Does Competitive Experience Affect Gender Difference in Economic Preference and Academic Performance?

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Abstract

This study examines whether competitive experience affects gender difference in the economic preference and academic performance. By utilizing the provincial differences in college admission rates as an indication of competitive experience for students, we assess the effects on risk preference, trust preference, and academic performance. We find that after experiencing more competitive environment, females are more risk averse and less trustful, and perform better in more competitive environment, compared with their male counterparts. Our study suggests that observed gender differences may partially reflect the effects of schooling environment rather than inherent gender traits.

Keyword: competition, risk, trust, gender difference
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1 Introduction

Despite significant educational advancements for women, a substantial gender gap in labor market outcomes, such as women being under-represented in high-paying jobs and high-level occupations, has been commonly observed and extensively recognized (Bertrand, 2011). Gender differences in economic preferences are suggested to explain these gender differences in labor market outcomes (Buser, Niederle, and Oosterbeek, 2014). Specifically, numerous studies from both behavioral and experimental economics have consistently found that men and women differ in a wide range of economic preferences (Croson and Gneezy, 2009). For example, compared with men, women are highly risk averse (e.g., Eckel and Grossman, 2008; Dohmen et al., 2011), significantly dislike competitive environments (Gneezy, Niederle and Rustichini, 2003; Niederle and Vesterlund, 2007; Flory, Leibbrandt, and List, 2014), and are considerably situationally specific in social preferences (Croson and Gneezy, 2009).

Recent studies have investigated the role of socialization in the observed gender differences. Gneezy, Leonard, and List (2009) show that men opt to compete at roughly twice the rate as women in the patriarchal society of Maasai in Tanzania, which is similar to what is observed in standard industrial societies (Niederle and Vesterlund, 2007). By contrast, women often prefer a competitive environment than men in the matrilineal society of Khasi in India. This cultural reversal has been shown to develop through socialization from the young age (Anderson et al., 2013). A similar reversal is also observed for gender difference in spatial ability (Hoffman, Gneezy, and List, 2011). Alesina, Giuliano, and Nunn (2013) examine the historical origins of gender roles, and show that societies that traditionally practiced plough agriculture currently exhibit unequal gender norms. Booth and Nolen (2012a, b) observe that gender differences in risk attitude and competitiveness depend on whether the girls have attended a single-gender or mixed-gender school. As observed in Bertrand (2011),

> "is it also the case that women's attitudes towards, say, risk or other-regarding preferences, have been converging over time towards men's? This would certainly fit with the view that the gender differences in preferences are not hard-wired but rather a reflection of environmental influences, and warrant more research on the specific changes in the home or schooling environments that might have triggered the convergence in attitudes."

Echoing this view and following previous studies on the role of socialization, the current study investigates the effects of competitive experience in school in shaping gender differences. In particular, we analyze the effects of competitive experience caused by the college

entrance examinations in China on gender differences in terms of economic preference and academic performance.

The college entrance examination in China is generally regarded as among the most competitive exams in the world. The passing rate is relatively low compared with those of most Western societies. Students compete for slots in China's nearly 2,000 colleges comprising three different tiers, namely, key universities, regular universities, and technical colleges. The differences among these colleges are based mostly on institutional ranking and duration of programs. Moreover, the national consensus is that studying in a superior university significantly enhances the opportunity to obtain an excellent job in China's fiercely competitive job market. Given that the Chinese educational system is typically exam-oriented, college entrance is almost entirely determined by scores in the College Entrance Examination (CEE), commonly known as Gaokao in Mandarin. Competitiveness and possibly the Chinese culture have led most high schools to dedicate the entire senior year to preparing students for CEE. Students commonly spend several hours studying after returning home from 10 hours in school, as well as foregoing breaks even on weekends. College entrance is definitely the most stressful experience typically shared by high school students in China.

We utilize the differences in college entrance rates across provinces in China as an empirical setup to assess the extent through which competitive experience induced by college entrance affects gender gap in terms of economic preference and academic performance. Using the Chinese College Students Survey (CCSS), which surveyed 8,176 undergraduate students from graduating classes across the different provinces in China, we analyze the effects on risk preference toward gain-oriented and loss-oriented gambles, as well as the trust preference measured by a general trust question. We find that, compared to males, the competitive experience makes females become more risk averse for both gain-oriented and loss-oriented gambles, and less trustful towards people in the society. In addition, we find that competitive experience makes females perform better in those more competitive examines, relative to males. We further show that the inclusion of pre-determined characteristics and college dummies has minimal effect on our estimates, thereby implying that our research design is valid. We discuss our results in relation to the literature on gender difference and stress in psychology. In particular, Nolen-Hoeksema and Girgus (1994) propose that compared with males, stress experience leads females to display considerable withdrawal and internalizing behaviors. This hypothesis has been used extensively to explain the observation that females under stress are highly vulnerable to depression. Furthermore, this hypothesis is compatible with our observation that competitive experience leads females to become more risk averse and less trustful than males. We further discuss the possibility that competitive experience makes females handle competitive environments better than their male counterparts, thereby

leading to better performance of the former.

Apart from the aforementioned studies on socialization and gender differences, recent studies have also explored the roles of biological factors in contributing to gender differences. In particular, biological differences between men and women, including features related with reproduction, such as hormonal systems, affect the physical, psychological, and behavioral characteristics between genders. For example, the menstrual cycle has been observed to cause absence from work among women, thereby leading to gender wage gap (Ichino and Moretti, 2009). The availability of oral contraceptive pills increases human capital investment and labor force participation for women (Goldin and Katz, 2002). Testosterone, which drives aggression particularly among males, has also been linked to economic preferences (for a review, see Apicella, Carré, and Dreber, 2014). These studies generally suggest that despite the possible role of biological factors, socialization can trump these influences in shaping gender differences.

Our study also contributes to recent studies on competition and gender gap. In previous experimental studies, Gneezy, Niederle, and Rustichini (2003) show that men were extensively more likely to perform better than women in a competitive environment.[1] Niederle and Vesterlund (2007) observe that compared to women, men are more likely to opt for a competitive environment after controlling for performance, overconfidence, and risk attitude. Flory, Leibbrandt, and List (2015) conduct a natural field experiment on job entry decisions and conclude that women disproportionately shy away from competitive work settings. Buser, Niederle, and Oosterbeek (2014) show that gender differences in competitiveness could partially account for gender differences in educational choices. Instead of examining preference toward competition and performance under competition, the current study investigates the effects of competitive experience on gender differences in economic behavior and outcomes.

Our study is consistent with literature on the effects of life experience on economic preference and outcomes. The long-term effects of early childhood environment on later life outcomes have been discussed extensively in human capital literature (Heckman, 2000; Currie, 2001). Moreover, macroeconomic experiences, such as great depression, has been shown to affect preference for risk (Malmendier and Nagel, 2011), preference for corporate financial policies among managers (Malmendier and Nagel, 2011), and preference for redistribution (Giuliano and Spilimbergo, 2014). Similarly, natural disaster experiences have been shown to affect risk (Cameron and Shah, 2015) and time preferences (Callen, 2015). In the current study, we show that the competitive experience of adolescents subsequently affects gender

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[1]In the real-world settings, Lavy (2013) and Paserman (2010) evaluate gender differences in the performance of high school teachers and professional tennis players, respectively, and find minimal evidence to support the view that women turn in inferior performance in highly competitive settings.

differences in economic preference and academic performance.

The rest of this paper is divided into the following sections. Section 2 provides background knowledge on college admission in China. Section 3 describes the data used in this study. Section 4 details the empirical strategy we used. Section 5 presents the empirical results. Section 6 concludes this paper.

2   Background: College Admission in China

For college admission in China, students are required to take a national standardized examination called CEE (or Gaokao). The total CEE score has been the main criterion for college admission, as well as the most important factor for evaluating the suitability of the majority of students.[2] Given that the college entrance exam is fate determining, students work extremely hard during their three years of high school to improve their exam-taking skills. In reality, students begin their exhaustive preparations for CEE as early as junior high school or primary school. Performing excellently in the CEE is a primary goal and all students exert effort to obtain high scores. Therefore, the CEE scores are essentially good measures of student ability, as well as direct measures of intelligence, in China.

A distinct feature of the Chinese college admission is that colleges are categorized into different tiers; those belonging to a considerably high tier are afforded first priority in admitting students. In all provinces, elite colleges fall under the first tier and are allowed to be the first to select among the applicants. Students fill in a form, in which they list their college preferences (4 to 6 in each tier) and favored majors in the order of importance. The timing of turning in the preference form varies by province; these forms may be submitted prior to the exam, after the exam but prior to being informed of the scores, or after learning the scores. The admission procedure that has prevailed in most provinces is similar to the Boston mechanism. In the first round, each college considers only students who listed it as their first choice. An applicant with a total CEE score above the threshold score is accepted; an applicant with a score below the threshold is rejected and placed in a pool of candidates for the college next on his or her list of options. Only if slots are still available after the first round will a college consider admitting students who list it as their second or third choice. Given the shortage of high-quality institutions, students have limited chances for admission by their second-choice colleges if they fail to enter the first-choice colleges. Therefore, filling in the college preference form requires certain skills and strategies, and two students with

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[2]Applicants to several special programs, including those in art departments (audition), military and police schools (political screening and physical exam), and several sports programs (tryout), are screened using additional criteria.

the same total CEE scores may end up in different colleges. Once a student is admitted by a college, the selection process is terminated and his/her files will no longer be accessible to other colleges. This protocol indicates that a student can obtain, at most, one admission offer. Finally, a student decides whether to attend the college that has admitted him/her; turning down an offer would mean that the student will not be going to a Chinese college that year.

Although the number of higher education institutions, as well as new students enrolled, has substantially increased since 1978, a significant number of young people still cannot enroll in higher education institutions. In addition, although the admission rate is increasing every year (from 4.8% in 1977, to 37% in 1995, to approximately 75% in 2012), such percentage remains fairly low compared to those in Western countries and cannot meet the demands of students. More importantly, enrolling in leading universities would generally increase the opportunity of success in both the labor and marriage markets. By contrast, less than 10% of candidates can be enrolled in tier-1 universities, and less than 0.2% of Gaokao takers will be accepted in China's top five universities based on a report by the Economist. The importance and competitiveness of college entrance examination exert enormous pressure on high school students, as well as on their parents and teachers. For example, the China Daily reported that several girls took contraceptives or received injections to prevent the onset of their menstrual cycle during the week of the exam, while a few students studied in a hospital while hooked up to oxygen tanks in hopes of improving their concentration. Therefore, the highly competitive nature of college entrance examinations in China provides an ideal setup to study the effects of competitive experience on gender difference.

3   Data

The data that we use are derived from the second round of the Chinese College Students Survey (CCSS), which was conducted by the China Data Center of Tsinghua University in May and June 2011. This survey was conducted from 2010 to 2014. The sampling method used is stratified random sampling, with locations (Beijing, Shanghai, Tianjin, Northeastern China, Eastern China, Central China, and Western China) and different tiers of colleges as stratifying variables.[3] In the first round of the survey, 19 out of 2,305 colleges in China were randomly selected as a pretest; the number was expanded to 50 colleges in 2011 and 2012, and 65 colleges in 2013 and 2014. In each college, approximately 200 students from

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[3]In the sampling process, we separate three metropolises (i.e., Beijing, Shanghai, and Tianjin) from the rest of China because these cities have an extremely large concentration of colleges, particularly the top universities.

the population of graduating classes were randomly sampled.

The questionnaire was designed collaboratively by experts in economics, sociology, and education. The questionnaire not only collected basic information, such as individual characteristics and family backgrounds, but also comprised questions on CEE scores, college activities, and student placement after graduation. The survey administrators were trained in Beijing for several days through intensive meetings before the survey was conducted. The students were asked to complete the questionnaires, after which the questionnaire forms were placed inside coded envelopes to guarantee anonymity. Thereafter, the submitted questionnaires were collected by survey administrators in the college. The survey was conducted with considerable care, with the survey team closely monitoring both the survey in each college and the data entry process.

In this study, we focus on data collected in 2011 because it is the only year when the questions on students' preferences were included in the questionnaire. The sampled colleges are located in 24 provinces. A total of 8,176 undergraduate students from graduating classes from all 31 provinces in China were selected. Table 1 shows several pre-college characteristics of these students. A total of 45% are female. Their average CEE score is 0.226.[4] On average, 25% of their parents have college degrees, 13% are cadres, and 28% work in the public sector. A total of 43% entered magnet classes in high school. Generally, these students performed well in high school. A total of 16% won awards in several city-level or above competitions, and 75% had GPAs in the top 20% level in high school.

[Insert Table 1 Here]

Our main independent variable is competitiveness experience, which is measured by the provincial college enrollment rate in 2007 when the college graduates in 2011 took the CEE. College enrollment rate is calculated as the ratio of college enrollment to the number of students taking the CEE. We obtained the data from the China Education Online website.[5] Table 1 shows that the average value of the competition measurement, that is, one minus college admission rate, is 0.363; its variation across different provinces is large and the variance is 0.113.

We investigate two sets of outcome variables in this study. The first set is on economic preferences, including preference toward risk and trust. We measure risk preferences over gain and loss (Kahneman and Tversky, 1979). Risk preference over gain-oriented gamble is measured by the following question: Would you rather (a) gain 1,000 Yuan with certainty,

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[4]The CEE scores are normalized using mean and standard deviation in the province where the student took the examination.

[5]http://gaokao.eol.cn/kuai_xun_3075/20070820/t20070820_249812.shtml

(b) gain 2,000 Yuan with 50%, and nothing with 50%? Option 1 (a), option 2 (b), and option 3 (a) and (b) are indifferent. Risk preference over gain-oriented gamble indexed with "Risk (gain)" is equal to 1 if the answer is option 1; 2 if the answer is option 3; and 3 if the answer is option 2, which indicate risk aversion, risk neutrality, and risk affinity, respectively. Risk preference over loss-oriented gamble is measured by the following question: Would you rather (a) lose 1,000 Yuan with certainty, (b) lose 2,000 Yuan with 50%, and no loss with 50%? Option 1 (a), option 2 (b), option 3 (a) and (b) are indifferent. Correspondingly, the variable "Risk (loss)" is equal to 1 if the answer is option 1; 2 if the answer is option 3; and 3 if the answer is option 2. Table 1 shows that the average value for "Risk (gain)" is 1.895 and the average value for "Risk (loss)" is 2.227. These results suggest that the students are risk averse over gain-oriented gamble and risk seeking over loss-oriented gamble, thereby demonstrating consistency with experimental observations reported in prospect theory (Kahneman and Tversky, 1979). To measure trust preference, students are asked "Do you agree with the following statement: 'Generally, you can trust people in society.' Option 1, Strongly Disagree; option 2, Disagree; option 3, Agree; and option 4, Strongly Agree." This question is known as the general trust question and has been used extensively to measure the willingness to trust, particularly in the General Social Survey and World Values Survey. Table 1 shows that the average value of trust is 2.154, suggesting that students on average tend to disagree that they can trust people in society.

The second set of variables is on the academic performance of students in college, including their GPA; an indicator of whether the student had failed in any course; an indicator of whether the student had won any awards in the provincial level or above; and their scores in the College English Level 4 Test (CET4), a national examination on English proficiency for college students. Table 1 shows the summary statistics of these variables. The average GPA in college is approximately 3 out of 4. A total of 41% of the students had failed in at least one course. Meanwhile, 14% had won awards in the provincial level or above. Their average CET4 score is 467 (out of 710).[6]

4   Estimation Strategy

To identify the effects of competitive experience (generated by the college entrance) on individuals' preferences and performance, we compare individuals across provinces with different college enrollment rates. Two empirical challenges are present. First, the distribution of provincial college enrollment rate in 2007, which is our regressor of interest to determine the differential competitive pressures experienced by different individuals, is unlikely to be ran-

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[6]A score of 425 is necessary to pass this test.

dom. For example, coastal provinces, such as Zhejiang and Fujian, may have considerably higher enrollment rates because of economic development. By contrast, inland provinces, such as Qinghai and Ningxia, have substantially lower rates. To overcome this identification issue, we focus on the competitive experience effect on gender differences in preferences and performance. This strategy enables us to include province-fixed effects in the regressions, which effectively controls for all differences across provinces in the cross-sectional data. However, the trade-off is that we cannot analyze the effects for females, males, and the entire population.

The second identification challenge is the sample selection issue, that is, different enrollment rates may select different quantiles of students even from the same population. For example, provinces with lower enrollment rates, compared with those with higher enrollment rates, could have admitted excceptional students. Consequently, the differences in individuals' preferences and performance across provinces may not be caused by competitive experience but simply reflect the selection caused by the different enrollment rates. However, the selection of college admission in our research setting is based mainly on the CEE score. This one-dimensional selection rule enables us to avoid the sample selection issue by comparing individuals with the same CEE scores across provinces. This strategy resembles the approach used by Lee (2009) in the setting of randomized experiment. As Lee (2009) does not know the exact selection rule in his research setting, he examine the worst and best selection scenarios to pin down the bounds on treatment effects.

Our regression specification is then

$$y_{ip} = \beta Competition_p \cdot Female_{ip} + \alpha Female_{ip} + CEE_{ip} + \boldsymbol{\lambda}_p + \varepsilon_{ip}, \tag{1}$$

where y_{ip} are the preferences and performance measures of individual i taking the CEE in province p; $Female_{ip}$ equals 1 if individual i is a female and 0 otherwise; CEE_{ip} is individual i's CEE score; $\boldsymbol{\lambda}_p$ is a set of province fixed effects, capturing all differences across provinces; and ε_{ip} is the error term. We calculate the standard errors by clustering over the province level to deal with any potential heteroskadasticity problem.

$Competition_p$ is our key regressor, which measures the college enrollment rate in province p. Specifically, it is measured as 1-college enrollment rate; hence, the higher value is $Competition_p$, the more competitive is the college admission. In the baseline analysis, we use the rate in 2007, the year when our concerned individuals took the CEE. To capture the possibility that students may face the competitive pressures of the CEE during the whole senior high school period, we also experiment with the average college enrollment rate from

2006 to 2007.[7]

5 Empirical Findings

5.1 Validity Checks and Balancing Tests

Our identifying assumption requires that conditional on province fixed effects and CEE scores, individuals are balanced across provinces with different college enrollment rates before taking CEE. Hence, *ex post* gender differences in preferences and performance across provinces can then be attributed to different degrees of competitive pressures experienced. To check whether this balancing has been achieved in our estimation framework, we conduct an analysis following the suggestions by Lee and Lemieux (2010) for the validity check of the regression discontinuity framework. Specifically, we use Equation (1) to examine whether individuals' pre-determined socioeconomic characteristics are balanced or not, as well as the balancing of the density function of college entrance exam scores.

Table 2 presents the regression results. In column 1, we consider whether an individual is a minority, and the coefficient of $Competition_p \cdot Female_{ip}$ is statistically insignificant and small in magnitude, suggesting that the gender difference in ethnicity are balanced across provinces. In columns 2-4, we examine the balancing of parental characteristics—specifically, whether they have college degrees, whether they are government cadres, and whether they work in public sector. Consistently, we find that our regressor of interest is statistically insignificant and has small magnitudes, suggesting that there is no selection by students' parents such as moving into better provinces.

[Insert Table 2 Here]

In columns 5-7, we examine whether there were any selections due to the admission into middle schools. Specifically, we look at during the middle school period, whether individuals were enrolled in magnet classes, whether they won any competitions at the province level or above, and whether their GPAs were at the top 20% level. We continue to find no statistically and economically significant gender differences across provinces in all these outcomes. These results indicate that there may not be significant selection due to the high school admission.

We then check the balancing among individuals' performance during their senior high school to further examine the selection due to the high school admission and whether there were any changes caused by the competitive experience during the high school entrance

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[7]It is better to use the average college enrollment rate from 2005 to 2007 since students spend three years in high schools in China; however, provincial college enrollment rates in 2005 are not available.

exam. Towards this end, we look at during the high school period, whether individuals were enrolled in magnet classes, whether they won any competitions at the province level or above, and whether their GPAs were at the top 20% level. As shown in columns 8-10, there are no statistically and economically significant gender difference across provinces in all these outcomes. These results suggest that genders were quite balanced during the high school period.

Lastly, we check whether there is any discontinuity in the density function of college entrance exam scores across provinces. McCrary (2008) argues that a mixture of discontinuities in individual characteristics resulted from selection would further imply a discontinuity in the density distribution. Following this argument, we check and find that there is no gender difference in the number of individuals obtaining same CEE scores across provinces in column 11.

In summary, these analyses demonstrate that there is no significant selection and genders were balanced across provinces before the CEE, which implies that our research design is generally valid.

5.2   Main Results

Preferences. We start with presenting the results on economic preferences in Table 3. We use the ordered logit model to capture the categorical nature of our outcome variables. However, the results from the linear probability model are qualitatively similar and available upon request.

[Insert Table 3 Here]

In columns 1-2, we consider the effects on risk preference—specifically, two measures solicited from questions on losing and gaining money, respectively. In a world without any competitive experiences, females are similar as males in their risk seeking towards losing and gaining money. The coefficients of $Competition_p \cdot Female_{ip}$ are both negative and significant. These results suggest that the competitive experience enlarges the gender gap in risk preference. Specifically, relative to males, females become more risk averse towards both gain-oriented and loss-oriented gambles after they experience competition in the college entrance.

In column 3, we investigate the effects of competitive experience on preference towards trust. The coefficient of $Female$ is positive and statistically significant, implying that in a world with 100 percent college enrollment (hence free of competitive experience), females are more willing to trust than males. Regarding our central interest, we find the coefficient of $Competition_p \cdot Female_{ip}$ to be negative and statistically significant. This suggests that

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the competitive experience makes the gender gap in trust to become considerably narrow. In particular, at the enrollment rate of 52 percent, females and males become equally trustful.[8]

Performance. In Table 4, we examine a number of performance indicators by individuals during their four-year college period. Specifically, we look at the GPA (in log), whether an individual had failed any courses, whether an individual had won any awards at the province level or above, and the CET4 score.

[Insert Table 4 Here]

We consistently find that in a world without any competitive experiences, females perform better than males in the colleges—specifically, they have 9.2 percent higher GPAs, 29.3 percent less likely to fail courses, and 14.42 higher in CET4 scores. However, we do not find that competitive experience reduces the gender gap in GPAs, likelihood of failing courses and CET4 scores, but the gender gap in winning provincial or national awards is enlarged by the competitive experience. Given that the former two outcomes pertain to competition within a college and CET4 is an English exam, it is much more competitive to win provincial or national awards. These results suggest that the competitive experience improves females' performance in more competitive environment relative to males.

Summary. We find that competitive experience causes females to become more risk averse, less trustful, and have better performance in more competitive environments, compared with male counterparts. In the next subsection, we first present several robustness checks to substantiate our findings. Thereafter, we provide an explanation along the psychology literature in Section 5.4.

5.3 Robustness Checks

We conduct a battery of robustness checks on our aforementioned results in this subsection. All regression results are contained in the online Appendix.

Inclusion of pre-determined characteristics. As the first check, we follow the suggestion by Lee and Lemieux (2010) by including pre-determined characteristics: if our research design is valid, including these controls should have little effect on our estimates. Regression results are reported in Tables A1 and A2 for economic preference and academic performance,

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[8] As trust preference is often linked to risk preference, the observed effect on trust preference could be due to the effect on risk preference. To examine this possibility, we include risk preference in the analysis, and we find that the magnitude of coefficient of $Competition_p \cdot Female_{ip}$ remains the same (results available upon request).

respectively. Indeed, we find our estimates barely change in both statistical significance and magnitudes, further implying the validity of our research design.

Inclusion of college dummies. Our sample comes from various colleges, which may have different curricula and exam standards. To address this potential incompatibility issue, we further add a set of college dummies in our analysis. However, a compromise is that as many provinces allow students to select colleges after the CEE, competitive experience may lead females and males to select colleges differently; hence, comparing individuals in the same colleges may overlook this competitive experience effect. Regression results are reported in Tables A3 and A4. Similar patterns on gender differences in preferences and performance caused by the competitive experience are also uncovered.

Placebo test. We conduct a placebo test to verify further whether our research design is valid. Specifically, instead of using the real distribution of college enrollment rates across provinces to measure the competitive experiences across provinces, we randomly assign these enrollment rates across provinces, and construct a false variable, $Competition_p^{false}$. We then replace $Competition_p$ with $Competition_p^{false}$ in regression (1). Given this random data generating process, we expect $Competition_p^{false} \cdot female_{ip}$ to cast zero effects on our outcomes; otherwise, it indicates some mis-specification of our regression. We conduct this exercise 500 times to avoid rare events and increase the power of the test. The mean, standard deviation, and p-value are reported in Table A5. We find that all the mean coefficients of $Competition_p^{false} \cdot female_{ip}$ are statistically insignificant and close to 0, lending further support to our research design.

Competitive experience in the high school. To incorporate the possibility that students may face competitive pressures since they were enrolled in high schools, we use the average competition between 2006 and 2007 as the measure of the competitive experience. Regression results are reported in Tables A6 and A7. We continue to find the similar patterns of competitive experience effects on gender differences in preference and performance.

5.4 Interpretation

We find that competitive and stressful experiences causes females to become less willing to trust and more risk averse, compared with males. To explore potential interpretations, we discuss the literature on gender difference in stress response. In biology and psychology literature, the dominant model of response to stress, originally proposed by Walter Cannon in the 1920s, is characterized by a fight-or-flight response, that is, either confronting a stressor (fight) or fleeing from it (flight). While both men and women show the fight-or-flight pattern

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of arousal, such as, elevated heart rate and blood pressure, Taylor et al (2000) observe that females are more likely than males to seek support from others in times of stress. They further propose an alternative model of stress response for women, dubbed Tend-and-befriend, in which tending involves nurturing activities designed to protect the self and offspring that promote safety and reduce distress and befriending is the creation and maintenance of social networks that may aid in this process.

Men and women differ not only in how they respond to the epoch of stress, but also in how chronic stress experience impacts them in longer term. In particular, stressful life events, many of which are novel and challenging, have been shown to account for numerous medical and psychiatric conditions such as anxiety, depression, and alcohol dependence. Nolen-Hoeksema and Girgus (1994) hypothesize that, after experiencing chronic stress, females are more likely to report internalizing symptoms, while males are more likely to report externalizing symptoms. This hypothesis has been proposed to account for the extensively observed gender difference in psychiatric disorders. That is, across different countries and different ethnic groups, the rates of depression are 2 to 3 times higher among women than men, while alcohol dependence is approximately twice as common in males compared to females (Hasin et al., 2007).

Maciejewski, Prigerson, and Mazure (2001) find that, among males and females who did not experience a stressful life event, no gender difference is observed among those suffering from major depression. By contrast, females who had been exposed to a stressful life event have a threefold increase in risk for major depression relative to males exposed to a stressful life event. Using data from the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions, Dawson et al. (2005) find that the association between the number of stressful life events and alcohol consumption is more pronounced among males than females, and that particular stressful life events differentially impacted the level of alcohol consumption among males. These studies support the hypothesis of Nolen-Hoeksema and Girgus (1994) on gender difference in response to stressful experiences.

We hypothesize that the pressure of college entrance is the most stressful life event that high school students commonly encounter. On the basis of the hypothesis proposed by Nolen-Hoeksema and Girgus (1994), if stress experience leads females to display more withdrawal and internalizing behaviors, it is reasonable to hypothesize that females experiencing more stressful and competitive environment would become less willing to take risk and less willing to trust others. Conversely, if stress experience makes males to exhibit more externalizing behaviors, it is reasonable to hypothesize that males experiencing more stressful and competitive environment would become more willing to take risk, and more willing to trust. Thus, our results are consistent with psychological literature on gender difference in stress

response. Moreover, our study goes beyond simple correlation, and identifies the casual role of stress experience on gender difference in economic preference.

We also find that competitive experience casues females to perform better in more competitive environments, compared with male counterparts. One possible explanation is that the gender differential effect on academic preference is partially due to the gender differential effect on economic preference. This argument follows Buser, Niederle and Oosterbeek (2014), in which they find that competitiveness measured in the laboratory setting is positively correlated with the selection of academic tracks, and the gender difference in competitiveness accounts for a substantial portion of the gender difference in track choice. An alternative explanation is that the competitive experience provides a learning opportunity to handle the subsequent competitive situations and males and females learn differently. For example, Wozniak, Harbaugh and Mayr (2014) show that feedback about relative performance removes the average gender difference in compensation choices, which suggests that learning may affect males and females differently. Although we could not explore these two possible explanations completely because of data limitations, we attempt to assess the first possibility. In particular, we include risk and trust preferences (and their interactions with the female dummy) in the analyses of academic performance presented in Table 4, and examine whether the magnitude of coefficients of $Competition_p \cdot Female_{ip}$ for academic performance remain the same. We find that the inclusion of preferences does not alter the magnitude for the effect on performance. (Appendix Table A8). This suggests that the differential effect on academic performance is unlikely to be caused by the differential effect on risk and trust preferences.

5.5 Heterogeneous Effects

In this section, we investigate whether and how the effects of competitive experience on gender difference in economic preference and academic performance may differ across various groups. We estimate a specification similar with Equation (1) but controlling for parental characteristics, such as indictors for minority, having a college degree, being a government cadre and working in public sector, and pre-college variables measuring students' performance in high schools and middle schools. Due to the space limit, Table 5 only presents the estimated coefficients of the interaction of competition and the female dummy.

[Insert Table 5 Here]

First, we compare the heterogeneous effect between students attending magnet high schools and regular high schools, as these two types of schools may have different competitive

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schooling environments. Columns 1 and 2 are for students attending magnet and regular high schools, respectively. Experiencing the same level of competition, female students attending magnet high schools become more risk averse and less trustful relative to their male counterparts than female students attending regular high schools. However, the effect on gender difference in terms of college performance is relatively the same for students attending magnet and regular high schools.

Second, high schools in China offer the natural science track, liberal arts and social science track, and other more minor tracks. The natural science track is more popular among males while the arts and social science track is more popular among females. Columns 3 and 4 show the results for students taking the natural science track and other tracks, respectively. We can see that with the same amount of increase in competition, female students taking other tracks are less trustful, more risk averse in losing money, and less risk averse in gaining money than female students taking the natural science track relative to their male counterparts. The effect of experiencing competition on gender difference of college performance is approximately the same for students taking different tracks.

Third, we examine the differences between those who are single child and those who have siblings, as it has been recently shown that the one child policy has produced significantly less trusting, less trustworthy, more risk-averse, less competitive, more pessimistic, and less conscientious individuals (Cameron et al., 2013). As shown in columns 5 and 6, experiencing the same level of competition, female students having siblings become less trustful and risk averse in gaining money, but perform better in college than those who are single child, relative to their male counterparts.

6   Conclusion

This study investigates the extent by which competitive experience affects gender differences in economic preference and academic performance. To address this issue, we use the empirical setup of differences in college admission rates across provinces because the pressure of college admission is probably the most competitive experience commonly shared by high school students in China. Our data reveal that the competitive experience induced by college admission makes females, compared to males, become more risk averse toward both gains and losses, less trustful, and perform better in highly competitive environments. This observed behavioral pattern is consistent with gender difference in stress response as proposed by Nolen-Hoeksema and Girgus (1994) in psychology literature. After experiencing stress, females are more likely to display withdrawal and internalizing behavior, such as less willing to take risks and to trust other people. By contrast, males are more likely to display

approach and externalizing behavior, such as highly willing to take risks and to trust other people.

Our study contributes to the policy implications regarding the effect of college expansion, which is a worldwide phenomenon. From a special report on university education published in the Economist on March 28, 2015, the global tertiary enrollment ratio increased from 14% to 32%, and the number of countries with a ratio of more than half increased from five to 54 in the two decades prior to 2012. Our results suggest that college expansion leading to less competitive environment would have implications on gender differences in economic preference, academic performance, and perhaps labor market outcomes.

Our study also contributes to understanding the relationship between stress and gender. Based on The Stress in America survey (2012) conducted by American Psychological Association, males and females do differ in the experienced stress and employ different stress management techniques. For example, females are likely to report experiencing extreme stress, and are more likely to engage in social and sedentary activities such as reading and shopping to manage stress. Despite its importance, the effects of stressful experience have not yet been much explored in economics. For example, Evans and Kim (2007) find that the number of years spent living in poverty during childhood is associated with elevated overnight cortisol and a more disregulated cardiovascular response, while concurrent poverty, i.e., during adolescence, does not affect these physiological stress outcomes. More recently, Chemin De Laat and Haushofer (2013) observe that low levels of rain in the preceding year increased the level of cortisol, the stress hormone, among farmers in Kenya. Goh, Pfeffer and Zenios (2015) find that stressors in the workplace contribute substantially to healthcare cost and mortality in the United States. Given the well-established gender difference in stress response in psychology and biology (Nolen-Hoeksema and Girgus 1994; Taylor et al 2000), investigating the effects of different sources of stress arising from early childhood poverty, parenting style, and workplace on gender gap in economic preferences and outcomes would be of significant interest.

References

Alesina, Alberto, Paola Giuliano, and Nathan Nunn. "On the Origins of Gender Roles: Women and the Plough." The Quarterly Journal of Economics 128, no. 2 (2013): 469-530.

Andersen, Steffen, Seda Ertac, Uri Gneezy, John A. List, and Sandra Maximiano. "Gender, competitiveness, and socialization at a young age: Evidence from a matrilineal and a patriarchal society." Review of Economics and Statistics 95, no. 4 (2013): 1438-1443.

Apicella, Coren L., Justin M. Carré, and Anna Dreber. "Testosterone and Economic Risk Taking: A Review." Adaptive Human Behavior and Physiology (2014): 1-28.

Bertrand, Marianne. 2011. "New Perspectives on Gender." Handbook of Labor Economics.

Booth, Alison L., and Patrick Nolen. "Gender differences in risk behaviour: does nurture matter?*." The Economic Journal 122, no. 558 (2012): F56-F78.

Booth, Alison, and Patrick Nolen. "Choosing to compete: How different are girls and boys?." Journal of Economic Behavior & Organization 81, no. 2 (2012): 542-555.

Buser, Thomas, Muriel Niederle, and Hessel Oosterbeek. "Gender, Competitiveness and Career Choices." Quarterly Journal of Economics 129(3). (2014). 1409-1447.

Cameron, Lisa, and Manisha Shah. "Risk-taking behavior in the wake of natural disasters." Journal of Human Resources 50, no. 2 (2015): 484-515.

Cameron, Lisa, Nisvan Erkal, Lata Gangadharan, and Xin Meng. "Little emperors: behavioral impacts of China's one-child policy." Science 339, no. 6122 (2013): 953-957.

Callen, Michael. "Catastrophes and time preference: evidence from the Indian Ocean earthquake." Journal of Economic Behavior & Organization (2015).

Chemin, Matthieu, Joost De Laat, and Johannes Haushofer. "Negative rainfall shocks increase levels of the stress hormone cortisol among poor farmers in Kenya." Available at SSRN 2294171 (2013).

Currie, Janet. "Early childhood education programs." Journal of Economic perspectives (2001): 213-238.

Croson, Rachel, and Uri Gneezy. "Gender differences in preferences." Journal of Economic literature (2009): 448-474.

Dawson, Deborah A., Bridget F. Grant, Frederick S. Stinson, Patricia S. Chou, Boji Huang, and W. Ruan. "Recovery from DSM-IV alcohol dependence: United States, 2001–2002." Addiction 100, no. 3 (2005): 281-292.

Dohmen, Thomas, Armin Falk, David Huffman, Uwe Sunde, Jürgen Schupp, and Gert G. Wagner. "Individual risk attitudes: Measurement, determinants, and behavioral consequences." Journal of the European Economic Association 9, no. 3 (2011): 522-550.

Eckel, Catherine C., and Philip J. Grossman. "Men, women and risk aversion: Experimental evidence." Handbook of experimental economics results 1 (2008): 1061-1073.

Evans, Gary W., and Pilyoung Kim. "Childhood poverty and health cumulative risk exposure and stress dysregulation." Psychological Science 18, no. 11 (2007): 953-957.

Flory, Jeffrey A., Andreas Leibbrandt, and John A. List. "Do Competitive Workplaces Deter Female Workers? A Large-Scale Natural Field Experiment on Job-Entry Decisions." The Review of Economic Studies (2014): rdu030.

Goldin, Claudia, and Lawrence F. Katz. "The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions." Journal of Political Economy 110, no. 4 (2002): 730-770.

Goh, Joel, Jeffrey Pfeffer, and Stefanos A. Zenios. "The Relationship Between Workplace Stressors and Mortality and Health Costs in the United States." Management Science (2015).

Giuliano, Paola, and Antonio Spilimbergo. "Growing up in a Recession." The Review of Economic Studies 81, no. 2 (2014): 787-817.

Gneezy, Uri, Muriel Niederle and Aldo Rustichini. 2003. "Performance in Competitive Environments: Gender Differences." Quarterly Journal of Economics. Vol 118: 1049-1074.

Gneezy, Uri, Kenneth L. Leonard, And John A. List. "Gender Differences In Competition: Evidence From A Matrilineal And A Patriarchal Society." Econometrica 77, no. 5 (2009): 1637-1664.

Heckman, James J. "Policies to foster human capital." Research in economics 54, no. 1 (2000): 3-56.

Hoffman, Moshe, Uri Gneezy, and John A. List. "Nurture affects gender differences in spatial abilities." Proceedings of the National Academy of Sciences 108, no. 36 (2011): 14786-14788.

Ichino, Andrea, and Enrico Moretti. "Biological Gender Differences, Absenteeism, and the Earnings Gap." American Economic Journal: Applied Economics 1, no. 1 (2009): 183-218.

Kahneman, Daniel, and Amos Tversky. "Prospect theory: An analysis of decision under risk." Econometrica: Journal of the Econometric Society (1979): 263-291.

Lavy, Victor. 2013. "Gender Differences in Market Competitiveness in a Real Workplace: Evidence from Performance-based Pay Tournaments among Teachers." Economic Journal. Vol 123: 540-573.

Lee, David S., and Thomas Lemieux. "Regression Discontinuity Designs in Economics." Journal of Economic Literature 48 (2010): 281-355.

Maciejewski, Paul K., H. G. Prigerson, and C. M. Mazure. "Sex differences in event-related risk for major depression." Psychological medicine 31, no. 04 (2001): 593-604.

Malmendier, Ulrike, Geoffrey Tate, and Jon Yan. "Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies." The Journal of finance 66, no. 5 (2011): 1687-1733.

Malmendier, Ulrike, Geoffrey Tate, and Jon Yan. "Overconfidence and early-life experiences: the effect of managerial traits on corporate financial policies." The Journal of finance 66, no. 5 (2011): 1687-1733.

McCrary, Justin. "Manipulation of the running variable in the regression discontinuity design: A density test." Journal of Econometrics 142, no. 2 (2008): 698-714.

Nolen-Hoeksema, Susan, and Joan S. Girgus. "The emergence of gender differences in depression during adolescence." Psychological bulletin 115, no. 3 (1994): 424.

Niederle, Muriel, and Lise Vesterlund. "Do Women Shy Away From Competition? Do Men Compete Too Much?." Quarterly Journal of Economics 122, no. 3 (2007).

Paserman, Daniel M. 2010. "Gender Differences in Performance in Competitive Environments? Evidence from Professional Tennis Players." Working Paper.

Taylor, Shelley E., Laura Cousino Klein, Brian P. Lewis, Tara L. Gruenewald, Regan AR Gurung, and John A. Updegraff. "Biobehavioral responses to stress in females: tend-and-befriend, not fight-or-flight." Psychological review 107, no. 3 (2000): 411.

Wozniak, David, William T. Harbaugh, and Ulrich Mayr. "The menstrual cycle and performance feedback alter gender differences in competitive choices." Journal of Labor Economics 32, no. 1 (2014): 161-198.

Table 1 Summary Statistics

Variables	Mean	S.D.
Female	0.446	0.497
Minority	0.074	0.262
Competition	0.363	0.113
CEE scores	0.226	0.623
Parent has a college degree	0.251	0.434
Parent is a cadre	0.133	0.340
Parent works in public sector	0.283	0.450
Enrolled in magnet classes in middle school	0.367	0.482
Win in competition in middle school	0.215	0.411
GPA in top 20% in middle school	0.861	0.346
Enrolled in magnet classes in high school	0.430	0.495
Win in competition in high school	0.162	0.369
GPA in top 20% in high school	0.748	0.434
GPA in college	3.038	0.489
Have Failed in Courses	0.405	0.491
Award in Provincial Level or above	0.142	0.349
CET4 Scores	467.027	56.277
Trust	2.154	0.646
Loss	2.227	0.791
Gain	1.895	0.871
OBS	8176	

Note: Competition is measured by one minus college enrollment rate in each province. The values of "Trust" come from answers to the question "Do you agree with the following statement: 'Generally, you can trust people in the society.' 1. Very Disagree; 2. Disagree; 3. Agree; 4. Very Agree." The values of "Loss" come from the question "You would rather (a) Lose 1000 yuan with certainty; (b) Lose 2000 with 50% and no loss with 50%. 1. (a); 2. (b); 3. (a) and (b) are indifferent."   "Loss" is equal to 1 if the answer is 1, 2 if the answer is 3, and 3 if the answer is 2. The values of "Gain" come from the question "You would rather (a) Gain 1000 yuan with certainty; (b) Gain 2000 with 50% and nothing with 50%. 1. (a); 2 (b); 3. (a) and (b) are indifferent." "Gain" is equal to 1 if the answer is 1, 2 if the answer is 3, and 3 if the answer is 2.

Table 2 Balancing Test

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
			Parent		Students' Performance in Middle School			Students' Performance in High School			
	Minority	College	Cadre	Work in Public Sector	Magnet Class	Win in Competition	GPA in Top 20%	Magnet Class	Win in Competition	GPA in Top 20%	Ln(# of Students Having CEE Scores in the Same Decile)
Female	-0.014	0.027	0.003	-0.001	0.012	-0.052	0.053	0.035	-0.048	0.020	0.028
	(0.020)	(0.056)	(0.033)	(0.045)	(0.030)	(0.035)	(0.027)*	(0.034)	(0.025)*	(0.033)	(0.223)
Female*Competition	0.088	0.088	0.078	0.170	0.046	0.094	-0.085	-0.046	0.068	-0.019	-0.243
	(0.069)	(0.136)	(0.087)	(0.120)	(0.067)	(0.088)	(0.063)	(0.090)	(0.063)	(0.088)	(0.533)
CEE Scores	-0.006	0.023	0.013	0.019	0.033	0.019	0.047	0.070	0.016	0.069	0.396
	(0.009)	(0.010)**	(0.008)	(0.010)*	(0.013)**	(0.010)*	(0.009)***	(0.011)***	(0.011)	(0.014)***	(0.109)***
Constant	0.067	0.203	0.117	0.272	0.348	0.205	0.860	0.414	0.156	0.741	2.089
	(0.004)***	(0.007)***	(0.005)***	(0.006)***	(0.006)***	(0.006)***	(0.004)***	(0.005)***	(0.005)***	(0.005)***	(0.051)***
Observations	6649	6212	6679	6679	6636	6553	6629	6640	6545	6650	311
R-squared	0.15	0.05	0.03	0.05	0.04	0.04	0.03	0.06	0.03	0.03	0.21

Robust standard errors in parentheses are calculated by clustering over province; * significant at 10%; ** significant at 5%; *** significant at 1%; Province dummies are controlled in all regressions.

Table 3   Gender Difference in the Impacts of Experiencing Competition on Preference: Ordered Logit

	(1) Loss	(2) Gain	(3) Trust
Female	0.208	-0.141	0.628
	(0.130)	(0.135)	(0.123)***
Female*Competition	-0.695	-0.604	-1.216
	(0.341)**	(0.315)*	(0.314)***
CEE Scores	0.031	0.019	0.066
	(0.032)	(0.032)	(0.059)
Observations	5748	5768	5866

Robust standard errors in parentheses are calculated by clustering over province; * significant at 10%; ** significant at 5%; *** significant at 1%; Province dummies are controlled in all regressions. The values of "Trust" come from answers to the question "Do you agree with the following statement: 'Generally, you can trust people in the society.' 1. Very Disagree; 2. Disagree; 3. Agree; 4. Very Agree." The values of "Loss" come from the question "You would rather (a) Lose 1000 yuan with certainty; (b) Lose 2000 with 50% and no loss with 50%. 1. (a); 2. (b); 3. (a) and (b) are indifferent." "Loss" is equal to 1 if the answer is 1, 2 if the answer is 3, and 3 if the answer is 2. The values of "Gain" come from the question "You would rather (a) Gain 1000 yuan with certainty; (b) Gain 2000 with 50% and nothing with 50%. 1. (a); 2 (b); 3. (a) and (b) are indifferent." "Gain" is equal to 1 if the answer is 1, 2 if the answer is 3, and 3 if the answer is 2.

Table 4 Gender Difference in the Impacts of Experiencing Competition on Performance in College: OLS

	(1) Ln(GPA in College)	(2) Have Failed in Courses	(3) Award in Provincial Level or above	(4) CET4 Scores
Female	0.092	-0.293	-0.029	14.423
	(0.024)***	(0.065)***	(0.031)	(8.399)*
Female*Competition	0.017	0.001	0.149	22.891
	(0.057)	(0.147)	(0.069)**	(19.083)
CEE Scores	0.007	-0.048	-0.000	15.800
	(0.005)	(0.012)***	(0.006)	(3.547)***
Constant	1.049	0.557	0.121	453.375
	(0.002)***	(0.009)***	(0.004)***	(1.241)***
Observations	4832	5885	4944	4796
R-squared	0.12	0.11	0.02	0.16

Robust standard errors in parentheses are calculated by clustering over province; * significant at 10%; ** significant at 5%; *** significant at 1%; Province dummies are controlled in all regressions.

Table 5 Effects of Competitive Experience by Different Groups

	(1) Magnet High School	(2) Regular High School	(3) Natural Science Track	(4) Other Tracks	(5) Only Child	(6) Having siblings
Loss	-0.850	-0.588	-0.214	-2.584	-0.259	-0.697
	(0.414)**	(0.755)	(0.378)	(0.613)***	(0.639)	(0.463)
Gain	-0.645	-0.158	-0.818	-0.736	-0.792	-0.236
	(0.402)	(0.510)	(0.354)**	(0.523)	(0.472)*	(0.562)
Trust	-1.572	-0.741	-1.128	-2.241	-0.951	-1.281
	(0.572)***	(0.673)	(0.279)***	(1.028)**	(0.379)**	(0.535)**
Ln(GPA in College)	0.052	-0.039	0.048	-0.120	0.087	-0.050
	(0.074)	(0.061)	(0.092)	(0.064)*	(0.074)	(0.087)
Have Failed in Courses	0.087	-0.216	-0.173	0.217	0.040	-0.013
	(0.170)	(0.144)	(0.169)	(0.140)	(0.195)	(0.122)
Award in Provincial Level or above	0.138	0.101	0.143	0.102	0.143	0.184
	(0.075)*	(0.190)	(0.084)*	(0.151)	(0.093)	(0.088)**
CET4 Scores	7.825	36.509	16.413	20.556	28.852	12.550
	(23.227)	(26.455)	(21.998)	(31.713)	(29.396)	(28.880)

Robust standard errors in parentheses are calculated by clustering over province; * significant at 10%; ** significant at 5%; *** significant at 1%. The same regressions as those in Table A1 and Table A2 are estimated using different groups of samples. The coefficients shown in the table are those on the interaction of the female dummy and the competition measurement.

Table A1 Gender Difference in the Impacts of Experiencing Competition on Preference: Ordered Logit

	(1)	(2)	(3)
	Loss	Gain	Trust
Female	0.201	-0.128	0.627
	(0.127)	(0.132)	(0.124)***
Female*Competition	-0.665	-0.625	-1.192
	(0.341)*	(0.309)**	(0.312)***
CEE Scores	0.019	0.020	0.068
	(0.031)	(0.033)	(0.060)
Minority	-0.053	0.050	0.042
	(0.084)	(0.133)	(0.166)
Parent has a college degree	-0.075	0.010	-0.002
	(0.072)	(0.084)	(0.087)
Parent is a cadre	-0.013	-0.067	-0.077
	(0.101)	(0.088)	(0.094)
Parent works in public sector	-0.047	-0.058	-0.103
	(0.065)	(0.056)	(0.077)
Enrolled in magnet classes in middle school	0.012	-0.008	-0.129
	(0.047)	(0.052)	(0.053)**
GPA in top 20% in middle school	0.161	-0.061	-0.052
	(0.078)**	(0.086)	(0.081)
Win in competition in middle school	0.131	0.124	0.088
	(0.077)*	(0.074)*	(0.081)
Enrolled in magnet classes in high school	0.018	-0.028	0.097
	(0.060)	(0.066)	(0.053)*
GPA in top 20% in high school	0.039	0.055	0.048
	(0.063)	(0.079)	(0.072)
Win in competition in high school	-0.073	-0.020	-0.206
	(0.071)	(0.073)	(0.119)*
Observations	5748	5768	5866

Robust standard errors in parentheses are calculated by clustering over province; * significant at 10%; ** significant at 5%; *** significant at 1%; Province dummies are controlled in all regressions. The values of "Trust" come from answers to the question "Do you agree with the following statement: 'Generally, you can trust people in the society.' 1. Very Disagree; 2. Disagree; 3. Agree; 4. Very Agree." The values of "Loss" come from the question "You would rather (a) Lose 1000 yuan with certainty; (b) Lose 2000 with 50% and no loss with 50%. 1. (a); 2. (b); 3. (a) and (b) are indifferent."   "Loss" is equal to 1 if the answer is 1, 2 if the answer is 3, and 3 if the answer is 2. The values of "Gain" come from the question "You would rather (a) Gain 1000 yuan with certainty; (b) Gain 2000 with 50% and nothing with 50%. 1. (a); 2 (b); 3. (a) and (b) are indifferent." "Gain" is equal to 1 if the answer is 1, 2 if the answer is 3, and 3 if the answer is 2.

Table A2 Gender Difference in the Impacts of Experiencing Competition on Performance: OLS

	(1)	(2)	(3)	(4)
	Ln(GPA in College)	Have Failed in Courses	Award in Provincial Level or above	CET4 Scores
Female	0.089	-0.291	-0.025	15.103
	(0.026)***	(0.066)***	(0.030)	(8.124)*
Female*Competition	0.024	-0.009	0.148	18.746
	(0.060)	(0.148)	(0.066)**	(18.863)
CEE Scores	0.003	-0.038	-0.003	13.045
	(0.005)	(0.012)***	(0.006)	(3.176)***
Minority	-0.009	0.018	0.013	-9.088
	(0.009)	(0.021)	(0.024)	(3.460)**
Parent has a college degree	0.008	-0.009	0.019	10.096
	(0.009)	(0.020)	(0.017)	(1.906)***
Parent is a cadre	-0.005	0.004	-0.005	2.329
	(0.008)	(0.020)	(0.018)	(3.316)
Parent works in public sector	-0.012	0.046	-0.007	5.208
	(0.006)**	(0.022)**	(0.017)	(1.772)***
Enrolled in magnet classes in middle school	-0.001	-0.008	0.005	2.221
	(0.006)	(0.012)	(0.009)	(1.740)
GPA in top 20% in middle school	0.021	-0.066	0.022	14.834
	(0.009)**	(0.021)***	(0.013)	(3.538)***
Win in competition in middle school	-0.012	0.007	0.012	11.743
	(0.008)	(0.017)	(0.015)	(1.949)***
Enrolled in magnet classes in high school	0.006	-0.049	-0.007	7.799
	(0.005)	(0.012)***	(0.010)	(1.495)***
GPA in top 20% in high school	0.024	-0.032	-0.009	5.591
	(0.006)***	(0.016)*	(0.013)	(1.436)***
Win in competition in high school	0.044	-0.068	0.149	9.165
	(0.009)***	(0.015)***	(0.021)***	(2.772)***
Constant	1.010	0.656	0.080	425.092
	(0.009)***	(0.021)***	(0.017)***	(3.466)***
Observations	4832	5885	4944	4796
R-squared	0.13	0.12	0.04	0.21

Robust standard errors in parentheses are calculated by clustering over province; * significant at 10%; ** significant at 5%; *** significant at 1%; Province dummies are controlled in all regressions.

Table A3 Gender Difference in the Impacts of Experiencing Competition on Preference, Adding College Dummies: Ordered Logit

	(1) Loss	(2) Gain	(3) Trust
Female	0.285	-0.125	0.581
	(0.134)**	(0.132)	(0.121)***
Female*Competition	-0.840	-0.709	-1.089
	(0.347)**	(0.302)**	(0.303)***
CEE Scores	0.002	0.028	0.068
	(0.031)	(0.033)	(0.059)
Minority	-0.104	0.020	0.072
	(0.086)	(0.135)	(0.170)
Parent has a college degree	-0.072	0.019	-0.019
	(0.075)	(0.084)	(0.089)
Parent is a cadre	-0.016	-0.066	-0.053
	(0.098)	(0.091)	(0.093)
Parent works in public sector	-0.057	-0.070	-0.113
	(0.068)	(0.058)	(0.074)
Enrolled in magnet classes in middle school	0.024	-0.015	-0.131
	(0.045)	(0.051)	(0.054)**
GPA in top 20% in middle school	0.147	-0.037	-0.069
	(0.079)*	(0.091)	(0.081)
Win in competition in middle school	0.120	0.140	0.058
	(0.076)	(0.073)*	(0.078)
Enrolled in magnet classes in high school	0.001	-0.021	0.109
	(0.066)	(0.067)	(0.051)**
GPA in top 20% in high school	0.031	0.074	0.047
	(0.058)	(0.076)	(0.074)
Win in competition in high school	-0.057	0.004	-0.202
	(0.070)	(0.079)	(0.118)*
Observations	5748	5768	5866

Robust standard errors in parentheses are calculated by clustering over province; * significant at 10%; ** significant at 5%; *** significant at 1%; Province dummies and college dummies are controlled in all regressions. The values of "Trust" come from answers to the question "Do you agree with the following statement: 'Generally, you can trust people in the society.' 1. Very Disagree; 2. Disagree; 3. Agree; 4. Very Agree." The values of "Loss" come from the question "You would rather (a) Lose 1000 yuan with certainty; (b) Lose 2000 with 50% and no loss with 50%. 1. (a); 2. (b); 3. (a) and (b) are indifferent." "Loss" is equal to 1 if the answer is 1, 2 if the answer is 3, and 3 if the answer is 2. The values of "Gain" come from the question "You would rather (a) Gain 1000 yuan with certainty; (b) Gain 2000 with 50% and nothing with 50%. 1. (a); 2 (b); 3. (a) and (b) are indifferent." "Gain" is equal to 1 if the answer is 1, 2 if the answer is 3, and 3 if the answer is 2.

Table A4 Gender Difference in the Impacts of Experiencing Competition on Performance, Adding College Dummies: OLS

	(1)	(2)	(3)	(4)
	Ln(GPA in College)	Have Failed in Courses	Award in Provincial Level or above	CET4 Scores
Female	0.094	-0.255	-0.022	20.186
	(0.024)***	(0.065)***	(0.035)	(6.386)***
Female*Competition	0.008	-0.050	0.138	12.782
	(0.059)	(0.146)	(0.077)*	(14.415)
CEE Scores	0.000	-0.035	0.004	7.323
	(0.004)	(0.011)***	(0.007)	(2.446)***
Minority	-0.015	0.032	0.003	-12.976
	(0.009)	(0.022)	(0.024)	(3.918)***
Parent has a college degree	-0.000	-0.001	0.028	5.640
	(0.008)	(0.018)	(0.018)	(1.768)***
Parent is a cadre	-0.001	0.003	0.002	-0.524
	(0.009)	(0.017)	(0.019)	(2.862)
Parent works in public sector	-0.014	0.055	-0.010	2.482
	(0.006)**	(0.021)**	(0.016)	(1.676)
Enrolled in magnet classes in middle school	0.001	-0.005	0.004	3.500
	(0.005)	(0.012)	(0.009)	(1.653)**
GPA in top 20% in middle school	0.023	-0.068	0.024	10.580
	(0.010)**	(0.020)***	(0.014)*	(3.795)***
Win in competition in middle school	-0.015	0.018	0.017	7.052
	(0.008)*	(0.017)	(0.015)	(2.005)***
Enrolled in magnet classes in high school	0.006	-0.052	-0.001	4.802
	(0.004)	(0.013)***	(0.010)	(1.290)***
GPA in top 20% in high school	0.025	-0.032	-0.006	1.105
	(0.005)***	(0.014)**	(0.013)	(1.391)
Win in competition in high school	0.040	-0.051	0.156	3.520
	(0.009)***	(0.016)***	(0.021)***	(2.819)
Constant	0.987	0.711	0.283	432.078
	(0.016)***	(0.050)***	(0.050)***	(5.738)***
Observations	4832	5885	4944	4796
R-squared	0.20	0.16	0.07	0.31

Robust standard errors in parentheses are calculated by clustering over province; * significant at 10%; ** significant at 5%; *** significant at 1%; Province dummies and college dummies are controlled in all regressions.

Table A5 Balancing Test, Monte Carlo Experiment

	Mean	S.D.	T	P-value
Loss	-0.010	0.118	-0.088	0.930
Gain	-0.008	0.139	-0.057	0.955
Trust	0.005	0.171	0.028	0.489
Ln(GPA in college)	0.001	0.015	0.035	0.486
Have Failed in Courses	0.000	0.054	0.000	1.000
Award in Provincial Level or above	-0.001	0.030	-0.050	0.960
CET4 Scores	-0.106	7.578	-0.014	0.989

Table A6 Gender Difference in the Impacts of Experiencing Competition on Preference: Ordered Logit

	(1)	(2)	(3)
	Loss	Gain	Trust
Female	0.272	-0.144	0.576
	(0.136)**	(0.137)	(0.120)***
Female*Competition (2-year average)	-0.804	-0.655	-1.074
	(0.355)**	(0.321)**	(0.312)***
CEE Scores	0.002	0.028	0.068
	(0.031)	(0.033)	(0.059)
Minority	-0.105	0.019	0.071
	(0.086)	(0.135)	(0.170)
Parent has a college degree	-0.072	0.019	-0.018
	(0.075)	(0.084)	(0.089)
Parent is a cadre	-0.016	-0.066	-0.053
	(0.098)	(0.091)	(0.093)
Parent works in public sector	-0.057	-0.070	-0.113
	(0.068)	(0.058)	(0.074)
Enrolled in magnet classes in middle school	0.024	-0.015	-0.131
	(0.045)	(0.051)	(0.054)**
GPA in top 20% in middle school	0.147	-0.036	-0.068
	(0.079)*	(0.091)	(0.081)
Win in competition in middle school	0.120	0.140	0.058
	(0.076)	(0.073)*	(0.078)
Enrolled in magnet classes in high school	0.001	-0.021	0.109
	(0.066)	(0.067)	(0.051)**
GPA in top 20% in high school	0.031	0.073	0.047
	(0.058)	(0.076)	(0.074)
Win in competition in high school	-0.057	0.004	-0.201
	(0.070)	(0.079)	(0.118)*
Observations	5748	5768	5866

Robust standard errors in parentheses are calculated by clustering over province; * significant at 10%; ** significant at 5%; *** significant at 1%; Province dummies are controlled in all regressions. The values of "Trust" come from answers to the question "Do you agree with the following statement: 'Generally, you can trust people in the society.' 1. Very Disagree; 2. Disagree; 3. Agree; 4. Very Agree." The values of "Loss" come from the question "You would rather (a) Lose 1000 yuan with certainty; (b) Lose 2000 with 50% and no loss with 50%. 1. (a); 2. (b); 3. (a) and (b) are indifferent."   "Loss" is equal to 1 if the answer is 1, 2 if the answer is 3, and 3 if the answer is 2. The values of "Gain" come from the question "You would rather (a) Gain 1000 yuan with certainty; (b) Gain 2000 with 50% and nothing with 50%. 1. (a); 2 (b); 3. (a) and (b) are indifferent." "Gain" is equal to 1 if the answer is 1, 2 if the answer is 3, and 3 if the answer is 2.

Table A7 Gender Difference in the Impacts of Experiencing Competition on Performance: OLS

	(1)	(2)	(3)	(4)
			Award in	
	Ln(GPA in	Have Failed in	Provincial	CET4
	College)	Courses	Level or	Scores
			above	
Female	0.089	-0.290	-0.024	14.421
	(0.025)***	(0.063)***	(0.031)	(8.034)*
Female*Competition (2-year average)	0.024	-0.012	0.143	20.562
	(0.058)	(0.141)	(0.069)**	(18.545)
CEE Scores	0.003	-0.038	-0.003	13.044
	(0.005)	(0.012)***	(0.006)	(3.176)***
Minority	-0.009	0.018	0.013	-9.080
	(0.009)	(0.021)	(0.024)	(3.455)**
Parent has a college degree	0.008	-0.009	0.019	10.095
	(0.009)	(0.020)	(0.017)	(1.903)***
Parent is a cadre	-0.005	0.004	-0.005	2.331
	(0.008)	(0.020)	(0.018)	(3.317)
Parent works in public sector	-0.012	0.046	-0.007	5.202
	(0.006)**	(0.022)**	(0.017)	(1.772)***
Enrolled in magnet classes in middle school	-0.001	-0.008	0.005	2.219
	(0.006)	(0.012)	(0.009)	(1.740)
GPA in top 20% in middle school	0.021	-0.066	0.022	14.837
	(0.009)**	(0.021)***	(0.013)	(3.538)***
Win in competition in middle school	-0.012	0.007	0.012	11.736
	(0.008)	(0.017)	(0.015)	(1.952)***
Enrolled in magnet classes in high school	0.006	-0.049	-0.007	7.802
	(0.005)	(0.012)***	(0.010)	(1.495)***
GPA in top 20% in high school	0.024	-0.032	-0.009	5.590
	(0.006)***	(0.016)*	(0.013)	(1.437)***
Win in competition in high school	0.044	-0.068	0.149	9.156
	(0.009)***	(0.015)***	(0.021)***	(2.774)***
Constant	1.010	0.656	0.080	425.102
	(0.009)***	(0.021)***	(0.017)***	(3.455)***
Observations	4832	5885	4944	4796
R-squared	0.13	0.12	0.04	0.21

Robust standard errors in parentheses are calculated by clustering over province; * significant at 10%; ** significant at 5%; *** significant at 1%; Province dummies are controlled in all regressions.

Table A8 Gender Difference in the Impacts of Experiencing Competition on Performance in College: OLS

	(1) Ln(GPA in College)	(2) Have Failed in Courses	(3) Award in Provincial Level or above	(4) CET4 Scores
Female	0.110	-0.330	-0.003	10.324
	(0.029)***	(0.085)***	(0.063)	(9.714)
Female*Competition	0.013	0.015	0.138	22.439
	(0.059)	(0.144)	(0.074)*	(19.251)
Loss	0.003	0.000	0.006	1.768
	(0.004)	(0.013)	(0.008)	(1.144)
Gain	0.002	0.003	-0.005	-1.825
	(0.005)	(0.010)	(0.009)	(1.129)
Trust	0.005	-0.023	-0.003	-1.084
	(0.005)	(0.016)	(0.009)	(1.508)
Female*Loss	-0.000	0.003	0.010	0.668
	(0.006)	(0.014)	(0.011)	(1.354)
Female*Gain	-0.004	-0.010	0.010	-1.338
	(0.006)	(0.017)	(0.014)	(1.968)
Female*Trust	-0.004	0.018	-0.029	2.071
	(0.007)	(0.018)	(0.019)	(2.620)
CEE Scores	0.007	-0.047	-0.001	15.298
	(0.005)	(0.012)***	(0.006)	(3.562)***
Constant	1.027	0.601	0.123	455.689
	(0.015)***	(0.043)***	(0.030)***	(5.088)***
Observations	4677	5663	4772	4647
R-squared	0.12	0.11	0.02	0.16

Robust standard errors in parentheses are calculated by clustering over province; * significant at 10%; ** significant at 5%; *** significant at 1%; Province dummies are controlled in all regressions.