Theory and Decision (2019) 87:389–420
https://doi.org/10.1007/s11238-019-09700-z

Hukou identity and fairness in the ultimatum game

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Published online: 24 April 2019

Abstract
The *hukou* system is a mandatory household registration system in China that assigns an individual either an urban/non-agricultural *hukou* or a rural/agricultural *hukou* based on one's birthplace. This system favors urban residents and discriminates against rural residents in accessing state-owned resources such as employment, education, health care, and housing. To better understand how this institutionally imposed *hukou* identity impacts an individual's sense of fairness in the ultimatum game, we conducted a field experiment in China using 9–12-year-old children and collected 672 observations. Subjects played a one-shot ultimatum game to allocate 20 yuan in groups of two. We employed a 2 (*hukou* salience) × 2 (proposer's *hukou* type) × 2 (responder's *hukou* type) experiment design and used the strategic method ultimatum game. We primed our subjects with their *hukou* identity before they made their decisions in the experiment. Results of this study show that *hukou* salience mainly affects rural *hukou* subjects, who belong to the perceived less-favored social group. On one hand, when the *hukou* identity is made salient, rural *hukou* proposers decrease their amount offered regardless of their responder's *hukou* type. On the other hand, rural *hukou* responders expect higher offers from their urban *hukou* proposers when the *hukou* identity is revealed. We interpret these results as that rural *hukou* subjects tend to seek compensations for their perceived *hukou* inferiority to achieve fair distributions.

Keywords *Hukou* identity · Fairness · Ultimatum game · Field experiment · Priming

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1 Introduction

Since the first ultimatum game experiment of Güth et al. (1982), researchers have been widely using this game and its modified versions to study how and why people's behaviors deviate from what the theory predicts. The ultimatum game is a bargaining game where individuals play in groups of two to divide a positive amount of money. In a standard ultimatum game, the proposer moves first by choosing an amount of a out of the total amount available c to keep and passes the rest of the amount $c - a$ to the other person (the responder). The responder can either choose to accept the offer and receives $c - a$, in which situation the proposer gets a, or reject the offer, in which situation both the proposer and the responder get 0. The theory predicts that a rational proposer will always choose to maximize his or her own payoff by keeping as much as the entire amount of the pie, c, and a rational responder should always accept any positive offer $\epsilon > 0$; however, evidence from numerous experimental studies shows that the actual distributions are far different from what the theory predicts. For example, in the meta-analysis of Oosterbeek et al. (2004) which included 75 ultimatum game experiments conducted in 25 countries, the authors found that people have a strong preference towards fair distributions. On average, the proposers offered 40% of the total endowment to their responders. Besides, responders showed monotonic preference and were more likely to reject offers lower than 20% of the total share. McLeish and Oxoby (2011) also concluded that fair distributions are relatively common among adult subjects.

Furthermore, research has shown that personal characteristics such as ethnicity, gender, and cultural background also influence people's decisions in the ultimatum game. For example, Fershtman and Gneezy (2001) conducted several games including the ultimatum game, trust game, and dictator game to analyze the discrimination and stereotyping between Eastern Jews and Ashkenazic Jews. They found that Eastern Jews received less from their partners in the trust game and dictator game, whereas they received larger amounts from their proposers compared to players of Ashkenazic Jews in the ultimatum game. The authors explained this "reverse discrimination" in the ultimatum game as a result of a strategic move rather than a preference towards fairness, because the stereotype of Eastern Jews is that they are more likely to react harshly when being treated unfairly. Moreover, the authors discovered that this ethnic discrimination only exists among male players. Other field experiment studies such as Henrich (2000), Solnick (2001), and Gil-White (2004) also found that gender and cultural difference play important roles in influencing people's decisions in the ultimatum game.

This research study applies the ultimatum game in the social context of the *hukou* system in China to examine how social identity affects an individual's decision in the ultimatum game. In a nutshell, the *hukou* system assigns individuals in China different types of *hukou* identity based on their birthplaces. Usually based on where one was born, an individual receives either an urban/non-agricultural *hukou* or a rural/agricultural *hukou*. Beyond imposing a social identity, the *hukou* system further creates a social hierarchy favoring those with urban *hukou* while discriminating those with rural *hukou*, and strengthens this social stratification over time. Under this background, we conduct a field experiment in China to gain a better understanding of how the institutionally imposed *hukou* identity influences an individual's sense of

fairness. Our subjects are 9–12-year-old children. They participate in a one-shot ultimatum game to allocate 20 yuan in pairs of two using the strategic method. This method allows the proposer and the responder to move simultaneously. Instead of reacting to a specific offer, the responder has to react to a series of possible offers by choosing his or her minimum acceptable offer. If the actual amount offered by the proposer is larger than the minimum acceptable offer, then the proposer and responder each gets the proposed amount; otherwise, they both get 0. We use a 2 (*hukou* salience) × 2 (proposer's *hukou* type) × 2 (responder's *hukou* type) experiment design and reveal subjects' real-life *hukou* identities in those treatments with *hukou* salience. We collected 672 observations from our experiment. Although there is little difference in the personal characteristics between our subjects of the two *hukou* groups, both rural and urban *hukou* students perceive that urban *hukou* students are more likely to become student cadres,[1] and they receive more daily allowances from their parents, which are in accordance with the perceptions that the urban *hukou* group is favored and ranks higher on the social ladder. Results of our experiment show that the *hukou* identity influences an individual's sense of fairness, especially for those with rural *hukou*. When the *hukou* identity is made salient, urban *hukou* proposers offer the same amount to their responders, regardless of their responders' *hukou* identity. However, rural *hukou* proposers tend to keep more for themselves. Besides, urban *hukou* proposers are expected to offer more, especially when they are paired with rural *hukou* responders. We do not find any intra-group favoritism or inter-group discrimination between these two *hukou* groups. Neither do we observe any significant gender difference in subject behaviors.

To the best of our knowledge, this is the first study applying the ultimatum game in the social context of the *hukou* system in a field experiment. Results of this study provide empirical evidence on how social identity affects an individual's decision in the ultimatum game and how the *hukou* identity influences an individual's sense of fairness. Results of this paper also offer practical insights to policymakers working with perceived inferior social groups. Instead of distributing resources evenly among groups, fairness sometimes are achieved by favoring the perceived subordinate group.

The rest of this paper proceeds as follows. The next section provides some background information on the *hukou* system. Section 3 reviews related literature on the impact of social identity on individual decisions and behaviors. Section 4 describes our experiment design and procedures. Section 5 presents the experimental results. Section 6 discusses the implications of the results and concludes.

2 Background information on the *hukou* system

The *hukou* system is a mandatory household registration system in China. This system assigns an individual a *hukou* identity shortly after one's birth and entitles this person to certain social benefits. In that sense, the *hukou* identity is similar to the Social Security number in the United States and the National Insurance number in the United Kingdom, since they are all institutionally imposed. However, the *hukou* system is

[1] Student cadres are somewhat similar to student leaders. The student cadres in China are usually appointed by teachers for their excellent academic performance and leadership. The student cadres are in charge of monitoring and maintaining class rules and orders as well as tutoring other students.

very different from the other two systems, because an individual's *hukou* type is not randomly assigned. Based on one's birthplace, an individual either receives an urban/non-agricultural *hukou* or a rural/agricultural *hukou*.[2] Furthermore, this system favors individuals with urban *hukou* and discriminates against those with rural *hukou* in multiple aspects such as obtaining education, employment, housing, health care, and other social benefits (Chan and Buckingham 2008; Chan 2009). Hence, the *hukou* identity is an institutionally imposed social identity assigned to Chinese at birth with a social rank. Some people may equate the *hukou* system to the caste system in India. However, these two systems occur in different socio-political contexts. The Indian caste is related to social mobility, while the Chinese *hukou* is related to spacial mobility (Zhao and Pellissery 2016).

The earliest form of the *hukou* system can be traced back to the ancient China thousands of years ago. The modern *hukou* system which is currently prevailing on the mainland China is founded in the year of 1958. The rationale of this *hukou* system is to monitor and restrain labor mobility within the country, especially from less developed rural areas to more developed urban areas and cities. Besides controlling internal labor migration, the *hukou* system also limits occupational mobility and causes occupational segregation (Cai et al. 2001). Furthermore, the *hukou* system affects people's socioeconomic status and other aspects of life by creating a social hierarchy with urban residents at the top and rural residents at the bottom. For example, Hu and Salazar (2008) documented the urban *hukou* superiority and rural *hukou* stigma in Lasha, Tibet. They found that the *hukou* stereotype dominates the social hierarchy rather than the non-institutionalized prejudice between different ethnic groups. Regardless of their ethnicity, both Han Chinese and Tibetians with urban *hukou* are treated as preferred customers and partners, whereas those with rural *hukou* are considered as utilitarian shoppers. In fact, *hukou* discrimination widely exists in the Chinese society. Wu and Treiman (2004) claimed that the *hukou* system "serves as an important mechanism in distributing resources and determining life chances in China." For example, Wu and Treiman (2007) found that the *hukou* system leads to educational inequality by favoring individuals with urban *hukou*. Results from Fu and Ren (2010) and Wu (2011) also showed that the *hukou* system benefits *urban* residents in both basic and higher education. In addition, having a rural *hukou* also relates to disadvantages in the marriage market (Qian and Qian 2017) and higher chances of suffering from mental health problems (Li et al. 2006; Fu et al. 2018).

The *hukou* system reinforces the social hierarchy across generations as well. Converting a rural *hukou* to an urban *hukou* is considered an upward movement in the social ladder. This process is highly selective and is restricted to limited circumstances including obtaining political party membership, military experience, and admission to highly ranked universities (Wu and Treiman 2004). Wu and Treiman (2007) argued that the *hukou* system intervenes with the inter-generation social mobility in China. They found that men with rural *hukou* origin have limited chances of moving up to high-status occupations due to lower educational attainment caused by the *hukou* inequality. On the macro level, the *hukou* system has a profound influence on the social stratification and other socioeconomic ramifications in China including the country's

[2] Before the year of 1998, children inherit their mother's *hukou* location and type.

urbanization process (Chan and Zhang 1999; Lu 2008; Zhao and Ming 2008; Henderson et al. 2009; Chan 2010; Guthrie 2012). Liu (2005) argued that the *hukou* system is "a major contributing factor to rural–urban inequality." Although this system has become less restrictive in the recent decades, it still distributes resources unevenly between the two *hukou* groups (Chan 2010).

3 Related literature on social identity and individual decision

Tajfel (1974) and Tajfel and Turner (1979) pointed out that the social groups or categories an individual belongs to shape his or her social identity. This formed collective self, or social identity, affects individual behaviors. Stereotype threat is one of the explanations of why social identity influences people's behaviors. It claims that people tend to comply with the norms and expectations associated with the social groups which they belong to. For example, Shih et al. (1999) found that Asian–American women perform better than their ethnic group counterparts in math tests when their ethnic identity is revealed, but they perform worse than their male counterparts when their gender identity is revealed. The authors explained these outcomes with stereotype threats: individuals conform to the common stereotypes that Asians are more proficient at mathematics compared to other ethnic groups, and females are less proficient at mathematics compared to males. Spencer et al. (1999) found similar results with the gender identity using math tests. Steele and Aronson (1995) used verbal tests and found that stereotypes impair African-American subjects' performance compared to their white counterparts.

Akerlof and Kranton (2000) incorporated social identity into their economic model to explain individual behaviors. A number of experimental studies show that an individual's economic behaviors are influenced by one's social identity, which is comprised of the social group a person belongs to and the expectations and social norms attached to this particular social group. For example, Benjamin et al. (2010) found that Asian–Americans and immigrants from Africa have lower discount rates over future payments when their ethnic identities are revealed. Benjamin et al. (2016) discovered that people's religious identity affects their contributions to public goods. When the religious identity is made salient, Protestants increase their contributions to public goods while Catholics decrease their contributions and expect others to contribute less as well. Chang et al. (2014) found that an individual's decision also depends on one's political identity. Results from their dictator games show that when the political identity is revealed, Democrats are more likely to distribute resources equally compared to Republicans, regardless of the amount of the initial endowment.

There are few studies analyzing how institutionally imposed social identities, such as Indian caste and Chinese *hukou*, affect people's economic behaviors. For example, Hoff and Pandey (2006) recruited boys with low and high caste ranks from an Indian village and asked them to solve maze problems independently. Their study results show that when the caste rank is kept private, boys of the high and low rank perform the same in solving maze problems. However, when the caste rank is made salient, boys of low caste rank perform worse compared to those of high caste rank. In their further study, Hoff and Pandey (2014) found that making the caste identity salient

impacts children's intellectual performance and ability to learn. Afridi et al. (2015) extended the studies of Hoff and Pandey (2006, 2014) and conducted a field research in China using children with rural *hukou* and urban *hukou*. They discovered similar results that when the *hukou* identity is kept private, there is no significant difference in the children's performance between these two *hukou* groups. However, when the *hukou* identity is revealed, children with rural *hukou* perform worse and make 13.5% less under the piece-rate payment compared to their urban *hukou* counterparts.

It is also found that people behave differently when paired with individuals of the same social identity versus different social identities. Chen and Li (2009) found that people act more prosocially when paired with those of the same group. Results of other research studies demonstrate such intra-group favoritism and inter-group discrimination as well (Charness et al. 2007; Hoff et al. 2011; McLeish and Oxoby 2011; Newheiser and Olson 2012; Gibson et al. 2015; Wu and Gao 2018), except that in Gil-White (2004), the author found that people are more likely to offer higher amounts and less likely to punish non-group members. We take these aspects into consideration in our experiment design and investigate if inter-group discrimination and intra-group favoritism exist with different *hukou* groups.

4 Experiment design and procedures

The *hukou* system has become less restrictive in controlling labor mobility from rural to urban areas in China in the recent decades. We select a major city and a city suburb about 80 miles apart in Zhejiang Province, China, to conduct our field experiment. Both of these areas have a large number of population with mixed *hukou* groups. We conduct our experiment in two elementary schools and recruit subjects from the fourth, fifth, and sixth grades. Our subjects are 9–12 years old. These two elementary schools provide an ideal context for our study. First of all, these schools are non-segregated and have large, balanced student populations of both rural and urban *hukou*. Students in these schools are required to wear school uniforms, so it is hard to distinguish a student's *hukou* identity by his or her appearance. We do not choose adult subjects, because adults have diverse backgrounds in education, occupation, income, life experience, and so on. These confounding factors can influence their perceived sense of fairness and their decisions in the ultimatum game. Besides, using adult subjects may lead to biased results, since an individual's decisions of migrating and living in a particular area are likely to depend on one's observed and unobserved personal characteristics. Moreover, it is widely found that children are cognizant of their social identities at an early age, and their social identities affect their economic decisions (for example, Murnighan and Saxon 1998; Quintana 1999; Harbaugh et al. 2002; Abrams et al. 2003; McKown and Weinstein 2003; Sutter and Kocher 2007; Afridi et al. 2015). If we find any significant result with children subjects, we believe that such effect will be larger and more significant with adults.

We use a 2 (*hukou* salience) $\times$ 2 (proposer's *hukou* type) $\times$ 2 (responder's *hukou* type) experiment design and alter the *hukou* salience, proposer's *hukou* type, and responder's *hukou* type. Table 1 shows the details of our experiment design. It is worth emphasizing that all subjects use their real-life *hukou* identities. We prime and

Table 1 Experiment design

	Hukou salience	Proposer's *hukou*	Responder's *hukou*	No. of groups
Control Group 1	Private	Urban	Urban	42
Control Group 2	Private	Urban	Rural	37
Control Group 3	Private	Rural	Urban	47
Control Group 4	Private	Rural	Rural	42
Treatment Group 1	Salient	Urban	Urban	42
Treatment Group 2	Salient	Urban	Rural	42
Treatment Group 3	Salient	Rural	Urban	42
Treatment Group 4	Salient	Rural	Rural	42

reveal subjects' *hukou* identities in those treatment groups where the *hukou* identity is made salient. In Control Group 1–4 where the *hukou* identity is kept private, subjects do not know their partner's *hukou* type. In Treatment Group 1–4 where the *hukou* identity is revealed, both proposers and responders are aware of their partner's *hukou* type before making their decisions in the ultimatum game. We also vary the proposer's and responder's *hukou* types to include all possible matching combinations.

We conducted eight sessions at each school and collected a total of 672 observations. At each school, we drew our subjects from 15 classes across the fourth grade to the sixth grade. We obtained prior consent from our subjects' parents or legal guardians and received agreement from each school before the experiment. Subjects did not know about the purpose of our experiment in advance. We obtained student personal information including name, gender, age, grade level, and *hukou* type from the school registrars beforehand. We confirmed all these information with students in private upon their arrival. We randomly assigned subjects to a session with the role of a proposer or a responder and balanced subject characteristics across sessions. Appendix A reports the subject characteristics in each session.

Subjects played a one-shot ultimatum game in groups of two. Everyone only participated in the game once. We separated the proposers and responders into different rooms, and they did not meet each other throughout the experiment. Subjects made their decisions in private and they were not allowed to talk during the experiment. We adopted the strategy method ultimatum game. Instead of reacting to one specific offer, the responders reported their minimum acceptable offer before receiving an actual offer. They were informed that if the minimum acceptable offer was equal or lower than the actual offer, they would get whatever the proposer proposed. If the minimum acceptable offer was higher than the actual offer, both the proposer and responder would get 0. We gave subjects plenty of time to read the experiment instructions and then verbally summarized the instructions to them. We used a double-blind design and a neutral framing to prevent the experimenter demand effect (Zizzo 2010). Subjects did two practice questions before they started the game. They received cash payments in private immediately after the experiment for whatever they made in the game plus

5 yuan participation fee. The experiment instructions and subject decision cards are presented in Appendix E–J.

Subjects in all the treatment groups received a pre-experiment survey. We used this survey to prime their *hukou* identity before they made their decisions. The priming technique, which refers to the method of using one stimulus before another stimulus, is widely used in behavioral and cognitive psychology studies (Bargh 2006). Recent economic studies such as Benjamin et al. (2010) and Afridi et al. (2015) have used priming in their experiments. Our survey contains *hukou* identity-related questions regarding subject's *hukou* residency and perceptions about different *hukou* types, such as "who is more likely to become a student cadre, a rural *hukou* student or an urban *hukou* student," and "who receives more daily allowances from parents, a rural *hukou* student or an urban *hukou* student?" The complete pre-experiment survey questionnaire can be found in Appendix K. Subjects in the control groups did not receive this survey. All subjects in the control and treatment groups received a post-experiment survey, in which we solicited subjects' personal characteristics including age, gender, grade level, ethnic group, academic standing, student cadre status, parents' education levels, the number of children in the household, and daily allowance received from parents. The complete post-experiment survey questionnaire is presented in Appendix L. Section 5.1 reports the subject answers to the pre- and post-experiment survey questions.

5 Results

5.1 Subject characteristics and *hukou* perceptions

We conducted our experiment in Zhejiang Province, China, in May 2014. We recruited 672 subjects for this experiment, including 336 subjects with urban *hukou* and 336 subjects with rural *hukou*. We dropped 3 observations of proposers and 29 observations of responders later in the regression analysis stage, because these subjects did not complete the experiment or they failed the practice test. Table 2 presents the subject characteristics of our experiment. The average age of our subjects is about 12 years old for both urban and rural *hukou* students. The average grade level of the subjects holding an urban *hukou* is 5.012, and that for the subjects holding a rural *hukou* is 4.986. (The percentages of the subjects from fourth, fifth, and sixth grade are 34.15%, 31.54%, and 34.31%, respectively). *Female*, *Ethnic Group*, and *Student Cadre* are dummy variables equal to 1 for females, Han Chinese, and student cadres, respectively, and 0 otherwise. The variable *No. of Children in hh* indicates the number of children in a subject's household including the subject him or herself. The numbers reported in *Academic Performance*, *Father's Education Level*, *Mother's Education Level*, and *Daily Allowance* are the frequencies in each category. The sample size of each variable differs due to missing data in the subject survey.

We do not find significant statistical difference in the personal characteristics between the two *hukou* groups, except for their parents' education levels. 44% of our rural *hukou* students' fathers hold middle school diplomas, compared to that of 31% of urban *hukou* students' fathers. The t-test result indicates that this difference

Table 2 Subject characteristics

	Average/frequency		Std. err		Sample size		*p* value
	Urban	Rural	Urban	Rural	Urban	Rural	
Age	12.045	11.950	1.222	1.383	336	336	0.765
Grade	5.012	4.986	1.240	1.244	336	336	0.856
Female	0.511	0.489	0.503	0.503	336	336	0.765
Ethnic group	1.000	0.989	0	0.107	336	336	0.319
No. of children in hh	1.980	1.830	1.280	1.160	330	332	0.254
Student cadre	0.360	0.370	0.480	0.480	333	331	0.820
Academic performance							
Bottom tier	0.03	0.02	0.17	0.18	336	335	0.856
Below average	0.14	0.12	0.35	0.33	336	335	0.790
Average	0.39	0.41	0.49	0.49	336	335	0.721
Above average	0.28	0.33	0.45	0.47	336	335	0.332
Top tier	0.17	0.12	0.43	0.30	336	335	0.156
Father's education level							
Elementary school	0.08	0.05	0.27	0.21	332	331	0.275
Middle school	0.31	0.44	0.42	0.50	332	331	0.012**
High school	0.42	0.34	0.50	0.48	332	331	0.152
College	0.17	0.17	0.38	0.38	332	331	1.00
Graduate school	0.03	0.007	0.16	0.08	332	331	0.110
Mother's education level							
Elementary school	0.05	0.13	0.18	0.34	332	331	0.006***
Middle school	0.36	0.38	0.48	0.49	332	331	0.753
High school	0.38	0.37	0.49	0.48	332	331	0.856
College	0.21	0.12	0.42	0.32	332	331	0.032**
Daily allowance							
$<$ 1 yuan	0.22	0.21	0.41	0.41	336	336	0.830
1–1.99 yuan	0.19	0.15	0.38	0.35	336	336	0.563
2–2.99 yuan	0.17	0.15	0.36	0.36	336	336	0.862
3–3.99 yuan	0.09	0.15	0.20	0.29	336	336	0.156
4–4.99 yuan	0.17	0.16	0.38	0.37	336	336	0.912
$\geq$ 5 yuan	0.16	0.18	0.36	0.38	336	336	0.811

***Significant at 1% level. **Significant at 5% level. *Significant at 10% level

is significant at the 5% level. Rural *hukou* students' mothers have relatively low education levels compared to the mothers of urban *hukou* students. 13% of rural *hukou* students' mothers hold elementary school diplomas and 12% of them hold college degrees, compared to those of 5% and 21% of urban *hukou* students' mothers. The *t*-test results are significant at the 1% and 5% level, respectively. These results are also presented in Table 2. Although there is little difference in the personal characteristics between the two *hukou* groups, both rural and urban *hukou* students perceive

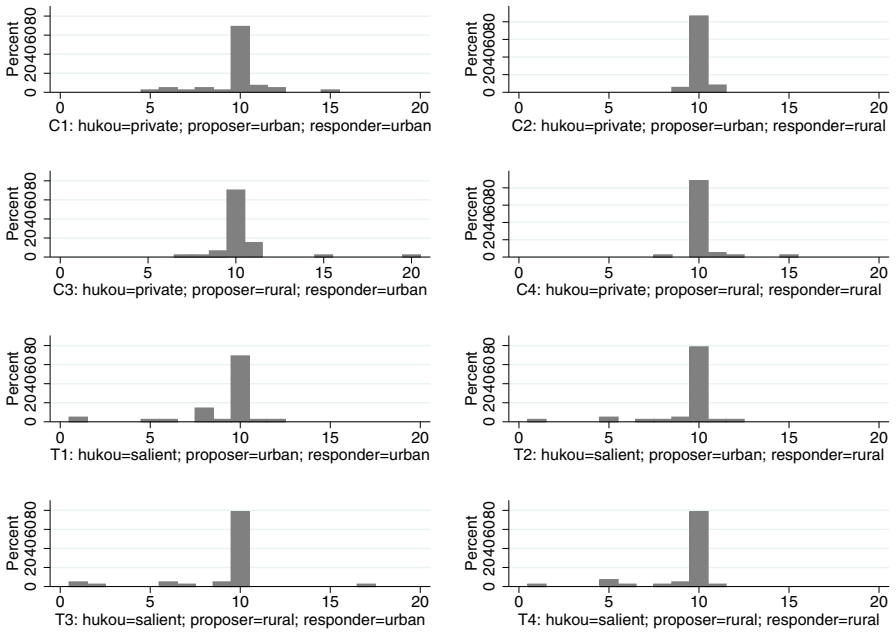


Fig. 1 The proposer's amount offered by treatment

that urban *hukou* students are more likely to become student cadres and receive more daily allowances from their parents, which are in line with the social perception that people with urban *hukou* are better off. Appendix B and C present more details on the subject *hukou* perceptions.

5.2 *Hukou* identity and the proposers' decisions

Figure 1 reports the dispersion of the proposer's amount offered in each treatment. The majority of the proposers choose to equally split the 20 yuan endowment, which is consistent with the findings in many experimental studies using ultimatum games (Oosterbeek et al. 2004). Similar results are found with children subjects across different countries and regions as well (see Appendix D).

Table 3 shows the Mann–Whitney U test results of the comparisons between the average offers in the treatment groups with *hukou* salience and those in the corresponding control groups without *hukou* salience. We do not find any significant treatment effect in the average amount offered between Control Group 1 (C_1) and Treatment Group 1 (T_1) or Control Group 2 (C_2) and Treatment Group 2 (T_2) ($p = 0.121$ and $p = 0.109$, respectively). These results imply that making the *hukou* identity salient does not affect the urban *hukou* proposer's amount offered regardless of their responder's *hukou* type. Nevertheless, the average offer in Control Group 3 (C_3) is 1.06 yuan higher than that of Treatment Group 3 (T_3). This difference is significant at the 5% level ($p = 0.017$). This result implies that making *hukou* salient reduces the rural proposers' amount offered to their urban *hukou* responders by 1.06 yuan. Besides, the

Table 3 The proposer's amount offered: non-parametric test results

	Hukou salience	Proposer	Responder	Average offer	Ti–Ci	Effect size
C1	No	Urban	Urban	9.79 (1.63)	$z = -1.552$	$d = 0.17$
T1	Yes	Urban	Urban	9.12 (2.21)	$p = 0.121$	
C2	No	Urban	Rural	10.03 (0.37)	$z = -1.602$	$d = 0.24$
T2	Yes	Urban	Rural	9.45 (1.84)	$p = 0.109$	
C3	No	Rural	Urban	10.30 (1.77)	$z = -2.394$	$d = 0.19$
T3	Yes	Rural	Urban	9.24 (2.68)	$p = 0.017$**	
C4	No	Rural	Rural	10.17 (0.91)	$z = -2.715$	$d = 0.33$
T4	Yes	Rural	Rural	9.26 (1.95)	$p = 0.007$***	

Standard deviations in parentheses
***Significant at 1% level. **Significant at 5% level. *Significant at 10% level

average offer in Control Group 4 (C_4) is 0.91 yuan higher than that of Treatment Group 4 (T_4) with $p = 0.007$, which is significant at the 1% level. This result implies that making the *hukou* identity salient reduces the rural *hukou* proposers' amount offered to their rural *hukou* responders by 0.91 yuan. In sum, making the *hukou* identity salient only reduces the rural *hukou* proposers' amount offered, regardless of their responders' *hukou* type.

We employ Tobit regression models to further analyze the impact of the *hukou* identity on the proposer's decisions. The dependent variable is the proposer's amount offered, which is left-censored at 0 and right-censored at 20. We control for subject characteristics including their gender, age, grade level, student cadre status, number of children in the household, and parents' education levels. The categorical variable *School* indicates the school where the experiment is conducted. We run separate regressions using samples from the control groups without *hukou* salience and the treatment groups with *hukou* salience and cluster the standard errors by session. Table 4 represents the regression results. We find that none of the subject characteristics has any effect on the proposer's amount offered. When the *hukou* identity is made salient, results from the model specification in Column (2) show that having an urban *hukou* responder decreases the offer amount by 0.15 yuan, which is significant at the 10% level. We add the interaction term of *urban proposer* and *urban responder* in the model specification presented in Column (3) and find that having an urban *hukou* proposer increases the amount offered by 0.26 yuan. This result is significant at the 1% level. We find a weak school effect with the control group sample in Column (1).

Table 5 reports the regression results based on the full sample of 333 proposers. Across various model specifications, making the *hukou* identity salient reduces the proposer's amount offered by 0.86 yuan or 1.04 yuan, and these results are significant at the 1% level. We also find that the proposers from the suburban school offer 0.65–0.66 yuan more compared to their counterparts at the other school located inside the city. These results are all significant at the 5% level. Besides, having each additional child living in the same household increases the proposer's amount offered by 0.34–0.36 yuan, and these results are significant at the 10% level. We include the interaction

Table 4 Tobit regression results: the proposer's amount offered (control versus treatment groups)

	(1)	(2)	(3)
Hukou salience	No	Yes	Yes
Urban proposer	− 0.21 (0.090)	0.10 (0.091)	0.26 (0.041)***
Urban responder		− 0.15 (0.087)*	0.022 (0.098)
School	0.38 (0.12)*	0.89 (0.34)	0.89 (0.34)
Female	− 0.13 (0.091)	− 0.20 (0.36)	− 0.19 (0.36)
Age	0.38(0.30)	− 0.25 (0.41)	− 0.25 (0.42)
Grade 5	− 0.25 (0.16)	− 0.12 (0.64)	− 0.14 (0.64)
Grade 6	− 1.10 (0.68)	0.024 (0.69)	− 0.013 (0.70)
Student cadre	0.23 (0.24)	− 0.17 (0.41)	− 0.16 (0.41)
No. of children in hh	0.19 (0.23)	0.43 (0.31)	0.42 (0.32)
Father's education	0.058 (0.16)	− 0.21 (0.19)	− 0.21 (0.19)
Mother's education	− 0.12 (0.090)	0.18 (0.27)	0.19 (0.27)
Urban proposer × urban responder			− 0.32 (0.086)
Constant	5.96 (3.61)*	10.54 (4.13)*	10.42 (4.14)*
Sigma cons	1.28 (0.24)*	2.18 (0.19)*	2.18 (0.19)*
Observations	168	165	165

Clustered standard errors in parentheses
***Significant at 1% level. **Significant at 5% level. *Significant at 10% level

terms of *hukou* salience and subject *hukou* types in different model specifications. We find that when the *hukou* identity is made salient, urban *hukou* proposers increase their average offer by 0.39 yuan, which partially offsets the decrease in the amount offered when making *hukou* salient. This result is significant at the 10% level and is reported in Column (2). In Column (3), the coefficient of the interaction term of *hukou salience* and *urban responder* is insignificant. This result implies that the proposers do not offer more to their urban *hukou* responders, holding other things equal. In Column (4), the coefficient of the interaction term of *urban proposer* and *urban responder* is negative (− 0.45) and significant at the 5% level, which implies that urban *hukou* proposers offer 0.45 yuan less to their urban *hukou* responders. Therefore, there is no intra-group favoritism among our urban-*hukou* subjects. Personal characteristics such as age, gender, grade level, and student cadre status do not affect the proposer's amount offered. Based on these findings, we draw our first conclusion.

Result 1. When the *hukou* identity is made salient, rural *hukou* proposers choose to keep more for themselves, regardless of their responder's *hukou* type. Urban *hukou* proposers do not exhibit any change in their amount offered when the *hukou* identity is made salient.

5.3 *Hukou* identity and the responders' decisions

Figure 2 presents the distribution of the responder's minimum acceptable offer in each treatment. A large percentage of the responders expect a fair share from their

Table 5 Tobit regression results: the proposer's amount offered (full sample)

	(1)	(2)	(3)	(4)
Hukou salience	−0.86 (0.12)***	−1.04 (0.14)***	−0.86 (0.15)***	−0.86 (0.084)***
Urban proposer	−0.11 (0.11)	−0.31 (0.15)	−0.11 (0.11)	0.12 (0.072)
Urban responder	−0.12 (0.11)	−0.12 (0.087)	−0.12 (0.17)	0.098 (0.11)
School	0.66 (0.20)**	0.65 (0.20)**	0.66 (0.20)**	0.66 (0.20)**
Female	−0.17 (0.17)	−0.17 (0.17)	−0.17 (0.17)	−0.16 (0.17)
Age	0.053 (0.27)	0.017 (0.26)	0.054 (0.27)	0.067 (0.26)
Grade 5	−0.17 (0.32)	−0.13 (0.32)	−0.17 (0.32)	−0.22 (0.33)
Grade 6	−0.55 (0.42)	−0.48 (0.42)	−0.55 (0.42)	−0.62 (0.42)
Student cadre	−0.011 (0.25)	−0.020 (0.24)	−0.011 (0.24)	−0.018 (0.24)
No. of children in hh	0.35 (0.18)*	0.36 (0.18)*	0.35 (0.18)*	0.34 (0.18)*
Father's education	−0.096 (0.12)	−0.10 (0.12)	−0.096 (0.12)	−0.088 (0.12)
Mother's education	0.060 (0.14)	0.072 (0.14)	0.060 (0.14)	0.070 (0.14)
Hukou salience × urban proposer		0.39 (0.17)*		
Hukou salience × urban responder			0.011 (0.21)	
Urban proposer × urban responder				−0.45 (0.15)**
Constant	8.70 (2.65)**	9.14 (2.61)***	8.70 (2.67)**	8.42 (2.67)**
Sigma cons	1.79 (0.21)***	1.79 (0.21)***	1.79 (0.21)***	1.79 (0.21)***
Observations	333	333	333	333

Clustered standard errors in parentheses
***Significant at 1% level. **Significant at 5% level. *Significant at 10% level

proposers, especially when subjects know that they are paired with urban *hukou* proposers. Table 6 presents the Mann–Whitney U test results between the control groups and corresponding treatment groups on the treatment effect of making *hukou* salient. We do not observe any significant treatment effect between C_3 and T_3 or C_4 and T_4 ($p = 0.154$ and $p = 0.262$, respectively). These results imply that making the *hukou* identity salient does not affect the responder's minimum acceptable offer when paired with a rural *hukou* proposer, regardless of the responder's *hukou* type. However, the difference between the average amounts of the minimum acceptable offer in C_1 and T_1 is statistically significant. When the *hukou* identity is made salient, on average, urban *hukou* responders expect 0.82 yuan more from their urban *hukou* proposers, and this result is significant at the 5% level. Making the *hukou* identity salient also increases the rural *hukou* responders' average minimum acceptable offer by 1.36 yuan, which is 16.6% higher compared to when the *hukou* identity is kept private. This result is statistically significant at the 1% level. In sum, the treatment effect of *hukou* salience affects the responders' expectations from their urban *hukou* proposers but not from their rural *hukou* proposers.

We use Tobit regression models to examine what factors influence the responder's decisions and run separate regressions using samples from the control groups without *hukou* salience and the treatment groups with *hukou* salience. Table 7 presents the regression results. The dependent variable is the responder's minimum acceptable

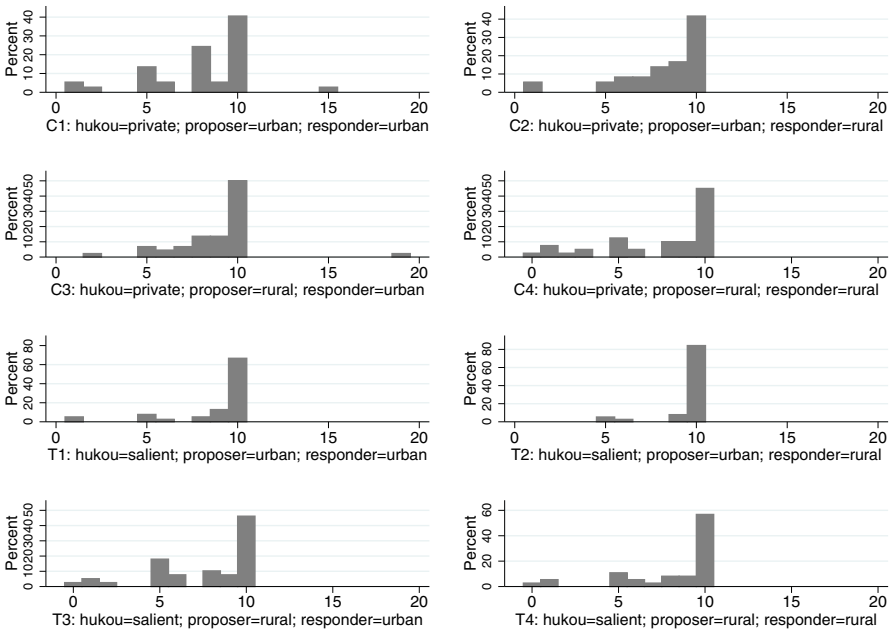


Fig. 2 The responder's minimum acceptable offer by treatment

Table 6 The responder's minimum acceptable offer: non-parametric test results

	Hukou salience	Proposer	Responder	Average minimum acceptable offer	Ti–Ci	Effect size
C1	No	Urban	Urban	8.00 (2.88)	$z = 1.998$	$d = 0.11$
T1	Yes	Urban	Urban	8.82 (2.36)	$p = 0.046$**	
C2	No	Urban	Rural	8.19 (2.35)	$z = 3.686$	$d = 0.33$
T2	Yes	Urban	Rural	9.55 (1.29)	$p = 0.000$***	
C3	No	Rural	Urban	8.89 (2.43)	$z = 1.427$	$d = 0.17$
T3	Yes	Rural	Urban	7.59 (2.99)	$p = 0.154$	
C4	No	Rural	Rural	7.40 (2.25)	$z = 1.123$	$d = 0.13$
T4	Yes	Rural	Rural	8.16 (2.85)	$p = 0.262$	

Standard deviations in parentheses
***Significant at 1% level.**Significant at 5% level. *Significant at 10% level

offer, which is left-censored at 0 and right-censored at 20. We control for subject characteristics including their gender, age, grade level, student cadre status, number of children in the household, and parents' education levels. We find that none of these factors has any impact on the responder's minimum acceptable offer, except that female responders in the control groups have lower minimum acceptable offers compare to their male counterparts. This result is significant at the 10% level and is presented in Column (1). There is a weak school effect in the treatment groups, where the responders from the suburban school expect higher amounts from their proposers.

Table 7 Tobit regression results: the responder's minimum acceptable offer (control versus treatment groups)

	(1)	(2)	(3)
Hukou salience	No	Yes	Yes
Urban proposer		1.38 (0.049)***	1.50 (0.068)***
Urban responder	0.60 (0.73)	− 0.59 (0.086)***	− 0.47 (0.079)
School	0.49(0.31)	0.58(0.23)*	0.59(0.23)
Female	− 0.80 (0.28)*	0.28 (0.52)	0.27 (0.52)
Age	− 0.25 (0.54)	− 0.29 (0.18)	− 0.29 (0.18)
Grade 5	− 0.61 (0.52)	0.89 (0.64)	0.89 (0.64)
Grade 6	0.068 (0.67)	0.90 (0.56)	0.91 (0.57)
Student cadre	− 0.16 (0.30)	0.0020 (0.35)	− 0.0072 (0.35)
No. of children in hh	0.61 (0.37)	0.24 (0.12)	0.24 (0.12)
Father's education	− 0.23 (0.37)	− 0.042 (0.25)	− 0.051 (0.26)
Mother's education	0.012 (0.50)	0.0087 (0.35)	0.020 (0.35)
Urban proposer × urban responder			− 0.23 (0.093)
Constant	10.68 (5.30)*	9.60 (1.83)**	9.55 (1.83)**
Sigma cons	2.77 (0.22)*	2.50 (0.36)**	2.50 (0.36)**
Observations	157	150	150

Clustered standard errors in parentheses
***Significant at 1% level. **Significant at 5% level. *Significant at 10% level

This result is significant at the 10% level and is presented in Column (2). We find that among the treatment groups where subject's *hukou* identity is made salient, the responders raise their minimum acceptable offer by 1.38 or 1.50 yuan. These results are significant at the 1% level and are shown in Column (2) and (3), respectively. In the model specification presented in Column (2), we find that when the *hukou* identity is made salient, holding everything else equal, the urban *hukou* responders have lower minimum acceptable offers (0.59 yuan less on average), and this result is significant at the 1% level. This implies that the urban *hukou* responders do not raise their minimum acceptable offer as much as their rural *hukou* counterparts when the *hukou* identity is made salient. In the model specification presented in Column (3), results show that holding everything else equal, making *hukou* salient increases the responder's minimum acceptable offer when paired with an urban *hukou* proposer.

Table 8 reports the regression results on the responder's minimum acceptable offer using the full sample. We obtained 307 valid observations from the responders. Across all the model specifications, we find a similar school effect that the responders from the suburban school exhibit higher minimum acceptable offers, which implies that they may have a different perception of fairness. Furthermore, we observe that making the *hukou* identity salient increases the responder's minimum acceptable offer when paired with an urban *hukou* proposer. These findings are demonstrated in those model specifications with interaction terms of *hukou* salience and subject *hukou* types. For example, in Column (2), the coefficient of the interaction term of *hukou salience* and *urben proposer* is 1.48, which implies that on average, pairing with an urban *hukou*

Table 8 Tobit regression results: the responder's minimum acceptable offer (full sample)

	(1)	(2)	(3)	(4)
Hukou salience	0.33 (0.43)	− 0.40 (0.56)	1.01 (0.37)**	0.32 (0.39)
Urban proposer	0.69 (0.44)	− 0.034 (0.54)	0.68 (0.37)*	1.25 (0.41)**
Urban responder	− 0.020 (0.48)	− 0.027 (0.037)	0.63 (0.68)	0.51 (0.69)
School	0.58 (0.19)**	0.54 (0.18)**	0.55 (0.18)**	0.58 (0.19)**
Female	− 0.24 (0.29)	− 0.27 (0.29)	− 0.24 (0.29)	− 0.24 (0.28)
Age	− 0.20 (0.24)	− 0.21 (0.23)	− 0.22 (0.25)	− 0.23 (0.24)
Grade 5	0.098 (0.45)	− 0.073 (0.47)	0.069 (0.46)	0.084 (0.45)
Grade 6	0.37 (0.41)	0.35 (0.43)	0.31 (0.43)	0.40 (0.41)
Student cadre	− 0.098 (0.23)	− 0.11 (0.26)	− 0.0077 (0.21)	− 0.064 (0.24)
No. of children in hh	0.34 (0.20)	0.43 (0.18)	0.33 (0.19)	0.39 (0.21)
Father's education	− 0.018 (0.18)	− 0.051 (0.17)	− 0.049 (0.17)	− 0.051 (0.18)
Mother's education	− 0.11 (0.26)	− 0.073 (0.24)	− 0.074 (0.28)	− 0.064 (0.27)
Hukou salience × urban proposer		1.48 (0.65)**		
Hukou salience × urban responder			− 1.32 (0.78)*	
Urban proposer × urban responder				− 1.09 (0.81)*
Constant	9.32 (2.42)***	9.66 (2.21)***	9.18 (2.48)***	9.21 (2.51)***
Sigma cons	2.73 (0.18)***	2.70 (0.20)***	2.71 (0.19)***	2.71 (0.19)***
Observations	307	307	307	307

Clustered standard errors in parentheses
***Significant at 1% level. **Significant at 5% level. *Significant at 10% level

proposer increases the responder's minimum acceptable offer by 1.48 yuan. This result is significant at the 5% level. In Column (3), making the *hukou* identity salient and pairing with an urban *hukou* proposer increase the responder's minimum acceptable offer by 1.01 yuan and 0.68 yuan, respectively, and these results are each significant at the 5% level and the 10% level. However, the coefficient of the interaction term of *hukou salience* and *urban responder* equals − 1.32, which is significant at the 10% level. This result offsets the higher expectation on the amount offered from urban *hukou* proposers, and it implies that only rural *hukou* responders increase their minimum acceptable offers when they know they are paired with urban *hukou* proposers. Similar results can be found in the model specification presented in Column (4). It is shown that having an urban *hukou* proposer increases the responder's minimum acceptable offer by 1.25 yuan, which is significant at the 5% level. If the proposer and the responder both hold an urban *hukou*, then the minimum acceptable offer will decrease by 1.09 yuan. This number is shown as the coefficient of the interaction term of *urban proposer* and *urban responder*, and it is significant at the 10% level. In sum, only urban *hukou* proposers are expected to offer higher amounts, especially by their rural *hukou* responders. Making the *hukou* identity salient solely alters the rural hukou responders' decisions. We do not find any intra-group favoritism or inter-group dis-

Table 9 *Hukou* perceptions and the proposer's amount offered

		Proposer's belief: Rural *hukou* is favored	Proposer's belief: Urban *hukou* is favored	Mann–Whitney U test
T1	Question 1	10.00 (0.00)	9.60 (0.89)	$d = 0.71$; $z = 1.095$; $p = 0.2733$
	Question 2	9.43 (1.62)	9.29 (2.12)	$d = 0.038$; $z = 1.160$; $p = 0.8727$
	Question 3	9.22 (0.97)	9.43 (1.51)	$d = 0.12$; $z = -0.969$; $p = 0.3323$
	Question 4	10.00 (0.00)	9.22 (2.13)	$d = 0.24$; $z = 0.771$; $p = 0.4405$
T2	Question 1	10.00 (0.00)	10.00 (0.00)	$d =$ na; $z = 0.00$; $p = 1.00$
	Question 2	9.61 (1.46)	9.375 (1.77)	$d = 0.087$; $z = 0.121$; $p = 0.9036$
	Question 3	9.05 (0.74)	10.375 (1.45)	$d = 0.86$; $z = -1.986$; $p = 0.0470$**
	Question 4	9.59 (1.50)	10.00 (0.00)	$d = 0.26$; $z = -0.454$; $p = 0.6497$
T3	Question 1	10.00 (0.00)	10.00 (0.00)	$d = na$; $z = 0.00$; $p = 1.00$
	Question 2	10.00 (0.00)	9.27 (1.93)	$d = 0.28$; $z = 1.190$; $p = 0.2341$
	Question 3	10.00 (0.00)	9.00 (1.73)	$d = 0.25$; $z = 1.468$; $p = 0.1422$
	Question 4	9.84 (1.03)	8.41 (2.62)	$d = 0.29$; $z = 1.947$; $p = 0.032$**
T4	Question 1	10.00 (0.00)	10.00 (0.00)	$d =$ na; $z = 0.00$; $p = 1.00$
	Question 2	9.25 (1.76)	9.27 (1.79)	$d = 0.06$; $z = -0.190$; $p = 0.8492$
	Question 3	9.62 (1.12)	9.375 (1.85)	$d = 0.095$; $z = 0.0856$; $p = 0.952$
	Question 4	9.30 (2.08)	10.00 (0.00)	$d = 0.23$, $z = -0.838$; $p = 0.4022$

Standard errors in parentheses
***Significant at 1% level. **Significant at 5% level. *Significant at 10% level

crimination with our urban *hukou* responders. We draw our second conclusion based on these findings.

Result 2. When the *hukou* identity is made salient, rural *hukou* responders expect more from their urban *hukou* proposers. Urban *hukou* responders do not exhibit any change in their minimum acceptable offers when the *hukou* identity is made salient.

Regarding our findings in Result 1 and 2, we hypothesize that the *hukou* identity only affects the perceptions of the rural *hukou* subjects. Since they perceive themselves as inferior to the urban *hukou* group, hence, they tend to seek pecuniary compensations to achieve fair distributions. On the other hand, urban *hukou* subjects do not hold such perceptions, and they see themselves neither superior nor inferior to the rural *hukou* group, which is in line with our findings that there is little difference in the personal characteristics between these two *hukou* groups. Therefore, urban *hukou* subjects do not demonstrate any intra-group favoritism or inter-group discrimination behavior, and they treat their partners equally regardless of their *hukou* types.

5.4 *Hukou* perceptions and individual decisions

We test how the perceptions of different *hukou* groups affect the subjects' decisions in the ultimatum game. We collect data on the subjects' beliefs about the following

Table 10 *Hukou* perceptions and the responder's minimum acceptable offer

		Responder's belief: Rural *hukou* is favored	Responder's belief: Urban *hukou* is favored	Mann–Whitney U test
T1	Question 1	7.00 (3.94)	8.29 (2.52)	$d = 0.11$; $z = -0.754$; $p = 0.4508$
	Question 2	8.17 (2.89)	9.33 (1.15)	$d = 0.19$; $z = -0.447$; $p = 0.6547$
	Question 3	8.08 (3.01)	8.16 (3.60)	$d = 0.007$; $z = -0.152$; $p = 0.879$
	Question 4	8.86 (2.35)	10.00 (0.00)	$d = 0.29$; $z = -0.669$; $p = 0.5038$
T2	Question 1	9.00 (2.24)	10.00 (0.00)	$d = 0.28$; $z = -0.894$; $p = 0.3711$
	Question 2	9.25 (1.75)	9.41 (1.50)	$d = 0.060$; $z = -0.417$; $p = 0.6766$
	Question 3	9.55 (1.51)	10.00 (0.00)	$d = 0.28$; $z = -0.426$; $p = 0.6698$
	Question 4	6.25 (1.89)	8.27 (3.24)	$d = 0.26$; $z = -1.968$; $p = 0.0477$**
T3	Question 1	8.33 (2.89)	7.78 (2.15)	$d = 0.081$; $z = 0.471$; $p = 0.6374$
	Question 2	7.86 (3.05)	6.40 (3.51)	$d = 0.13$; $z = 0.864$; $p = 0.3874$
	Question 3	7.44 (3.15)	7.33 (3.67)	$d = 0.009$; $z = 0.035$; $p = 0.9719$
	Question 4	8.35 (2.50)	6.23 (2.06)	$d = 0.40$; $z = 1.961$; $p = 0.0499$**
T4	Question 1	10.00 (0.00)	9.58 (2.32)	$d = 0.11$; $z = 0.216$; $p = 0.867$
	Question 2	8.23 (3.49)	7.22 (3.19)	$d = 0.090$; $z = 0.913$; $p = 0.3613$
	Question 3	8.10 (3.11)	6.29 (3.25)	$d = 0.18$; $z = 1.254$; $p = 0.2098$
	Question 4	9.75 (0.50)	9.44 (1.46)	$d = 0.20$; $z = 0.253$; $p = 0.8001$

Standard errors in parentheses
***Significant at 1% level. **Significant at 5% level. *Significant at 10% level

questions including "Question 1: Who pays higher tuition and fees at school, a rural *hukou* student or an urban *hukou* student," "Question 2: Who is more likely to become a student cadre, a rural *hukou* student or an urban *hukou* student," "Question 3: Who is more likely to be recognized at school, a rural *hukou* student or an urban *hukou* student," and "Question 4: Who receives higher daily allowances, a rural *hukou* student or an urban *hukou* student" via the pre-experiment survey distributed to subjects in the treatment groups. We separate subjects into two groups by their *hukou* perceptions. Table 9 presents the comparison results of the proposer's amount offered between those who believe that the urban *hukou* group is favored versus those who believe that the rural *hukou* group is favored. We find that in Treatment Group 2 with urban *hukou* proposers and rural *hukou* responders, those proposers who believe that urban *hukou* students are more likely to be recognized at school give more to their responders ($d = 0.86$; $z = -1.986$; $p = 0.0470$), and this difference is significant at the 5% level. In addition, in Treatment Group 3 with rural *hukou* proposers and urban *hukou* responders, those proposers who believe that rural *hukou* students receive more daily allowances give more to their responders ($d = 0.29$; $z = 1.947$; $p = 0.032$), and this difference is significant at the 5% level. Theoretically, proposers would offer less to their responders if they believe that the absolute amount of the offer is relatively large to their responders, since the responders are less likely to reject offers with relatively high costs. Yet, we observe the opposite outcome in our Treatment Group 3. Therefore, we argue that the rural *hukou* proposers who believe themselves are

better off offer more to their urban *hukou* responders as a result of preferences for fairness.

On the other hand, we compare the responder's minimum acceptable offer between those who believe that the urban *hukou* group is favored versus those who believe that the rural *hukou* group is favored. Table 10 presents these results. We find that in Treatment Group 2 with urban *hukou* proposers and rural *hukou* responders, those responders who believe that urban *hukou* students receive more daily allowances expect more from their proposers ($d = 0.26$; $z = -1.968$; $p = 0.0477$), and this result is significant at the 5% level. In Treatment Group 3 with rural *hukou* proposers and urban *hukou* responders, those responders who believe that rural *hukou* students receive more daily allowances have higher minimum acceptable offers ($d = 0.40$; $z = 1.961$; $p = 0.0499$), and this result is significant at the 5% level as well. In sum, responders are more demanding if they believe that the other *hukou* group is favored. These results confirm that the responders' decisions are also driven by the preference for fairness.

We also run Tobit regressions using subject *hukou* perceptions, personal characteristics, and *hukou* types to explain the proposer's offer and the responder's minimum acceptable offer, respectively. We do not find that any of these variables has a significant effect on the proposer's amount offered or the responder's amount expected, except that having an urban *hukou* proposer increases the responder's minimum acceptable offer. Therefore, we do not include the regression results here. These results are available upon request.

6 Conclusion

To gain a better understandings of how the *hukou* identity affects an individual's decision in the ultimatum game, we conduct a field experiment in China using children subjects with rural and urban *hukou*. Since it is impossible to collect data on the entire population from all the provinces in China, we choose to base our study on a representative sample in Zhejiang Province. This location provides an ideal context for our study, since it has a large balanced resident population of both rural and urban *hukou*. Because the *hukou* system is ubiquitous, we believe that the results of our study should generally apply to other locations across China as well. To strengthen the external validity of our experimental results, more field studies across different locations in China would be very much helpful. We use children subjects instead of adult subjects, because we expect that adults have experienced more of the impact of *hukou* on their lives compared to children. Therefore, the effect size found in our study should be the lower bound compared to that if we use adult subjects. In other words, we expect similar findings with adult subjects but with larger magnitudes and higher significance levels.

In this research study, we find that although there is no significant difference in most aspects of the personal characteristics of our subjects from the rural and the urban *hukou* group, both groups perceive that the urban *hukou* subjects are favored at school and in life compared to those with rural *hukou*. This perception affects the subjects' decisions in the ultimatum game, especially for the rural *hukou* group. When the *hukou* identity is made salient, rural *hukou* proposers tend to decrease

their amount offered, regardless of their responder's *hukou* type. Besides, rural *hukou* responders expect higher offers from their urban *hukou* proposers. When we factor in subject *hukou* perceptions, we find that these behaviors can be explained by the "fairness-seeking" motivation. Rural *hukou* subjects seem more demanding as they seek monetary compensations for their perceived *hukou* inferiority. The findings of this study offer practical implications for policymakers in China, particularly during the process of reforming the *hukou* system. When policies are designed aiming to alleviate social inequality and to distribute resources fairly, the *hukou* identity should be included as a consideration factor. In addition, results of this study shed light upon all those working with suppressed or perceived inferior social groups. Rather than allocating resources evenly in the absolute amount, fairness may be achieved by favoring the perceived subordinate group.

In August 2014, the State Council of the People's Republic of China announced plans to abolish the *hukou* system. It is expected that the elimination of this system will facilitate labor mobility and grant migrant workers full access to state-owned resources. However, as Hoff and Pandey (2006) argued in their research that the effect of belonging to a historically discriminated social group persists even after the barrier has been removed, we believe that the influence of the *hukou* system will continue beyond its abolition. Future research will be required to answer this question.

Acknowledgements This work was supported by the Ministry of Education in China (Project of Humanities and Social Sciences, Grant no. 17YJCZH120) and the National Natural Science Foundation of China (Grant nos. 71703145, 71773111). We also thank the two anonymous reviewers for their valuable comments.

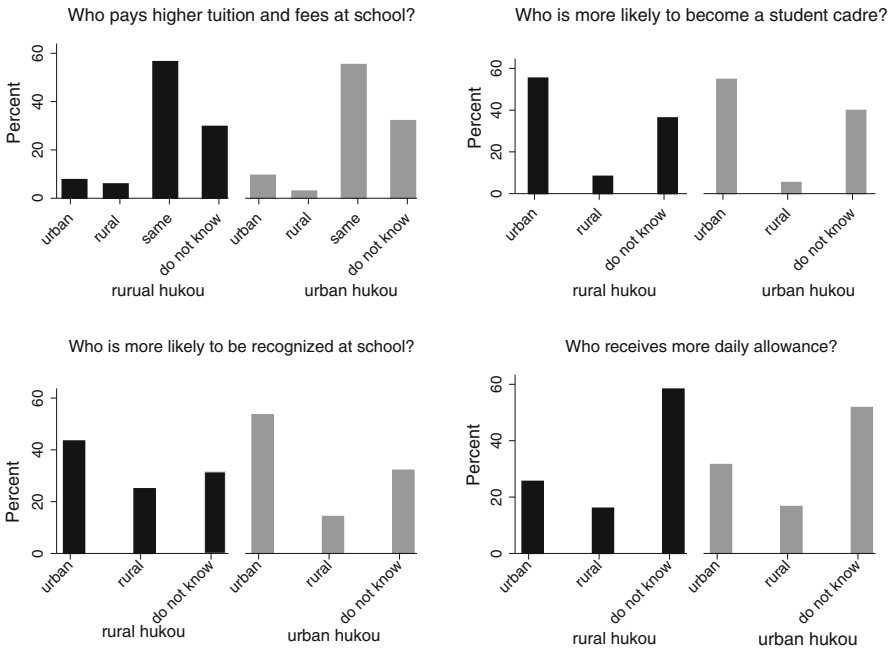
Appendix

A Subject characteristics by session

	Session	School	Subject	*Hukou* type		Age				Gender		Grade level		
				Urban	Rural	9	10	11	12	Male	Female	4th	5th	6th
Control 1	1	1	Proposer	20	0	2	8	7	3	10	10	6	7	7
			Responder	20	0	2	8	7	3	10	10	6	7	7
	2	2	Proposer	22	0	4	8	8	2	10	12	8	8	6
			Responder	22	0	4	8	8	2	10	12	8	8	6
Control 2	3	1	Proposer	15	0	2	5	6	2	8	7	6	5	4
			Responder	0	15	2	5	6	2	8	7	4	6	5
	4	2	Proposer	22	0	3	7	7	5	11	11	7	7	8
			Responder	0	22	3	7	7	5	11	11	7	7	8
Control 3	5	1	Proposer	0	25	5	9	8	3	12	13	8	8	9
			Responder	25	0	5	9	8	3	12	13	8	9	8
	6	2	Proposer	0	22	4	7	9	2	12	10	8	6	8
			Responder	22	0	4	7	9	2	12	10	8	6	8
Control 4	7	1	Proposer	0	20	3	8	6	3	10	10	7	6	7
			Responder	0	20	3	8	6	3	10	10	7	6	7
	8	2	Proposer	0	22	3	8	8	3	11	11	7	8	7
			Responder	0	22	3	8	8	3	11	11	7	8	7
Treatment 1	9	1	Proposer	20	0	1	8	8	3	10	10	6	7	7
			Responder	20	0	1	8	8	3	10	10	6	7	7
	10	2	Proposer	22	0	4	8	9	1	10	12	8	7	7
			Responder	22	0	4	8	9	1	10	12	8	7	7
Treatment 2	11	1	Proposer	15	0	3	5	5	2	8	7	6	5	4
			Responder	0	15	3	5	5	2	8	7	4	6	5
	12	2	Proposer	22	0	4	7	7	4	11	11	7	8	7
			Responder	0	22	4	7	7	4	11	11	7	8	7
Treatment 3	13	1	Proposer	0	25	5	9	8	3	12	13	8	8	9
			Responder	25	0	5	9	8	3	12	13	8	9	8
	14	2	Proposer	0	22	3	8	9	2	12	10	8	7	7
			Responder	22	0	3	8	9	2	12	10	8	7	7
Treatment 4	15	1	Proposer	0	20	2	8	7	3	10	10	7	6	7
			Responder	0	20	2	8	7	3	10	10	7	6	7
	16	2	Proposer	0	22	2	8	8	4	11	11	7	7	8
			Responder	0	22	3	8	8	4	11	11	7	7	8
Total				336	336	100	242	240	90	336	336	224	224	224

We tried our best to balance subject personal characteristics including age, gender, and grade level in each session. However, we were only able to have 37 groups in Control Group 2 and 47 groups in Control Group 3 with balanced personal characteristics

B *Hukou* perceptions



The figures above present the subject answers to the pre-experiment survey questions regarding *hukou* perceptions. For example, the top left figure shows the subject answers to the question "who pays higher tuition and fees at school, a rural *hukou* student or an urban *hukou* student?" In the rural *hukou* group, about 8% of the subjects believe that urban *hukou* students pay higher tuition and fees, 6% believe that rural *hukou* students pay more, 56% believe that rural *hukou* and urban *hukou* students pay the same amount, and 30% say that they do not know. In the urban *hukou* group, 10% believe that urban *hukou* students pay more, 4% believe that rural *hukou* students pay more, 53% believe that they pay the same amount, and 33% say that they do not know. The rest of the figures can be interpreted by the same token.

C Wilcoxon signed-rank test results on *hukou* perceptions

Question	Beliefs	Among rural *hukou* subjects	Among urban *hukou* subjects
Who pays higher tuition	Urban > rural	$z = 0.571$; $p = 0.798$	$z = 0.863$; $p = 0.561$
	Urban < do not know	$z = -2.843$; $p = 0.030$**	$z = -2.786$; $p = 0.031$**
Who is more likely to become a student cadre	Urban > rural	$z = 2.564$; $p = 0.036$**	$z = 3.988$; $p = 0.007$***
	Urban > do not know	$z = 2.013$; $p = 0.048$**	$z = 3.105$; $p = 0.022$**
Who is more likely to be recognized	Urban > rural	$z = 1.164$; $p = 0.206$	$z = 1.356$; $p = 0.110$
	Urban < do not know	$z = -3.023$; $p = 0.026$**	$z = -2.512$; $p = 0.038$**
Who receives higher daily allowance	Urban > rural	$z = 4.096$; $p = 0.005$***	$z = 4.525$; $p = 0.003$***
	Urban > do not know	$z = 2.125$; $p = 0.042$**	$z = 1.976$; $p = 0.052$*

***Significant at 1% level. **Significant at 5% level. *Significant at 10% level

The table above presents the Wilcoxon signed-rank test results for the comparisons between subjects' *hukou* perceptions. the two *hukou* groups. For example, the second row shows the test results regarding the question "who pays higher tuition and fees at school, a rural *hukou* student or an urban *hukou* student?" Among the rural *hukou* subjects, the difference between the percentages believing urban *hukou* students pay more and rural *hukou* students pay more is not statistically significant ($z = 0.571$, $p = 0.798$). Among the urban *hukou* subjects, this difference is statistically insignificant as well ($z = 0.863$, $p = 0.561$). The same analogy applies to other questions of "who is more likely to become a student cadre, a rural *hukou* student or an urban *hukou* student," "who is more likely to be recognized at school, a rural *hukou* student or an urban *hukou* student," and "who receives higher daily allowances, and a rural *hukou* student or an urban *hukou* student." We find that subjects of both *hukou* groups believe that rural *hukou* students and urban *hukou* students pay the same amount of tuition and fees and are equally likely to be recognized at school. However, both rural and urban *hukou* students perceive that urban *hukou* students are more likely to become student cadres and receive more daily allowances from parents, although the data in subject characteristics do not show that there is a difference.

D Ultimatum game outcomes with children subjects

	Experiment location	Subjects	Sample size	Average offer[a]	Std
Harbaugh et al. (2003)	Oregon, USA	2nd graders	74	0.35	0.17
		4th graders	106	0.41	0.16
		9th graders	90	0.45	0.09
		12th graders	40	0.41	0.07
Murnighan and Saxon (1998)	Illinois, USA	6th graders	60	0.45	0.12
		9th graders	58	0.40	0.14
Sally and Hill (2006)	London, UK	6 years old	14	0.50	0.13
		8 years old	19	0.36	0.15
		10 years old	18	0.41	0.12
Takezawa et al. (2006)	Berlin, Germany	6th graders	51	0.46	0.16
		8th graders	48	0.53	0.25
Zhu et al. (2008)	Beijing, China	3rd graders	48	0.59	0.23
		8th graders	48	0.52	0.09
Yu (2014)	Fuzhou, China	4 years old	36	0.33	0.17
		5 years old	36	0.41	0.16
		6 years old	36	0.51	0.12

[a]The average offers are normalized

E Experiment instructions (for proposers)

The following appendixes are the English translations of our experiment instructions, decision cards, pre-experiment survey, and post-experiment survey. The original documents are written in Chinese.

Your game ID: _____

Greetings! Welcome to this experiment conducted by Zhejiang University. This experiment will take about 30 min of your time.

General instructions

- You will play a game and earn cash in this experiment. Please read the following instructions carefully and make sure that you understand all of them before you make your decision. The decision you make will determine the amount of money you receive at the end of this experiment. You will be paid 5 yuan for your participation, in addition to whatever you make in the game. In other words, your total earnings of today's experiment will equal to whatever you make in the game, plus 5 yuan participation fee.
- You are not allowed to talk during the game. If you have any question, please raise your hand and an experimenter will come and answer your question in private. You will be asked to terminate the game and leave the room if you speak with another participant, and we will not be able to pay you in such situation.
- All your personal information, including your game decision, answers to the survey questions, and the amount you earn from this game will be kept private.

- Please do not share your decision with any other participants throughout the experiment.
- You will do two practice questions before the game starts. You have to answer both of them correctly to proceed with the game. The purpose of these practice questions is to make sure that you fully understand the game instructions and know how to calculate your earnings correctly.

Game procedures

1. You will pick one card out of a deck of cards. The number on the card will be your game ID.
2. You will be paired with one person in the other room to play this game. Your partner will be the person who has the same card number (game ID). You will not meet your partner throughout this experiment. You may or may not have met your partner before.
3. You will receive 20 yuan from us. You have to decide how to allocate this money between yourself and your partner. You will be given a list of choices. Please indicate your decision by checking the box in front of the choice you make.
4. If your partner accepts your proposal, then you and your partner will receive whatever you have proposed plus 5 yuan participation fee for each of you. If your partner rejects your proposal, then both of you will receive 0. However, each of you will still receive 5 yuan for your participation.
5. You have 5 min to make a decision. When time is up, we will collect your decision card and pass it to your partner. After your partner has made his or her decision, we will give your decision card back to you. You will have the chance to confirm your final payment.
6. You will receive a questionnaire after you hand in your decision card. Your answers to these questions will be kept private. Please respond carefully and truthfully. You have 5 min to answer these questions.
7. Please remain seated after completing the questionnaire. The experimenter will call your game ID one by one and pay you privately. Only you and the experimenter will know your earnings. No other participant will know how much you have made in the game.

Practice questions

You have to answer both of these questions correctly to proceed.

1. For example, in the game, you choose to keep 11 yuan for yourself and give 9 yuan to your partner. The lowest amount your partner is willing to accept is 8 yuan. In this case, you will get _____ yuan, and your partner will get _____ yuan.
2. For example, in the game, you choose to keep 11 yuan for yourself and give 9 yuan to your partner. The lowest amount your partner is willing to accept is 10 yuan. In this case, you will get _____ yuan, and your partner will get _____ yuan.

F Experiment instructions (for responders)

Your game ID: _____

Greetings! Welcome to this experiment conducted by Zhejiang University. This experiment will take about 30 min of your time.

General instructions

- You will play a game and earn cash in this experiment. Please read the following instructions carefully and make sure that you understand all of them before you make your decision. The decision you make will determine the amount of money you receive at the end of this experiment. You will be paid 5 yuan for your participation, in addition to whatever you make in the game. In other words, your total earnings of today's experiment will equal to whatever you make in the game, plus 5 yuan participation fee.
- You are not allowed to talk during the game. If you have any question, please raise your hand and an experimenter will come and answer your question in private. You will be asked to terminate the game and leave the room if you speak with another participant, and we will not be able to pay you in such situation.
- All your personal information, including your game decision, answers to the survey questions, and the amount you earn from this game will be kept private.
- Please do not share your decision with any other participants throughout the experiment.
- You will do two practice questions before the game starts. You have to answer both of them correctly to proceed with the game. The purpose of these practice questions is to make sure that you fully understand the game instructions and know how to calculate your earnings correctly.

Game procedures

1. You will pick one card out of a deck of cards. The number on the card will be your game ID.
2. You will be paired with one person in the other room to play this game. Your partner will be the person who has the same card number (game ID). You will not meet your partner throughout this experiment. You may or may not have met your partner before.
3. Your partner will receive 20 yuan from us. Your partner will allocate this money between you and him or herself.
4. You have to decide the lowest amount that you are willing to accept. You have 5 min to make a decision.
5. If your partner's offer is equal or higher than the lowest amount that you are willing to accept, then both of you will receive what your partner has proposed plus 5 yuan participation fee for each of you. If your partner's offer is lower than the lowest amount that you are willing to accept, then both you and your partner will receive 0. However, each of you will still receive 5 yuan for your participation.

6. You will receive a questionnaire after you hand in your decision card. Your answers to these questions will be kept private. Please respond carefully and truthfully. You have 5 min to answer these questions.
7. Please remain seated after completing the questionnaire. The experimenter will call your game ID one by one and pay you privately. Only you and the experimenter will know your earnings. No other participant will know how much you have earned from the game.

Practice questions

You have to answer both of these questions correctly to proceed.

1. For example, in the game, your partner chooses to keep 11 yuan for him or herself and offers you 9 yuan. The lowest amount you are willing to accept is 8 yuan. In this case, you will get _____ yuan, and your partner will get _____ yuan.
2. For example, in the game, your partner chooses to keep 11 yuan for him or herself and offers you 9 yuan. The lowest amount you are willing to accept is 10 yuan. In this case, you will get _____ yuan, and your partner will get _____ yuan.

G Proposer's decision card (for control groups with private *hukou* identity)

Your game ID: _____
Your partner's game ID: _____

You are a proposer. You have to allocate 20 yuan between you and your partner. Please make your decision by checking one of the brackets below.

( ) Keep 20 yuan for yourself, give 0 yuan to your partner.
( ) Keep 19 yuan for yourself, give 1 yuan to your partner.
( ) Keep 18 yuan for yourself, give 2 yuan to your partner.
( ) Keep 17 yuan for yourself, give 3 yuan to your partner.
( ) Keep 16 yuan for yourself, give 4 yuan to your partner.
( ) Keep 15 yuan for yourself, give 5 yuan to your partner.
( ) Keep 14 yuan for yourself, give 6 yuan to your partner.
( ) Keep 13 yuan for yourself, give 7 yuan to your partner.
( ) Keep 12 yuan for yourself, give 8 yuan to your partner.
( ) Keep 11 yuan for yourself, give 9 yuan to your partner.
( ) Keep 10 yuan for yourself, give 10 yuan to your partner.
( ) Keep 9 yuan for yourself, give 11 yuan to your partner.
( ) Keep 8 yuan for yourself, give 12 yuan to your partner.
( ) Keep 7 yuan for yourself, give 13 yuan to your partner.
( ) Keep 6 yuan for yourself, give 14 yuan to your partner.
( ) Keep 5 yuan for yourself, give 15 yuan to your partner.
( ) Keep 4 yuan for yourself, give 16 yuan to your partner.
( ) Keep 3 yuan for yourself, give 17 yuan to your partner.

( ) Keep 2 yuan for yourself, give 18 yuan to your partner.
( ) Keep 1 yuan for yourself, give 19 yuan to your partner.
( ) Keep 0 yuan for yourself, give 20 yuan to your partner.

H Proposer's decision card (for treatment groups with salient *hukou* identity)

Your game ID: _____
Your hukou type: urban
Your partner's game ID: _____
Your partner's hukou type: rural

You are a proposer. You have to allocate 20 yuan between you and your partner. Please make your decision by checking one of the brackets below.

( ) Keep 20 yuan for yourself, give 0 yuan to your partner.
( ) Keep 19 yuan for yourself, give 1 yuan to your partner.
( ) Keep 18 yuan for yourself, give 2 yuan to your partner.
( ) Keep 17 yuan for yourself, give 3 yuan to your partner.
( ) Keep 16 yuan for yourself, give 4 yuan to your partner.
( ) Keep 15 yuan for yourself, give 5 yuan to your partner.
( ) Keep 14 yuan for yourself, give 6 yuan to your partner.
( ) Keep 13 yuan for yourself, give 7 yuan to your partner.
( ) Keep 12 yuan for yourself, give 8 yuan to your partner.
( ) Keep 11 yuan for yourself, give 9 yuan to your partner.
( ) Keep 10 yuan for yourself, give 10 yuan to your partner.
( ) Keep 9 yuan for yourself, give 11 yuan to your partner.
( ) Keep 8 yuan for yourself, give 12 yuan to your partner.
( ) Keep 7 yuan for yourself, give 13 yuan to your partner.
( ) Keep 6 yuan for yourself, give 14 yuan to your partner.
( ) Keep 5 yuan for yourself, give 15 yuan to your partner.
( ) Keep 4 yuan for yourself, give 16 yuan to your partner.
( ) Keep 3 yuan for yourself, give 17 yuan to your partner.
( ) Keep 2 yuan for yourself, give 18 yuan to your partner.
( ) Keep 1 yuan for yourself, give 19 yuan to your partner.
( ) Keep 0 yuan for yourself, give 20 yuan to your partner.

I Responder's decision card (for control groups with private *hukou* identity

Your game ID: _____
Your partner's game ID: _____

You are a responder. You have to decide the lowest amount that you would like to accept from the proposer.

The lowest amount you are willing to accept from your partner is _____ yuan.

J Responder's decision card (for treatment groups with salient *hukou* identity)

Your game ID: _____
Your hukou type: urban
Your partner's game ID: _____
Your partner's hukou type: rural

You are a responder. You have to decide the lowest amount that you would like to accept from the proposer.

The lowest amount you are willing to accept from your partner is _____ yuan.

K Pre-experiment survey (for treatment groups only)

1. Your sex: _____
2. Your age: _____
3. Your ethnic group: _____
4. Your grade level: _____
5. Your *hukou* location: _____ Province _____ City _____ County/District

   Check here ( ) *if you do not know your hukou location.*
6. How long have you been living in this county/city ? _____
7. Can you speak the local dialect? ( ) Yes ( ) No
8. Do you consider yourself a local? ( ) Yes ( ) No ( ) Do not know
9. Do your classmates consider you a local? ( ) Yes ( ) No ( ) Do not know
10. Do your teachers consider you a local? ( ) Yes ( ) No ( ) Do not know
11. Who pays higher tuition and fees at school, a rural *hukou* student or an urban *hukou* student?

    ( ) A rural *hukou* student ( ) An urban *hukou* student ( ) They pay the same amount ( ) Do not know
12. Who is more likely to become a student cadre, a rural *hukou* student or an urban *hukou* student?

    ( ) A rural *hukou* student ( ) An urban *hukou* student ( ) Do not know
13. Who is more likely to be recognized at school, a rural *hukou* student or an urban *hukou* student?

    ( ) A rural *hukou* student ( ) An urban *hukou* student ( ) Do not know
14. Who receives more daily allowance from parents, a rural *hukou* student or an urban *hukou* student?

    ( ) A rural *hukou* student ( ) An urban *hukou* student ( ) Do not know

L Post-experiment survey (for all subjects)

1. Your sex: _____
2. Your age: _____
2. Your ethnic group: _____
4. Your grade level: _____
5. Are you a student cadre? ( ) Yes ( ) No
6. How many siblings do you have? ( ) 0 ( ) 1 ( ) 2 ( ) 3 ( ) more than 3
7. What is your father's education level?

   ( ) Illiterate ( ) Elementary school ( ) Middle school ( ) High school ( ) College ( ) Graduate school
8. What is your mother's education level?

   ( ) Illiterate ( ) Elementary school ( ) Middle school ( ) High school ( ) College ( ) Graduate school
9. What is your current academic standing?

   ( ) Top tier ( ) Above average ( ) Average ( ) Below average ( ) Bottom tier
10 How much money do your parents give you on a typical day, excluding the amount for transportation and meals?

   ( ) $<$ 1 yuan ( ) 1–1.99 yuan ( ) 2–2.99 yuan ( ) 3–3.99 yuan ( ) 4–4.99 yuan ( ) $\geq$ 5 yuan

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