Competition and gender differences in educational outcomes: Evidence from one matrilineal and two patrilineal societies

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One of the starkest and best known examples of gender inequality is a phenomenon that Amartya Sen calls "missing women," which finds over 100 million less women in the world than there would have been if sex ratios in China and India were equal to that in Western countries. Less dramatic, although in some ways more troubling, is that even in developed countries, women are severely underrepresented in top echelons of society. For example, Bertrand and Hallock (2001) find that only 2.5% of the five top earners in US companies are women.

While theories of discrimination and gender specific occupational preferences have been put forth to understand gender gaps in developed countries, a recent strand of experimental literature has the potential to explain why gender inequality is pervasive across different regions and levels of development. Subjects at the University of Pittsburgh were given a task for pay and then given the choice of being paid on a piece-rate schedule, or on a tournament schedule. In the tournament schedule, subjects would be paid four times as much as in the piece-rate but only if they were the high scorer in their group of four. Niederle and Vesterlund (2007) found that twice as many men chose tournament than women, even though their actual performances in the task were not statistically different. Based on this evidence the authors suggested that it is innate gender differences in competitive inclination that explains the persistent gender gaps in economic outcomes around the world.

This hypothesis has enormous implications for shaping gender based development policy. If true, then

even if women had the same opportunities as men, outcomes would not necessarily be equal, because women would systematically not put themselves into the competitive situations required to take advantage of the opportunities.

This paper tests the hypothesis in two parts. First, it tests whether the experimental measure of competitive inclination can explain real world gender gaps in economic outcomes. The real world choice in this setting is the decision to take a competitive high school entrance exam. Education in China is compulsory up to middle school, but admission into high school is based almost entirely on performance in the entrance exam. Subjects in this study are rural Chinese middle school students who were given the same experiment given to the Pittsburgh students. Their academic progress was tracked to determine whether they took the entrance exam and their performance on it. An individual index of competitive inclination was created after factoring out the relative probability of winning in the task and risk aversion. This index has significant explanatory power for the decision to take the exam, as well as for the likelihood of passing the exam, even controlling for regular term academic performance, demographics, and socioeconomic status. Gender differences in high school admissions were not explained away by competitive inclination, however, because at the middle school level, there were no significant gender differences in competitive inclination. The absolute levels of the index gave no indication that females were less competitive than optimal, although males in some cases were more competitive than optimal.

Second, this paper tests the claim that gender differences in competitive inclination are innate against the alternative explanation that cultural gender norms play a role in determining gender difference in competitive inclination. The three ethnic groups in this study vary in their kinship systems: two are patrilineal and one is matrilineal. The experimental sites were selected to have a substantial proportion of matrilineal and patrilineal students and to be in close proximity (in the same county) to mitigate environmental differences that can lead to biological differences over the course of evolution. (Gneezy, Leonard, and List (2008) also study competitive inclination in a matrilineal and a patrilineal society, but the societies are on different continents and employ different means of subsistence, which complicates the interpretation of the results.) The residence structure associated with matriliny and patriliny is believed to give rise to gender differentiated investment in children across the kinship systems. In this population, evidence of differential investment is

found in the lower sex ratios of the matrilineal society compared to Western societies and higher sex ratios in the patrilineal societies compared to Western societies. Surprisingly, patterns of gender differences in competitive inclination across cultures were small and if anything, the patrilineal societies exhibited less gender differences in competitive inclination than the matrilineal society. This finding suggests that either kinship is not the sole channel through which culture acts on competitive inclination, or that factors other than culture are more powerful in explaining gender differences in competitive inclination.

Lastly, regardless of how gender differences in competitive inclination arise, understanding when it arises is important for policymakers who wish to reduce gender gaps to target intervention to the right age group. Students in the high schools in this county were recruited to expand the age range of the subjects so that the final range is from ages 11 to 21. Gender differences in competitive inclination were much more pronounced in high school than in middle school, even after the middle school sample was limited to only those who would eventually pass their entrance exams to minimize selection effects. Gender differences were non-existent in the last two grades of middle school, and appear in both grade categories of high school. The age profiles of males and females were not statistically different. Both exhibit a quadratic relationship between age and competitive inclination, which peaks at about 18 years of age. These findings suggest that the target range for intervention is during the transition between middle school and high school rather than at a specific age. However, in this sample, the transition from middle school to high school coincides with moving into a boarding school as well as with becoming a minority in a strongly patrilineal culture for the matrilineal students, so care should be taken in extrapolating these results to other populations.