compete*. *Girl* is a dummy variable equal to one for girls. Regressions in columns II and IV also control for performance, overconfidence, risk tolerance, cognitive ability, and a dummy variable for missing confidence. All regressions include school fixed effects. The sample consists of the 1,077 children who answered all four liking questions. Standard errors in parentheses are implied by wild cluster bootstrap p-values, clustering at the school level (Webb weights, 99,999 replications). *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, based on the bootstrap p-values.

To study these associations more formally, we run a series of linear regressions. The dependent variable is the child's liking of school or of one of the subjects. To make the coefficients easier to interpret, we standardize liking to have a mean of zero and a standard deviation of one. The main independent variable is the dummy variable *compete*. In column I, it is the only independent variable. In column II, we also control for performance, overconfidence, risk tolerance, and cognitive ability. In columns III and IV, we repeat these two specifications but add a dummy variable for girls. As before, all regressions include school fixed effects, and we compute p-values with the wild cluster bootstrap, clustering at the school level. We report the results in Table 5.

Children who chose to compete like school more than those who did not. In column I, the coefficient on *compete* equals 0.21 standard deviations ($p = 0.052$). The coefficient is very stable

across specifications. Controlling for performance, overconfidence, risk tolerance, and cognitive ability barely changes it (0.20 in column II, $p = 0.058$). Adding the dummy variable for girls does not change it either (0.23 in column III and 0.20 in column IV). The latter is expected since boys and girls chose to compete at similar rates. In columns III and IV, the coefficient on *compete* is significant at the 5% level ($p = 0.031$ in column III and $p = 0.045$ in column IV).

The results for math are somewhat weaker. Without controls (column I), children who chose to compete like math 0.20 standard deviations more than those who did not ($p = 0.083$). Once we control for performance, overconfidence, risk tolerance, and cognitive ability in column II, the coefficient falls to 0.14 and is no longer marginally significant ($p = 0.118$). The magnitude and significance of these coefficients are similar when we add the dummy variable for girls ($p = 0.099$ in column III and $p = 0.132$ in column IV). Hence, we find only suggestive evidence of an association between the decision to compete and liking math. For language and art, the coefficients on *compete* are positive but small (between 0.06 and 0.11) and never statistically significant ($p > 0.112$).

The coefficients on the dummy variable for girls capture the gender differences described in Section 3. Girls like school, language, and art more than boys, and they like math less. These differences are large, ranging from 0.28 to 0.37 standard deviations, and are highly significant across all specifications ($p < 0.001$).

Since the literature on the willingness to compete often studies boys and girls separately, we also estimate the association between the decision to compete and liking separately for boys and girls. To do so, we interact *compete* with gender. In the specifications with controls, we also interact the controls with gender. We report the results in Table 6.

For both boys and girls, the decision to compete is positively associated with liking school. For boys, the coefficient on *compete* is 0.20 standard deviations without controls and 0.16 with controls. For girls, it is 0.25 and 0.23, respectively. All four coefficients are significant at the 10% level ($p < 0.083$). For math, the coefficient on *compete* is positive and significant for girls. Girls who chose to compete like math 0.25 standard deviations more than girls who did not (column III, $p = 0.098$), and 0.26 standard deviations more once we add the controls (column IV, $p = 0.044$). For boys, the coefficient is smaller and not statistically significant (0.10 and 0.02, $p > 0.469$). We see a similar pattern for art. For girls, the coefficient on *compete* is 0.14 without controls (column VII, $p = 0.017$) and 0.17 with controls (column VIII, $p = 0.016$). For boys, the coefficients are close to zero ($p > 0.610$). Lastly, for language, the coefficient on *compete* is small and not statistically significant for either boys or girls ($p > 0.314$).

In summary, children who chose to compete like school more than those who did not. This association is robust. It holds for boys and girls and does not depend on controlling for performance, overconfidence, risk tolerance, and cognitive ability. There is also suggestive evidence that children who chose to compete like math more. When we estimate this association sepa-

Table 6. Decision to compete and liking of school subjects by gender

	School		Math		Language		Art	
	I	II	III	IV	V	VI	VII	VIII
Compete × Boy	0.20*	0.16*	0.10	0.02	0.13	0.10	0.01	0.06
	(0.10)	(0.08)	(0.14)	(0.10)	(0.12)	(0.11)	(0.12)	(0.12)
Compete × Girl	0.25*	0.23*	0.25*	0.26**	0.08	0.05	0.14**	0.17**
	(0.13)	(0.12)	(0.14)	(0.11)	(0.11)	(0.10)	(0.05)	(0.06)
Girl	0.31**	0.30**	−0.43**	−0.47***	0.33**	0.34**	0.27**	0.26**
	(0.14)	(0.13)	(0.16)	(0.15)	(0.15)	(0.14)	(0.10)	(0.09)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1077	1077	1077	1077	1077	1077	1077	1077
R^2	0.073	0.093	0.081	0.109	0.095	0.105	0.053	0.070

Notes: This table presents linear regressions of children's liking of school, math, language, and art. Liking is standardized to have a mean of zero and a standard deviation of one. *Compete* × *Boy* and *Compete* × *Girl* are the coefficients on the decision to compete for boys and girls, respectively. *Girl* is a dummy variable equal to one for girls. Regressions in columns II, IV, VI, and VIII also control for performance, overconfidence, risk tolerance, cognitive ability, and a dummy variable for missing confidence, each interacted with gender. All regressions include school fixed effects. The sample consists of the 1,077 children who answered all four liking questions. Standard errors in parentheses are implied by wild cluster bootstrap p-values, clustering at the school level (Webb weights, 99,999 replications). *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, based on the bootstrap p-values.

rately by gender, it is positive and significant for girls and not significant for boys. This suggests that the gender gap in liking math is smaller among some children. Without controls, girls who did not compete liked math 0.43 standard deviations less than boys who did not compete. By contrast, girls who chose to compete liked math 0.18 standard deviations less than boys who did not compete. However, since boys and girls chose to compete at similar rates, the decision to compete does not explain the overall gender gap in liking math.

4.3. Aspired occupations

Lastly, we examine whether the decision to compete is associated with the occupations children aspire to. Among adults, willingness to compete predicts working in higher-ranking positions and in more prestigious fields (Buser et al., 2026), as well as choosing to play professional sports (Fallucchi et al., 2020). Children aged 7 to 8 are far from choosing an occupation. However, they already know about many occupations and their basic characteristics (Ferrari et al., 2015; Cinamon and Yeshayahu, 2021). Moreover, their aspirations take shape early. According to Gottfredson (1981), children begin to rule out occupations that do not fit their gender as early as ages 6 to 8. In the United Kingdom, the sectors that children aged 7 to 8 aspire to work in are broadly similar to those that 17- to 18-year-olds aspire to, although interest in the arts

and sports declines with age (Chambers et al., 2018, 2020). Aspirations are also consequential. Aspirations in adolescence predict educational attainment in adulthood (Beal and Crockett, 2010), as well as occupational attainment, even after controlling for family background and cognitive ability (Schoon and Polek, 2011). Therefore, we ask whether children who chose to compete aspire to different occupations than children who did not.

We characterize each child's aspired occupation using ratings from the occupation ratings survey described in Section 2.2. Our main outcome is the importance of being competitive for success in the occupation. To test whether the association is specific to competition, we also examine the importance of being risk-tolerant, intelligent, and generous. In a separate analysis, we assess the occupation's status. To make the coefficients easier to interpret, we standardize each rating across the 150 occupations in our analysis, counting each occupation once. Hence, the coefficients are in standard deviations of the rating across occupations. As in the previous subsection, we run four specifications. In column I, *compete* is the only independent variable. In column II, we also control for performance, overconfidence, risk tolerance, and cognitive ability. In columns III and IV, we add a dummy variable for girls to these two specifications. All regressions include school fixed effects, and we compute p-values using the wild cluster bootstrap, clustering at the school level. The sample consists of the 1,018 children who named an occupation for which we have ratings. We report the results in Table 7.

Children who chose to compete aspire to occupations in which being competitive is rated as more important for success. In column I, the coefficient on *compete* is 0.15 standard deviations and is statistically significant ($p = 0.030$). On the original 1-to-5 scale, this difference corresponds to about 0.08 points. Controlling for performance, overconfidence, risk tolerance, and cognitive ability reduces the coefficient to 0.12 (column II, $p = 0.047$). Adding the dummy variable for girls further reduces it to 0.11 in column III ($p = 0.030$) and 0.10 in column IV ($p = 0.042$).[14] Nevertheless, the coefficient on *compete* remains significant in all four specifications.[15]

The association is specific to the importance of being competitive. For the other three traits, the coefficients on *compete* are small and never statistically significant. For being risk tolerant,

[14] Unlike in the case of liking, the dummy variable for girls seems to matter for the magnitude of the coefficients. The reason is that the gender difference in the importance of being competitive is very large. Girls aspire to occupations in which being competitive is rated 0.73 standard deviations (of the rating across occupations) less important than in the occupations boys aspire to. Hence, even a small, statistically insignificant gender difference in the decision to compete is enough to somewhat change the coefficient on *compete*.

[15] Footballer is both one of the most common occupations and the occupation in which being competitive is rated as most important. If we add a dummy variable for children who aspire to be footballers to the regressions in columns III and IV, the coefficient on *compete* falls to 0.078 and is no longer statistically significant ($p = 0.111$ without controls and $p = 0.119$ with controls). Hence, aspiring to be a footballer accounts for about a quarter of the association, but most of it remains. Note that aspiring to a career in professional sports is itself consistent with the willingness to compete (Fallucchi et al., 2020).

Table 7. Decision to compete and the importance of traits in aspired occupations

Panel A. Being competitive

	I	II	III	IV
Compete	0.15**	0.12**	0.11**	0.10**
	(0.06)	(0.05)	(0.05)	(0.05)
Girl			−0.73***	−0.71***
			(0.11)	(0.11)
Controls	No	Yes	No	Yes
Obs.	1018	1018	1018	1018
R^2	0.052	0.070	0.183	0.189

Panel B. Being risk-tolerant

	I	II	III	IV
Compete	0.09	0.05	0.05	0.04
	(0.10)	(0.10)	(0.09)	(0.09)
Girl			−0.96***	−0.94***
			(0.14)	(0.14)
Controls	No	Yes	No	Yes
Obs.	1018	1018	1018	1018
R^2	0.079	0.097	0.219	0.226

Panel C. Being intelligent

	I	II	III	IV
Compete	0.01	0.02	0.02	0.03
	(0.06)	(0.07)	(0.06)	(0.07)
Girl			0.30***	0.28***
			(0.09)	(0.09)
Controls	No	Yes	No	Yes
Obs.	1018	1018	1018	1018
R^2	0.043	0.050	0.062	0.066

Panel D. Being generous

	I	II	III	IV
Compete	−0.09	−0.10	−0.06	−0.08
	(0.06)	(0.07)	(0.06)	(0.07)
Girl			0.71***	0.71***
			(0.11)	(0.11)
Controls	No	Yes	No	Yes
Obs.	1018	1018	1018	1018
R^2	0.013	0.023	0.136	0.144

Notes: This table presents linear regressions of the importance of being competitive (Panel A), risk-tolerant (Panel B), intelligent (Panel C), and generous (Panel D) for success in the child's aspired occupation, as rated in the occupation ratings survey. Each rating is standardized to have a mean of zero and a standard deviation of one across the 150 occupations in our analysis. *Compete* is a dummy variable equal to one if the child chose *Compete*. *Girl* is a dummy variable equal to one for girls. Regressions in columns II and IV also control for performance, overconfidence, risk tolerance, cognitive ability, and a dummy variable for missing confidence. All regressions include school fixed effects. The sample consists of the 1,018 children who named an occupation for which we have ratings. Standard errors in parentheses are implied by wild cluster bootstrap p-values, clustering at the school level (Webb weights, 99,999 replications). *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, based on the bootstrap p-values.

they range from 0.04 to 0.09 ($p > 0.363$). For being intelligent, they range from 0.01 to 0.03 ($p > 0.690$). For being generous, they are negative, ranging from −0.10 to −0.06 ($p > 0.153$). Hence, children who chose to compete do not simply aspire to occupations that are more demanding in general. Instead, they aspire to occupations where success depends on competing.

As with liking, we also estimate these associations separately for boys and girls. We report the results in Table 8. The coefficients on *compete* are similar for boys and girls. For boys, they equal 0.13 without controls ($p = 0.085$) and 0.10 with controls ($p = 0.141$). For girls, they equal 0.10 ($p = 0.123$) and 0.12 ($p = 0.061$), respectively. Because each estimate relies on only half the sample, the coefficients are estimated less precisely, and only two are significant at the 10% level. For being risk-tolerant and being intelligent, the coefficients are small and

Table 8. Decision to compete and the importance of traits in aspired occupations by gender

	Competitive		Risk-tolerant		Intelligent		Generous	
	I	II	III	IV	V	VI	VII	VIII
Compete × Boy	0.13*	0.10	0.09	0.06	−0.10	−0.10	0.06	0.04
	(0.07)	(0.07)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.10)
Compete × Girl	0.10	0.12*	0.02	0.04	0.13	0.11	−0.18**	−0.23***
	(0.06)	(0.06)	(0.14)	(0.14)	(0.09)	(0.10)	(0.06)	(0.06)
Girl	−0.71***	−0.73***	−0.91***	−0.94***	0.13	0.15	0.88***	0.90***
	(0.12)	(0.11)	(0.17)	(0.17)	(0.16)	(0.14)	(0.17)	(0.17)
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	1018	1018	1018	1018	1018	1018	1018	1018
R^2	0.183	0.193	0.220	0.230	0.064	0.077	0.138	0.154

Notes: This table presents linear regressions estimating the importance of being competitive, risk-tolerant, intelligent, and generous for success in the child's aspired occupation. Each rating is standardized to have a mean of zero and a standard deviation of one across the 150 occupations in our analysis. *Compete × Boy* and *Compete × Girl* are the coefficients on the decision to compete for boys and girls, respectively. *Girl* is a dummy variable equal to one for girls. Regressions in columns II, IV, VI, and VIII also control for performance, overconfidence, risk tolerance, cognitive ability, and a dummy variable for missing confidence, each interacted with gender. All regressions include school fixed effects. The sample consists of the 1,018 children who named an occupation for which we have ratings. Standard errors in parentheses are implied by wild cluster bootstrap p-values, clustering at the school level (Webb weights, 99,999 replications). *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, based on the bootstrap p-values.

not statistically significant for either boys or girls ($p > 0.174$). For being generous, we find a negative association for girls. Girls who chose to compete aspire to occupations in which being generous is rated 0.18 standard deviations less important without controls and 0.23 standard deviations less important with controls ($p < 0.014$). For boys, the corresponding coefficients are close to zero ($p > 0.508$).

Next, we turn to the status of the children's aspired occupations. We study status because the literature links willingness to compete to prestige. Buser et al. (2014) show that students who are more willing to compete choose more prestigious study profiles, and Buser et al. (2026) show that adults who are more willing to compete are more likely to hold higher-ranking positions. However, as Buser et al. (2014) note, in their setting the prestige of study profiles is perfectly correlated with their math intensity, so the two cannot be distinguished. Our data allow us to differentiate between the importance of being competitive for success in an occupation and the occupation's status. Across the 150 occupations, the two are positively correlated ($r = 0.54$). Hence, occupations in which being competitive is important tend to have higher status, but the two characteristics are far from identical.

We ran linear regressions predicting the status of the child's aspired occupation from their decision to compete. The dependent variable is the percentage of adult respondents who clas-

Table 9. Decision to compete and the status of aspired occupations

	I	II	III	IV	V	VI
Compete	0.08	0.08*	0.07	0.08*		
	(0.05)	(0.05)	(0.04)	(0.04)		
Compete × Boy					0.01	0.00
					(0.06)	(0.07)
Compete × Girl					0.12	0.13
					(0.08)	(0.08)
Girl			−0.18***	−0.19***	−0.26*	−0.27**
			(0.06)	(0.06)	(0.12)	(0.12)
Controls	No	Yes	No	Yes	No	Yes
Obs.	1018	1018	1018	1018	1018	1018
R^2	0.018	0.019	0.029	0.030	0.029	0.040

Notes: This table presents linear regressions of the status of the child's aspired occupation, measured as the percentage of adult respondents in the occupation ratings survey who classified the occupation as high status. The dependent variable is standardized to have a mean of zero and a standard deviation of one across the 150 occupations in our analysis, with each occupation counted once. *Compete* is a dummy variable equal to one if the child chose *Compete*. *Compete* × *Boy* and *Compete* × *Girl* are the coefficients on the decision to compete for boys and girls, respectively. *Girl* is a dummy variable equal to one for girls. Regressions in columns II, IV, and VI also control for performance, overconfidence, risk tolerance, cognitive ability, and a dummy variable for missing confidence. In column VI, we interact the controls with gender. All regressions include school fixed effects. Standard errors in parentheses are implied by wild cluster bootstrap p-values, clustering at the school level (Webb weights, 99,999 replications). *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, based on the bootstrap p-values.

sified the occupation as high status. As before, we standardized it across the 150 occupations. Table 9 reports the results. Columns I to IV use the same specifications as in Table 7. Columns V and VI estimate the association separately for boys and girls.

The association between the decision to compete and the status of children's aspired occupations is weaker. The coefficient on *compete* is stable across specifications, at about 0.08 standard deviations. This corresponds to about 2.5 percentage points more respondents classifying the occupation as high status. However, it is marginally significant in only two of the four specifications (columns II and IV, $p < 0.095$). When we estimate the association separately by gender, the coefficient is close to zero for boys (0.01 and 0.00, $p > 0.859$) and positive but not statistically significant for girls (0.12 and 0.13, $p > 0.122$). As shown in Section 3, girls aspire to occupations that are less often classified as high status, and the coefficient on the dummy variable for girls is negative and significant in most specifications ($p < 0.036$ in columns III, IV, and VI, and $p = 0.054$ in column V).

In summary, children who chose to compete aspire to occupations in which being competitive

is rated as more important for success. This association is specific to the importance of being competitive. It does not hold for the importance of being risk-tolerant, intelligent, or generous. The association is also similar for boys and girls. By contrast, the association between the decision to compete and the status of the children's aspired occupations is weaker and only marginally significant.

Math intensity vs. status

As discussed above, Buser et al. (2014) cannot distinguish the prestige of study profiles from their math intensity. As an auxiliary exercise, we use data from a separate online survey to examine these dimensions separately. In the survey, adult respondents rated how important math is for success in each occupational category.[16] As before, we standardize this rating across the 150 occupations. Unlike in Buser et al. (2014), math intensity and status are clearly distinct in our setting. Across the 150 occupations, the importance of math is positively correlated with status ($r = 0.41$), but negatively correlated with the importance of being competitive ($r = -0.25$).

The decision to compete is not associated with the importance of math in children's aspired occupations. In all four specifications, the coefficient on *compete* is between -0.01 and 0.00 and is not statistically significant ($p > 0.849$). When we estimate the association separately by gender, the coefficients are also small and not statistically significant for both boys and girls. Table C5 in Appendix C reports the full regression results.[17] Hence, children who chose to compete do not aspire to more math-intensive occupations, even though such occupations tend to have higher status.

5. Conclusions

In this paper, we study whether the willingness to compete is associated with children's school preferences and job aspirations long before they make any educational or occupational choices. We measured children's willingness to compete among 1,093 children aged 7 to 8 in schools in Abu Dhabi using an incentivized task. We also asked them how much they like school and individual school subjects, and what job they would like to have when they grow up. To characterize the occupations they named, we relied on adult raters to measure the importance

[16] We also ran this survey on Prolific after the children's data was collected, with a separate sample of 280 respondents. Respondents first classified occupations as in the first part of the occupation ratings survey. In the second part, they rated how important math, language skills, and art are for success in each occupational category, without distinguishing by status. As for the four traits, we combine the ratings of the importance of math for occupational categories with the classification shares of the children's occupations. We do not analyze the ratings for language skills and art.

[17] In addition, Table C4 reports the importance of math for the ten most common occupations and for the occupations named by boys and girls.

of different traits for success in each child's aspired occupation and whether it is a high-status job.

We find that the decision to compete is already associated with children's orientations toward school and work. Children who chose to compete like school more than those who did not. This association is robust. It holds for boys and girls and does not depend on controlling for performance, overconfidence, risk tolerance, and cognitive ability. Children who chose to compete also aspire to occupations in which being competitive is rated as more important for success. This association is specific to being competitive. It does not hold for the importance of being risk-tolerant, intelligent, or generous, and it is similar for boys and girls. By contrast, the association with liking math is only suggestive, and the association with the status of the aspired occupation is weak.

These results speak to what the decision to compete captures. Among adolescents and adults, willingness to compete predicts educational choices, occupations, and earnings (Buser et al., 2014, 2026; Reuben et al., 2024). However, it is less clear why. One possibility is that the decision to compete reflects a taste for competition itself. Another possibility is that it reflects an attraction to prestige. For example, Buser et al. (2014) show that students who are more willing to compete choose more prestigious study profiles. A third possibility is that it reflects a broader willingness to seek out and take on challenges (Buser and Oosterbeek, 2023; Buser, 2026a). Our results on job aspirations are most consistent with the first possibility. Children who chose to compete aspire to occupations where success depends on competing. The association with status is weaker, even though the two characteristics are positively correlated across occupations. If the decision to compete mainly reflected an attraction to prestige, we would expect the opposite pattern. Our results on liking are less clear-cut. Children who chose to compete like school in general more, not only the subject used in the task. This is consistent with a broader engagement with school or a willingness to take on challenges. Our data do not allow us to distinguish between these explanations.

Our results also shed light on the task used to measure willingness to compete. Most studies use a math task, as we do. This raises the concern that the decision to compete partly reflects a liking for math. Our results suggest that this is not the main driver of the decision. The decision to compete is more strongly associated with liking school in general than with liking math. Moreover, it is not associated with how important math is for success in the occupations children aspire to. This is in line with Buser et al. (2022), who find similar gender differences in willingness to compete when the task involves math and when it involves letters.

Our results also have implications for the study of gender differences. In our sample, boys and girls chose to compete at similar rates. Nevertheless, a large gender difference already exists at this age. Girls like math 0.30 standard deviations less than boys. Hence, this early gender difference cannot be due to differences in the willingness to compete. It must arise from

other factors. This suggests that the gender gap in math, which carries over into later educational and occupational choices, has its roots elsewhere. In many settings, gender differences in the willingness to compete appear later in childhood and adolescence (Andersen et al., 2013; Buser, 2026a). These later differences matter for some outcomes. Among Dutch adults, the willingness to compete explains between 5% and 10% of gender differences in income, major choice, and holding a high-level position, with the largest share for high-level positions (Buser et al., 2026). However, high-level positions are not necessarily math-intensive. In the same population, survey measures of competitiveness and related traits explain a large part of the gender gaps in management and supervisory positions, but essentially none of the gender gap in STEM occupations (Buser, 2026b). Among Dutch adolescents, the willingness to compete also explains part of the gender difference in the choice of study profiles (Buser et al., 2014). But in that setting, more prestigious profiles are also more math-intensive, so the two cannot be disentangled. Taken together, these findings suggest that the willingness to compete matters for gender differences in outcomes that involve competition, such as reaching high-level positions. By contrast, it is probably not a key factor behind the gender gap in math and STEM, which receives much attention in the literature and in public debate.

As with most research, our study has several limitations. First, our results are associations. We do not observe exogenous variation in the willingness to compete, and we do not interpret our regressions as identifying the effect of preferences for competition. Second, we observe children at a single point in time. Children's preferences and aspirations change as they grow older. For example, interest in the arts and sports declines with age (Chambers et al., 2018, 2020). Hence, we cannot be sure how the associations we find will translate into eventual educational and occupational choices. Third, we study children in a specific setting. Abu Dhabi has a highly diverse population and a highly international school system. Moreover, the schools we studied are attended by children whose parents have high levels of education. Therefore, it remains an open question whether similar associations exist in other settings and among children of less educated parents. To determine whether the patterns we document persist, one would need longitudinal data that follow children from early childhood until they make educational and occupational choices.

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Online appendices: Willingness to compete in childhood, school preferences, and job aspirations

by Ernesto Reuben and Alena Tsiulya

Appendix A contains additional details and the instructions of the classroom experiment. Appendix B contains additional details of the occupation ratings survey. Appendix C contains supplementary data analyses.

Appendix A. Instructions and materials

In this appendix, we provide the instructions and the booklet pages for the parts of the classroom experiment used in this paper. We first summarize the procedures. We then reproduce the script read to the children and show the corresponding booklet pages.

A.1. Procedures

Each session took place in the children's classroom. Instructions were given by a prerecorded audio track with animations, which was played for the whole class. In the recording, a cartoon character named Mojo guided the children through the session. The same character appeared in the booklets. We prepared the recording and the booklets in both English and Arabic. Children in schools that teach in Arabic received the Arabic version.

Each part of the session had its own booklet, which included the child's identification number. Research assistants handed out each booklet just before the corresponding part. Children were asked to keep the booklet closed until the recording instructed them to open it. Throughout the session, children were reminded not to say their answers out loud, not to talk to their classmates, and not to show their answers to their classmates. Research assistants collected each booklet at the end of the corresponding part.

The cognitive ability test was untimed. Children who finished raised their hands, and a research assistant collected their booklets. Every child received one star for completing the test, regardless of their answers.

Before each incentivized task, the recording explained the rules with examples and then posed a set of comprehension questions. The recording read the possible answers to each question, and the class reviewed the correct answer together. Children could then ask questions before the booklets were distributed. In the competition task, the payment schemes were described

in terms of sums. Under *Not compete*, children earned one star for every correct sum. Under *Compete*, children who won earned two stars for every correct sum. In the risk task, each child received four sticky stars and placed them on a page of the booklet that showed a circle and a square.

After each incentivized task, research assistants scored the booklets and computed the number of stars each child earned. Children received their stars only at the end of the session, after the wheel for the risk task had been spun. They then exchanged their stars for toys.[18]

A.2. Questionnaire

The following script was read at the start of the questionnaire. Figure A1 shows the corresponding booklet pages.[19]

> Hello! My name is [experimenter's name]. I work with parents and children, and I try to learn new things through research. Right now, my helpers and I are trying to learn more about what children think about school.
>
> If you agree, I will ask you some questions, and we will play some games. In the games, you will be able to win some stars [show the stars], which can be exchanged for toys in the end, but only if we make it in one and a half hours. So it's important to stick to the time.
>
> If you don't want to be in our study, you don't have to be in it. We asked your parents, and they said it's okay for you to join. But, remember, being in the study is up to you. You can still say no and decide not to be in the study. If you decide to stop after we start, it is also OK.
>
> If you agree to help us, you should know that your teacher and classmates won't know your answers. Would you like to answer my questions and play games with me? If you want to participate, please raise your hand and say yes.
>
> We will start with some questions. However, before we start, there are some rules I would like you to follow: 1) don't say your answers out loud; this is very important; 2) don't talk to your classmates, and don't show them your answers; 3) don't turn your booklet's pages until you hear "Next page!"; 4) Remember to answer honestly. There are no right or wrong answers.
>
> Now, let's open your booklets and look at the first question and the possible answers. I will now read a series of questions. For example, the first question is "Do you like school?" We would like to know what you think. The very sad face means "I don't like it at all" whereas the very happy face means "I like it a lot."
>
> Let's start with the first question: "Do you like school?" Just mark your answer in the booklet with a cross or a circle.

[18] As part of the broader project, the booklets for the incentivized tasks also asked children what they thought their mother and father would choose for them. These questions came after the children's own choices and, in the competition task, after the confidence question. Hence, they could not affect the measures in this paper.

[19] The language subject was English in the English booklets and Arabic in the Arabic booklets. The questionnaire also included the background-characteristics questions described in the main text, which we do not reproduce here.

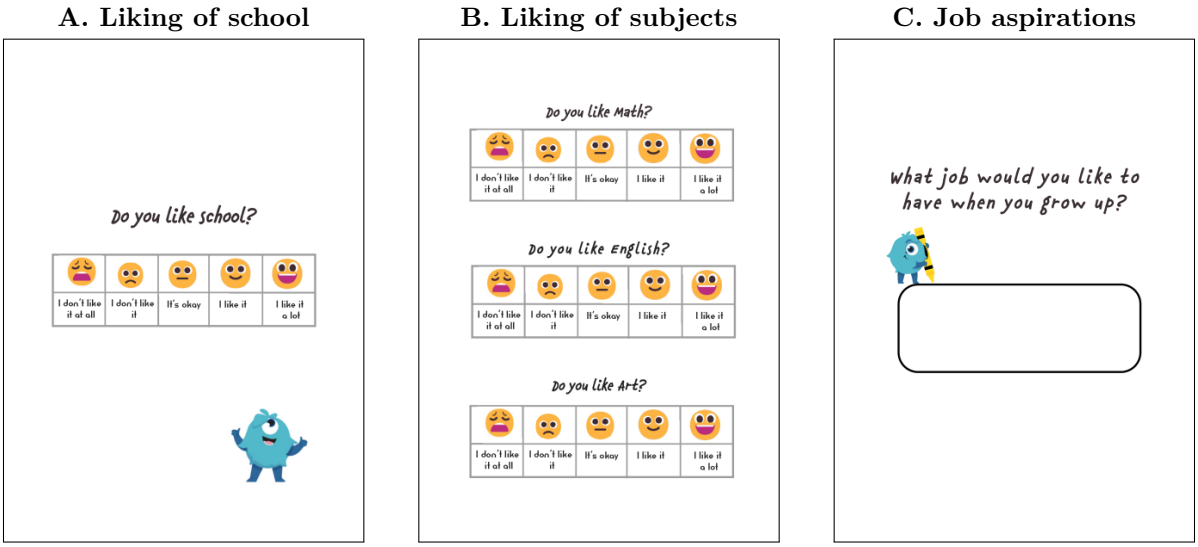


Figure A1. Booklet pages of the questionnaire

Notes: The figure shows the pages of the English booklet with the questions on liking school and school subjects and on job aspirations.

Next page! Please turn the page now.

Do you like Math?

Do you like English?

Do you like Art?

Next page!

There are so many different jobs out there. We would like to know: What job would you like to have when you grow up? Please write your answer in the booklet. If you do not know, just write "I don't know."

A.3. Cognitive ability

The following script was read before the cognitive ability test. Figure A2 shows an example of a booklet page.

Hi, my name is Mojo and I am going to help you go through the games. Please listen carefully to what I say. Remember the rules. Firstly, don't say your answers out loud. Secondly, don't talk to your classmates, and don't show them your answers.

In the booklet there are 10 puzzles. Your task is to find the missing piece that completes the pattern. You need to put a big X on the piece that you think completes the puzzle. Open the booklets and solve the puzzles, but make sure you solve all of them. Once you finish, please raise your hand and the helpers will pick up the booklet.

Ready? Go!

We have now finished this part; everyone will get one star.

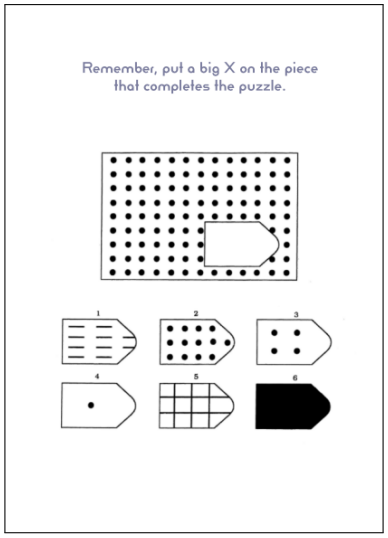


Figure A2. Example of a booklet page of the cognitive ability test

Notes: The figure shows one of the ten items from Raven's Progressive Matrices included in the booklet.

A.4. Competition task

The following script was read for the competition task (Game 1). Figure A3 shows the corresponding booklet pages.

> Ok, now it's time to play some games. In the games, you will be able to win some stars, which can be exchanged for toys in the end.
>
> Let's start with game 1. In this first game, you will have 2 minutes to solve some sums. For example, how much is 18 + 13? 18 + 13 = 31.
>
> You can choose how to win your stars. You have two options: Compete and Not Compete. Not Compete: If you choose Not Compete, you win one star for each sum you solve correctly. That means it doesn't matter what your other classmates do; you get one star for each correct sum. Compete: If you choose Compete, you will be compared to another classmate, but you will not know who. If you correctly solve more sums than your classmate, you win; otherwise, you lose. If you win, you get two stars for each sum. If you lose, you get zero stars.
>
> To make sure you understand the rules of the game, I will now ask you some questions and we will answer them together: Imagine you choose Not Compete, how many stars do you get for each two sums you solve? 0, 1, 2, or 3?
>
> Imagine you choose Compete, how many stars do you get for each two sums if you win? 0, 1, 2, or 3?
>
> Imagine you choose Compete, how many stars do you get for each two sums if you lose? 0, 1, 2, or 3?
>
> You can now open the booklet! Which option do you choose? Compete or not compete? Once you have made your choice, please wait.
>
> Everyone ready? You can turn the page and start solving sums as soon as Mojo says go.

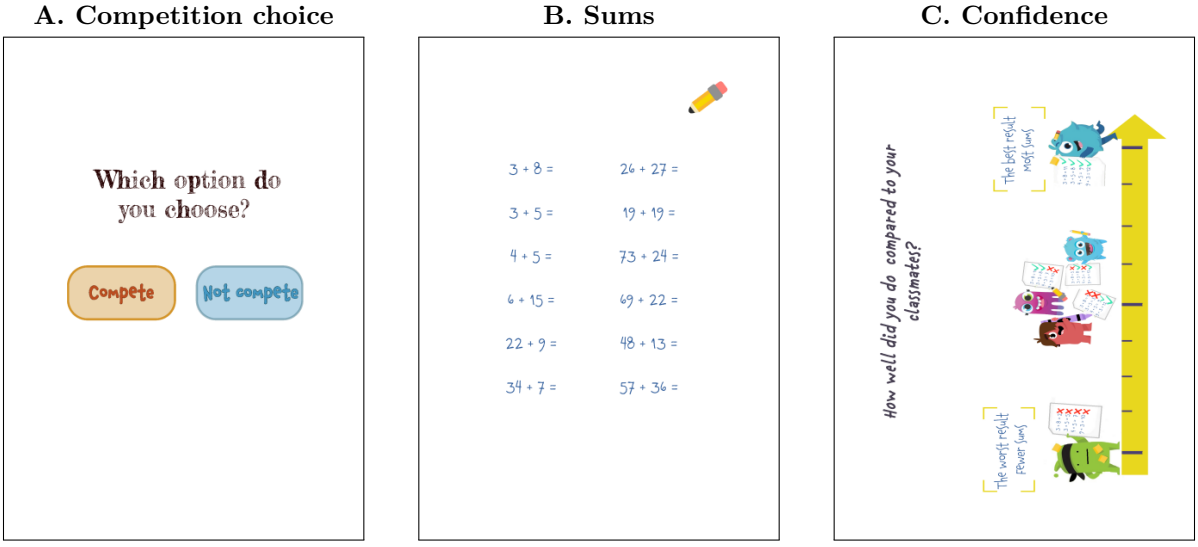


Figure A3. Booklet pages of the competition task

Notes: The figure shows the pages of the English booklet on which children chose their payment scheme, solved the 12 sums, and reported their belief about their performance relative to their classmates. In the booklet, the confidence page is printed in landscape orientation.

Go!

[After two minutes:] The time is over; put your pencils down.

Before we move to the next game, we would like to ask you a few questions.

Next page!

Now the question is "How many sums do you think you solved correctly compared to your classmates?" If you place yourself on the left, it means you think you solved less sums than your classmates. If you place yourself on the right, it means you think you solved more sums than your classmates. If you place yourself in the middle, it means you think you solved as many sums as your classmates.

Great job! We have now finished the first game. The helpers will calculate how many stars you won, and we will give them to you once we finish all the games.

A.5. Risk task

The following script was read for the risk task (Game 2). Figure A4 shows the corresponding booklet page.

It's now time to start game #2.

In this game, you have 4 sticky stars and you need to decide how many you want to put in a circle and how many you want to put in a square. The ones you put in the circle are safe and you get to keep them. They are yours. The ones you put in the square are not safe, they will either multiply, or be lost.

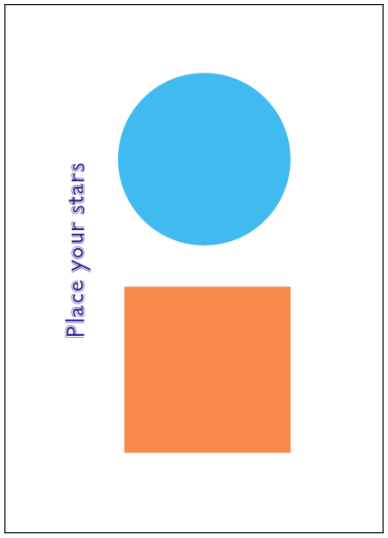


Figure A4. Booklet page of the risk task

Notes: The figure shows the page of the English booklet on which children placed their four sticky stars. Stars placed in the circle were safe. Stars placed in the square were doubled or lost depending on the spin of the wheel.

We will spin this wheel. If it lands on green, you win, and the stars you put in the square will double (that is, they will be multiplied by two). If it lands on red, you lose the stars you put in the square. Green and red are just as likely, like flipping a coin.

To make sure you understand the rules of the game, I will now ask you some questions and we will answer them together: Say you put one star in the square, and put three in the circle. Now imagine green came out on the wheel. In this case, how many stars do you get from the square? 0, 1, 2, 3, or 4?

How many stars do you get from the circle? 0, 1, 2, 3, or 4?

How many stars do you get in total? 3, 4, 5, 6, or 7?

Now imagine red came out on the wheel. In this case, how many stars do you get from the square? 0, 1, 2, 3, or 4?

How many stars do you get from the circle? 0, 1, 2, 3, or 4?

How many stars do you get in total? 0, 1, 2, 3, or 4?

Are there any questions? If there are no questions, I will ask the helpers to distribute the booklets for the second game. Once you receive your booklet, keep it closed on your desk until I tell you it's time to open it.

Ready? You can now open the booklet and decide how many stars you want to put in the circle and how many in the square! Once you finish, please raise your hand, and the helpers will pick up the booklet.

Great job! We have now finished the second game. Once we finish all the games, we will spin the wheel, and the helpers will calculate how many stars you won in this game.

Table B1. Occupational categories

1	Creative and Performing Arts Occupations
2	Media and Communication Occupations
3	Sports and Fitness Occupations
4	Business, Management and Entrepreneurship Occupations
5	Science, Technology, Engineering, and Mathematics (STEM) Occupations
6	Teaching and Education Occupations
7	Medical and Healthcare Occupations
8	Animal Care and Environmental Occupations
9	Manual Trades and Customer Service Occupations
10	First Response and Military Occupations
11	Airline and Aviation Occupations

Notes: This table lists the occupational categories used in the occupation ratings survey. For each occupation, respondents chose one of these categories or answered "I don't know."

Appendix B. Occupation ratings survey

In this appendix, we provide additional details on the occupation ratings survey described in Section 2.2. We first describe the occupational categories and the respondent sample. We then describe how we construct the occupation-level measures.

Occupational categories. Table B1 lists the 11 occupational categories that respondents used to classify the occupations named by the children. In addition to these categories, respondents could answer "I don't know."

Sample. Table B2 reports the characteristics of the 249 respondents. Half of the respondents are women, and their average age is 39 years. Most respondents are employed and have a university degree. About half of them have children. About a third of them have worked in a managerial or human resources position.

Construction of the occupation-level measures. We index occupations by i, occupational categories by $c \in \{1, \dots, 11\}$, and status by $s \in \{H, N\}$, where H stands for high-status jobs and N for jobs that are not high status. For each occupation i, let n_{ics} be the number of respondents who assigned occupation i to category c and status s. When computing n_{ics}, we exclude respondents who answered "I don't know" to either the category or the status question. The share of respondents who assigned occupation i to category c and status s is then

$$w_{ics} = \frac{n_{ics}}{\sum_{c'=1}^{11} \sum_{s' \in \{H,N\}} n_{ic's'}}.$$

For each trait k (being competitive, risk-tolerant, intelligent, or generous), let $\bar{R}^k_{cs}$ be the average rating of the importance of trait k for success in category c and status s, computed across all

Table B2. Characteristics of the respondents in the occupation ratings survey

Age (mean)	39.39
Age (standard deviation)	13.29
Female (%)	50.2
Has children (%)	53.0
Managerial or human resources experience (%)	30.9
Education (%)	
High school or less	14.1
Technical or vocational training	21.3
Undergraduate degree (Bachelor's)	43.4
Postgraduate degree (Master's or PhD)	21.3
Employment status (%)	
Employed full-time	52.6
Employed part-time	21.7
Other	25.7

Notes: This table reports the characteristics of the 249 respondents in the occupation ratings survey. *Managerial or human resources experience* is the percentage of respondents who have worked in a managerial position, in human resources, or in a similar job. *Other* includes students, retirees, respondents who are not working, respondents taking care of home or family, and respondents who preferred not to say.

respondents. The importance of trait k for success in occupation i is the average of these ratings weighted by the classification shares:

$$\textit{Job trait}_i^k = \sum_{c=1}^{11} \sum_{s \in \{H,N\}} w_{ics}\, \bar{R}_{cs}^k.$$

Since each rating ranges from 1 to 5, so does $\textit{Job trait}_i^k$. These measures correspond to the variables *job competition*, *job risk tolerance*, *job intelligence*, and *job generosity*. The status of occupation i is the percentage of respondents who classified it as a high-status job:

$$\textit{Job status}_i = 100 \times \sum_{c=1}^{11} w_{icH}.$$

We exclude occupations for which more than 25% of respondents answered "I don't know" to the category or the status question. This leaves 150 occupations. In the regressions, we standardize each measure to have a mean of zero and a standard deviation of one across these 150 occupations, counting each occupation once.

We construct the importance of math in the same way, with one difference. In the separate survey described in Section 4.3, respondents rated the importance of math for each category

Table C1. Background characteristics

	All	Boys	Girls	p-value
Father's education (%)				
Went to university	67.25	66.97	67.51	0.888
Did not go to university	6.59	7.75	5.44	0.140
Does not know	26.17	25.28	27.04	0.705
Mother's education (%)				
Went to university	67.80	65.31	70.24	0.064
Did not go to university	9.97	11.62	8.35	0.117
Does not know	22.23	23.06	21.42	0.650
Number of siblings (mean)	2.38	2.41	2.35	0.155
Standard deviation	2.06	2.12	2.00	

Notes: This table reports the parental education and the number of siblings reported by the children, for the full sample and separately for boys and girls. The sample consists of the 1,093 children (542 boys and 551 girls) who made a valid choice in the competition task. The rightmost column displays p-values from a regression of each variable on a dummy variable for girls with school fixed effects. The p-values are computed with the wild cluster bootstrap, clustering at the school level (Webb weights, 99,999 replications).

without distinguishing by status. Hence, we weight the average rating of each category, $\bar{M}_c$, by the share of respondents in the occupation ratings survey who assigned occupation i to that category, irrespective of status:

$$Job\ math_i = \sum_{c=1}^{11} (w_{icH} + w_{icN})\, \bar{M}_c.$$

Appendix C. Additional analyses

In this appendix, we show that our results are robust to additional controls and present supplementary results on the importance of math in the occupations children aspire to.

C.1. Robustness to background characteristics

In this subsection, we check whether our results are robust to controlling for the children's family background and for participating in sessions where children were reminded before the incentivized tasks that their parents could be informed of their choices (24 of the 50 sessions). We use two standard measures for their family background. The first is parental education, measured by whether the child's mother and father attended university. The second is the child's number of siblings.

Table C1 reports the descriptive statistics of the family background variables for the full

Table C2. Determinants of decision to compete with additional controls

	I	II	III	IV
Girl	−4.03	−2.52	−1.25	−1.29
	(3.09)	(2.94)	(2.94)	(2.98)
Performance		5.83**	9.23***	9.16**
		(2.61)	(2.98)	(3.12)
Overconfidence			5.29**	5.31**
			(2.12)	(2.12)
Risk tolerance			4.77***	4.77***
			(1.35)	(1.35)
Cognitive ability				0.31
				(0.82)
Obs.	1093	1093	1093	1093
R^2	0.061	0.073	0.096	0.096

Notes: This table presents linear regressions of the decision to compete, as in Table 4. All regressions control for dummy variables indicating whether the child's father or mother went to university (or whether the child does not know), whether the child took part in the reminder condition, and the number of siblings. All regressions include school fixed effects. The dependent variable equals 100 if the child chose *Compete* and 0 otherwise. Standard errors in parentheses are implied by wild cluster bootstrap p-values, clustering at the school level (Webb weights, 99,999 replications). *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, based on the bootstrap p-values.

sample and separately for boys and girls. Most children report that their parents went to university. This is true for 67% of fathers and 68% of mothers. However, many children do not know whether their parents went to university. About a quarter of the children answered "I don't know" to each question, which is not surprising for children this age. To avoid losing these observations, we include a separate dummy variable for children who answered "I don't know." On average, children have 2.38 siblings. Boys and girls do not differ significantly in any of these variables at the 5% level.[20]

We then rerun our main regressions, adding dummy variables for each parent's education, a dummy variable for the reminder condition, and the number of siblings. Table C2 presents the determinants of the decision to compete, as in Table 4. Table C3 reports the coefficient on *compete* for each of our outcomes, using the same four specifications as in Tables 5 and 7.

The additional controls have little effect on the results. In Table C2, coefficients are nearly identical to those in Table 4. The gender gap in competition entry remains small and statis-

[20]We test for gender differences with a separate linear regression of each variable on a dummy variable for girls, with school fixed effects and wild cluster bootstrap p-values. The only marginally significant difference is the share of mothers who went to university (65.31% for boys and 70.24% for girls, $p = 0.064$).

Table C3. Association between willingness to compete and liking school subjects and traits important for success in aspired occupations with additional controls

	I	II	III	IV	Obs.
Liking of School	0.21**	0.21**	0.23**	0.21**	1077
	(0.10)	(0.09)	(0.10)	(0.09)	
Liking of Math	0.20*	0.14*	0.18*	0.13	1077
	(0.10)	(0.08)	(0.10)	(0.08)	
Liking of Language	0.09	0.08	0.11	0.09	1077
	(0.07)	(0.07)	(0.07)	(0.07)	
Liking of Art	0.06	0.11*	0.08	0.11*	1077
	(0.06)	(0.06)	(0.06)	(0.06)	
Being competitive	0.14**	0.11*	0.11**	0.10*	1018
	(0.06)	(0.06)	(0.05)	(0.05)	
Being risk-tolerant	0.09	0.05	0.05	0.03	1018
	(0.10)	(0.10)	(0.08)	(0.09)	
Being intelligent	0.01	0.03	0.02	0.03	1018
	(0.06)	(0.07)	(0.06)	(0.07)	
Being generous	−0.09	−0.09	−0.05	−0.08	1018
	(0.06)	(0.07)	(0.06)	(0.07)	
High job status	0.07*	0.08*	0.07	0.08*	1018
	(0.04)	(0.04)	(0.04)	(0.04)	
Importance of math	0.00	−0.01	−0.01	−0.01	1018
	(0.05)	(0.06)	(0.05)	(0.06)	
Competition task controls	No	Yes	No	Yes	
Girl dummy	No	No	Yes	Yes	

Notes: This table repeats our main regressions with additional controls. It reports only the coefficient on *compete* from regressions of the outcome listed in each row, as in Tables 5, 7, 9, and C5. All regressions control for dummy variables indicating whether the child's father or mother went to university (or whether the child does not know), whether the child took part in the reminder condition, and the number of siblings. All regressions include school fixed effects. All outcomes are standardized to have a mean of zero and a standard deviation of one. Regressions in columns II and IV control for performance, overconfidence, risk tolerance, and cognitive ability. Regressions in columns III and IV include a dummy variable for girls. Standard errors in parentheses are implied by wild cluster bootstrap p-values, clustering at the school level (Webb weights, 99,999 replications). *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, based on the bootstrap p-values.

tically insignificant. In Table C3, the coefficients on *compete* change by at most 0.01 standard deviations relative to our main results. Children who chose to compete like school more than those who did not. They also aspire to occupations where being competitive is rated as more important for success. The associations with the other outcomes remain small and not statistically significant.

Table C4. Importance of math in aspired occupations

Panel A. Ten most common occupations

Occupation	Importance of math
Artist	1.88
Astronaut	4.85
Doctor	3.96
Engineer	4.66
Footballer	2.32
Pilot	3.97
Police officer	3.35
Scientist	4.86
Teacher	4.28
Vet	3.34
10 most common occupations	3.53

Panel B. By gender

	Mean	SD	N
All	3.47	0.94	1018
Boys	3.48	0.93	503
Girls	3.46	0.95	515

Notes: The table reports the importance of math for success in the children's aspired occupations, as rated by 280 adult respondents in a separate survey (see Section 4.3) on a scale from "Not at all important" (1) to "Extremely important" (5). Panel A reports the rating of the ten occupations named most often by the children, in alphabetical order. The last row reports the average across the 686 children who named one of these occupations. Panel B reports the mean, standard deviation, and number of observations for the 1,018 children who named an occupation for which we have ratings, for the full sample and by gender.

C.2. Importance of math in aspired occupations

In this subsection, we present additional results on the importance of math for success in the occupations children aspire to. As described in Section 4.3, we measure the importance of math through a separate survey of 280 adult respondents. These respondents rated the importance of math for success in each occupational category. We combine these ratings with the occupation classification, as described in Appendix B.

Panel A of Table C4 shows the perceived importance of math for the ten occupations most often named by the children. The ratings are in line with common sense. Math is rated as most important for success as a scientist (4.86), an astronaut (4.85), or an engineer (4.66). It is rated as least important for success as an artist (1.88) or a footballer (2.32). Note that the importance of math differs from the importance of being competitive. Across the 150 occupations, the importance of math is negatively correlated with the importance of being competitive ($r = -0.25$) and positively correlated with status ($r = 0.41$).

Panel B of Table C4 shows that boys and girls aspire to occupations in which math is rated equally important. On average, the importance of math is 3.48 for the occupations named by boys and 3.46 for those named by girls ($p = 0.651$). This contrasts with the large gender differences in the importance of being competitive, risk-tolerant, intelligent, and generous (see

Table C5. Decision to compete and the importance of math in aspired occupations

	I	II	III	IV	V	VI
Compete	−0.00	−0.01	−0.01	−0.01		
	(0.05)	(0.06)	(0.05)	(0.06)		
Compete × Boy					−0.08	−0.09
					(0.09)	(0.09)
Compete × Girl					0.06	0.03
					(0.07)	(0.07)
Girl			−0.04	−0.06	−0.14	−0.13
			(0.09)	(0.09)	(0.15)	(0.12)
Controls	No	Yes	No	Yes	No	Yes
Obs.	1018	1018	1018	1018	1018	1018
R^2	0.040	0.046	0.041	0.047	0.042	0.053

Notes: This table presents linear regressions of the importance of math for success in the child's aspired occupation, as rated in a separate survey of 280 adult respondents (see Section 4.3). The dependent variable is standardized to have a mean of zero and a standard deviation of one across the 150 occupations in our analysis, with each occupation counted once. *Compete* is a dummy variable equal to one if the child chose *Compete*. *Compete* × *Boy* and *Compete* × *Girl* are the coefficients on the decision to compete for boys and girls, respectively. *Girl* is a dummy variable equal to one for girls. Regressions in columns II, IV, and VI also control for performance, overconfidence, risk tolerance, cognitive ability, and a dummy variable for missing confidence. In column VI, the controls are interacted with gender. All regressions include school fixed effects. The sample consists of the 1,018 children who named an occupation for which we have ratings. Standard errors in parentheses are implied by wild cluster bootstrap p-values, clustering at the school level (Webb weights, 99,999 replications). *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, based on the bootstrap p-values.

Section 3). Hence, although girls like math less than boys, they do not aspire to occupations in which math is less important.

Table C5 reports regressions of the importance of math in children's aspired occupations. We use the same specifications as in Table 9. Columns I to IV use the four specifications from Table 7. Columns V and VI estimate the association separately for boys and girls. The decision to compete is not associated with the importance of math in the aspired occupation. In columns I to IV, the coefficient on *compete* ranges from −0.01 to 0.00 and is not statistically significant. When we estimate the association separately by gender, the coefficients are small and not statistically significant for both boys (−0.08 and −0.09) and girls (0.06 and 0.03). The coefficient on the dummy variable for girls is also small and not statistically significant across all specifications.