Cultural Assimilation, Peer Effects and the Evolution of the Gender Gap in Risk Preferences

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Abstract

This paper investigates the persistence of cultural and gender norms among two ethnic groups. We elicit risk preferences from elementary and middle school children belonging to Mosuo (a matrilineal society) and Han (a traditionally patriarchal society) cultures. These children attend the same schools and are taught by mostly Han (patriarchal) teachers in rural China. We find that in the lower elementary school grades, Mosuo and Han children exhibit a striking contrast in gender norms–Mosuo girls take more risks during the experiment than Mosuo boys while Han girls are more risk averse than Han boys. However, in the upper grades, Mosuo girls are more risk averse than Mosuo boys, and become more similar to their Han counterparts. Furthermore, we exploit the fact that these Han and Mosuo students attend a boarding middle school and roommates are randomly assigned. Using the random variation in roommates' ethnicity, we find that Mosuo boys who have more non-Mosuo roommates behave more similarly to Han than the ones who have fewer non-Mosuo roommates. Our findings suggest that cultural and gender norms are malleable at formative ages.

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1 Introduction

Many studies suggest that cultural norms play an important role in economic decision making and economic development (see the handbook chapters by Fernandez (2011), Bisin and Verdier (2010) and Marianne (2011) for a thorough review of this broad literature). Less is known about how malleable these cultural norms are.[1] This study examines the evolution and persistence of cultural traits of two ethnic groups-Mosuo and Han in rural China. Mosuo and Han have distinct gender norms. Mosuo are traditionally a matrilineal society whereas Han are traditionally a patriarchal society.[2] In rural Yunnan, Mosuo and Han reside in the same area. Their children attend the same set of schools and are taught by the same teachers. The Mosuo children interact with Han children on daily basis. This setting provides an unique opportunity to study how cultural norms evolve when children of these two ethnic groups mingle. We can observe cultural assimilation and the shift of cultural norms by observing the gender norms of these children.

To study these questions, we conducted artefactual field experiments to elicit risk preferences and collect survey data from a total of approximately 400 Mosuo and Han elementary-school and middle-school children each year in Yongning County, China in 2015 and 2016. We choose risk preference as our key outcome and a marker for gender norm for the following reasons. First, risk preference measured by experiments is a objective measure, which could be less biased compared to other self-reported gender-related survey questions. Second, many studies have found that women are more risk averse than men in most societies.[3] A paper by (Gong and Yang, 2012) conducted in the same region as our study finds that Mosuo adults have a narrower gender gap in risk preference compared to adults from other ethnic groups. In other words, the preferences of women in a matrilineal society are more similar to men in a patriarchal society.[4] Third, studies suggest that risk preference is an important predictor for economic decision (Chetty and Szeidl, 2007; Dohmen and Falk, 2011; Marianne, 2011; Liu, 2013) and gender gap in risk preference could possibly explain gender gap in labor market outcome (Fortin, 2008). Lastly, since our subjects are of a young age, we opt to use extremely simple protocols for risk experiments that have been previously used on subjects of similar age group (Harbaugh et al., 2002).

Our findings are as follows: In the lower elementary school grades (first to third grades), Han girls behave more risk averse than Han boys, while Musuo girls behave more risk loving than Mosuo boys. The striking contrast in gender norms for Mosuo are driven by both boys and girls. Mosuo boys are more risk averse than Han boys while Mosuo girls are more risk loving than Han girls. Interestingly, by the upper grades (fourth to fifth grade), Mosuo girls also become

[1] Papers by Nunn and Wantchekon (2011), Tabellini (2010), Alesina et al. (2013) and Fernández et al. (2004) find evidence of the resilience of the social norms. Other works suggesting that social norms evolve over time slowly (Bisin and Verdier, 2000; Fernández and Fogli, 2009; Almond et al., 2013).

[2] Matriarchal societies are those where authorities are headed by females, and matrilineal society involves tracing kinship through the mother's line. We use the term matrilineal instead of matriarchal since sociologists argue that a truly matriarchal society does not exist any more (Campbell, 2013). Anthropologists who study the life of Mosuo also refer to Mosuo as matrilineal society Shih (2009).

[3] See Croson and Gneezy (2009), Eckel and Grossman (2008b) and Niederle (2014) for thorough literature reviews on gender differences in preferences.

[4] This finding is also supported by Gneezy et al. (2009).

more risk averse than Mosuo boys.[5] This reversal of gender gap during in upper elementary school grades are driven by the change of behaviors in Mosuo girls who now have more similar in risk attitudes to their Han counterparts. It is not clear what causes the changes in behavior among Mosuo girls. It can be driven by the teachers, peers, or other factors. For example, it is possible that teachers treat boys and girls differently in class or that an increasing exposure to mainstream media as one ages could reinforce Han's gender norm on Mosuo students. To further investigate the importance of peer effects, we take advantage of the fact that all Mosuo and Han students in this township attend the same middle school, which is a boarding school. Each room consists of 8-16 students and roommates are randomly assigned in this school. We exploit the variation in the share of non-Mosuo roommates. We find that Mosuo boys who have higher share of non-Mosuo roommates behave more similarly to Han than the ones who have lower share non-Mosuo roommates.

Our analysis makes contributions to several literatures. First, our work speaks to the literature on cultural and social norms. There is a vast literature on the economic importance of culture and how they affect decision making and economic outcomes. Our work provide empirical evidence that social norms are malleable. Considering our finding that sharing a room with more Han roommates or having Han classmates for a few years would possibly change the social norm of Mosuo. This finding suggests that social norms may be more malleable than previously thought, especially at the formative ages.

Our paper is also related to the literature focused on the development of individual risk preferences and the gender gap in risk preferences. In a series of papers, Booth and Nolan 2012b; 2012a find that girls attending single-sex schools or in an all-girls experimental environment are more likely to take risks and compete than their co-ed counterparts. They suggest that a gender gap in preferences can be due to social learning rather than inherent gender traits. Our paper echoes their findings that social learning, in our particular context, is critical. In the literature on the development of risk preferences Dohmen et al. (2011) find that risk attitudes among females experience the most rapid decline starting from the late teens to thirties. Andersen et al. (2013) also conducted field experiments on school children in matrilineal and patriarchal villages. Although the subject age groups are similar to ours, the focus of this work is to examine how the gender norms within a given culture evolve over one's lifetime, and they do not discuss the issue of assimilation.

Lastly, to the best of our knowledge, in the peer-effect literature, while many had exploited similar identification strategies such as random roommate assignment or random cohort variation to study the impact of peer characteristics on various outcomes (Sacerdote, 2001; Carrell et al., 2009; Lavy and Schlosser, 2011; Lavy et al., 2012), none had studied how peers from different ethnic groups affect each other's cultural norms. The one that is closest to our study is the one by Carrell et al. (2015), which examine how being randomly assigned black roommate affect one's view on black.

This paper is organized as follows. In section 2, we provide the background of these two

[5] Among the 5 schools we visited, four elementary schools include first to fifth grades. The middle school ranges from seventh to ninth grade.

ethnic groups and our hypotheses. In section 3, we describe the experimental method, survey and the dataset. Section 4 presents empirical specification and findings. Section 5 discusses robustness checks and additional analysis. Section 7 concludes.

2 Background and Hypotheses

2.1 Background on Mosuo and Han societies

The population of China consists of 56 ethnic groups, among which Mosuo is the only one which maintains a matrilineal culture. They reside in the Southwest of China, across the border of Yunnan Province and Sichuan Province, with a population of about 45,000(Shih, 2009). Mosuo have their unique family structures, lifestyle and religion.

A Mosuo family only includes members bound by the ties of the maternal kin, with the grandmother generally being the household head. Grandmothers, grand maternal uncles, mothers, mother's brothers, mother's sisters and the children live in the same household.(Cai, 2001; Shih, 2010; Zhou, 2009).[6] Their marriage system is not monogamous and children are raised by their mothers' household, and often, father of the children is excluded from the household (Shih, 1993). In the Mosuo society, women not only have the freedom to choose their partners or end the relationship on their own, but also play an important role in the family business. For example, household labor arrangement, spending decision and religious activities. To sum up, women enjoy higher or equal social status as men in this society(Shih, 1993).

On the contrary, Han Chinese are known to be influenced by Confucianism for thousands of years. " Obey your father at home, obey your husband after you get married and obey your son if your husband dies"(, n.d.) is a widely known quote which demonstrates the low status of women. The family system of Han is traditionally patriarchal and patrilineal. The household head of the family is typically the oldest male in a family, who is responsible for major decisions within the household. Kinship in Han families is passed down through the male descent line– sons and their male offsprings continue the family name and they are expected to support their aging parents(add citation). On the other hand, daughters are only considered as transient members of this household. A daughter will be married into another family and bear sons for her husband's family. Even though contemporary Chinese families have undergone tremendous changes since the communist regime, the male dominance in Han culture is still prevalent. For example, sons are preferred over daughters and the prevalence of sex-selected abortion against girls is some evidence that patriarchal and patrilineal influences are ingrained in Han culture.

2.2 Experimental Setting and Hypotheses

The Yongning township is located in Yunnan province. The local annual average income per capita was $481 in 2011(Yunnin County Statistical Yearbook, 2012). It is the home of Mosuo,

[6]There is variety in marriage practices and household configurations even among the Mosuo from different region (Walsh, 2005). The customs and the norms described here are the norms of the Mosuo in Yongning township, where we had visited.

Han and 23 other ethnic groups. Mosuo comprise about 9% the total population.[7] Han and Mosuo are the juxtaposition of matrilineal and patrilineal family system and gender roles. Children from these distinctive ethnic groups go to the same set of schools, and are taught by the same set of teachers who are predominantly Han.

Existing studies have shown that individuals' preferences vary across cultures, but few studies demonstrate the development of individual preferences in a cross-culture context. Since Mosuo are so distinctively different from Han, this setting in Yongning provides us an unique opportunity to observe and examine whether and how culture assimilation affects individuals' preferences. In this study, we focus on risk preferences since the artfactual experiment to elicit risk attitudes is easy to understand even for young children, and an existing work by Gong and Yang (2012) have shown that gender gap in risk preferences patriarchal societies and could differ in matrilineal society.

To understand the origin of risk preferences in two distinctly different cultures and how culture assimilation affects the gender gap in risk preferences, we recruited children from several elementary schools and a middle school to conduct field experiments and post-experiment surveys. We propose three hypotheses as below.

Hypothesis 1: *Gender gap in risk preference could be quite different for Mosuo and Han children at very younger age.*

A study done by Gong and Yang (2012) find that while Mosuo adult females are also more risk averse than Mosuo male, but the gender gap is smaller than that of patriarchal ethnic groups (Gong and Yang, 2012). One possibility is that young Mosuo preferences may be first shaped by family cultures, but these preferences evolve over time due to increasing interactions with patriarchal groups. This is consistent with the theory that preferences are shaped both by ethnic heritage (vertical transmission) and social environment(horizontal transmission)(Bisin and Verdier, 2010).

Hypothesis 2: *Gender gap in risk preference could converge between Mosuo and Han children as they age.*

We are interested in understanding how malleable the gender gap in risk preferences is. Mosuo children interact with children and teachers from Han and other patriarchal ethnic groups at schools. At home, Mosuo children could be influenced by the mainstream (predominantly Han) media. We hypothesize that Mosuo might become more similar to their Han counterparts. It is also possible that the preferences of Han students might be affected by their Mosuo classmates as well.

Hypothesis 3: *The intensity of exposure to other culture could affect individual preferences. Peer effect is important.*

There are many environmental factors (e.g. TV, news, neighbors, classmates) that could affect one's preferences. Does the intensity of exposure to other culture matter? The intensity

[7]The largest ethnic group in this county is Yi. They are also patriarchal in nature.

exposure is endogeneous for most factors, for example, the Mosuo who have more affinity to Han culture could watch more mainstream TV. Therefore, the causality would not be clear. We take advantage of the fact that more than 80% of middle school students live on campus and they are randomly assigned to room with 8-12 students. We study the intensity of exposure using the share of roommates from other cultures.

3 Experiment and Data

3.1 Experimental Design and Procedures

The experimental design follows the design by from Eckel and Grossman (2002) and Eckel and Grossman (2008a). The advantage of the experimental design is its simplicity: it has been tested widely with less educated populations in developing countries. Figure 1 depicts the choices presented to students. Each person can choose only one out of the six lotteries presented. Each lottery has a 50/50 chance of winning higher versus lower awards. The safest choice is Lottery #1 indicating one will always win 3 yuan regardless of the color of ball they draw. The riskiest choice is Lottery #6, indicating a 50/50 chance of winning either zero yuan or 10 yuan.[8] Students are instructed that this is an incenvitized choice experiment and at the end of the experiment, they will be paid based on their choice and the color of the ball they draw. The detailed experimental instructions are provided as in the Appendix.

Elementary School The experiment and the survey were conducted in the winter of 2015 and 2015. In Yongning township, there are 10 elementary schools, but due to budget constraints, we only selected four elementary schools with the greatest number of Mosuo students to conduct our experiments. These schools are usually located in villages with more Mosuo residents. These schools are usually small with about 10-30 students per grade, and one class per grade. All of these schools include first to fifth grades. [9] The share of Mosuo students in these schools ranges from 10% to 65% by grades in school. Some might worry that there could be endogenous sorting where parents sending their children to schools with students from their own ethnic groups. In this context, sorting is unlikely because school assignment is based the children's *hukou*(household registration), which is determined by the parents' permanent residency. It is extremely difficult to change one's *hukou*.

In the four elementary schools, we invited all Mosuo and Han students to participate in the survey. Several days before the survey, we asked principals/teachers to distribute parental consent forms to the invited students. At the beginning of the survey and experiment, we asked for their permission once again and those who did not wish to participate could leave. All of the students invited agreed to participate. All the students who participated in the survey received stationery as a reward for participation. On average we have 2 to 3 sessions per school with 15-30 students per session. The experiment usually took place in a classroom during lunch

[8]The cost of a school lunch is about 5 yuan (85 cents).

[9]Only one of the four schools we visited has sixth grade, and students from adjacent villages would attend this school during the sixth grade. For consistency, we surveyed only first to fifth graders in all four schools.

recess or immediately after the classes ended. The survey and the experiment took about 40 minutes to one hour to conduct. We had a total of 185 and 167 students who participated in our experiments and filled out the survey in 2015 and in 2015, respectively. 121 participated in the experiment in both years. 61.36% of the students who participated are Mosuo. Our survey design is very simple since it needs to be understood even by first graders. For those students who cannot read our survey, we had enumerators reading them the questions. Students cannot talk nor can they see each other's response during the experiment.

Middle School There is only one middle school located in this township. The middle school ranges from seventh to ninth grade. The compulsory schooling is 9 years. However, not all students continue on to middle school after graduating from elementary school. According to the local government report, the enrollment rate for middle school is about 98% of the eligible population. In terms of sample selection, we randomly drew similar number of Mosuo and Han students, stratified by gender and grade. Because of the location of the school and the distance from the students' home, about 80% of students board in this middle school and they go home on the weekend. This type of boarding school is extremely common in rural China. This school has more than 600 students, and each grade has about 200 students divided into four classes. 28% of students in this middle school are Mosuo. Students are randomly assigned roommates upon entering middle school. Usually, the median size of the room has 12 students. People stay with the same roommates throughout one academic year. At the end of one academic year, classes will be reorganized along with the dorms. Since we only have administrative information of their current year's roommates, we would not be able to accurately account for the previous exposure to other cultures for eighth and ninth graders. Therefore, our analysis would focus on seventh grade students only. Our final sample consisted of 157 seventh grade students, among whom 127 live on campus. All students were also given a parental consent form before they participated in the experiment. The survey and experiment took place during evening study between 7 and 9pm in a classroom.[10] Each session had about 50 students and lasted about 40 minutes. Students cannot talk nor can they see each other's response during the experiment.

3.2 Data

Panel A and Panel B in Table 1 presents the summary statistics for the elementary and middle school students, respectively. On average, Mosuo students live in a bigger family and mothers have a little bit higher education attainment than Han students. 80% of elementary school students reported monthly allowance and among those who reported, Mosuo children receive more allowance than Han children. Similar patterns are observed in middle school as well.

For the middle school students, we obtain roommate assignment from the administration. We calculated the share of patriarchal (non-Mosuo) roommates in each room. The density distribution of share of patriarchal roommates among our surveyed sample is presented in Figure

[10]Evening self-study period is extremely typical and almost compulsory for all students in middle school in China.

2. The share of patriarchal roommates ranges from 44% to 100%, and the mean and the median are both around 73% .

In Table 2, we present the lottery choices and the corresponding ranges of coefficient of relative risk aversion. The last two columns present the distribution of students for the lottery choices. Surprisingly, the seventh grade middle school students make more risk averse choices than elementary school students, despite having higher allowance.

Figure 3 presents cumulative density function (CDF) of lottery choices (ranging from 1 to 6) by gender-ethnicity and by grades for elementary students. The top panel compares the distribution of choices by gender by ethnicity in lower grades (first to third grades). The bottom panel show the CDF in upper grades (fourth and fifth grades). Red dotted line represents the CDF of females while blue solid line shows the CDF of males. There are several noteworthy points from this figure. First, we observe that Mosuo boys are more risk averse than Mosuo girls, and Han boys are more risk loving than Han girls in lower grades. Second, if we compare the blue/red lines in the top 2 figures, it would appear that Mosuo boys are more risk averse than Han boy, and Mosuo girls are more risk loving than Han girls in lower grades. Third, in the upper grade, Mosuo females become more risk averse than Mosuo boys. On the other hand, the CDF distribution of Han boys and Han girls become more similar in the upper grades than in the lower grades. Although the figure is interesting, it is not clear whether these differences in risk preferences we observe from the figure is statistically significant or not, thus in the next section, we present the regression results.

4 Empirical Results

4.1 Elementary School Students

We first hypothesize that children are more influenced by their own ethnic cultures and the gender gap in risk preferences is different between Mosuo and Han at younger age. To be more specific, the hypothesis is that Han females are more risk averse than Han males, but Mosuo females are more risk tolerant than Mosuo males in lower grade in elementary schools. The primary specification which is used to test this hypothesis is as follows:

For each student i in lower grade(1st to 3rd) g at school s in year t,

$$Y_{igst} = \alpha + \beta_1 Mosuo_i + \beta_2 Female_i + \beta_3 Mosuo_i * Female_i + \varepsilon_{igst} \quad (1)$$

Y_{igst} indicates the student's choice in the experiment. It ranges from 1 to 6, with the bigger number indicating the more risky choice. $Mosuo$ and $Female$ are two dummy variables. The result from 1 is presented in Column 1 of Table 3. In Column 2, we include age fixed effects, year fixed effects and school fixed effects.[11] It is difficult to interpret the size of coefficients in this regression since the dependent variable is ordinal, thus our discussion would be focused on

[11]The regression results are robust when we add more controls, such as number of family members, mother's education attainment and average monthly allowance, but we lose nearly a quarter of samples due to missing reports. These regression results are available upon request.

the signs of coefficients. β_2 reflects the gender gap of Han. $\beta_1 + \beta_2$ reflects the gender difference in Mosuo. We find that β_2 is negative and significant, which suggests Han girls are more risk averse than Han boys. This is somewhat surprising since the literature on the development of gender gap among young children is quite mixed. Some papers find the existence of gender gap in preferences at early age (see Cárdenas et al. (2012); Gneezy and Rustichini (2004), while others suggest that gender gap does not exist among young children, or it is developed during puberty (Andersen et al., 2013; Ginsburg and Miller, 1982). In contrast, $\beta_1 + \beta_2$ is positive, which suggests that Mosuo girls are more risk tolerant than Mosuo boys. The coefficient on Mosuo, β_3 is negative, which suggests that Mosuo boys are more risk averse than Han boy, and a positive β_1 indicates that Mosuo girls are more risk tolerant than Han girls. The bottom line is that Mosuo and Han exhibit distinctive risk preferences and reversal of gender gap at very young age.

Using the same specification, we next examine the gender gap in risk preferences in the upper grades (fourth and fifth grades), and the results are presented in Column 3 and Column 4 in Table 3. Interestingly, the gender gap for Han, β_2 is negative but insignificant. However, the gender gap for Mosuo, $\beta_1 + \beta_2$ reverse the sign compared to the lower grades results. This suggests that Mosuo girls are now more risk averse than Mosuo boys. This reversal of gender gaps are driven by change of behaviors for both genders since we observe that both β_1 and β_3 change sign in upper grades. These coefficients suggest that Mosuo girls are more risk averse than Han girls in upper grades.

Table 3 clearly indicates the difference of gender gap between two ethnic groups in lower and upper grade, but how the gender gap evolves over time is unclear. In order to show a complete picture of the development of gender gap of these two ethnic groups, we estimate the following equation:

For individual i at grade g in year t,

$$Y_{igt} = \alpha + \sum_{g=1}^{5} \beta_g Female_i * g + \tau_g + \delta_t + \varepsilon_{igt} \tag{2}$$

We run this regression separately for Mosuo and for Han. We present the coefficients, β_g in Figure 4. Each dot in this figure shows the coefficient β_g for a given grade and a given ethnicity. A positive number suggests females are more risk loving than males. We find that the gender differences in risk preferences significantly varies by two ethnic groups. Second, during the first grade, Mosuo girls are significantly more risk loving than Mosuo boys, but this gender gap narrow and eventually reverse the sign by fourth and fifth grades. In contrast, we find that Han girls are significantly more likely to avoid risky choices than Han boys among first to third grade, and then such gender gap becomes insignificant in fourth and fifth grade. This figure provide suggestive evidence that among elementary school students from two distinct gender norms societies converge in their risk preferences as they spend more and more time together.

Although we may expect Mosuo to be reshaped because they are minority and surrounded by all other patriarchal groups at school, reflection problem may exist and Han may be changed

too. On the other hand, convergence in risk preferences between two groups does not necessarily convey why such change happens. For example, it could be the case that Mosuo boys are becoming more risk loving because they are more likely to hangout with other patriarchal students than Mosuo girls. Mosuo girls might have stronger self−conscious to their own culture. By looking at the elementary school results cannot explain which group has been influenced and what is the magnitude of changes.

4.2 Middle School Students

We have shown that children from two distinctly different cultures converge in risk preferences overtime in elementary schools. It could be a number of potential reasons which contribute to this emergence of this pattern. For example, We do not know how exposure to other cultures affects individual's risk attitudes. By exploiting the change of share of patriarchal roommates in each dorm in the local boarding middle school, we will be able to identify the extent to which ethnic or gender groups are affected more because of interactions with the other culture. The random roommate assignment setting provides us a good opportunity to examine peer effects. Furthermore, the post-experiment survey gives us the information of the ethnic composition of each students' three best friends. By studying whether a student has Mosuo in his/her best friends'(same sex) list, we can infer whether their risk preferences are more likely to change.

The main specification we use to examine which groups are influenced because of the exposure to the other culture is as follows:

For a student i,

$$\begin{aligned} Y_i = \alpha + \beta_1 Female_i * Mosuo_i * \Delta_i + \beta_2 Female_i * \Delta_i \\ + \beta_3 Mosuo_i * \Delta_i + \beta_4 Female_i * Mosuo_i + \beta_5 \Delta_i \\ + \beta_6 Female_i + \beta_7 Mosuo_i + \varepsilon_i \quad (3) \end{aligned}$$

Δ is either the share of the patriarchal roommates in each dorm, which is imputed as the number of patriarchal roommates divided by the total number of roommates or it equals to 1 if the student i 's three best friends are all patriarchal. When Δ is the share of the patriarchal roommates, it has been demeaned for the ease of interpreting coefficients for other dummy variables. (Balli and Sørensen, 2013).Since the school will rearrange the room assignment every academic year and only keep one year's roommate list, we restrict our analysis to the seventh grade students. We conducted two rounds experiments in two sequential years, but we only collect the best friends' information in the first round. Results from Equation 3 are reported in Table 4 panel A. In order to ease the interpretations of the results, we present the effects of change of patriarchal share in each dorm on four groups in panel B. First column shows the peer effects results. Overall, if the share of patriarchal roommates increases by 15%, Mosuo males would become more risk loving by 0.93. We do not find significant effects on Han or Mosuo females, but this does not necessarily suggest that Han are not influenced by Mosuo.

Our results might be suggestive because when we conducted our experiments, students only spent four months together and we have limited samples. The last column shows the effects of having all three patriarchal best friends. We find that Mosuo males are more likely to become risk loving if they are making friends with students from patriarchal groups.

Although we have limited middle school samples, our results indicate even only a relatively short period interactions(four months) with other cultures would impact individuals' preferences. The greater exposure to patriarch cultures, the more change of Mosuo students in risk preferences. The more likely a student having a best friend from the same culture, the more likely a Mosuo students to keep their own culture traits. The bottom line here is that Mosuo would be definitely influenced by Han culture.

5 Discussion

5.1 Why do patriarchal Han change their Risk Preferences in Elementary Schools?

In previous sections, we find that not only Mosuo students change their risk attitudes but also Han does in the upper grade in the elementary schools. But peer effects results from middle school students do not support this observation. Given matrilineal Mosuo is the minority ethnic group in the local area, this elementary schools' result seems a little surprising. In this section, we first study whether Han who are interacting with Mosuo indeed behave differently from Han who do not have the opportunity to expose to the distinctly different culture in elementary schools. We conducted the same experiment in a nearby township where there is only Han. Except the ethnic composition, this so we call "control" township is similar to the Mosuo township in terms of GDP per capital, household income and other economic performances. We run Equation 2 by using the Han students from the Mosuo township and the "control" township, separately and we present the results as Figure 5 . The left graph shows the results of the gender gap of Han students from the "control" township by grade while the right one demonstrates the evolution of the gender gap in Han students who are interacting with matrilineal Mosuo culture. We find that these two groups actually show different gender gap patterns in risk attitudes. For those Han in the control township, there is no significant gender gap in risk preference from lower to upper grade. On the other hand, the gender gap of Han students significantly shrinks in the Mosuo township, depending on the years of exposure to the matrilineal culture.

5.2 Panel Analysis

Up until now, we have shown that risk preferences could be reshaped by the environment and we provide some evidence that the greater exposure to a distinctly different culture would lead the minority group to change more. These findings align with existing literature(add citation). Another advantage of our study is that we conducted two rounds of the same experiments in two sequential years, our goal is to track the same individuals across two years. With this short panel dataset, we can count for individual heterogeneity by using individual fixed effects

model and very few existing studies have shown how risk preferences of the same individuals form across years. In four elementary schools, we were be able to track 121 students across two years, among whom Mosuo takes up 61.36% and female accounts for 54.55%. Our object is to examine whether these students become more risk averse or risk loving across two years. The main equation we estimate is as follows:

For a student i,

$$Y_i = \alpha + \beta_1 Mosuo_i + \beta_2 Female_i + \beta_3 Mosuo_i * Female_i + \gamma_s + X_s'\pi + \varepsilon_i \quad (4)$$

We define our dependent variable Y_i as an ordinal indicator, which equals 1 if the game choice of individual i in 2015 is bigger than his/her choice in 2015. It is equal to 0 if the individual's choice is the same across two years and -1 if the later year's choice is bigger than the previous year's. A negative β_2 would indicate Han females are becoming more risk loving than Han males and vice verse. Meanwhile, if $\beta_1 + \beta_3$ is positive, it suggests that Mosuo females are becoming more risk averse than Mosuo males. γ_s is school fixed effects. X_s' include age, number of family members and average monthly allowance in last year.

The regression results from Equation are displayed in Table **??**. We find that $\beta_1 + \beta_3$ is significantly positive, which indicates Mosuo females are becoming more risk averse than Mosuo males over two years. β_2 is negative suggesting Han females are becoming more risk loving than Han males, but it is not significant.

Our panel analysis results are consistent with our previous findings. Culture assimilation plays an important role in forming individuals' preferences.

6 Conclusion

We investigate whether a gender gap in risk preference is present for children from a matrilineal society (Mosuo). We find that in the lower grades of elementary school, Mosuo girls take more risks during the experiment than boys while Han girls are more risk averse than Han boys. We further examine situations when Mosuo students interact with Han students more, observing whether they become more similar to their Han counterparts. Our findings indicate that in the upper grades, Mosuo girls also become more risk averse than Mosuo boys. Furthermore, we exploit the fact that Han and Mosuo students both attend a boarding middle school and roommates are randomly assigned. Using the random variation in roommate ethnicity, we find that Mosuo girls who have a higher share of patriarchal roommates behave in a more risk averse manner than the ones who have a lower share of patriarchal roommates. Our findings suggest that gender norms are malleable at formative ages, and that the environment could alter gender gaps.

Our findings are important since they suggest that gender norms and cultural norms are fluid. Most recently there have been a lot of public discussions on immigrants and whether they can assimilate into the culture of receiving countries (e.g., Muslim immigrants in France;

Syrian refugees in Greece and immigrants in the United States).[12] Our findings suggest that environment can change the gender norms and social norms in a matter of a few years, especially when subjects are at the formative period. Unfortunately, our work also highlights the difficulty faced by minority groups, such as Mosuo, in preserving their cultural norms when they are integrated in Han society.

[12] Although in our setting that Mosuo are not immigrants, but they are still the ethnic minority in China.

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7 Figures and Tables

Figure 1: Binswanger Lottery Risk Game

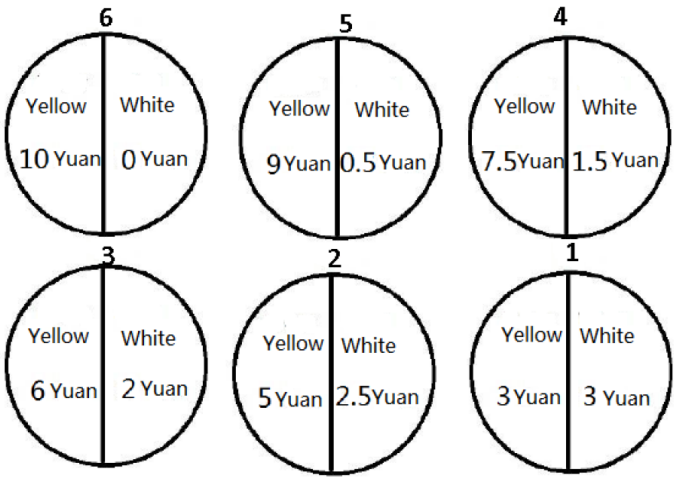


Figure 2: Probability Distribution of Share of Patriarchal Roommates

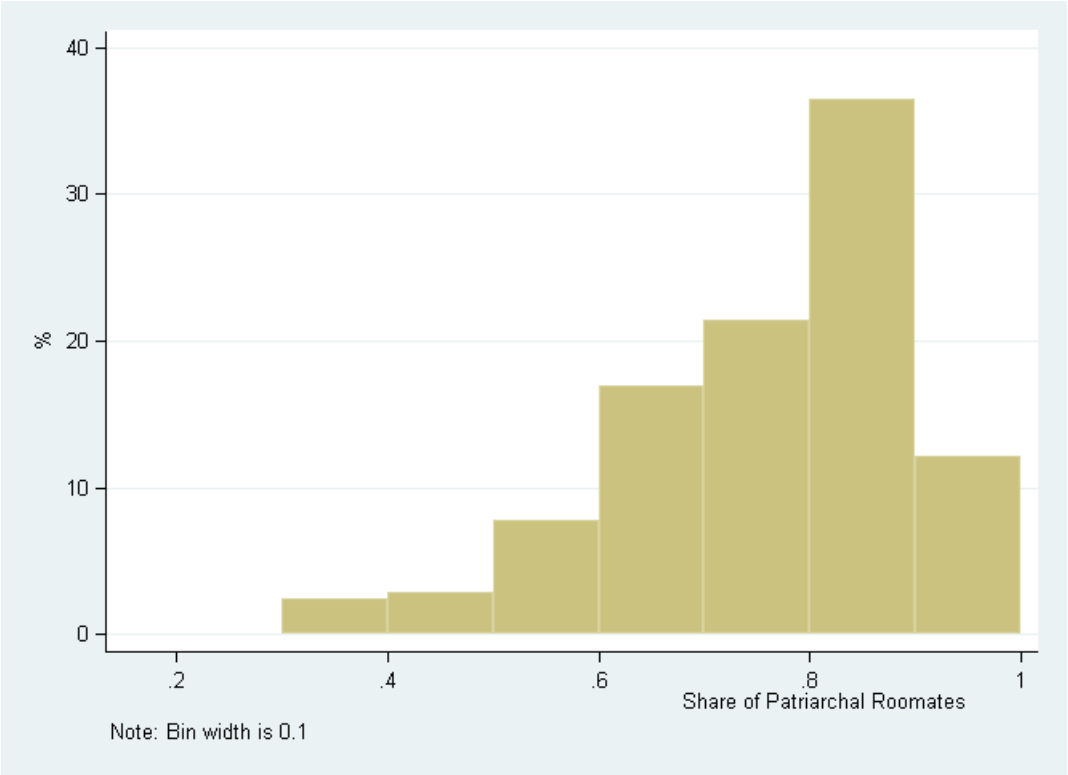
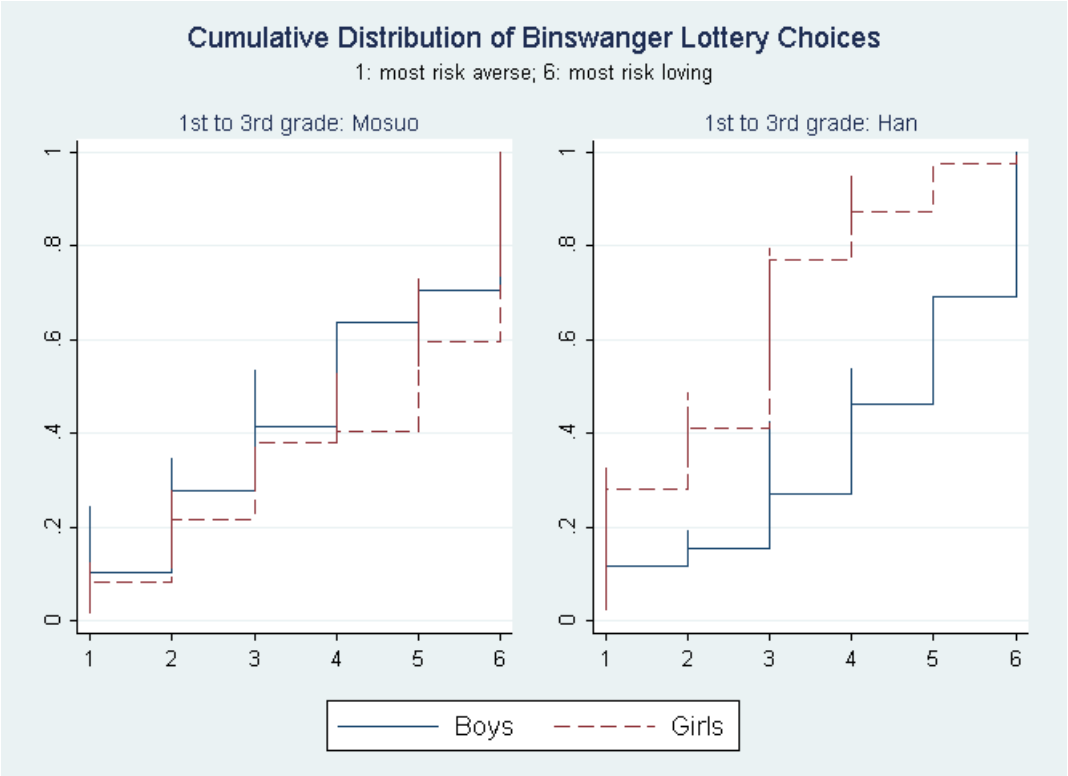


Figure 3: Cumulative Distribution of Bingswanger Lottery Choices



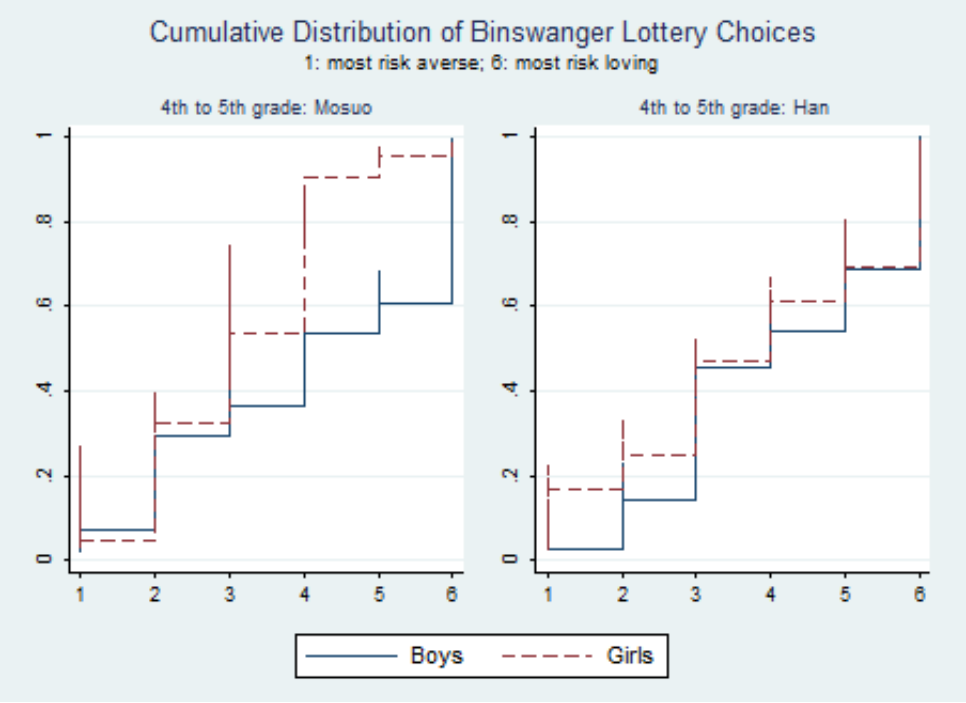


Table 1: Summary Statistics

	Han	Mosuo	Han=Mosuo (p-values)
Panel A: Elementary Schools			
Female	0.55	0.54	0.86
	(0.50)	(0.50)	
Age	9.97	9.23	0.00
	(1.66)	(1.49)	
Number of family members	5.07	6.49	0.00
	(1.84)	(2.45)	
Average monthly allowance (RMB)	36.29	49.56	0.24
	(57.89)	(109.02)	
Mother′s education attainment(primary or lower)	0.73	0.62	0.03
	(0.45)	(0.49)	
Observations	136	216	
Panel B: Middle School			
Female	0.53	0.53	0.99
	(0.50)	(0.50)	
Age	13.33	13.38	0.81
	(1.06)	(0.92)	
Number of family members	4.54	5.69	0.00
	(1.02)	(2.37)	
Average monthly allowance (RMB)	134.93	164.15	0.42
	(216.82)	(172.80)	
Mother′ education is primary or lower	0.85	0.79	0.39
	(0.36)	(0.41)	
Observations	74	53	

Notes: The last column report the p-values of the two-way tests of the equality of the means between two groups as indicated. Middle school sample only include those who were in the seventh grade in 2015 and in 2015.

Table 2: Distribution of Incentivized Lottery Choices

50/50 Gamble	Payout				CRRA range	Distribution %	
	Low Payout	High Payout	Expected payout	S.D of payout		Elementary	Middle
1	3	3	3	0	$r > 4.17$	19.89	25.98
2	2.5	5	3.75	1.25	$0.99 < r < 4.17$	12.50	22.83
3	2	6	4	2	$0.81 < r < 0.99$	20.45	33.86
4	1.5	7.5	4.5	3	$0.32 < r < 0.81$	13.35	5.51
5	0.5	9	4.75	4.25	$0 < r < 0.32$	12.22	3.15
6	0	10	5	5	$r < 0$	21.59	8.66

Notes: CRRA coefficient calculated as the range of r in the function: $u = x^{1-r}/(1-r)$ for which the subject chooses each gamble.

Table 3: Regression Results of Elementary School Students

Dependent Variable: Choice in the Risk Game(1...6)

	Lower Grade		Upper Grade	
	(1)	(2)	(3)	(4)
Mosuo*Female, β_1	2.019**	2.104**	-0.739	-1.064*
	(0.364)	(0.174)	(0.467)	(0.421)
Female, β_2	-1.577**	-1.412***	-0.441	-0.229
	(0.181)	(0.089)	(0.218)	(0.248)
Mosuo, β_3	-0.521	-0.862**	-0.008	0.423
	(0.324)	(0.093)	(0.634)	(0.318)
N	197	196	155	155
Additional Controls	No	Yes	No	Yes
$\beta_1 + \beta_2$	.442	.692*	-1.18*	-1.293*

All regressions include age, age squared year fixed effect and school fixed effect . Standard errors are clustered at the school level. Additional controls include age fixed effects, year fixed effects and school fixed effects. * significant at 10%, ** significant at 5%, *** significant at 1%.

Figure 4: The Development of the Gender Gap in Risk Preferences by Ethnicity: Elementary School

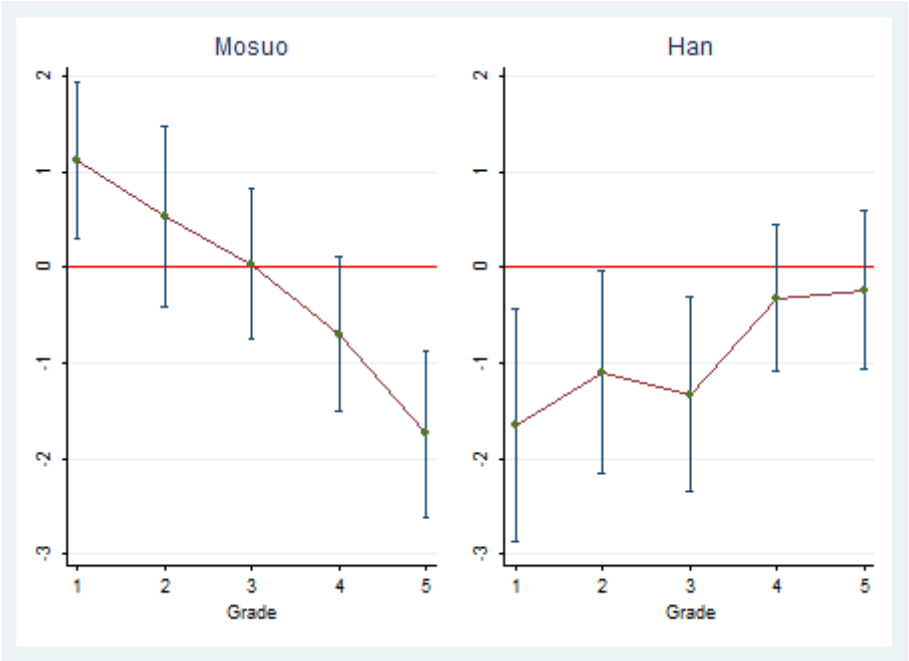


Table 4: Regression Results of Middle School

Dependent Variable: Choice in the Risk Game(1...6)

Panel A

	Δ: Share of Patriarchal Roommates	Δ: All three Best Friends are Patriarchal
	All	1st Round
Δ *Mosuo*Female, β_1	-0.574	-0.413
	(0.503)	(0.905)
Δ*Female, β_2	-0.164	-0.150
	(0.305)	(0.735)
Δ*Mosuo, β_3	0.942**	1.100
	(0.366)	(0.689)
Δ, β_4	-0.011	-0.350
	(0.248)	(0.552)
Mosuo*Female, β_5	0.055	-0.354
	(0.525)	(0.688)
Female, β_6	-0.697**	-0.417
	(0.310)	(0.528)
Mosuo, β_7	0.200	-0.167
	(0.322)	(0.530)
R-squared	0.0881	0.1275
N	127	67

Panel B: Interpretation the Results from Panel A

	Share of Patriarchal Roommates goes up by One Standard Deviation(15%)	All three Best Friends are Patriarchal
	All	1st Round
Mosuo Female, $\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5$	0.19	0.17
Mosuo Male, $\beta_3 + \beta_4$	0.93**	0.75*
Han Female, $\beta_2 + \beta_4$	-0.17	-0.5
Han Male , β_4	-0.01	-0.35

Panel A: column1, robust standard errors are clustered at the dorm level; Panel B: p-values are in the parentheses. * significant at 10%, ** significant at 5%, *** significant at 1%.

Figure 5: Compare Han in Two Different Cultures

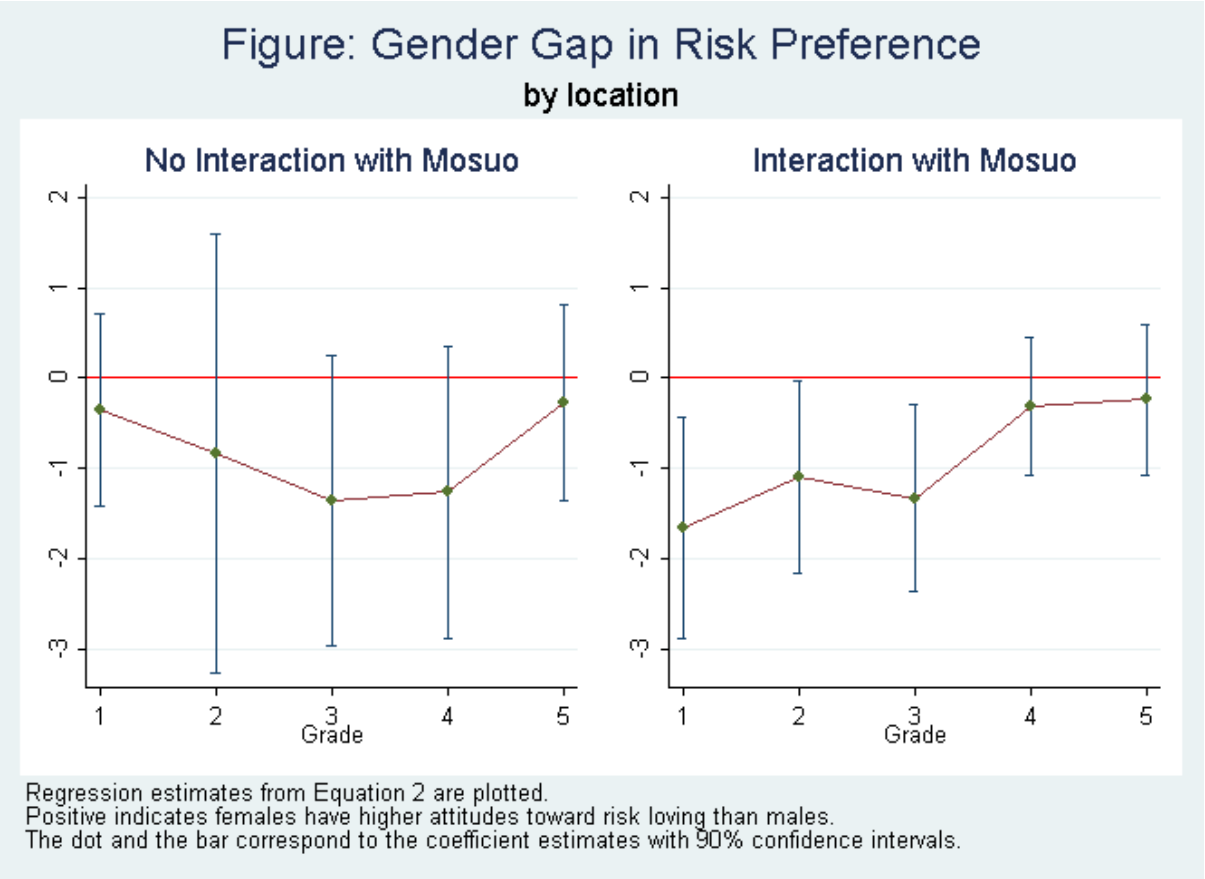


Table 5: Panel Analysis: Elementary Schools

Dependent variable:Becoming more Risk Averse(-1..1)

	(1)	(2)
Mosuo*Female, β_1	0.229	0.279
	(0.232)	(0.347)
Female, β_2	-0.048	-0.099
	(0.214)	(0.295)
Mosuo, β_3	0.181	0.142
	(0.109)	(0.239)
N	121	121
Additional Controls	No	Yes
$\beta_1 + \beta_3$	.41 *	.42 *

All regressions include school fixed effect. Robust standard errors are clustered at the school level. Additional controls include age fixed effects and school fixed effects. * significant at 10%, ** significant at 5%, *** significant at 1%.