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Gender differences in preferences of adolescents: evidence from a large-scale classroom experiment

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ABSTRACT

In this study, we estimate unadjusted and adjusted gender gap in time preference, risk attitudes, altruism, trust, trustworthiness, cooperation and competitiveness using data on 1088 high-school students from 53 classes. These data, collected by running incentivized experiments in Hungarian classrooms, are linked to an administrative data source on the students' standardized test scores, grades and family background. We find that after taking into account class fixed effects, females are significantly more altruistic (both with classmates and schoolmates), but are less present-biased, less risk tolerant, less trusting, less trustworthy and less competitive than males. At the same time we do not observe significant gender differences in patience, time inconsistency and cooperation at the 5% significance level. We also show that these initial gender differences do not change even if we control for age, family background, cognitive skills and school grades in a regression framework. Moreover, the gender gap also remains in all but one of these preferences even if we control for the other preference domains, suggesting that only risk preferences are confounded by the other preferences, at least as the gender gap in these preferences is concerned.

JEL codes: C80,C90,D91

Keywords: adolescents, altruism, competitiveness, cooperation, dictator game, patience, present bias, public goods game, risk preferences, social preferences, time inconsistency, time preferences, trust, trustworthiness

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Kamaszkori nemi különbségek a preferenciákban: egy nagyléptékű iskolai kísérlet eredményei

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ÖSSZEFOGLALÓ

Ebben a tanulmányban a nyers és kiigazított nemi különbségeket becsüljük meg az időpreferencia, a kockázattal szembeni attitűd, a nagylelkűség, a bizalom, a megbízhatóság, az együttműködés és a versengési preferenciák terén, amihez 53 osztály 1088 középiskolás diákjának adatait használtuk fel. Az adatokat, melyeket osztálytermi ösztönzött kísérletek során gyűjtöttük, a diákok adminisztratív adatforrásból származó standard tesztpontszámaihoz, jegyeihez és családi hátterét leíró adataihoz kötjük. Ha figyelembe vesszük az osztály fixhatásokat, a lányok szignifikánsan nagylelkűbbek (osztály- és iskolatárssal szemben is), kevésbé jelentorzítottak, kevésbé kockázattűrők, kevésbé bíznak a másikban, kevésbé megbízhatóak és kevésbé versengőek, mint a fiúk. Ezzel szemben nem találunk szignifikáns nemi különbséget türelemben, idő-inkonzisztenciában, és együttműködésben 5%-os szignifikanciaszinten. Azt is megmutatjuk, hogy ezek a nemi különbségek nem változnak akkor sem, ha regressziós elemzés keretein belül figyelembe vesszük a kort, a családi hátteret, a kognitív képességeket és az iskolai jegyeket. A nemi különbségek akkor is megmaradnak egy kivételével az összes preferenciát tekintve, ha az összes többi preferenciára is kontrollálunk, amiből arra következtethetünk, hogy csak a kockázati preferenciák függnek össze szorosan más preferenciákkal, legalábbis a nemi különbségek vonatkozásában.

JEL: C80,C90,D91

Kulcsszavak: bizalom, diktátor-játék, együttműködés, idő-inkonzisztencia, időpreferencia, jelen-torzítás, kamaszok, kockázati preferencia, közjószág-játék, megbízhatóság, nagylelkűség, társas preferencia, türelem, versengés

Gender differences in preferences of adolescents: evidence from a large-scale classroom experiment*

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Abstract

In this study, we estimate unadjusted and adjusted gender gap in time preference, risk attitudes, altruism, trust, trustworthiness, cooperation and competitiveness using data on 1088 high-school students from 53 classes. These data, collected by running incentivized experiments in Hungarian classrooms, are linked to an administrative data source on the students' standardized test scores, grades and family background. We find that after taking into account class fixed effects, females are significantly more altruistic (both with classmates and schoolmates), but are less present-biased, less risk tolerant, less trusting, less trustworthy and less competitive than males. At the same time we do not observe significant gender differences in patience, time inconsistency and cooperation at the 5% significance level. We also show that these initial gender differences do not change even if we control for age, family background, cognitive skills and school grades in a regression framework. Moreover, the gender gap also remains in all but one of these preferences even if we control for the other preference domains, suggesting that only risk preferences are confounded by the other preferences, at least as the gender gap in these preferences is concerned.

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1 Introduction

Preferences matter. A large and growing literature shows that preferences strongly predict a wide array of real-life outcomes, including educational, labor market, financial and health choices (Dohmen et al., 2011; Falk et al., 2018; Golsteyn et al., 2014; Moffitt et al., 2011). Special attention has been given to gender differences in preferences as these may lead to inefficient social outcomes (Blau and Kahn, 2017; Buser et al., 2014; Ellison and Swanson, 2010; Paglin and Rufolo, 1990).

Preferences evolve throughout childhood and adolescence, and there are several studies shedding light on how gender shapes preferences, besides other important determinants like socioeconomic status. Understanding gender differences in preferences in childhood and adolescence is important as those preferences seem to be more malleable at younger ages (Ertac, 2020). Moreover, the gender intensification theory in psychology (Hill and Lynch, 1983) posits that adolescence reinforce societal expectations for gender-typed behavior (Rose and Rudolph, 2006), so investigating the factors that shape preferences in this age is an important endeavor.[1]

This paper investigates gender differences in time, risk, social and competitive preferences of high-school students using incentivized lab-in-the-field experiments conducted in 9 schools' 53 school classes, with overall 1088 students in Hungary. The four most widely researched preference domains were measured in detail. We used the staircase (or unfolding brackets) method to measure time preferences (see Cornsweet, 1962; Falk et al., 2018). Following the beta-delta model proposed by Phelps and Pollak (1968) and Laibson (1997) we focus on the individual discount factor capturing the patience of the students (we often refer to it as *delta*), and on time consistency (we often call it *beta*) as well as on present-bias (when $beta<1$). We opted for the bomb risk elicitation task (Crosetto and Filippin, 2013) to assess risk preferences. We were interested in various aspects of social preferences, so we measured altruism (proxied by the dictator game), trust and trustworthiness (with the trust game), and cooperation (with a two-person public goods game). Moreover, we used the dictator game to assess altruism toward a classmate and a schoolmate, varying the degree of social distance between the dictator and the recipient. We call our corresponding measures *altruism* / *trust* / *trustworthiness* / *cooperation*, higher values of the measures indicating a higher level of the given preference. Competitive preferences were estimated using the established experimental procedure by Niederle and Vesterlund (2007) and we refer to this measure as *competition*. To ensure that the different tasks do not affect each other (e.g. receiving a low amount in the dictator game may influence how much a subject gives in the trust game), there was no feedback until the end of the experiment. A major strength of our study is that besides these preference measures, we obtained rich background information on the subjects from an administratively collected individual-level data source on the students' previous cognitive abilities (proxied by their standardized test scores in mathematics

[1] Andersen et al. (2013) and Alan and Ertac (2019) illustrate this point related to the emergence of gender difference in competitiveness with evidence from field experiments.

and literacy), school performance (grades) and family background.

There is consensus in the literature (see meta-analyses by Croson and Gneezy, 2009; Bertrand, 2011; Niederle, 2016) that there is a substantial gender difference in competitive preferences and no gender difference in time preferences.[2] However, there is an ongoing debate if there are gender differences in risk and social preferences. While Eckel and Grossman (2008), Croson and Gneezy (2009) and Bertrand (2011) claim that a robust gender difference exists in risk attitudes (women being more risk-averse), Niederle (2016) shows convincingly that this finding is dependent on the elicitation technique, a finding confirmed by Filippin and Crosetto (2016). Regarding social preferences, Bertrand (2011) argues that gender differences exist, Croson and Gneezy (2009) emphasize that women react in a more sensitive way to cues in the experimental context than men, and Niederle (2016) calls for further investigation to see if there are indeed gender differences. In a recent meta-analysis of the literature on the preferences of children and adolescents, Sutter et al. (2019) report findings mostly in line with the previous results that were blind to the age of the subjects. That is, there is no gender difference in time preferences, in bargaining situations (captured by the ultimatum and the trust games) and in cooperation, but there are gender differences in risk preferences (females being more risk-averse), in individual decision-making (proxied by the dictator game where females are more altruistic), and in competitiveness (females being less competitive).

This paper complements previous research on gender differences in preferences in two ways. First, we measure nine aspects of the four most widely used preferences *at once*, so we can measure gender differences more precisely, conditional on correlated preferences. The issue of correlated preferences has been addressed in some cases. For instance, risk preferences are often controlled for when measuring competitiveness, (see, for instance Buser et al., 2014), or when investigating time preferences, (see, for instance Andersen et al., 2008), but the same is typically not done when analyzing other preferences. Little is known about the rest of the potential correlations between the measured preferences and their effects on the gender gap. If there are significant correlations between the preferences - as we see in our data - not taking this into account might lead to an incorrect interpretation of gender differences in the various preference domains. While risk has been suspected of playing a role in many of the other preferences the same might be true for other preferences. For instance, we see that delta correlates significantly with the amount sent in the trust game and the contribution in the public goods game. Therefore, estimating the gender gap in trust without taking into account the potential differences in patience could lead to under- or overestimated gender gaps. This study investigates if omitting other preferences is conducive to such issues or not.

Second and related to the previous point, given our rich data including information on family background, cognitive abilities and school performance (controls that have been found important determinants of preferences in the literature, see Sutter et al. (2019)), we can assess how the unadjusted gender differences change as we take into

[2]There are just a very few papers that document no gender differences in competitiveness (Price, 2012) or that document gender differences in time preferences (Dittrich and Leipold, 2014).

account more and more controls. In other words, we are able to see when the gender difference disappears (if it does at all), which may shed light on factors mediating the gender difference in the given domain. Note also that even though our sample is not representative, by controlling for the factors mentioned above, we can account for potential individual confounders in a way that if we find gender difference in a given domain, then the difference is likely to be genuine.

Without further controls, we observe gender differences in all the preferences, females being less patient, less present-biased, more risk-averse, more altruistic (both with classmates and schoolmates), less trusting, less trustworthy, less cooperative and less competitive than males. However, our preferred baseline is when class fixed effects are taken into account as they control for many unobserved factors that affect the same group of students. Once class fixed effects are considered, the gender difference in delta and cooperation vanishes. Interestingly, after applying an extensive set of further controls, including age, family background, cognitive abilities and school grades, the previous findings do not change. Hence, there seems to be a solid gender difference in risk preferences, altruism, trust, trustworthiness, competitiveness, time-consistency and present bias in adolescence. If we take the analysis one step further and control also for the rest of the preferences (risking over-control), then the gender gap disappears also in time-consistency and risk preferences, but significant gender difference (at 5%) remains in altruism, trust, trustworthiness, competitiveness and present-bias. Interestingly, females are more altruistic (independently of the social distance from the recipient), while males are more trusting. We observe that in the dictator game females are more likely to split their endowment evenly than males, while in the trust game males are more likely to send all their endowment. These results are in line with previous findings in the literature according to which females are more egalitarian and concerned about payoff inequality (Fehr et al., 2013), while males are more efficiency-oriented and so more likely to make decisions that enhance the pie (Almås et al., 2010; Sutter et al., 2018).

The study is organized as follows. Section 2 contains information about the experimental tasks that we used, the procedures, the rest of the variables and a descriptive analysis of the data. In section 3 we present the results, and section 4 concludes.

2 Data

From March 2019 to March 2020, we visited 9 secondary schools in Hungary to assess the economic preferences of students. Overall, we measured time, risk, social and competitive preferences of 1088 students in 53 school classes (groups of students studying the major subjects together as of the start of their upper-secondary education). The experiments were anonymous, but we can link the preference measures to individual-level data from the National Assessment of Basic Competences (NABC) (for details see Sinka, 2010), providing useful information about the participants' previous standardized test scores, school grades and family background. With the detailed preference map of the students and the additional information on their background and school performance,

we can study how gender differences in preferences observed in adolescence depend on other observable factors.

In this section, first we briefly describe the procedures related to the experiments and the experimental tasks that we used. Then, we present our variables related to family background and cognitive abilities. We finish the section with some descriptive statistics of the variables. For a more detailed description of the collection of the experimental data see Horn et al. (2020).

2.1 Procedures

At the beginning of the project, we contacted all educational providers in Hungary with at least one secondary school to request permission to run the experiment in their institutions. Our sample contains schools that were either suggested by the provider and schools that - once the provider gave permission - indicated voluntarily their willingness to participate. Half of the sample operates in Budapest and the other half in smaller rural towns of Hungary.

Our sample is not representative of the total school population of Hungary. The socioeconomic status of the participating students is higher than that of the corresponding population. In terms of school performance, students in our sample achieved a higher average mathematics test score on the NABC in 6th grade than the population of all 6th-grade students in 2017.[3]

After arranging the schedule with the schools, but before the experiment, we sent out a data protection statement to all parents and children, explaining that we would ask for the students' IDs used in the NABC so that we would be able to connect our experimental data to anonymous NABC data on school performance and socioeconomic background at the individual level.[4] Participation was voluntary and anonymous.[5]

On experiment day, we unpacked our laptops in the school in a designated classroom, turning it into our laboratory for the day. The experiment was conducted using the z-Tree (Fischbacher, 2007) software. We ran the experiments during school hours (courses in Hungary are 45 minutes long followed by 15-minute break), so we had at most an hour to conduct the experiment with a given class and pay the participants. Participants knew each other as they were classmates in all sessions. After entering the classroom, participants were free to choose a seat. Once seated, the experimenter read aloud the instructions that students could also read from the sheet in front of them. Importantly, we explained in the instructions that participants would make decisions in 8 situations, many of them involving interaction with other participants, but we did not tell anything about the concrete experimental tasks. We emphasized that the experiment was not an exam, there were no correct answers, and that we were interested in how they would

[3] In Horn et al. (2020) we provide more information on the differences between the sample used in this study and the overall student population in Hungary.

[4] The NABC ID is a hash-code of the educational IDs of the students used only to identify students within the NABC surveys. It is not linked to any other data set. We notified the education providers that we would collect NABC IDs.

[5] There were two students who opted out from our experiment.

decide in a given situation. After that, questions and doubts were answered. Participants were assured that all decisions remained confidential. The experimenters made sure that participants did not speak with each other or disturb each other in any way during the experiment.

There were no time limits in the different tasks (except for the real-effort task to measure competitiveness), the only constraint being that we had to end the experiment before the next class. We asked participants to occupy themselves silently after they have finished, because potentially there could be large differences in how much it would take for different participants to make all the decisions. Even though there was a large variance in the time that participants spent with the tasks, there were no incidents related to it.

Time and risk preferences were measured using individual tasks, so the payoffs did not depend on the choices of other participants. The measurement of social and competitive preferences involved strategic interaction, so payoffs were interdependent. To create random student pairs, we used z-Tree (Fischbacher, 2007). Matching pairs was carried out always at the end of the experiment, after each student made the decisions in each task.[6]

We incentivized the participants with meal vouchers that could be used in the school cafeterias as cash. We made clear to the students that from the 8 experimental tasks one would be randomly chosen by the computer for payment, and that the game for payment would be the same for all participants. We explained carefully that if a task involved several choices (as the time preference measures did), only one randomly picked choice would be payoff-relevant. We paid no show-up fee, as we went to the schools during school hours. Payoffs in the different tasks were designed so that the expected payoff was around 1000 HUF (around 3 EUR), approximately the price of a full meal at an average school cafeteria.

We informed participants about the details of the payment (e.g. random selection of tasks for payment, use of vouchers) at the beginning of each session. Payoffs not involving delay were handed out in private at the end of the session.

2.2 Experimental tasks

Time preferences Time preferences reveal how an individual trades off earlier and later benefits. Using the beta-delta model proposed by Phelps and Pollak (1968) and Laibson (1997) we can differentiate between patience (delta) and time consistency (beta). Patience indicates how an individual values the future relative to the present, while time consistency indicates if this relative valuation is the same at different points in time. Patient individuals value the future more relative to the present than their less patient counterparts. Time consistency implies the same trade-off between earlier and later benefits at different points in time when separated by the same time interval. In con-

[6]With an odd number of students in the room, the last pair of students was in fact a group of three participants and the payments of students in this group were affected by the decision of only one of the other students who was also randomly chosen by the program.

trast to time consistent individuals, present-biased (future-biased) ones are more (less) impatient now than later. To capture both aspects of time preferences, we measured decisions at two different time horizons. Participants had to choose between receiving a smaller amount today or a larger amount in 2 weeks (task 1) and they made the same decision also for the dates 4 weeks vs. 6 weeks (task 6). In both cases, participants made 5 interdependent choices using the staircase (or unfolding brackets) method (see Cornsweet, 1962; Falk et al., 2018). The benefit of this method is that it uses the available number of questions efficiently to find the approximate indifference point between the earlier and the later payoffs. In each case, the earlier amount was fixed (1000 HUF $\sim$ 3 EUR) while the later amount (X) was changed in an adaptive way, depending on the previous choices. For instance, a choice of 1000 HUF today instead of X=1540 HUF in 2 weeks indicated that the indifference point was higher than 1540 HUF, so in the next question X was increased. X ranged from 1030 to 2150 HUF. After five questions we have a fairly accurate information about the indifference point.[7] If the same participant in task 6 (4 weeks vs. 6 weeks) ends up with the same indifference point, then she is time consistent. A lower indifference point indicates present bias.

When one of the two time preference tasks was payoff-relevant, the computer chose randomly one of the 5 decisions and participants were paid according to their choice. That is, students who chose to receive a larger amount two, four or six weeks later were asked to put their vouchers in an envelope, that indicated the name of the student and the date when the payment was to be received, which we placed at the school secretariat from where the students could claim their payment in two, four or six weeks.[8]

Risk preferences Attitudes toward risk are informative about an individual's attitude toward uncertainty, so the corresponding tests generally involve some situation with uncertainty, mainly gambles (e.g. Eckel and Grossman, 2002; Gneezy and Potters, 1997; Holt and Laury, 2002). Based on our experience in a pilot experiment, gambles may seem strange to our student pool, so instead of gambles, we decided to use the bomb risk elicitation task by Crosetto and Filippin (2013), which is a more game-like measure of risk preferences, where higher values indicate higher risk tolerance.[9] Crosetto and Filippin (2016) examine four, widely used risk elicitation methods in experimental economics, including the bomb risk elicitation method, and report that it is a valid measure

[7] If the participant in the last question chooses 1730 HUF in 2 weeks instead of 1000 HUF today, then (by the construction of the payoffs) we know that her indifference point is between 1730 HUF and the closest lower amount (1650 HUF). For simplicity, in this case, we assign the indifference point of 1650 to the participant, so she needs a 650 HUF compensation for waiting 2 weeks to receive the payment.

[8] We made sure to choose dates for the experiments so that these later payments can be received and the vouchers could be used without any problem, e.g. no later payment occurred during holidays. The Covid-19 outbreak and the sudden school closures have affected some of the later payments, so we agreed with the schools to distribute these later payments to the students when normal routine returns. Since the outbreak and the ensuing school closure was unexpected, the choices of the students should not have been influenced by these events.

[9] In this task, there is a store with 100 numbered boxes, one of which contains a bomb with uniform probability. Participants decide how many boxes to collect, following the numbering. If the bomb is in one of the boxes collected, then the participant earns no money, otherwise earnings increase with the number of boxes collected. The number of boxes collected is a proxy for risk preferences.

of risk preferences. We measured risk attitudes in task 4.

When this task was selected for payment, the computer generated a random number between 0 and 100 that determined the outcome of the risky situation and the earnings of the participants.

Social preferences There are many aspects of social preferences. In our experiment, we focused on four of them: *altruism, trust, trustworthiness and cooperation.*

Following standards of the profession, we measured altruism with the dictator game. In fact, there were two dictator games. In both tasks, participants were endowed with 2000 HUF. In the first one (task 2), the participants had to decide how to split their endowment with a classmate in the room, while in the second one (task 3), the other party was not somebody from the room, but a random schoolmate. Task 2 was incentivized, but task 3 was hypothetical as implementing the choice was not feasible. When this task was payoff-relevant, the computer paired the participants randomly and selected randomly a member of each pair to be the dictator and her / his choice was implemented.

We measured trust and trustworthiness using a modification of the trust game (also known as investment game) by Berg et al. (1995). The modification consisted in that the receiver did not have an initial endowment. The game (task 7) consisted of two steps. In step 1, in the role of the sender, each participant decided how much of their endowment of 1000 HUF to send to a randomly selected receiver in the room, knowing that the amount would triple at the receiver, and in the second step, the receiver could send back any portion of that larger amount. The sent amount had to be a multiple of 100 and it is a measure of trust. In step 2, everybody assumed the role of the receiver and they had to choose how much they would return of the 3*X of sent X amount (X=0, 100, 200,...1000). That is, we have answers for all contingencies, and this stage provides information on the trustworthiness of the participants. More concretely, we calculate for every amount sent and tripled the share of the amount sent back, and we use the average of theses shares as our measure of trustworthiness.[10] Everybody made a decision in both roles (as a sender and as a receiver). We modified the trust game to link it more to the dictator game where the recipient depends on the altruism of the dictator. Here this motive is still present, but it is complemented with the possibility of reciprocity by the receiver. In the role of the receiver, the reciprocity motive may become stronger relative to the standard trust game as without the sender sending money, she would end up with nothing. Hence, the modification both intensified the senders' and the receivers' motives to be prosocial. When this game became payoff-relevant, students were paired, and one student in each pair was randomly selected as sender. We used the decision of the receiver that corresponded to the sent amount to determine the players' payoffs.

The third dimension of social preferences that we measured was cooperation. Using a two-person variant of public goods game (task 5), we endowed everybody with 1000 HUF and matched each participant randomly with somebody else from the room. They

[10] For instance, if X=300 and the receiver returns 450 HUF, then the share sent back is $\frac{450}{3*300} = 0.5$.

had to decide how much of the endowment to contribute to a common account, without knowing the decision of the other participant. The amount not contributed to the common project added to their payoff. The marginal per capita return was 75%, so each of the two participants received 75% of the total contributions, independently of the individual contribution. Our proxy for cooperation is the contribution to the common project: the more a participant contributes, the more cooperative she is.[11] When this task was chosen for payment, the computer randomly paired the participants and based on their decisions the payoffs were calcualted and paid.

Competitiveness We measured competitiveness in the last task (task 8), using the setup by Niederle and Vesterlund (2007), but instead of adding up numbers, participants faced a real-effort task where they had to count zeros in 5x5 matrices (as in Abeler et al. (2011)) for one minute. In the first stage (piece-rate) the number of correctly solved matrices determined the participants' earnings. In stage 2, the outcome of a tournament defined the payoffs, where only the best 25% of the participants earned money for the task, though in this case, earnings were 4 times as high per matrix solved as in stage 1. At the end of stage 1 and 2 we provided feedback about how many matrices the participants solved correctly, but no information was given about their relative performance. In stage 3, students could decide whether to get paid by the piece-rate or by the tournament scheme. The tournament choice is the indicator of a participant being competitive. After stage 3, participants were asked to rank themselves (being in the 1st / 2nd / 3rd / 4th quartile) based on their performance in stage 1 and 2. This belief elicitation was incentivized, those who guessed correctly received 300 HUF. At the end of the experiment, when this task was selected for payment, the computer picked one of the stages randomly and participants were paid according to their performance in that stage.

Order It was not obvious in which order to implement the 8 tasks. The following considerations governed our decision when establishing the order. Since participants might have unwittingly tried to be consistent in their choices in the two time preference tasks, we wanted to have them somewhat apart, introducing other tasks between them. In the two dictator games, the only difference was the reference group so we put these questions close to each other, since we did not think that participants would want to be consistent in giving the same amount to classmates and schoolmates. Our aim was that participants consider the different tasks as separate and independent decisions, so in the first 7 tasks, we did not give any feedback to them. Note that in the first 7 tasks there is no clear good choice. However, in last one, the competitiveness task participants received feedback about their absolute performance (that is, the number of matrices

[11] To make the decision easier, on the decision screen, participants had two sliders, both of them going from 0 to 1000, the first representing their contribution and the second corresponding to their co-player's contribution. By moving the sliders, they could see the payoff consequences of different contribution combinations. Figure 7 in Horn et al. (2020) contains a screenshot of the decision screen.

solved) and the (potential) earnings that those performances implied.[12] Knowing the absolute performance may affect the participants emotionally (e.g. having earned a lot of money in the piece-rate stage may cause elation), so we put the competitiveness task at the end. All participants made decisions in the same order. An advantage of having a fixed order of tasks for all students is that students' decisions are directly comparable, while the drawback is that we do not know whether order effect influenced the choices (e.g., would students make the same decisions in the time preference tasks if those tasks are the last ones?). As a consequence, all our findings are conditional on the special order that the participants played the games.

2.3 Family background and cognitive abilities

Besides the preferences that we measured at schools, the other main variables of interest are related to demography (age, gender), the family background of the students, their school performance and their cognitive abilities. We obtained these student-level variables from the NABC database. Data on gender and age are missing only for a few cases, but socioeconomic status is missing in 16% of the cases and GPA in 24% of the cases, because these were self-reported in the NABC questionnaire. For family background, we transformed all categorical variables into dummy variables, where missing was a separate category. For the GPA, we imputed missing values with the sample mean and controlled for the imputed values with a separate missing dummy.

The family background variables that we consider are: the highest level of parents education, father's employment status, whether the family receives regular child protection support and the number of books at home. We proxy cognitive ability with standardized mathematics and reading test scores measured in grade 6 (around age 12).

As a further set of controls for school performance, we use teacher-given class-marks from grade 6: GPA, as well as separate grades in mathematics, Hungarian language, literature, sedulity and conduct.

2.4 Some descriptive statistics about the sample

In our sample of 1088 students, we have 611 females and 477 males. Table 1 shows the pairwise correlations of the preference measures as well as their significance level while Table 2 shows the average difference between males and females in all observed characteristics and the corresponding t-statistic.[13]

Unsurprisingly, different preference measures within a preference domain are well correlated - i.e. altruism, trust, trustworthiness and cooperation within social preferences, as well as delta and beta within the time preference domain. Risk is correlated

[12] We did not inform participants after stage 2 if they were in the best 25% of students. We only let them know the number of correctly solved matrices and the payoff if they happened to be in the best 25%, but we did not tell them if they were or were not.

[13] Table 4 in the Appendix gives descriptive information about all utilized controls as well as about the measured preferences by gender.

Table 1: Pairwise correlations between preferences

	Delta	Beta	Risk	Altruism	Trust	Trust-return	Cooperation
Beta	-0.394***	1					
Risk	0.156***	-0.115***	1				
Altruism	0.0278	0.0668*	0.130***	1			
Trust	0.145***	0.0520	0.220***	0.266***	1		
Trustworthiness	0.0213	0.0190	0.0157	0.294***	0.324***	1	
Cooperation	0.103***	0.00970	0.149***	0.138***	0.450***	0.252***	1
Competition	0.0184	0.0486	0.0813**	0.0280	0.0466	0.0297	0.0329

with most of the measured preferences, suggesting that it has a prime role among preferences. There are also some less straightforward associations: delta is correlated with trust and cooperation.[14] Competition seems to be the most unique preference as it correlates only with risk.

According to Table 2, while in most cases there is no statistical difference between females and males, some variables are significantly different. Apparently, males in our sample have better family background, as their parents are relatively more educated and less likely to be self-employed. The number of books also indicates a higher socioeconomic status of males. Males have higher mathematics and reading test scores in grade 6 in our sample, indicating better cognitive abilities. These differences are likely to be interrelated as better test scores may be due to better family background. If we look at within class differences in these variables, only very few of them remain significant (e.g. females' parents are more likely to be medium level educated, but not less or more educated), and few reverse their sign (e.g. females have higher GPA within class due to their higher Hungarian and literature grades, but males have significantly higher math test scores).[15] This suggests that while our sample of classes are far from being representative, the within class gender differences resemble that of the total population better.[16]

3 Results

Our main variable of interest is the gender dummy (*female*) that indicates if females make different decisions in the given preference task. For each preference measure, the first specification is the raw difference between the genders: the female coefficient without any control variables. But as we have shown above, our sample is quite imbalanced if we do not control for the fact that our respondents are clustered within classes. Hence, the second specification adds the class fixed effects (*class FE*). Their inclusion allows us

[14] This might be due to the fact that both the trust game and the public goods game have a slight time element in the sense that one has to wait until the other player decides to know the outcome.

[15] See section A in the Appendix for more details.

[16] In the 2017 NABC 6th grade full database females have 8 points lower maths scores and 55 points higher reading scores than males. Females also have a 0.24 points higher GPA, 0.4 points higher Hungarian and 0.33 higher literature grades than boys, while boys score 0.15 points higher in maths than females.

Table 2: Average difference of all variables between males and females

	T-test	
	Diff.	t-stat
NABC data		
Age (in months)	0.684	(0.83)
Family		
parental ed.: low	0.00496	(0.62)
parental ed.: medium	0.124***	(4.27)
parental ed.: high	−0.108***	(−3.55)
parental ed.: missing	−0.0216	(−1.17)
father: employed	−0.0421	(−1.45)
father: self-employed	0.0549*	(2.55)
father: regural work	0.00405	(0.46)
father: occasional work	−0.00741	(−1.01)
father: childcare	−0.00368	(−0.50)
father: retired	0.00890	(1.53)
father: unemployed	0.00609	(1.35)
father: disabled	0.00563	(1.08)
father: missing	−0.0264	(−1.29)
child support: no	−0.0109	(−0.42)
child support: yes	0.0364	(1.81)
child support: missing	−0.0255	(−1.34)
No. books: 0-50	0.00140	(0.09)
No. books: cca. 50	0.0337*	(2.01)
No. books: max. 150	0.0256	(1.11)
No. books: max 300	0.0246	(1.13)
No. books: 300-600	0.00239	(0.11)
No. books: 600-1000	−0.00712	(−0.32)
No. books: over 1000	−0.0599**	(−2.81)
No. books: missing	−0.0206	(−1.14)
Cognitive skills		
Math score, 6th grade	−106.9***	(−9.08)
Reading score, 6th grade	−25.48*	(−2.16)
Grades		
GPA, imputed	0.0361	(1.35)
GPA, missing	−0.00721	(−0.30)
Math grade, imputed	−0.105*	(−2.03)
Hungarian grade, imputed	0.0839	(1.92)
Literature grade, imputed	0.0768	(1.94)
Math grade, missing	−0.0305	(−1.42)
Hungarian grade, missing	−0.0251	(−1.17)
Literature grade, missing	−0.0298	(−1.37)
Experiments		
Payoff	−23.01	(−0.45)
Delta	−0.0402***	(−4.27)
Beta	0.0532***	(3.85)
Risk	−6.294***	(−5.39)
Competition	−0.101***	(−3.40)
Altruism	5.932***	(5.34)
Altruism (school mate)	4.550***	(3.67)
Trust	−8.215***	(−5.36)
Trust-return	−3.058**	(−3.08)
Cooperation	−3.842*	(−2.28)

/***/**/* denote significance at 1 / 5 / 10%.

to take into account the following: i) all experiments were conducted within a classroom at a given time and place under similar circumstances; ii) participants play some of the games with their peers in the classroom; iii) students are likely to be selected into different classes (and hence our imbalance in the covariates). In fact, we believe that the results of this specification would probably be closer to a representative sample, had we have one. Henceforth, when including additional controls to our models, we will use the class fixed-effect model as a reference. In the next specification, we control for age as it has been shown to be an important determinant of preferences during adolescence (see Sutter et al., 2019). Then, we control for family background by considering various aspects of the socio-economic status (*family*), see section 2.3. In the next specification, we include the mathematics and reading test scores from grade 6, assuming that they are good proxies of *cognitive skills*. Then, we also add *grades* to control for school performance. Besides the grade point average, we also take mathematics, Hungarian language and literature into account. In the last specification we control for all other preferences, thereby testing if the association of gender with the preference of interest is confounded by the other preferences.[17]

By controlling for exogenous factors like age, family characteristics, cognitive skills and school performance, we not only control for the biases in our sample but also try to speculate about the mechanisms through which gender associates with preference measures. Finally, by controlling for all other measured preferences, we test whether the given preferences have a direct (*ceteris paribus*) effect on the differences between genders.

To ease the exposition of the results, we use coefficient plots that visualize the estimation of the coefficient of the *female* dummy with the corresponding 95% confidence intervals. Section C in the Appendix contains the full regression tables. To present our findings in a structured way, we use the same descriptive statistics and the same specifications in all of the regressions for the analysis of the different preferences below.

3.1 Time preferences

The existing literature did not produce a clear-cut finding if there is a gender difference in the patience of adolescents. Some studies report females being more patient (Bettinger and Slonim, 2007; Castillo et al., 2011, 2019), while others document the opposite result (Golsteyn et al., 2014). Some individual factors are argued to have a direct effect on time preferences. Patience is shown to increase with age (Bettinger and Slonim, 2007), while low social status is likely to predict more impatient choices (Castillo et al., 2011). There is also some evidence that better cognitive abilities associate with more patience (Luehrmann et al., 2018). Regarding present bias, Tymula (2019) and Luehrmann et al. (2018) do not find gender differences.

[17]We only control for the "main" preferences from the four domains - delta, risk, altruism, trust, cooperation and competition - and we never control for preferences from the same domain. So we do not take delta into account when we look at beta, nor do we control for the other social preferences, when we look at altruism, trust or cooperation.

Our measure of patience (delta) is the individual discount factor that we calculate based on task 6, the intertemporal choice between a lower amount of money in 4 weeks and a larger amount of money in 6 weeks. Assuming linear utility, the indifference amount of 1000 HUF to be received in 6 weeks (denoted by x_6) comes from the equation $1000 = delta * x_6$, were *delta* denotes patience. In our sample, delta ranges from 0.33 to 0.97. The mean for females is 0.73 and for males is 0.77.

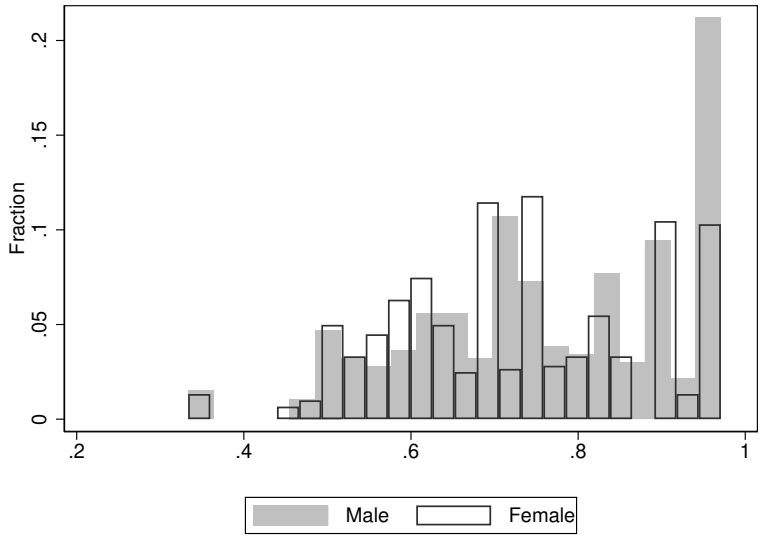

Figure 1: Distribution of time-discounting (delta) by gender

Figure 1 shows the distribution of delta by gender and reveals that the difference between females and males is mainly due to the fact that there are more males at the upper end of the distribution. More precisely, more males exhibit the maximum level of patience than females.[18]

Figure 2 represents the coefficient plot of the regression analysis (see Table 6 in the Appendix for the full regression). The first point in Figure 2 shows the difference in the raw data, confirming that there is a significant gender difference in patience. However, once we add class fixed effects, the gender difference disappears and remains so in the rest of the specifications. Therefore, if the individual characteristics of the participants and features of the environment are controlled for, there seems to be no gender difference in patience.

We compute the time inconsistency parameter (beta) by applying the delta - beta model (Phelps and Pollak, 1968; Laibson, 1997) to the observations from experimental tasks 1 and 6. Using the previously computed delta parameter and denoting the indifference amount of today's 1000 HUF to be received in 2 weeks by x_2, beta is given by $1000 = beta * delta * x_2$. In our sample, *beta* ranges from 0.34 to 2.91. The

[18]The Wilcoxon rank-sum test (p-value<0.001) indicates that overall, males are more patient than females. The Kolmogorov-Smirnov test shows that the two distributions are not equal (p-value<0.001).

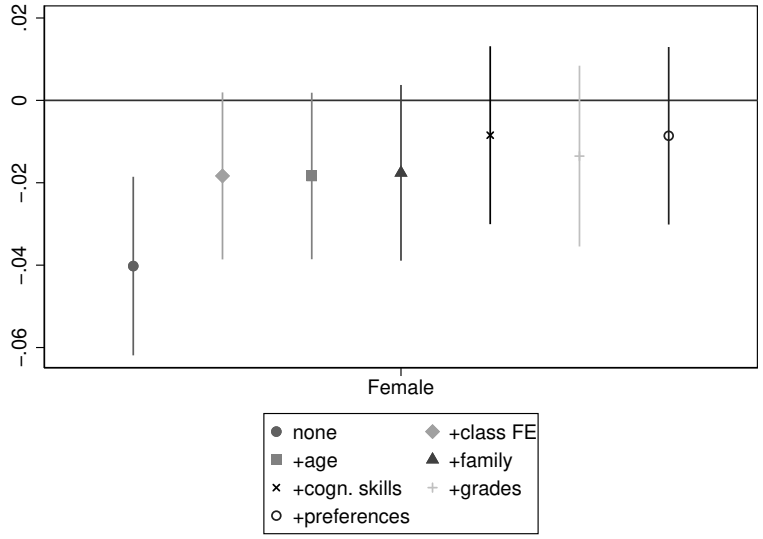

Figure 2: Adjusted gender differences in time-discounting (Delta)

mean for females is 1.05, while for males it is 1.[19] These values near 1 indicate that on average, females and males are quite time consistent. Even though the distributions of beta illustrated in Figure 3 seem to be very similar for females and males, the Kolmogorov-Smirnov test rejects the equality of distributions (p-value<0.01). The Wilcoxon rank-sum test indicates that the beta of females is different from the beta of males (p-value<0.001). In order to be able to test time inconsistency in a linear regression framework we have transformed the beta parameter: the greater the distance from the value 1 the greater the time inconsistency. Hence, we subtracted 1 from beta and took its absolute value, before running the regressions below. Thereby, the female coefficient can straightforwardly be interpreted as gender differences in time inconsistency.

Figure 4 shows that there is no significant gender difference in time inconsistency. The initial raw significant difference disappears after taking into account class fixed effects and the lack of gender gap remains even after we control for all observable characteristics and the rest of the preferences.

Time inconsistency comprises any deviation from time consistency: individuals being more impatient now than in the future (known as present bias) or the other way around (known as future bias). However, more attention has been given to present bias as it relates to procrastinating behavior and suboptimal life outcomes (Ariely and Wertenbroch, 2002; Moffitt et al., 2011; Daly et al., 2015; Wang and Sloan, 2018). To study present bias, we restrict our attention to beta<1, and generate a dummy variable where present bias=1 if beta<1 and beta=0 if beta≥1. 32.8% of the students, 29.8% of the females and 36.7% of the males are present biased. The test of proportions reveals that there is a significant difference in the proportion of present-biased students

[19]Luehrmann et al. (2018) report similar range of values for time inconsistency.

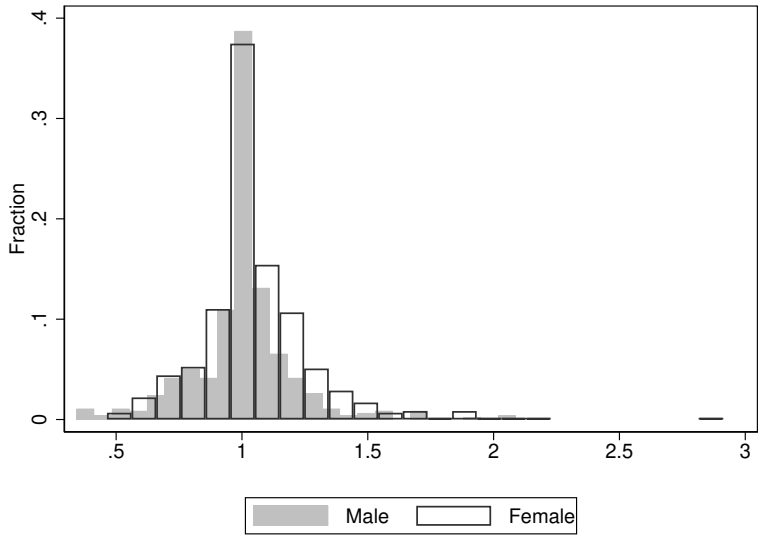

Figure 3: Distribution of time inconsistency (beta) by gender

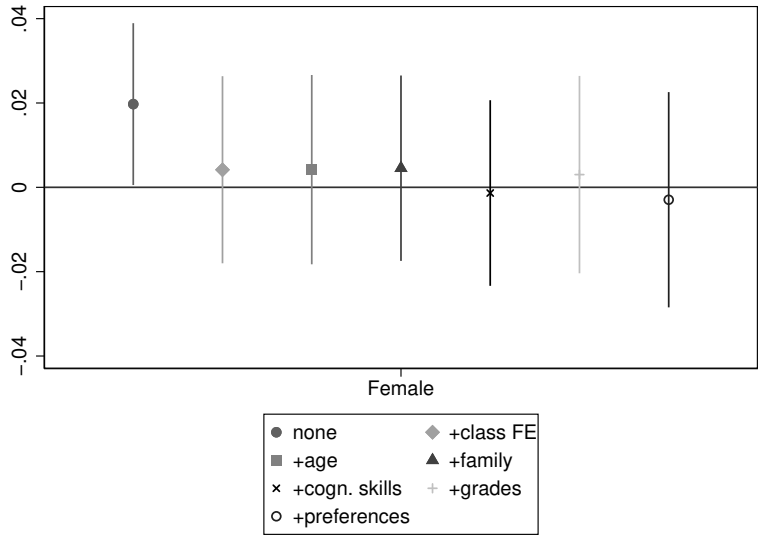

Figure 4: Adjusted gender differences in time inconsistency (|beta-1|)

between females and males (two-tailed test, p-value=0.0179), indicating that males are more present-biased than females. Figure 5 shows that this difference is persistent and though it diminishes somewhat when adding the observable characteristics, it remains statistically significant throughout our analysis (see Table 8 in the Appendix).

When we compare the female coefficients statistically across models, it is apparent, that the included exogenous covariates or preferences do not have a significant effect on its size, that is, no observable individual characteristic affects the gender gap in time preferences (see Table 5 in the Appendix that shows the direct comparison of the female coefficients across models).

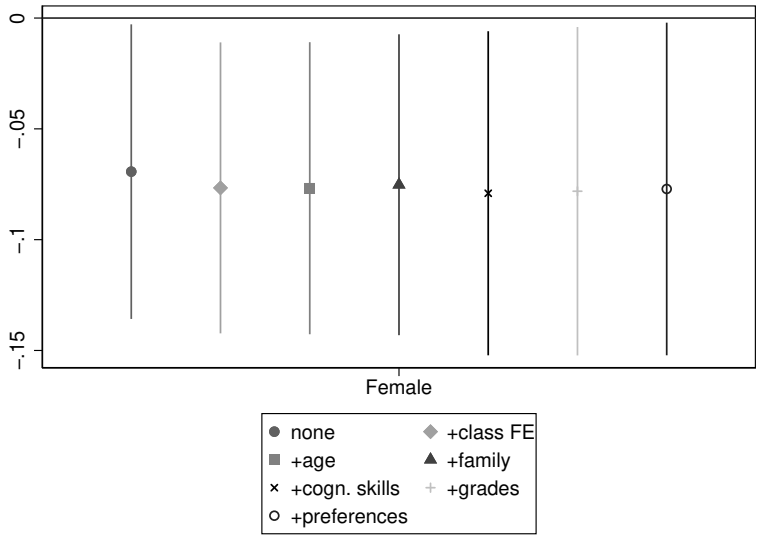

Figure 5: Adjusted gender differences in present bias (beta<1)

3.2 Risk preferences

Studies about risk preferences during adolescence mostly find that females are more risk-averse than males (Borghans et al., 2009; Booth and Nolen, 2012b; Eckel et al., 2012; Sutter et al., 2013). There seems to be an age trend, older children are less risk-taking (Harbaugh et al., 2002). Moreover, Khachatryan et al. (2015) find that the gender gap in risk-taking becomes larger in adolescence. Socioeconomic status also seems to matter, as low status associates with more risk-taking, though the evidence here comes mainly from the childhood (Deckers et al., 2015, 2017; Alan et al., 2017).

Regarding risk attitudes, there is mounting evidence that the type of risk elicitation task matters, as some tasks are more likely to reveal gender differences than others (see Filippin and Crosetto, 2016; Niederle, 2016). Crosetto and Filippin (2013, 2016) show that there is no general gender difference in risk-taking in the bomb risk elicitation task that we use, although the participants where older in both studies than the students in our sample.

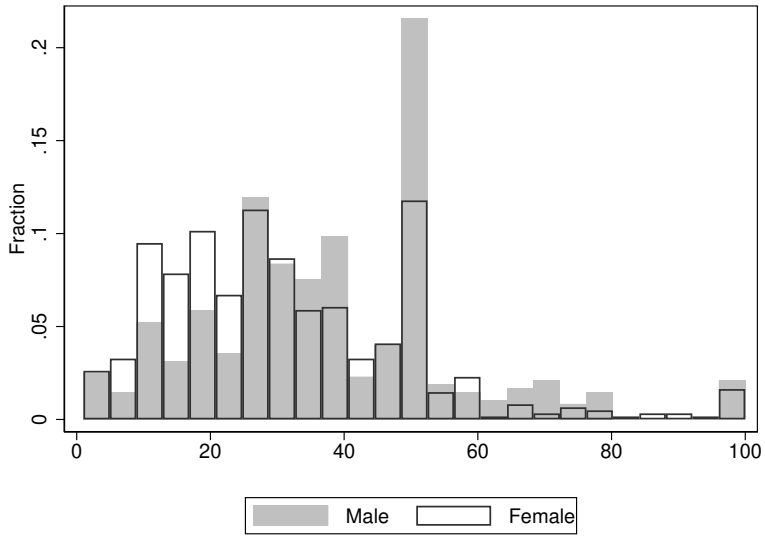

Figure 6: Distribution of risk preferences by gender

The distributions in Figure 6 indicate that females tended to take out fewer boxes in the bomb risk elicitation task, that is, they are less risk-taking. There is also a marked difference in the choice of 50 boxes that seems to be a focal point. Males chose this number more often than females.[20]

While males were willing to take an average of 37.7 boxes out of the store, females chose to take out only 31.4.[21] Figure 7 indicates that this difference is statistically sig-

[20]The Kolmogorov-Smirnov test reveals that the distributions are not equal ($p<0.001$), and the Wilcoxon rank-sum test indicates that males are more risk-taking ($p<0.001$).

[21]Usually, both females and males are willing to take more risk in this task than our sample of students. For instance in Crosetto and Filippin (2013) females / males take out 43.4 / 44.2 boxes.

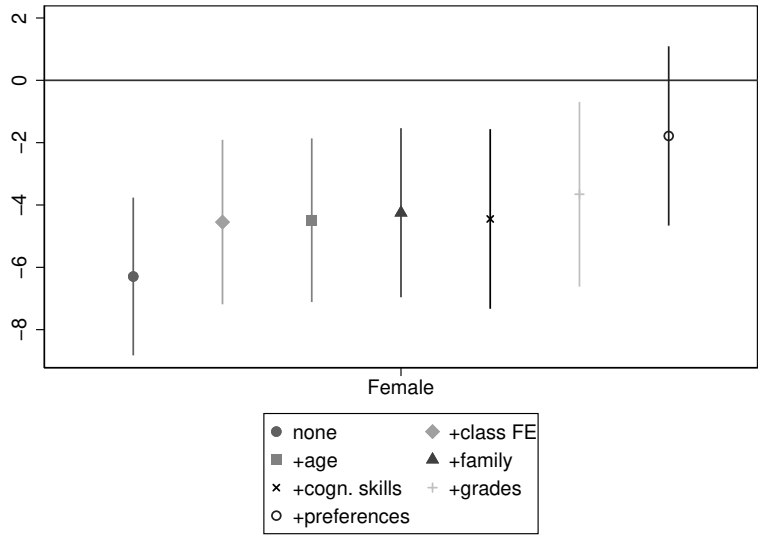

Figure 7: Adjusted gender differences in risk preferences

nificant at 5% and persists even if we take into account class fixed effects, age, variables related to the family background and proxies for cognitive abilities and school performance. However, when we control for the other preferences the difference becomes insignificant (though the sign of the coefficient does not change). When only the preference measures are considered, all preferences except trustworthiness associate with risk at a significance level of at least 5%, see Table 1. Moreover, many preferences (delta, altruism, trust and competition) associate with risk significantly *ceteris paribus*, even if we control for all other preference measures, which suggests that risk is a preference present in many other domains (see Table 9 in the Appendix). This result might also be interpreted as the result of risk preferences mirroring the gender effects of the other preferences, or conversely the gender difference in risk preferences drives some of the gender effect in the other preferences. While using these data we cannot tell which of these directions is more pronounced, it is important to underline that risk is a preference that is inherent in many of the other preference domains and that the gender gap in risk also associates with gender differences within the other preferences.

A caveat is in order. We have used a risk preference elicitation task that generally does not lead to gender difference with university students. We do not know whether we would have obtained the same conclusions, had we used an elicitation task that usually leads to gender difference in risk-taking, like the investment game by Gneezy and Potters (1997) (see Charness and Gneezy (2012)). Potentially, with such a task the gender difference would survive, a conjecture that future research will confirm or reject.

3.3 Social preferences

3.3.1 Altruism

During adolescence, females tend to be more altruistic (Harbaugh et al., 2003; Bettinger and Slonim, 2006) and altruism increases with age (Harbaugh et al., 2003; Bettinger and Slonim, 2006; Fehr et al., 2013).[22] The association of socioeconomic status with altruism is less clear. For younger children, low status correlates with giving less in the dictator game (Bauer et al., 2014; Deckers et al., 2017; Kosse et al., 2020). For adolescents, on the other hand, the only evidence (Almås et al., 2017) that we are aware of shows that low-status individuals are more egalitarian than individuals from a different background.

Following the literature, we proxy altruism with the amount given in the dictator game. While females in our sample gave 41.7% of their endowment to their classmates, males gave only 35.8%. Figure 8 indicates that females chose the egalitarian split more often than males (in line with findings by Fehr et al. (2013)), while the latter are more likely to give zero.[23]

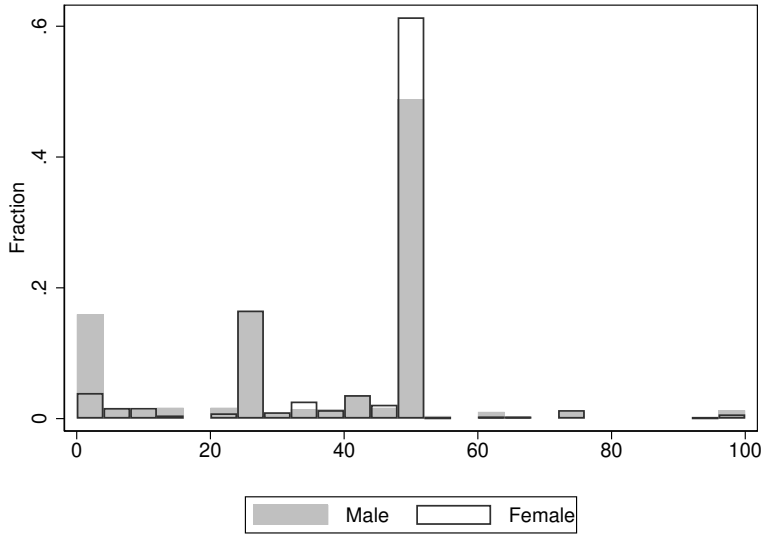

Figure 8: Distribution of altruism (proxied by giving in the dictator game with classmate) by gender

We observe similar patterns when we consider how much the students give to a random schoolmate, but understandably the amount given decreases substantially. Figure 9 shows that females chose the egalitarian split more often and gave zero less frequently than males. Moreover, giving 25% of the endowment seems to be the focal point, and the

[22] The effect of age is more complex as the change in altruism is intertwined with the application of meritocratic principles (Almås et al., 2010) and an increasing concern for efficiency (Maggian and Villeval, 2016; Sutter et al., 2018).

[23] The Wilcoxon rank-sum test and the Kolmogorov-Smirnov test indicate that the differences in the median and the distributions are significant (p-values<0.001 in both cases).

share of females giving this percentage is higher than that of males. As to classmates, more males gave zero to a random schoolmate than females. Overall, both females and males gave less to a schoolmate than to a classmate (29.6% and 25.1% of their endowment) in our sample, but the significant gender difference remains.[24] This suggests that the gender difference in altruism does not depend on the social distance between the dictator and the recipient.

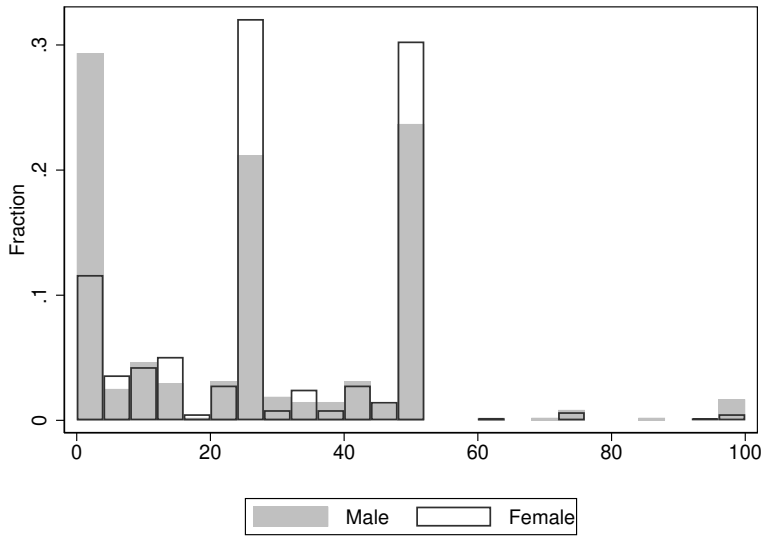

Figure 9: Distribution of altruism (proxied by giving in thedictator game with schoolmate) by gender

Figures 10 and 11 indicate that in line with the literature, females are significantly more altruistic than males, even if we add all the controls that we can observe. Hence, the significant difference is not due to differences in socioeconomic status, cognitive abilities, school grades or correlation with other preferences. There is no significant difference between the female coefficients across models (see Table 5 in the Appendix).

[24] Again, both the Wilcoxon rank-sum test and the Kolmogorov-Smirnov test indicate that the differences are significant (p-values <0.001 in both cases).

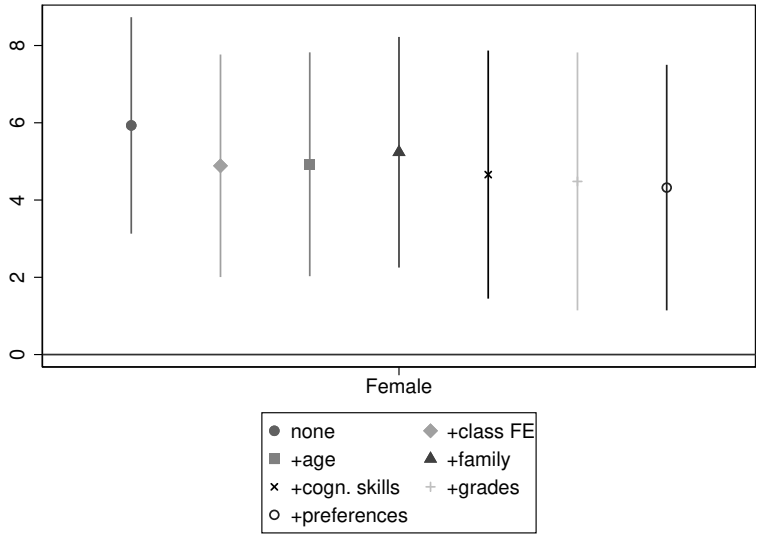

Figure 10: Adjusted gender differences in altruism (proxied by giving in the dictator game with classmate)

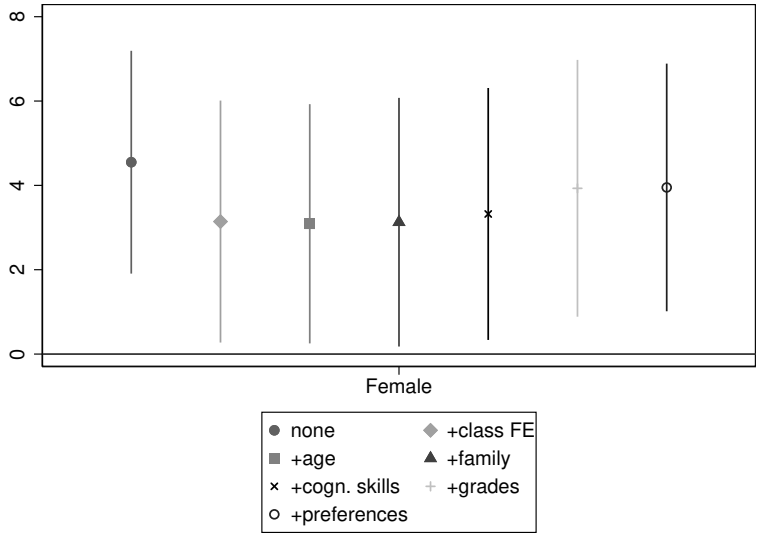

Figure 11: Adjusted gender differences in altruism (proxied by giving in the dictator game with schoolmate)

3.3.2 Trust and trustworthiness

No gender differences have been reported for the trust game in the literature, but the amount sent by the trustor and the amount returned by the trustee tend to increase with age (Harbaugh et al., 2003; Sutter and Kocher, 2007).

We played a modified version of the trust game as the receiver had no initial endowment. The modification of the game implies that the receiver ends up without money if the sender does not send her / him anything. Thus, altruistic motives behind the sending behavior of the sender are stronger than in the standard game. This small modification allows us to directly compare both stages of the trust game with the dictator game as both differ from the dictator game in one aspect only. The sending stage of the trust game differs from the dictator game in that the sender can expect some reciprocity, while the altruistic motives behind the decisions are similar (and certainly stronger than in the standard trust game). The return stage of the trust game differs from the dictator game only in that the trustee received the amount from the sender and not from the experimenter, but there is no reciprocity, just as in the dictator game. Overall, the modification increases the altruistic motives compared to the standard trust game.

In this light, it seems important that we find that males sent more of their endowment than females in both stages of the trust game, while females sent more in the dictator game (41.7% vs. 35.8% of their endowments, as shown above). In the first stage of the trust game, males sent 59.8% and females sent 51.6%. In the second stage, males - again - sent more than females (40.3% vs. 37.3%).[25]

Figure 12 indicates that the gender difference in the first stage of the trust game is due to the fact that almost 25% of the males sent their entire endowment to the receiver, while only less than 7% of females did so.[26] An explanation may be the difference in the weight that females and males assign to equality and efficiency (that is, making the overall pie bigger). Almås et al. (2010) and Maggian and Villeval (2016) point out that efficiency seeking becomes an important motive in adolescence (while egalitarianism matters less), and efficiency concerns are stronger in the case of males (Sutter et al., 2018).

Figure 13 shows that as we add controls, the gender difference in trust shrinks, but it does not disappear. Males still send more of their endowment in the first stage of the trust game, even after all their observable characteristics - including their time, risk and competitive preferences - are controlled for.

Turning to trustworthiness (the second stage of the trust game), Figure 14 indicates that males' decisions are more extreme: they are more likely to send nothing back, but they are also more likely to send half of the received (and tripled) amount back, or even

[25] In the experiment, when playing the role of the receiver, students made a decision on how much to send back to the sender for each possible amount that they could receive. That is, we asked for ten separate decisions. We asked that if s/he received 100/200/.../900/1000 HUF, how much s/he would send back from the tripled 300/600/.../2700/3000 HUF. We calculated the corresponding shares for each decision and computed the average. This is our proxy for trustworthiness.

[26] Both the Wilcoxon rank-sum test and the Kolmogorov-Smirnov tests indicate that males and females behave differently in the first stage of the trust game (p-value$<$0.0001 in both cases)

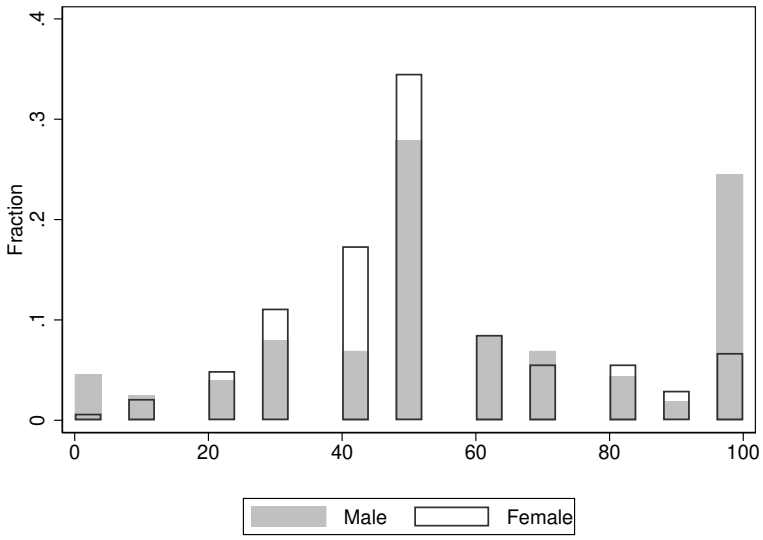

Figure 12: Distribution of trust by gender

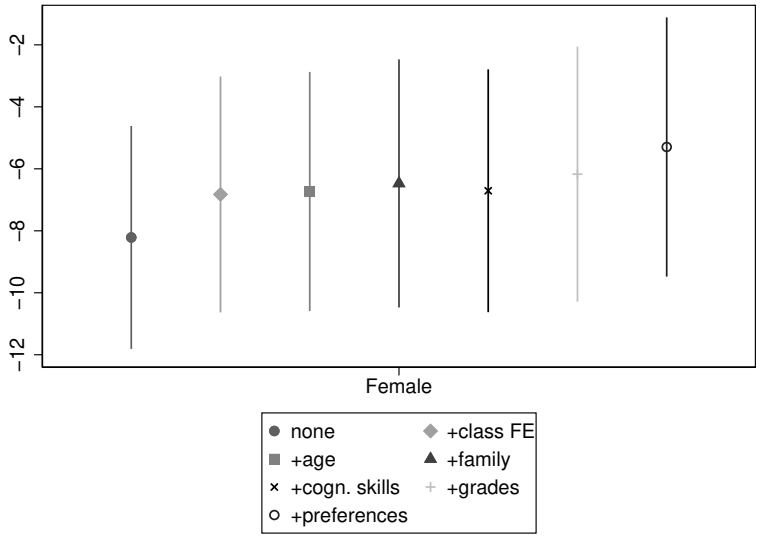

Figure 13: Adjusted gender differences in trust

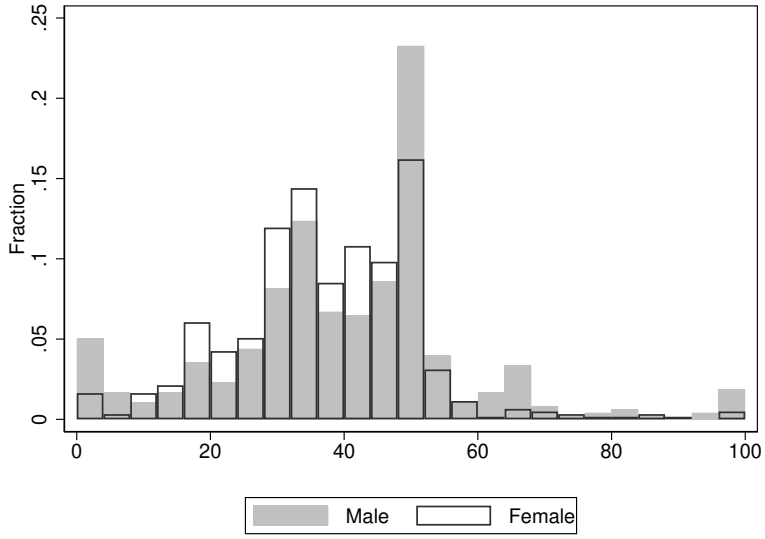

Figure 14: Distribution of trustworthiness by gender

above that.[27] Figure 15 shows that the gender difference remains significant at 5% even if we add all the controls we have, including preferences.

Overall, we see that females tend to be more altruistic when they cannot expect anything in exchange and when the endowment is independent of the co-player. If any of these changes, males tend to send more. Figure 16 shows the distribution of residuals from the three separate models of altruism, trust and trustworthiness, where we have controlled for all observable characteristics (including preferences) except the gender of the students. The more the distribution of trust and trustworthiness residuals differ from the dictator game, the more responsive students are to the changes between games. For females both the trust and the trustworthiness residuals are shifted to the left, indicating a general tendency to lower the amounts if parameters of the models change. Males, on the other hand, seem to react much less to the changes between the dictator game and the second stage of the trust game (albeit there is a slight bump at the lower end of the dictator game distribution), but much more to the changes between the dictator game and the trust game. That is, males react more to changes concerning reciprocity but less to changes in the source of the endowment, while females respond strongly to both.

[27]The differences in the medians and the distributions are significant according to the Wilcoxon rank-sum test and the Kolmogorov-Smirnov test (p-values<0.0005 in both cases).

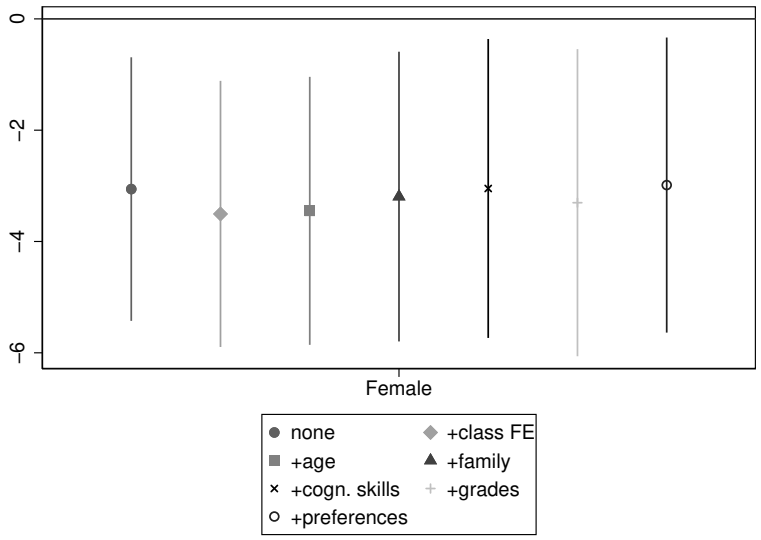

Figure 15: Adjusted gender differences in trustworthiness

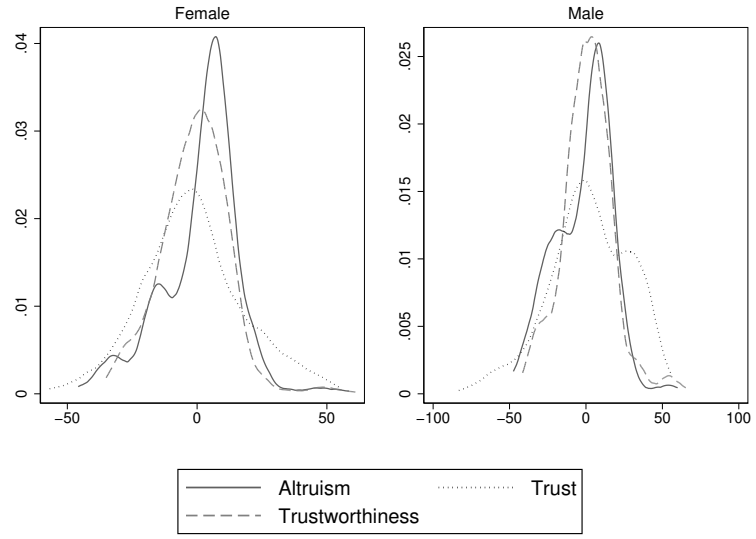

Figure 16: Distribution of residuals

3.3.3 Cooperation

The scant literature on cooperative behavior during adolescence does not report gender differences.[28] There is some evidence that cooperativeness increases with age (Brocas et al., 2017), though the evidence is stronger in younger ages (Fan, 2000; Harbaugh and Krause, 2000; Angerer et al., 2016). We do not know if socioeconomic status or cognitive abilities associate with cooperative attitudes.

As explained in section 2.2, we used a two-person variant of the public goods game in which the marginal per capita return on the offered amount was 75%. We proxy cooperativeness with the amount of contribution to the common project. While males contribute 62.6% of their endowment, females contribute 58.8%. Figure 17 reveals that this difference is mainly due to males contributing their whole endowment more frequently than females, while females choose to contribute half of the endowment more frequently than males.[29] Similarly to the behavior in trust games, the stronger efficiency-seeking motive present in males may explain why they contribute more to the public good. The OLS analysis reveals that once we take class fixed effects into account the gender difference vanishes and this finding does not change as we add more and more controls.

However, when comparing the female coefficients directly across models, it becomes apparent that the controls matter more than in the other preferences. The female coefficient in the class FE model (second specification) and in the next to last model (where all exogenous variables are controlled) differ significantly at the 5% level.[30] This difference becomes even more significant when we control for the other preferences. Thus, it seems that – unlike in any of the other preferences – exogenous controls do have a small but significant effect on the gender gap in cooperation (see Table 5 in the Appendix).

[28] For younger children, Angerer et al. (2016) report that females cooperate more.

[29] The Wilcoxon rank-sum test indicates that the contribution levels differ across genders (p-value=0.0059), while the Kolmogorov-Smirnov test rejects the null hypothesis the distributions of contributions are equal (p-value=0.001).

[30] Males contribute around 1% more when controlling for class FE, while females contribute more by around 0.5% when all exogenous variables are controlled.

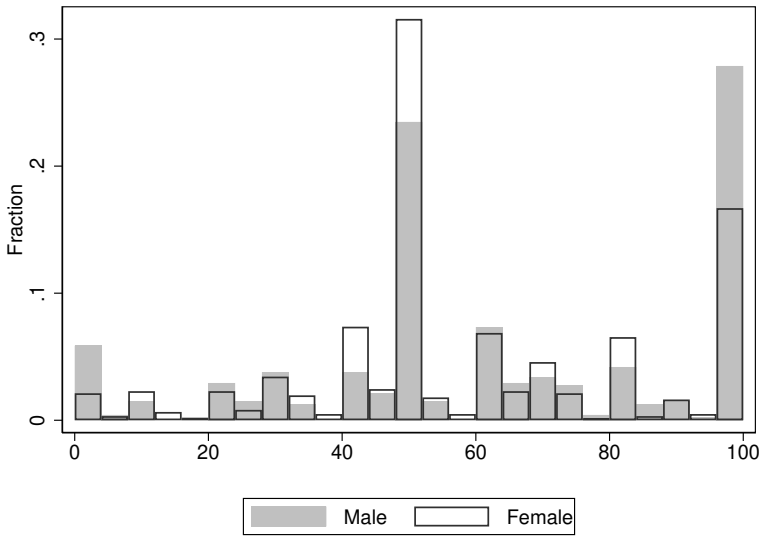

Figure 17: Distribution of cooperation by gender

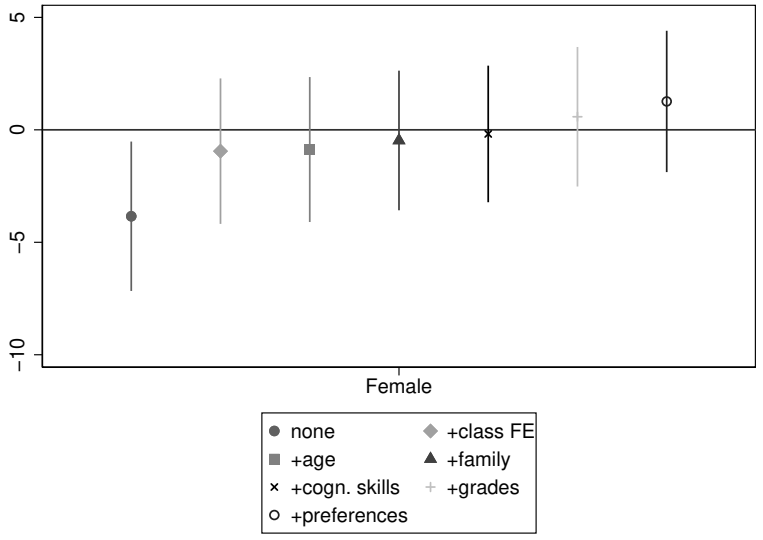

Figure 18: Adjusted gender differences in cooperation

3.4 Competitive preferences

There is ample evidence in the literature that females are less willing to enter competition than males during adolescence (Booth and Nolen, 2012a; Buser et al., 2014; Dreber et al., 2014; Sutter and Glätzle-Rützler, 2015; Almås et al., 2016; Sutter et al., 2016).[31] Moreover, the environment may also shape competitive preferences, as Booth and Nolen (2012a) show that females in single-sex schools are more competitive. There is also some evidence that low-status adolescents (especially males) are less likely to compete (Almås et al., 2016).

We use the experimental task developed by Niederle and Vesterlund (2007) to measure competitiveness, and we classify a student competitive if she chooses the tournament-based compensation in stage 3 of the competition task. Our data reveal that males are 10 percentage points more likely to enter the tournament than females (66.2% vs 56.1%) if we do not take any of their observable characteristics into account.[32]

Figure 19 indicates that the gender difference of 10 percentage points remains relatively stable even if we add more and more controls. Controlling for factors related to socioeconomic status, cognitive abilities, or school performance do not change the findings. Importantly, in the last step, we add the other preference measures to the regression, but the result is the same. As expected, more risk-taking students are more likely to enter the tournament, but even if we take this into account, the gender difference in competitiveness persists. There are no differences in the size of the female coefficient across models (see Table 5 in the Appendix).

[31] The only exception is Khachatryan et al. (2015) who do not find a gender gap in Armenia. In fact, culture may affect gender difference in competitiveness as Andersen et al. (2013) report that females from patriarchal societies are less competitive.

[32] The test of proportions rejects the null hypothesis that the two proportions are equal (p-value=0.0007).

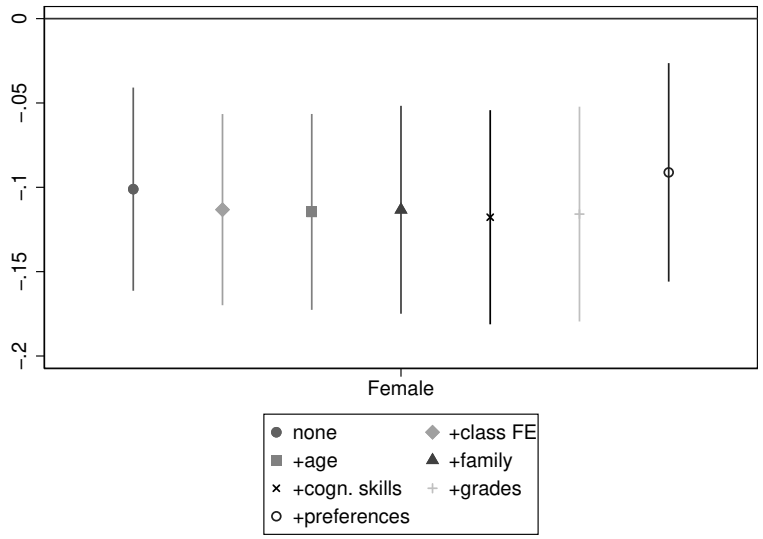

Figure 19: Adjusted gender differences in attitudes toward competition

4 Discussion and Conclusion

We carried out a large-scale experiment with Hungarian high-school students in their classrooms to measure a wide array of economic preferences that allows us to investigate gender differences in preferences during adolescence. Table 3 summarizes the main findings. The letters (F / M) indicate if the female dummy in the regressions is significant and which gender has a significantly higher measure in the given preference. Asterisks show the level of significance.

Table 3: Summary of the results

	None	+Class FE	+Age	+SES	+Cognitive	+Grades	+Preferences
Patience (Delta)	M***	M*	M*	∅	∅	∅	∅
Time inconsistency (Beta)	F**	∅	∅	∅	∅	∅	∅
Present bias (Beta<1)	M**	M**	M**	M**	M**	M**	M**
Risk tolerance	M***	M***	M***	M***	M***	M**	∅
Altruism (classmate)	F***	F***	F***	F***	F***	F***	F***
Altruism (schoolmate)	F***	F**	F**	F**	F**	F**	F***
Trust	M***	M***	M***	M***	M***	M***	M**
Trustworthiness	M**	M***	M***	M**	M**	M**	M**
Cooperation	M**	∅	∅	∅	∅	∅	∅
Competition	M***	M***	M***	M***	M***	M***	M***

F / M represents females / males. */**/*** denotes significance at 10 / 5 / 1 % level.

In order to take into account the factors related to the time and place of the experiments, selection into classes and the peer effects, we control for class fixed effects. Moreover, we consider many factors that have been proven to be important determinants of many preferences in adolescence according to the literature (Sutter et al., 2019). Thus, we control for age, family background, cognitive skills and school grades. By adding these controls, we make our non-representative sample reflect the total population of Hungarian adolescents better, and we also take the effect of potential individual confounders into account. Hence, if we observe gender differences even after considering these controls, it is strong evidence that those differences are real.

We observe that even though once we control for class fixed effects there is no gender difference at the 5% significance level in patience and time inconsistency, males are more present-biased than females even after deploying all the controls that we have. There is a gender gap in risk attitudes, males being more risk-tolerant, that only ceases to be significant when we control for the other preferences. We see strong gender differences in two aspects of social preferences: while females are more altruistic than males (both with classmates and schoolmates), the opposite occurs regarding trust and trustworthiness. We detect no gender difference in cooperation. We also find that males are more competitive than females.

One might argue that as preferences are correlated to a large extent, focusing only on a single preference when investigating gender differences and not considering other preferences may be conducive to misleading conclusions. If preferences are not per-

pendicular they might be capturing the same non-cognitive traits. However, with one exception, we find that not taking into account other preferences will generally not lead to biased gender gaps. This is not the case with risk preference. Risk might be the only preference among those observed here, that correlates with almost all of the other preferences and also has an effect on their gender gap.

It is apparent that females and males are different along many of these non-cognitive skills. Our results suggest that exogenous characteristics hardly ever influence these gender gaps and, besides risk preference, neither do the other preference domains.

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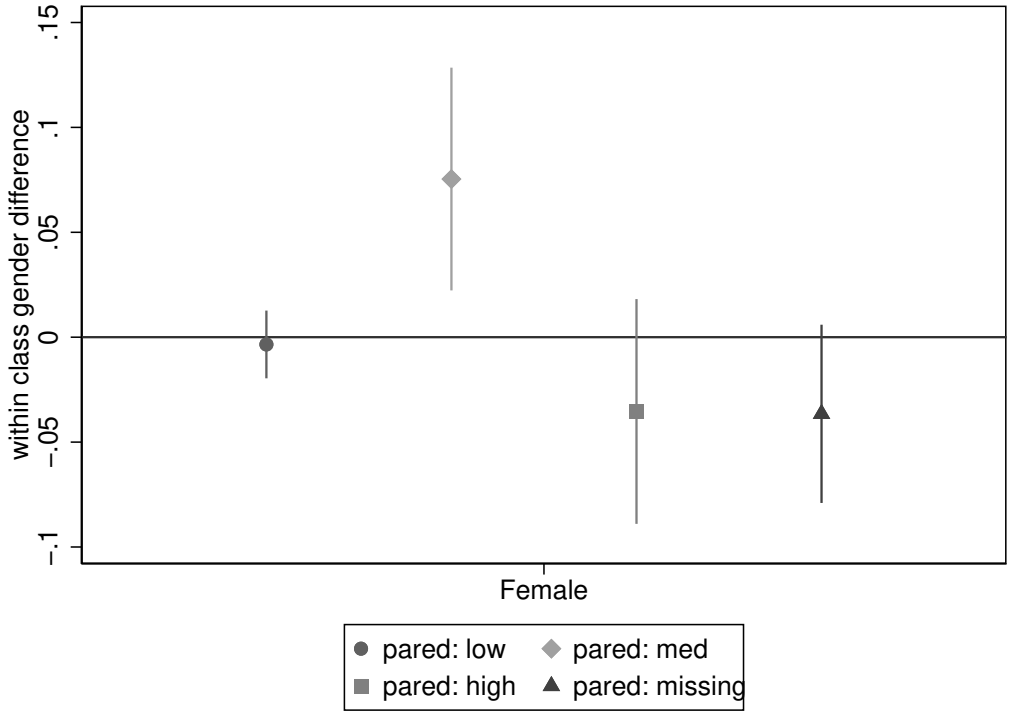
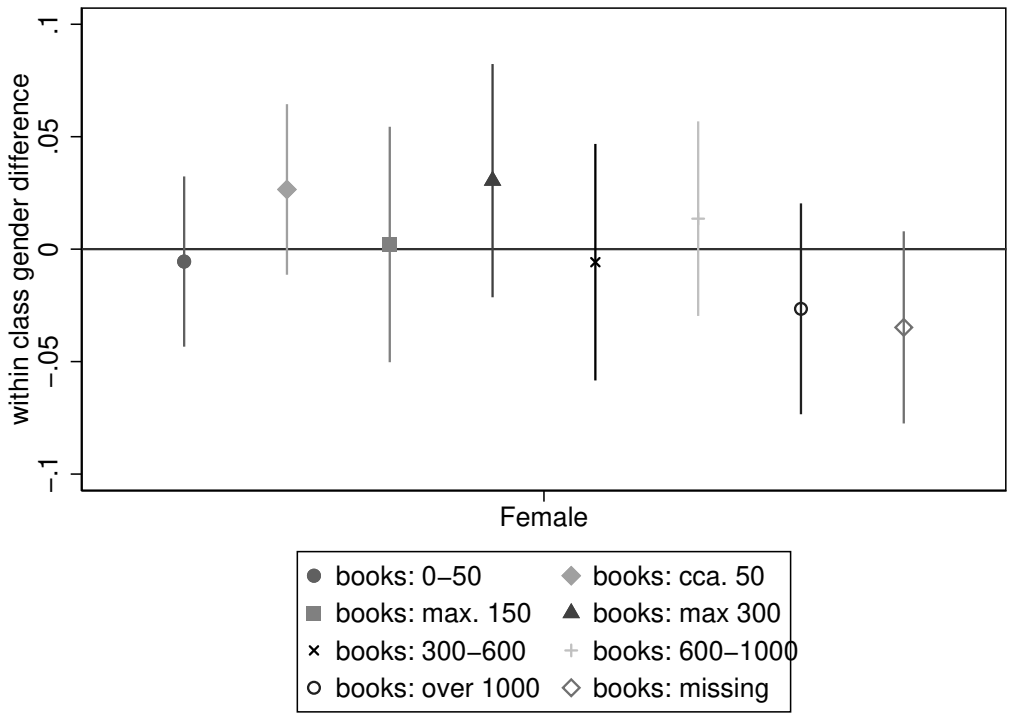
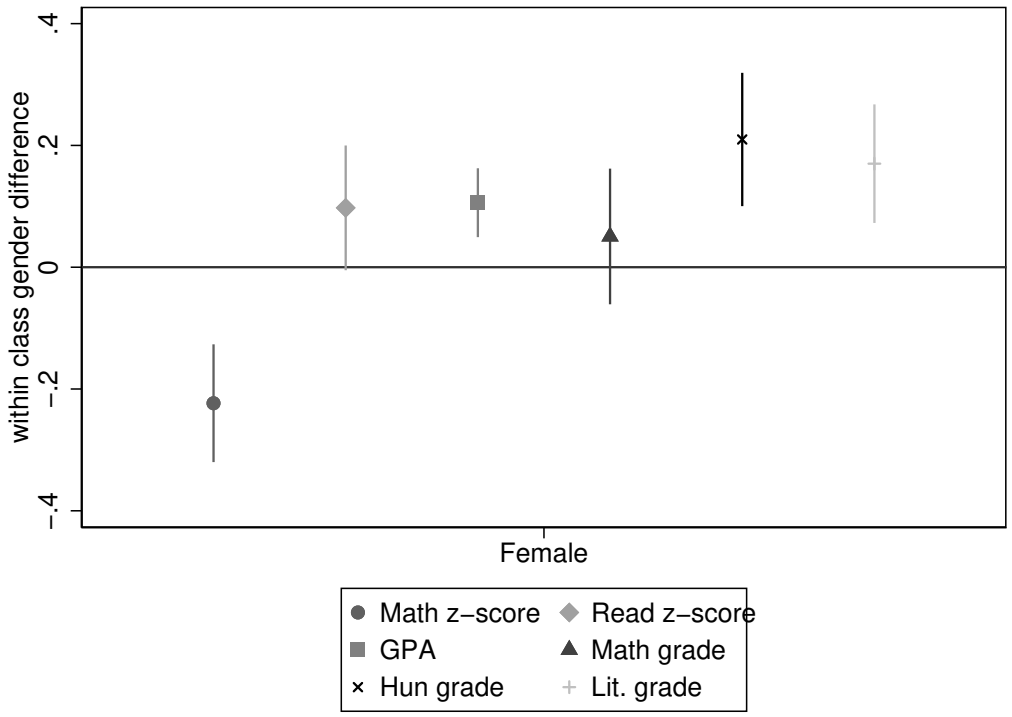
Appendix

A Within class gender differences




within class gender difference
−.1
−.05
0
.05
.1
Female
f_job: empl.
f_job: self−empl.
f_job: reg. work
f_job: occ. work
f_job: chilc.
f_job: ret.
f_job: unempl.
f_job: disabl.
f_job: miss.


within class gender difference
−.1
−.05
0
.05
.1
Female
books: 0−50
books: cca. 50
books: max. 150
books: max 300
books: 300−600
books: 600−1000
books: over 1000
books: missing


within class gender difference
.4
.2
0
−.2
−.4
Female
Math z−score
Read z−score
GPA
Math grade
Hun grade
Lit. grade

B Tables

Table 4: Descriptive statistics by gender

	Female			***Male***		
	Mean	Std.Dev.	Obs	Mean	Std.Dev.	Obs
NABC data						
Age (in months)	202.34	13.61	611	201.65	13.34	477
Family						
parental ed.: low	0.02	0.14	611	0.01	0.12	477
parental ed.: medium	0.42	0.49	611	0.29	0.45	477
parental ed.: high	0.47	0.50	611	0.58	0.49	477
parental ed.: missing	0.09	0.29	611	0.11	0.32	477
father: employed	0.64	0.48	611	0.68	0.47	477
father: self-employed	0.17	0.38	611	0.12	0.32	477
father: regural work	0.02	0.15	611	0.02	0.14	477
father: occasional work	0.01	0.11	611	0.02	0.14	477
father: childcare	0.01	0.11	611	0.02	0.13	477
father: retired	0.01	0.11	611	0.00	0.06	477
father: unemployed	0.01	0.09	611	0.00	0.05	477
father: disabled	0.01	0.10	611	0.00	0.06	477
father: missing	0.12	0.32	611	0.14	0.35	477
child support: no	0.76	0.43	611	0.77	0.42	477
child support: yes	0.14	0.35	611	0.10	0.30	477
child support: missing	0.10	0.30	611	0.12	0.33	477
No. books: 0-50	0.06	0.24	611	0.06	0.24	477
No. books: cca. 50	0.10	0.30	611	0.06	0.24	477
No. books: max. 150	0.18	0.39	611	0.16	0.37	477
No. books: max 300	0.16	0.37	611	0.13	0.34	477
No. books: 300-600	0.14	0.35	611	0.14	0.35	477
No. books: 600-1000	0.15	0.36	611	0.16	0.37	477
No. books: over 1000	0.12	0.32	611	0.18	0.38	477
No. books: missing	0.09	0.28	611	0.11	0.31	477
Cognitive skills						
Math score, 6th grade	1565.62	179.38	600	1672.53	204.98	469
Reading score, 6th grade	1601.89	189.26	600	1627.37	195.07	469
Grades						
GPA, imputed	4.54	0.42	611	4.51	0.45	477
GPA, missing	0.19	0.39	611	0.20	0.40	477
Math grade, imputed	4.17	0.84	611	4.27	0.85	477
Hungarian grade, imputed	4.39	0.69	611	4.31	0.75	477
Literature grade, imputed	4.56	0.64	611	4.48	0.65	477
Math grade, missing	0.13	0.34	611	0.16	0.37	477
Hungarian grade, missing	0.13	0.34	611	0.16	0.37	477
Literature grade, missing	0.14	0.34	611	0.17	0.37	477
Experiments						
Payoff	1031.91	760.59	611	1054.93	925.16	477
Delta	0.73	0.15	602	0.77	0.16	467
Beta	1.05	0.23	590	1.00	0.21	457
Risk	31.37	19.15	611	37.66	19.05	477
Altruism	41.72	15.78	611	35.79	20.88	477
Altruism (school mate)	29.60	18.44	611	25.05	22.42	477
Trust	51.55	21.23	611	59.77	29.25	477
Trust-return	37.26	14.11	611	40.31	18.60	477
Cooperation	58.76	25.38	611	62.60	30.12	477
Competition	0.56	0.50	611	0.66	0.47	477

Table 5: Comparing the coefficients of the female dummy in different specifications to the coefficients of the female dummy of the specification with the class fixed effects. Note: p-values of Chi-squared tests are in each cell.

	Unadjusted	All Exogenous	All and preferences
Patience	0.007	0.365	0.081
Time inconsistency	0.005	0.859	0.369
Present bias	0.776	0.925	0.976
Risk tolerance	0.043	0.173	0
Altruism (classmate)	0.159	0.392	0.312
Altruism (schoolmate)	0.113	0.213	0.264
Trust	0.222	0.411	0.101
Trustworthiness	0.51	0.66	0.347
Cooperation	0.025	0.037	0.006
Competition	0.592	0.857	0.211

C Regression tables

Table 6: Adjusted gender differences in time-discounting (delta)

	None	Class FE	Age	Family	Cogn. skills	Grades	Preferences
Female	−0.040***	−0.018*	−0.018*	−0.018	−0.008	−0.014	−0.009
Age (in months)			−0.000	0.000	−0.000	−0.000	−0.000
child support: missing				0.023	0.022	0.031	0.028
child support: yes				0.006	0.009	0.009	0.009
father: self-employed				−0.018	−0.020	−0.018	−0.019
father: regural work				0.012	0.019	0.020	0.020
father: occasional work				−0.016	−0.029	−0.025	−0.040
father: childcare				−0.081*	−0.077*	−0.068	−0.063
father: retired				−0.008	−0.016	−0.008	−0.015
father: unemployed				0.053	0.057**	0.040*	0.042*
father: disabled				−0.028	−0.032	−0.020	−0.023
father: missing				−0.003	−0.013	−0.009	−0.008
parental ed.: missing				−0.094	−0.089	−0.089	−0.090
parental ed.: medium				−0.042	−0.053	−0.050	−0.055
parental ed.: high				−0.031	−0.040	−0.040	−0.045
No. books: cca. 50				0.035	0.043*	0.041	0.036
No. books: max. 150				0.019	0.020	0.019	0.017
No. books: max 300				0.053**	0.053**	0.051**	0.050**
No. books: 300-600				0.036	0.035	0.030	0.030
No. books: 600-1000				0.056**	0.056**	0.051*	0.052*
No. books: over 1000				0.048*	0.046*	0.040	0.034
No. books: missing				0.093*	0.101*	0.107**	0.107*
Math score, 6th grade					0.000***	0.000***	0.000***
Reading score, 6th grade					−0.000	−0.000	−0.000
GPA, imputed						−0.009	−0.007
GPA, missing						−0.012	−0.017
Math grade, imputed						0.016*	0.016*
Hungarian grade, imputed						0.010	0.012
Literature grade, imputed						0.005	0.005
Math grade, missing						−0.050	−0.042
Hungarian grade, missing						0.048	0.050
Literature grade, missing						−0.010	−0.021
Competition							0.007
Altruism							0.000
Trust							0.000
Cooperation							0.000
Risk							0.001**
Constant	0.766***	0.754***	0.758***	0.740***	0.564**	0.558**	0.553**
Observations	1069	1069	1069	1069	1051	1051	1051
Adjusted R^2	0.016	0.089	0.088	0.091	0.114	0.116	0.124

Table 7: Adjusted gender differences in time inconsistency (beta)

	None	Class FE	Age	Family	Cogn. skills	Grades	Preferences
Female	0.020**	0.004	0.004	0.005	−0.001	0.003	−0.003
Age (in months)			0.000	0.000	0.000	0.000	0.000
child support: missing				0.014	0.014	0.008	0.016
child support: yes				0.004	0.002	0.003	0.004
father: self-employed				0.018	0.018	0.016	0.017
father: regural work				0.002	−0.006	−0.008	−0.006
father: occasional work				−0.005	0.002	−0.004	0.000
father: childcare				0.111	0.108	0.102	0.095
father: retired				−0.035	−0.028	−0.042	−0.044
father: unemployed				−0.020	−0.034	−0.018	−0.010
father: disabled				0.012	0.016	0.001	0.005
father: missing				−0.034	−0.027	−0.036*	−0.035
parental ed.: missing				0.020	0.015	0.022	0.019
parental ed.: medium				0.034	0.042	0.042	0.045
parental ed.: high				0.036	0.038	0.040	0.044
No. books: cca. 50				0.014	0.008	0.008	0.012
No. books: max. 150				−0.022	−0.023	−0.021	−0.022
No. books: max 300				−0.047*	−0.046*	−0.046*	−0.045*
No. books: 300-600				−0.055**	−0.055**	−0.052**	−0.053**
No. books: 600-1000				−0.035	−0.033	−0.030	−0.033
No. books: over 1000				0.003	0.007	0.013	0.016
No. books: missing				−0.006	−0.015	−0.028	−0.030
Math score, 6th grade					−0.000**	−0.000*	−0.000*
Reading score, 6th grade					0.000	0.000	0.000
GPA, imputed						0.001	−0.002
GPA, missing						0.043	0.045
Math grade, imputed						−0.019**	−0.019**
Hungarian grade, imputed						−0.014	−0.016
Literature grade, imputed						0.011	0.013
Math grade, missing						0.049	0.042
Hungarian grade, missing						−0.001	0.004
Literature grade, missing						−0.068**	−0.067*
Competition							0.007
Altruism							0.001
Trust							−0.001
Cooperation							−0.000
Risk							−0.000
Constant	0.127***	0.135***	0.130	0.060	0.291	0.286	0.272
Observations	1047	1047	1047	1047	1030	1030	1030
Adjusted R^2	0.002	0.003	0.002	0.006	0.015	0.019	0.022

Table 8: Adjusted gender differences in present bias (beta<1)

	None	Class FE	Age	Family	Cogn. skills	Grades	Preferences
Female	−0.069**	−0.077**	−0.077**	−0.075**	−0.079**	−0.078**	−0.077**
Age (in months)			−0.000	−0.000	−0.000	−0.000	−0.000
child support: missing				−0.012	0.004	−0.007	0.008
child support: yes				−0.022	−0.032	−0.034	−0.030
father: self-employed				−0.040	−0.049	−0.049	−0.050
father: regural work				−0.192**	−0.190*	−0.195**	−0.188*
father: occasional work				0.162	0.163	0.161	0.153
father: childcare				−0.089	−0.095	−0.093	−0.106
father: retired				−0.081	−0.077	−0.074	−0.086
father: unemployed				0.332	0.340	0.334	0.353
father: disabled				0.025	0.036	0.039	0.044
father: missing				−0.034	−0.022	−0.012	−0.010
parental ed.: missing				−0.231	−0.260	−0.274	−0.289
parental ed.: medium				−0.066	−0.059	−0.069	−0.074
parental ed.: high				−0.045	−0.038	−0.050	−0.054
No. books: cca. 50				−0.068	−0.076	−0.072	−0.071
No. books: max. 150				−0.062	−0.075	−0.065	−0.066
No. books: max 300				−0.029	−0.040	−0.031	−0.029
No. books: 300-600				−0.047	−0.058	−0.044	−0.046
No. books: 600-1000				−0.018	−0.033	−0.021	−0.022
No. books: over 1000				−0.020	−0.028	−0.015	−0.010
No. books: missing				0.141	0.138	0.143	0.142
Math score, 6th grade					−0.000	−0.000	−0.000
Reading score, 6th grade					0.000	0.000	0.000
GPA, imputed						−0.025	−0.032
GPA, missing						−0.009	−0.012
Math grade, imputed						0.012	0.013
Hungarian grade, imputed						0.034	0.035
Literature grade, imputed						−0.036	−0.034
Math grade, missing						0.045	0.057
Hungarian grade, missing						−0.016	−0.025
Literature grade, missing						−0.009	−0.016
Competition							0.019
Altruism							0.000
Trust							−0.001
Cooperation							−0.000
Risk							0.001
Constant	0.368***	0.372***	0.409	0.513	0.522	0.640	0.646
Observations	1047	1047	1047	1047	1030	1030	1030
Adjusted R^2	0.004	0.059	0.058	0.054	0.055	0.049	0.047

Table 9: Adjusted gender differences in risk tolerance

	None	Class FE	Age	Family	Cogn. skills	Grades	Preferences
Female	−6.294***	−4.549***	−4.489***	−4.248***	−4.448***	−3.655**	−1.785
Age (in months)			0.080	0.095	0.065	0.082	0.058
child support: missing				0.994	−0.525	−2.046	−5.012
child support: yes				−1.056	−1.058	−1.237	−0.968
father: self-employed				1.358	1.315	1.455	1.200
father: regural work				−3.557	−3.623	−3.683	−4.446
father: occasional work				14.639***	13.521***	13.592***	15.175***
father: childcare				0.429	−0.039	−0.581	2.181
father: retired				8.612*	7.715	6.539	6.649
father: unemployed				−7.439*	−5.846	−4.190	−5.311
father: disabled				5.667	5.441	3.539	4.040
father: missing				1.326	0.136	−0.517	0.029
parental ed.: missing				0.712	5.318	3.902	5.821
parental ed.: medium				6.901**	6.715**	6.886**	6.246*
parental ed.: high				6.333*	6.278**	6.840**	6.225*
No. books: cca. 50				3.826	3.840	3.658	3.160
No. books: max. 150				2.237	1.937	1.321	2.157
No. books: max 300				1.270	0.335	0.278	0.438
No. books: 300-600				1.071	0.237	0.385	1.567
No. books: 600-1000				0.225	−0.568	−0.567	0.044
No. books: over 1000				4.146	2.379	2.552	1.559
No. books: missing				8.246	4.351	3.248	4.511
Math score, 6th grade					0.002	0.004	0.000
Reading score, 6th grade					0.015**	0.017***	0.016***
GPA, imputed						−0.701	1.304
GPA, missing						2.477	1.684
Math grade, imputed						−0.047	−0.335
Hungarian grade, imputed						−2.929*	−3.035**
Literature grade, imputed						0.212	0.430
Math grade, missing						−7.432	−4.051
Hungarian grade, missing						1.426	−2.159
Literature grade, missing						9.412	9.123
Competition							2.828**
Altruism							−0.150***
Trust							0.133***
Cooperation							0.021
Delta							9.689**
Constant	37.662***	36.682***	20.475	8.459	−11.446	−7.626	−15.243
Observations	1088	1088	1088	1088	1069	1069	1051
Adjusted R^2	0.025	0.076	0.076	0.080	0.091	0.099	0.146

Table 10: Adjusted gender differences in altruism

	None	Class FE	Age	Family	Cogn. skills	Grades	Preferences
Female	5.932***	4.887***	4.926***	5.238***	4.659***	4.482***	4.322***
Age (in months)			0.053	0.047	0.037	0.041	0.038
child support: missing				−0.244	−0.835	−1.157	−2.271
child support: yes				1.008	0.903	0.633	1.397
father: self-employed				−1.150	−0.976	−1.134	−0.787
father: regural work				−3.360	−3.201	−3.027	−3.427
father: occasional work				6.638	6.753	6.876	5.700
father: childcare				1.181	0.929	0.895	0.801
father: retired				5.080***	5.384***	5.231***	5.464***
father: unemployed				−2.885	−2.604	−3.666	−4.446
father: disabled				1.888	2.245	2.991	2.597
father: missing				1.442	1.460	1.558	1.300
parental ed.: missing				−1.788	−0.296	1.050	1.470
parental ed.: medium				−0.812	−0.977	−1.170	−1.204
parental ed.: high				0.370	0.373	0.081	−0.293
No. books: cca. 50				0.276	0.704	0.919	1.851
No. books: max. 150				0.364	0.866	1.183	2.868
No. books: max 300				0.158	0.537	0.807	1.902
No. books: 300-600				2.487	2.912	3.100	4.063
No. books: 600-1000				1.420	1.786	2.051	3.677
No. books: over 1000				3.887	4.130	4.328	5.939*
No. books: missing				1.120	0.709	0.064	1.218
Math score, 6th grade					−0.007	−0.008	−0.006
Reading score, 6th grade					0.006	0.004	0.006
GPA, imputed						1.231	1.421
GPA, missing						1.000	2.113
Math grade, imputed						0.247	0.081
Hungarian grade, imputed						0.478	0.294
Literature grade, imputed						−0.010	−0.615
Math grade, missing						11.032*	10.196*
Hungarian grade, missing						−22.395***	−22.109***
Literature grade, missing						9.545***	10.479***
Competition							−1.594
Risk							−0.078**
Delta							3.004
Constant	35.793***	36.380***	25.704	25.383	30.434	23.977	23.273
Observations	1088	1088	1088	1088	1069	1069	1051
Adjusted R^2	0.025	0.082	0.081	0.074	0.075	0.075	0.085

Table 11: Adjusted gender differences in altruism (schoolmate)

	None	Class FE	Age	Family	Cogn. skills	Grades	Preferences
Female	4.550***	3.142**	3.090**	3.127**	3.322**	3.930**	3.951***
Age (in months)			−0.071	−0.076	−0.085	−0.067	−0.063
child support: missing				−1.776	−1.567	−1.354	−2.966
child support: yes				0.571	0.737	0.672	0.996
father: self-employed				−0.914	−0.917	−0.960	−0.625
father: regural work				−2.525	−2.220	−2.274	−2.527
father: occasional work				3.420	3.539	3.657	3.071
father: childcare				3.130	3.090	2.420	2.772
father: retired				7.679**	8.225**	7.803**	8.071**
father: unemployed				5.402	4.671	5.991	4.945
father: disabled				3.696	3.873	2.204	2.145
father: missing				−0.577	−0.549	−1.028	−0.970
parental ed.: missing				6.882	5.902	7.196	7.826
parental ed.: medium				5.508	5.162	5.354	5.472
parental ed.: high				5.682	5.311	5.915	5.352
No. books: cca. 50				−1.071	−0.484	−0.325	0.063
No. books: max. 150				1.582	2.297	1.785	2.817
No. books: max 300				0.300	1.236	0.803	1.434
No. books: 300-600				1.417	2.311	1.911	1.964
No. books: 600-1000				−0.059	0.855	0.750	1.842
No. books: over 1000				3.433	4.853	4.757	6.043
No. books: missing				−0.398	1.301	1.124	1.833
Math score, 6th grade					0.004	0.007	0.006
Reading score, 6th grade					−0.009	−0.007	−0.005
GPA, imputed						0.556	0.267
GPA, missing						−2.070	−1.279
Math grade, imputed						−0.888	−0.981
Hungarian grade, imputed						−3.233**	−3.353**
Literature grade, imputed						1.590	1.089
Math grade, missing						11.820	11.236
Hungarian grade, missing						−14.385*	−14.322*
Literature grade, missing						3.729	4.107
Competition							−1.251
Risk							−0.068*
Delta							7.966*
Constant	25.048***	25.838***	40.207	34.806	44.607	41.031	37.690
Observations	1088	1088	1088	1088	1069	1069	1051
Adjusted R^2	0.011	0.054	0.053	0.044	0.042	0.044	0.050

Table 12: Adjusted gender differences in trust

	None	Class FE	Age	Family	Cogn. skills	Grades	Preferences
Female	−8.215***	−6.825***	−6.732***	−6.471***	−6.708***	−6.173***	−5.296**
Age (in months)			0.126	0.163	0.144	0.162	0.155
child support: missing				11.106*	11.711**	11.596*	12.406*
child support: yes				2.007	1.562	1.390	2.337
father: self-employed				0.598	0.760	0.581	0.437
father: regural work				−0.289	0.631	0.431	0.968
father: occasional work				7.651*	6.630	6.500	1.153
father: childcare				−11.834*	−11.230*	−11.424*	−10.698*
father: retired				3.928	3.145	1.414	−0.653
father: unemployed				4.099	5.950	6.284	6.984
father: disabled				5.784	6.373	4.837	4.252
father: missing				2.529	2.440	1.940	1.995
parental ed.: missing				−0.562	−1.832	−1.788	−4.036
parental ed.: medium				3.839	3.630	3.360	1.247
parental ed.: high				5.281	5.439	5.356	2.374
No. books: cca. 50				4.533	4.477	4.359	4.068
No. books: max. 150				0.303	−0.461	−0.383	0.917
No. books: max 300				1.296	0.080	0.450	1.558
No. books: 300-600				0.535	−0.669	−0.135	0.867
No. books: 600-1000				−2.299	−4.005	−3.437	−0.939
No. books: over 1000				10.230***	8.236**	8.909**	10.154**
No. books: missing				−8.885	−9.310	−10.350	−10.221
Math score, 6th grade					0.005	0.007	0.003
Reading score, 6th grade					0.011	0.012	0.011
GPA, imputed						−4.866*	−4.960**
GPA, missing						5.945**	5.762**
Math grade, imputed						0.825	0.852
Hungarian grade, imputed						−1.471	−0.955
Literature grade, imputed						1.705	1.220
Math grade, missing						−3.555	−0.259
Hungarian grade, missing						−10.895*	−11.862**
Literature grade, missing						10.348	7.706
Competition							0.780
Risk							0.190***
Delta							10.151*
Constant	59.769***	58.989***	33.555	18.953	−1.841	6.672	0.919
Observations	1088	1088	1088	1088	1069	1069	1051
Adjusted R^2	0.025	0.054	0.054	0.071	0.076	0.077	0.111

Table 13: Adjusted gender differences in trustworthiness (trust return)

	None	Class FE	Age	Family	Cogn. skills	Grades	Preferences
Female	−3.058**	−3.505***	−3.449***	−3.193**	−3.047**	−3.303**	−2.986**
Age (in months)			0.074	0.067	0.060	0.066	0.063
child support: missing				4.802	4.472	5.264	4.681
child support: yes				2.189	2.367	2.595	2.958
father: self-employed				−1.324	−1.334	−1.283	−1.190
father: regural work				1.513	1.025	1.286	1.623
father: occasional work				5.961	6.072	6.138	2.057
father: childcare				−2.788	−2.846	−2.641	−2.596
father: retired				−2.447	−2.627	−2.021	−2.394
father: unemployed				3.623	3.495	3.592	3.491
father: disabled				6.629	6.554	6.811	6.497
father: missing				−1.584	−1.762	−2.058	−2.216
parental ed.: missing				−3.150	−2.457	−2.377	−3.032
parental ed.: medium				0.881	0.606	1.118	0.063
parental ed.: high				0.844	0.563	1.123	−0.255
No. books: cca. 50				−0.176	−0.029	−0.105	0.689
No. books: max. 150				0.016	0.216	−0.044	1.092
No. books: max 300				−0.037	0.105	−0.129	0.883
No. books: 300-600				1.079	1.220	0.691	1.356
No. books: 600-1000				−1.716	−1.683	−2.004	−0.292
No. books: over 1000				5.353**	5.227**	4.810*	5.905**
No. books: missing				1.395	0.850	0.996	1.788
Math score, 6th grade					0.001	0.003	0.003
Reading score, 6th grade					0.001	−0.001	0.000
GPA, imputed						−0.220	−0.284
GPA, missing						−0.081	−0.050
Math grade, imputed						−0.988	−1.189
Hungarian grade, imputed						−0.143	−0.134
Literature grade, imputed						2.237*	1.831
Math grade, missing						−2.017	−1.299
Hungarian grade, missing						2.924	3.020
Literature grade, missing						−1.405	−1.696
Competition							−0.813
Risk							0.024
Delta							3.130
Constant	40.313***	40.564***	25.511	25.123	23.222	17.560	16.103
Observations	1088	1088	1088	1088	1069	1069	1051
Adjusted R^2	0.008	0.042	0.042	0.048	0.046	0.043	0.041

Table 14: Adjusted gender differences in cooperation

	None	Class FE	Age	Family	Cogn. skills	Grades	Preferences
Female	−3.842**	−0.947	−0.876	−0.473	−0.182	0.582	1.263
Age (in months)			0.096	0.094	0.076	0.090	0.075
child support: missing				5.313	6.536	6.580	6.462
child support: yes				2.606	2.678	2.814	3.418
father: self-employed				0.416	0.540	0.475	0.502
father: regural work				6.335	8.247	7.844	8.468
father: occasional work				21.340***	19.653***	19.332***	15.982***
father: childcare				−7.196	−6.772	−6.982	−6.274
father: retired				−0.499	−1.713	−1.497	−2.870
father: unemployed				5.067	7.691	9.885	10.574
father: disabled				6.578	6.799	4.570	4.487
father: missing				−1.687	−2.130	−1.993	−1.834
parental ed.: missing				−4.577	−7.893	−9.648	−11.192
parental ed.: medium				2.906	2.287	1.753	−0.017
parental ed.: high				3.724	3.562	3.447	1.119
No. books: cca. 50				0.593	0.725	1.276	1.271
No. books: max. 150				−2.759	−3.273	−2.670	−1.408
No. books: max 300				0.610	−0.719	0.060	0.892
No. books: 300-600				−7.037	−8.393	−7.174	−6.718
No. books: 600-1000				−5.642	−6.818	−5.441	−3.522
No. books: over 1000				4.884	2.659	4.172	4.799
No. books: missing				8.713	9.519	10.371	10.857
Math score, 6th grade					0.015*	0.018**	0.018**
Reading score, 6th grade					0.010	0.013*	0.012
GPA, imputed						−5.163*	−5.243*
GPA, missing						−1.246	−1.915
Math grade, imputed						−1.572	−1.813
Hungarian grade, imputed						0.687	0.990
Literature grade, imputed						−0.055	−0.504
Math grade, missing						3.050	5.817
Hungarian grade, missing						−1.607	−2.323
Literature grade, missing						1.413	−0.866
Competition							0.933
Risk							0.115***
Delta							8.146
Constant	62.601***	60.975***	41.592	38.668	3.656	16.896	14.506
Observations	1088	1088	1088	1088	1069	1069	1051
Adjusted R^2	0.004	0.034	0.034	0.052	0.062	0.061	0.073

Table 15: Adjusted gender differences in competition

	None	Class FE	Age	Family	Cogn. skills	Grades	Preferences
Female	−0.101***	−0.113***	−0.115***	−0.113***	−0.118***	−0.116***	−0.091***
Age (in months)			−0.002	−0.002	−0.002	−0.002	−0.002
child support: missing				−0.016	0.006	−0.052	−0.049
child support: yes				−0.045	−0.049	−0.054	−0.055
father: self-employed				0.021	0.024	0.023	0.013
father: regural work				0.103	0.103	0.102	0.091
father: occasional work				0.197*	0.189	0.180	0.139
father: childcare				−0.016	−0.017	−0.022	−0.017
father: retired				0.297***	0.294***	0.272***	0.256**
father: unemployed				−0.327*	−0.321*	−0.314*	−0.326*
father: disabled				−0.120	−0.110	−0.103	−0.121
father: missing				−0.095	−0.088	−0.086	−0.089
parental ed.: missing				0.294*	0.253	0.185	0.174
parental ed.: medium				0.070	0.063	0.045	0.031
parental ed.: high				0.055	0.044	0.023	0.008
No. books: cca. 50				−0.030	−0.021	−0.022	−0.027
No. books: max. 150				−0.085	−0.082	−0.062	−0.054
No. books: max 300				−0.071	−0.072	−0.043	−0.043
No. books: 300-600				−0.135	−0.137	−0.098	−0.083
No. books: 600-1000				−0.079	−0.080	−0.054	−0.035
No. books: over 1000				−0.025	−0.024	0.008	0.012
No. books: missing				−0.185	−0.160	−0.186	−0.218
Math score, 6th grade					0.000	0.000	0.000
Reading score, 6th grade					0.000	0.000	0.000
GPA, imputed						−0.009	0.006
GPA, missing						0.151*	0.161*
Math grade, imputed						−0.002	−0.003
Hungarian grade, imputed						0.067*	0.069*
Literature grade, imputed						−0.084**	−0.088***
Math grade, missing						−0.341	−0.301
Hungarian grade, missing						0.144	0.136
Literature grade, missing						0.227	0.200
Altruism							−0.002
Trust							0.001
Cooperation							0.000
Delta							0.080
Risk							0.002**
Constant	0.662***	0.669***	1.034	0.983	0.721	0.923	0.861
Observations	1088	1088	1088	1088	1069	1069	1051
Adjusted R^2	0.010	0.032	0.031	0.031	0.034	0.047	0.048