Are "left-behind" children really left behind? A lab-in-field experiment concerning the impact of rural/urban status and parental migration on children's other-regarding preferences

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Abstract
Other-regarding preferences have a profound influence on both individual and societal success. In this paper, using a unique sample from China, we study the impact of two family background characteristics: parental migration and rural/urban status on both the level and the developmental formation of other-regarding preferences during childhood. Decades of economic reform have led to an unprecedented growth of economically driven rural-to-urban internal migration in China. Many migrant parents leave their children behind. According to figures from China's 2010 census, more than 61 million children from birth to 17 years were "left behind." In this lab-in-field experiment, we use three simple allocation games to study samples from four populations: rural children left behind by both parents, rural children left behind by one parent, rural non-left-behind children, and urban children. We expected that the development of altruistic preferences would be positively associated with parental presence. However, we found this was not the case. In fact, among rural children the development of altruistic preferences from Grade 3 to Grade 5 was most pronounced among those who were left-behind by both parents. Moreover, by Grade 5, it was these children whose preferences most resembled those of the urban children.

Keywords: Children; Other-regarding preferences; Social preferences; China; Experiment; Migration.
JEL Codes: D63, D64, D91, J61

Highlights
- We examine the other-regarding preferences of Grade 3 and 5 rural and urban children in China.
- We run a lab-in-field experiment using three simple allocation games.
- We compare rural children by parent migration status to each other and city children.
- For rural children, altruistic preferences developed most among those left behind by both parents.
- By grade 5 the preferences of these children most resembled those of city children.

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1. Introduction

Decades of economic reform have led to unprecedented growth fueled by economically driven rural-to-urban internal migration within China. With an urban population that has climbed to 52.6% in 2012 from 20.9% in 1982 (National Bureau of Statistics of China, 2014), China is experiencing what has often been described as the largest migration in human history. According to Lu and Xia (2016), 273 million people now live in a place where they do not have a local *hukou*[1] in China, and the majority of these people are rural-to-urban migrants. With the current push for further urbanization and industrialization, it is inevitable that rural to urban migration will continue and remain an important force behind China' s economic growth.

Although migrant workers have made important contributions to the economic development of urban centers,[2] the discriminatory *hukou* system leads to their employment, social and residential segmentation, and hinders their and their family members' access to key public-services such as education, health care and social security in urban areas. Due to this institutional barrier as well as the financial burden of raising children in urban areas (Xiang, 2007), the vast majority of migrant workers leave their children at home and entrust them to the care of a remaining parent or relatives and friends. These children have been called "left-behind" children (Asis, 2006; Liang and Ma, 2004). It is estimated that more than 61 million children under the age of 17 are classified as left-behind in China (Ai and Hu, 2016), a number equivalent to the number of all the children in the US (The Economist, 2015). In total, left-behind children account for 38 percent of all rural children and 22 percent of all children in China (All China

[1] *Hukou* (household registration) is a registration identity that classifies a person as either "nonagricultural" or "agricultural" and determines a specific *hukou* location, which is usually based on where one's parents originated. A *hukou* entitles a person at his/her location to employment and is linked to locally financed social security and public services, and thus often results in discrimination against migrants as very few people can change their *hukou* status and/or location.

[2] For example, Sun (2004) reported that the proportion of gross domestic product (GDP) created by migrant workers was 32% for Beijing, 31% for Shanghai and 30% for Guangdong.

Women's Federation Research Group, 2013).

There is a growing body of literature focusing on migrant workers and various migration outcomes such as socioeconomic achievements, cultural integration, and health and health-care effects (Liang and Ma, 2004; Wen and Wang, 2009). However, this literature has concentrated mainly on adult migrants, largely ignoring a critical externality of the migration process, namely the children left in the original rural communities by one or both parents.

The left-behind children, and rural children in general, representing an important segment of the population directly influenced by this massive rural-to-urban migration in China, deserve serious research attention to understand fully the profound socioeconomic implications of this migration process. Although there is a burgeoning literature investigating the physical and mental outcomes of parental migration on children[3], to our knowledge, there has been no research effort to explore how such children develop key economic preferences such as altruism, egalitarianism and spitefulness, which fundamentally shape human socioeconomic interaction and outcomes. Our experiment represents the first such investigative endeavor. Building on the growing literature in experimental economics that investigates the influence of age on the developmental formation of economic preferences and decision-making (e.g. Brocas, Carrillo and Kodaverdian, 2017; Fehr, Bernhard and Rockenbach, 2008; Fehr, Glätzle-Rützler, and Sutter, 2013), we explore how two family background characteristics, parental migration status and rural/urban status, may influence a child's other-regarding preferences as well as the developmental trajectories of those preferences. Moreover, we collect data about the children's

[3] A nascent literature on left-behind children has examined the psychological well-being, and educational and health outcomes of being left-behind. Many studies have provided evidence that the environment for left-behind children has been relatively unfavorable (e.g., Asis, 2006) with left-behind children being disadvantaged along a number of dimensions, ranging from physical health outcomes, cognitive and academic achievements, self-esteem, loneliness, and school engagement (e.g. Ai and Hu, 2016; Biao, 2007; Chang et al., 2011; Fan et al., 2010; Hu and Li, 2009; Hu et al., 2014; Li and Wen, 2009; Li, et al., 2010; Luo, et al, 2008; Song and Zhang, 2009; Tao et al, 2013; Ye et al., 2006; Zhang et al., 2014; Zhao, Chen et al., 2014; Zhao, Yu et al., 2014). However, there are also other studies that reported no adverse effects on these children's psychological and/or physical well-being (e.g. Xu and Xie, 2015; Zhang et al., 2014; Zhou et al, 2015). For example, Zhou et al. (2015) represents the first multi-provincial sample study of Chinese migrants' children that examines multiple outcome variables including health, nutrition, and education. The authors reported that left-behind children scored equally and in a few areas slightly better than those living with both parents.

gender, cognitive intelligence, number of siblings, family wealth, ethnicity, locus of control, and school engagement, and control for them in our analysis.

Our lab-in-field experiment was carried out in two primary schools in Guizhou Province, located in southwestern China. We study samples from four populations: rural children left behind by both parents, rural children left behind by one parent, non-left-behind rural children, and urban children. We expected that the development of altruistic preferences would be positively associated with parental presence. However, we found this was not the case. In fact, among rural children the development of altruistic preferences from Grade 3 to 5 was most pronounced among those who were left-behind by both parents. Moreover, by Grade 5, it was these children whose preferences most resembled those of the urban children.

We contribute to this literature by providing the very first study on whether children's social-preference development is affected by the level of parental care as measured by parental migration status, and/or by rural/urban parental background. The rest of the paper is organized as follows. In section two we review the literature on social preferences in children and formulate our behavioral hypotheses. Section three describes the experimental design and the sample. In section four we present and discuss the results. Section five concludes.

2. Related Literature on Social Preferences in Children and Behavioral Hypotheses

In the field of developmental psychology, pro-social behavior research often focuses on instrumental or altruistic helping or providing emotional support for needy others. Such behaviors are either measured experimentally, or assessed through observations, parent reports or teacher reports (see a comprehensive survey of related work in this area by Eisenberg and Fabes, 1998). This literature generally concludes that pro-social behavior develops with age during childhood (e.g. Eisenberg et al., 2006; Malti et al., 2012; Warneken and Tomasello, 2006).

There is a growing literature in experimental economics that investigates the influence of age on the developmental formation of economic preferences and decision-making. Harbaugh and his colleagues are the earliest contributors to this area of research and have investigated children's economic decision-making in a wide array of domains such as rationality in revealed

preferences (Harbaugh et al, 2001), risk aversion (Harbaugh et al., 2002), altruism (Harbaugh and Krause, 2000), and trust and trustworthiness (Harbaugh et al., 2003).

We base our work both methodologically and thematically on Fehr et al. (2008; 2013), who examined other-regarding preferences among European children aged three to seventeen. In Fehr et al. (2008) with subjects aged from three to eight, the authors reported that selfishness dominates among three- and four-year-old children, while inequality-aversion develops strongly up to the age of eight years. For those aged between eight and seventeen (Fehr et al., 2013), a weak form of altruism emerges over the age range of 8-17 years, while spiteful and egalitarian motives diminish during this period. Following upon Fehr and colleagues' work, Brocas, Carrillo and Kodaverdian (2017) use a one-shot dictator game in comparison with a repeated version of the same dictator game in which the dictator and recipient alternate roles to investigate the evolution of altruism and strategic giving from childhood to adulthood. Dictators must choose between a simultaneously altruistic and egalitarian (4,4) split and a self-interested (6,1) split. The findings are that (4,4) splits in the one-shot game increase with age in children until Grade 9, and drop afterwards. They point out that this pattern on its own cannot explain the development of cooperation during the repeated game. Moreover, older subjects reciprocate more often and are better able to anticipate the potential gains of a cooperative strategy. Other papers have also documented how age influences social preferences (Houser et al., 2012; Martinsson et al., 2011), risk aversion (Eckel et al., 2012,), time discounting (Bettinger and Slonim, 2007; Angerer et al. 2015), trust and trustworthiness (Sutter and Kocher, 2007), fairness (Almas et al., 2010), and honesty (Bucciol and Piovesan, 2011; Glatzle-Rutzler and Lergetporer, 2015; Maggian and Villeval, 2016).

A key result from this literature pertinent to our study is that that people are not born with unchangeable preferences and traits. Rather, they develop social preferences during childhood and adolescence. Importantly, nurture and socialization both appear to play important roles in the development and formation of economic preferences. Thus, it is vital to examine whether and to what extent parental migration and the resultant absence of parents from their children's lives

may influence socialization and thus the formation and shaping of left-behind children's social preferences.

A primary goal of our paper is thus to explore whether there is any impact of parental rural-urban migration on the development of social preferences among rural children. *A priori*, there are several plausible reasons why parental migration could matter. First, children may differ in the kind of socialization they receive; they may be exposed to different values, and they may grow up in different family environments. Indeed, a problematic relationship and/or lack of a relationship with parents has long been identified in the developmental psychology literature as one key reason why children may develop differently from their counterparts who grow up with caring parents (Levy-Garboua, Meidinger, and Rapoport, 2006). Second, there may exist a "care-versus-resources" trade-off (Zhou et al., 2015). On the one hand, children living with both parents may, compared to left-behind children, receive more face-to-face care, which can produce a greater sense of security, confidence, and intellectual competence (e.g. Bowlby, 1982). On the other hand, children of non-migrants may have access to fewer financial resources than left-behind children. Better economic and material living conditions have been found to be correlated with higher prosocial preferences (Benenson, et al., 2007). Third, there may be a self-selection effect as parental characteristics of migrant families may be fundamentally different from non-migrant ones.[4]

Building upon the intellectual tradition in developmental psychology, pioneered by Piaget (1997), who theorizes that prosocial development is largely shaped by parents in early life, Heckman and his colleagues (e.g. Cunha, Heckman, Lochner, and Masterov, 2006; Heckman and Masterov, 2004), economists who focus on human development, conclude that more engaged parents have greater success in promoting the development of both cognitive and non-cognitive skills in their children. We thus hypothesize that 8-9 to 10-11-year-old left-behind

[4] For example, Hao et al. (2016) reported the first incentivized artefactual field experiment conducted in China to examine whether migrants differ from non-migrants in terms of preferences regarding risk, uncertainty and competition in various contexts. Their results show that, compared to non-migrants, migrants are significantly more likely to enter competitions and are more risk tolerant in a strategic environment.

children in rural China, relative to their counterparts who live with both parents, will exhibit weaker, less mature other-regarding preferences, resulting in more self-interested and less altruistic behavior. They will also move along the developmental trajectories documented by Fehr et al., (2013) of more altruistic and less egalitarian behavior and of Brocas et al. (2017) of less self-interested and more sharing behavior for Grade 3 (8 to 9 years old) to Grade 5 (10 to 11 years old) children more slowly than children with both parents at home.

H1: Compared to those who live with both parents, left-behind children (who live with either one or no parent) exhibit weaker, less mature other-regarding preferences, manifested by more self-interested and less altruistic behavior.

H2: Compared to those who live with both parents, left-behind children (who live with either one or no parent) develop more mature altruistic other-regarding preferences at a slower pace.

Given the wide socioeconomic gap between rural and urban China, a second goal of our paper is to investigate whether there are differences in the development of key social preferences in the urban versus the rural environment in modern China. There are several forces that may create a gap in other-regarding preferences of children brought up in rural versus urban areas. First is the apparent socioeconomic status gap. Focusing on the effect of parental SES (socioeconomic status), Bauer et al. (2014) report that children (aged 4-12) of parents with low education are more spiteful, more selfish and less altruistic and overall become less spiteful and more altruistic with increasing age. Second is the possibility that the preponderance of families with migrating parents not only affects the other-regarding preferences of their own children, but also impacts the entire rural community through its influence on local social norms. In addition, nurture and socialization may also differ between the city and the countryside for reasons apart from migration, reflecting the different requirements for and/or values congruent with success in each environment. This argument was put forward persuasively in the classic *From the Soil: The Foundations of Chinese Society* written in the mid-1940's by Fei Xiaotong (1992), a renowned sociologist in China. Similarly, in an influential anthropological study, Henrich et al. (2005)

show that altruism and preferences for fairness among adult populations are stronger in communities with a higher level of market integration and attribute this key result to a conjecture that in communities with greater returns to cooperation adults are more likely to socialize their children to display more altruistic behavior. Accordingly, our next two hypotheses focus on the differences between rural children and their urban counterparts.

H3: Compared to those who live in urban areas, rural children exhibit weaker, less mature other-regarding preferences, manifested by more self-interested and less altruistic behavior.

H4: Compared to those who live in urban areas, rural children develop more mature altruistic other-regarding preferences at a slower pace.

3. Experimental Design, Procedures and Measures

3.1 Subject pool and procedures

The rural area where the lab-in-field experiment was carried out is located in Kaitang county in Guizhou province in southwestern China. Guizhou is one of the least developed provinces in China, with its population possessing an average of 6.75 years of schooling (Carlsson et al., 2012) and producing a GDP per capita of 33,632 Chinese Yuan in 2017, equal to just 62% of the national average of 53,817 Yuan (Bureau of Statistics of Guizhou, 2017). The comparable urban sample was selected from a primary school of similar size in the city of Kaili from the same province. The urban and rural schools are about 30 kilometers apart. All sessions were run in class during regular school hours. We randomly selected ten classes in Grades 3 and 5. The Grade-3 students were all 8 to 9 years old, while the Grade-5 students were all 10 to 11 years old. Elementary schools in China must enroll students into grades strictly according to their birth age, and since 2006 both repeating a grade and accelerating or skipping a grade are forbidden by law. A total of 460 students participated in the experiment: 280 from six classes in the rural area (50% are Grade-3 students and 55% are boys) and 190 from four classes in the urban area (48% are Grade-3 students and 52% are boys).

The social preference experiment reported in this paper was one of several experiments

conducted during the same session using the same participants. Some of the other experiments are discussed elsewhere (Cadsby, Song and Yang, 2018).[5] At the beginning of a session, the experimenter described the session as a scientific project that would study decision making in children but did not reveal any details of the experiment. Students were informed that they would earn various kinds of "goodies" by playing some games. The "goodies" (e.g. candies, mechanical pencils, erasers, compasses, little toys etc.) were presented on a table at the front of the classroom and were shown throughout the session. We solicited each student's willingness to participate in the experiments. All students gave their consent.

The experiment was run as a paper-and-pencil experiment where participants had to indicate their decisions in a booklet, within which each decision was presented on a separate page. Each decision task was carefully explained one at a time and all participants had to answer one or two control questions to check their understanding before using the decision form at the bottom of the page to record their decisions for a given task. (See Appendix 1 for the complete set of experimental instructions and instruments for the allocation tasks used to elicit social preferences.) In order to eliminate potential confounds of learning, reputation-building or other strategic motives, all games in the experiment were one-shot games and those games with partners used re-matching protocols between games and partners that were anonymous to each other. Lastly, all games were incentivized with different types of "goodies" to minimize satiation or wealth effects.[6]

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[5] The other experiments included a die-under-cup task that focuses on honesty behavior, a prisoner's dilemma game, a risk-aversion elicitation and a trust game. This social preference experiment was positioned at the very beginning of the experimental session. Given that these experiments involved the same subjects, there is some overlap in our descriptions of the background and demographics for this study with Cadsby, Song and Yang (2018), which studies cheating behavior. However, the decision data analyzed and issues addressed in these two studies are entirely different.

[6] While it is the usual practice with adult subjects to pay for one randomly selected task when there are multiple tasks in an experiment, paying for each task is common in experiments with children as subjects because it is simpler for children to understand. A legitimate concern with paying for each task is that children may think about the total allocations resulting from the multiple choices instead of considering payoffs in each individual game separately. This is unlikely in our setup, because the children made choices sequentially, did not know how many choices were to come, and did not know what the allocations in subsequent tasks would be. Furthermore, the payoff medium in each task was different, ranging from Rainbow Candy (pro-social task) and Gummy Bears (envy task) to Oreo cookies (sharing task). See below for detailed descriptions of the tasks.

After participants completed all the decision tasks, they were given another booklet to complete to enable us to gather additional demographic data. The first part of the second booklet contained a section of the Raven Progressive Matrices (Raven et al., 2004) test, a widely used and reliable nonverbal test of cognitive intelligence that has been used for children frequently in the literature. Besides intelligence, we also collected demographic information about each participant including: 1) gender; 2) Grade level, 3 or 5 (ages 8-9 or 10-11 respectively); 3) ethnic background - Han ethnicity or not; 4) whether he/she was living with one or two parents at the time; 5) family wealth, proxied by the number of major electronic appliances such as TV set, fridge, etc., owned by the family; 6) number of siblings; 7) self-reported school engagement; and 8) locus-of-control. School engagement was measured by a three-question survey (Hu et al., 2014), producing a measure from 1 (highest engagement) to 4 (lowest engagement). Originally developed by Rotter (1966), the locus of control questionnaire measures the extent to which one believes that the outcomes of events in one's life are contingent on what one does (internal control orientation) or on forces outside one's personal control (external control orientation) with 1 representing the highest internal control orientation and 4 representing the highest external control orientation.

At the end of the session, a research assistant went over the earnings from each task with each participant and gave him/her the goodies he/she earned in the experiment according to the outcomes of the games. The whole session took about an hour to complete.

3.2 Key measures

We adopted the three simple allocation tasks developed by Fehr et al. (2008; 2013), which have been used successfully on children aged 3-17. Each participant was matched with one anonymous partner from the same age cohort and was asked to choose between two allocations that assigned a payoff between him/herself and the randomly-assigned partner. The pairs were re-matched for each of the three tasks. These three tasks were described as "Allocation Games" to the children. The first task, the prosocial game, offered a choice between (1, 1) and (1, 0), which was always 1 for the decision maker but 1 or 0 for the partner depending

on the decision-maker's choice. This game serves as a measure of the most basic form of prosociality, namely the willingness to choose an allocation that benefits the partner by equalizing his/her earnings with those of the decision maker of at no cost to the decision maker. A choice of (1,1) is consistent with three distinct motives: 1) an egalitarian preference that avoids inequality (Fehr and Schmidt, 1999); 2) an efficiency concern (Charness and Rabin, 2002); and 3) self-interest if the participant chooses randomly as there is no difference in payoff to the decision maker between the two choices.

The second task, the envy game, offered a choice between (1, 1) and (1, 2), which is always 1 for the decision maker but 1 or 2 for the partner depending on the decision-maker's choice. As in the first task, the decision maker can increase the partner's payoff at no cost to him/herself, but in this task such a choice results in disadvantageous inequality. Analyzing the choices in tasks 1 and 2 together, a choice of (1,1) in both games would indicate a person who is inequality-averse or egalitarian; a choice of (1,1) in task 1 and (1, 2) in task 2 would indicate an altruistic type.

The third task, the sharing game, offered a choice between (1, 1) and (2, 0). Thus, in this task a simultaneously altruistic and egalitarian choice of (1, 1) is costly for the decision maker. Such a choice indicates a situation where other-regarding preferences either for altruism or egalitarianism dominate self-interest because it requires a sacrifice by the decision maker to achieve the simultaneously altruistic and egalitarian allocation. In contrast, selecting (2,0) is a self-interested choice.

Fehr et al. (2008, 2013) classified their subjects into five categories, namely strong and weak altruistic, strong and weak egalitarian, and spiteful.[7] Due to limited data points in each of the four sub-group samples and for simplicity of exposition, we aggregate the strong and weak sub-profiles and thus our classification has three profiles, altruistic, egalitarian and spiteful.

[7] The strong or weak designation depends on whether the subject chooses (1, 1) or (2, 0) in the sharing task. In particular, a person making altruistic (egalitarian) choices in the pro-social and envy tasks is deemed strongly altruistic (egalitarian) if he or she chooses (1, 1) in the sharing task.

Table 1 summarizes both the structure of the three allocation games and the classification of the three types of other-regarding preferences according to a participant's pattern of choices across the three games.

Insert Table 1 about here

4. Results

4.1 Demographic differences across treatment groups and key behavioral data overview

All 470 children completed the study. Table 2 summarizes the sample sizes across age groups as well as for parental migration and urban/rural status, categorizing all participants into rural children left behind by both parents (n=132), those left behind by one parent with the other parent at home (n=98), those with both parents at home (N=50), and urban children (n=190). The urban/rural categorization is based on whether a child's residence and school were in the rural area or in the city. If we follow the most widely adopted definition of left-behind in the literature, defining a child's status as left-behind if at least one parent is not living with the child and is currently a migrant worker in the city, the majority (82%) of the children in our rural sample are left-behind. Among the left-behind children, more than half have neither parent at home, while for those who have one parent at home, about half lived with their mothers (n=47).

Insert Table 2 about here

The demographic differences are stark between the urban and rural children, as measured by *t*-tests of difference in unconditional means. Overall, urban children score significantly higher on the Raven IQ test, measured by the number of questions answered correctly out of 12 questions (8.54 vs. 5.98, $p<0.001$), have fewer siblings (1.02 vs. 1.99, $p<0.001$), are more likely to be of Han ethnicity (0.32 vs. 0.03, $p<0.001$), are wealthier (4.23 vs. 2.75, $p<0.001$), and exhibit higher internal locus-of-control (1.74 vs. 2.05, $p=0.02$) and higher school engagement (1.78 vs. 1.90, $p=0.03$).[8] This demographic snapshot is consistent with a recent large-scale non-

[8] For locus of control, 1 represents the maximum internal locus of control, while 4 represents the maximum external locus of control. For school engagement, 1 represents the highest level of school engagement, while 4 represents the lowest level.

experimental study (Zhou et al., 2015) in that, compared to their urban counterparts, rural children in general are disadvantaged in terms of SES status.

A parallel comparison between those left-behind by at least one parent and non-left-behind children in the rural area, however, reveals much smaller gaps. Specifically, left-behind children score higher on the Raven IQ test with marginal significance (6.14 vs. 5.25, p =0.07), but are from poorer families (2.65 vs. 3.20, p =0.002). There are no significant differences in the frequency of being of Han ethnicity or the number of siblings. In terms of psychological dimensions, left-behind children have significantly higher external locus of control (2.13 vs. 1.69, p =0.009). Within the left-behind category, our samples seem to have very similar demographic backgrounds as the only demographic difference between those with zero or one parent at home is that the former are less wealthy than the latter (2.50 vs. 2.85, p=0.01). Similarly, for those who live with only one parent at home, there are no significant differences in demographic background when we further separate this sub-sample into those who live with their mother or with their father.

Our behavioral data are summarized using six measures: the frequency of choosing the allocation indicated by the label for each of the three games, namely pro-social, envy and sharing, as well as the categorization of subjects into each of the three revealed other-regarding preference profiles adapted from Fehr et al. (2008, 2013) and defined in Table 1, namely altruistic, egalitarian and spiteful. Figures 1a-c depict the unconditional frequencies in the three allocation games across two age/grade groups (Grade 3 and 5) and four subpopulations (rural 0/1/2 parents-at-home and urban children), while Figures 2a-c depict the unconditional frequencies of the three revealed preference profiles across two age/grade groups and four subpopulations. Lastly Figure 3 illustrates the relative frequencies of the three revealed preference profiles across the two groups and four subpopulations. Not controlling for observed differences in the demographic backgrounds of the participants, these figures show some overall, broad-stroke trends. Across subpopulations, by and large, as children age, they become less prosocial, less envious, and more willing to share (the last case only applies to the urban group).

In terms of preference categorizations, more children become altruistic, shifting away from egalitarian. Table 3 reports separate χ^2-tests for each of the four sub-samples in the study in the two age/grade groups. These results indeed echo many results reported in other papers, most notably by Fehr et al. (2013) and Brocas et al. (2017). In particular, the proportion of children classified as altruistic rises significantly from Grade 3 to 5 for all four groups as in Fehr et al. (2013) while the proportion of children willing to sacrifice their own self-interested outcome in order to share rises significantly from Grade 3 to 5 as in Brocas et al. (2017), but only for the urban group.

It is also true that our Chinese sample are much more egalitarian across all three games than the same aged groups reported in Fehr et al. (2013). Since our study is not focused on cross-national comparisons but rather on intra-national comparisons, we do not have either a theoretical explanation or an empirical reconciliation for this sharp contrast. We conjecture that it could be due to the salient cultural differences on the continuum of collectivism versus individualism, which have been theorized and observed in other cross-cultural studies comparing Chinese and Western culture (e.g. Hofstede, 1984; Markus and Kitayama, 1991; Triandis, 1995). However, this is just a conjecture and more work is warranted to study further such differences in children's pro-sociality preferences across cultures.

Insert Table 3, Figures 1a-c, 2a-c and 3 about here

4.2 The effects of parental migration status and age in rural children

The effects discussed above are unconditional differences, which could be due to differences in the demographic backgrounds of the sub-samples. To examine the impact of parental migration status and/or urban/rural status and test our hypotheses taking account of these observable characteristics, we estimated an econometric model in which we controlled for the various demographic variables. We focus on the three other-regarding preference profiles for this analysis. We supplement them with a separate analysis of the sharing game because it is the only one of the three allocation games that pits self-interest against the altruistic or egalitarian

social preferences as in Brocas et al. (2017). Thus, we have four dependent variables: the probability of an altruistic preference profile, the probability of an egalitarian preference profile, the probability of a spiteful preference profile, and the probability of choosing to share in the sharing task.

Using a linear probability regression framework,[9] we first examined whether and to what extent parental migration status may influence rural children's other-regarding preferences and their developmental trajectories. We regressed the four dependent variables on the following independent variables: Grade3, a dummy variable equal to 1 for students in Grade 3 and 0 for students in Grade 5; Ph1or2, a dummy variable equal to 1 when at least one parent is at home and zero otherwise;[10] Ph2, a dummy variable equal to 1 when two parents are at home and zero otherwise; and interactions between Grade3 and Ph1or2 and between Grade3 and Ph2. Notice that this choice of coding makes Grade 5 children who are left behind by both parents the benchmark group. The coefficient on Ph1or2 indicates whether having one parent at home is associated with making different allocation choices than having none at home for Grade-5 children. The coefficient on Ph2 indicates whether having both parents at home is associated with making different choices than having just one parent at home for Grade-5 children. [11] Raven score and its interactions with Grade3 and/or Ph1or2 and Ph2, as well as other demographic and psychological variables outlined earlier as controls are also included in the regressions.[12] Raven is centered at its grand mean over the entire rural and urban sample. Thus, the coefficients and

[9] Logit regressions not reported here but available from the authors yield results consistent with those of the linear probability regressions and associated tests reported in Tables 4 and 5.

[10] For simplicity of exposition, we did not distinguish between whether the one parent at home was the mother or the father in the reported regressions. However, in regressions not reported here, we find no significant difference between the presence of a mother versus the presence of a father for any of the dependent variables.

[11] Although Ph1or2 equals 1 for both the cases of one parent at home and both parents at home, the presence of Ph2 means that the coefficient on Ph1or2 measures the effect of having one versus zero parents at home, while the Ph2 coefficient examines that difference between having two parents versus one parent at home. We chose this coding to highlight our finding that it is not the traditional definition of left behind by either one or both parents that is associated with different allocation choices, but rather solely being left behind by both parents and having no parents present at home that is critical.

[12] Specifically, these are a Han dummy equal to 1 for Han ethnicity, and zero otherwise; family wealth measured by the number of major electronic appliances such as TV sets, fridges, etc., owned by a family; number of siblings; and school engagement and locus of control, both measured from 1 to 4 as described in detail above.

statistical tests performed on grade level or migration status indicate marginal effects at the grand mean Raven score.

With this estimation framework, we first examined whether gender played any significant role by adding a dummy variable for gender to each model, interacting that gender dummy with all the other independent variables, and running a joint F-test of the null hypothesis that the main effect of gender and of all of its associated interactions were jointly zero. The *p*-values were never significant except for sharing (p=0.036). Thus, we conclude that except for sharing, there are no significant gender differences either as main effects or interacting with parental migration status in rural children. The details of the gender differences are not the focus of this study. To simplify our exposition, we therefore aggregate the data for rural boys and girls in the analysis that follows, and report separate sharing regressions for boys and girls in Appendix 2.

Table 4 reports the results based on the rural data only. We outline the key results here. First, at the younger age (Grade 3 or 8-9 years old), we observe no significant left-behind effect for any of the four behavioral measures. As indicated under the header Grade 3 Effects, all F-tests for the impacts of Ph1or2 or Ph2 on each dependent variable fail to reject the null hypothesis of no effect. However, by Grade 5 an unexpected left-behind effect emerges. This is indicated by the significant negative coefficients on Ph1or2 for the sharing (p=0.03) allocation and the altruistic preference profile (p=0.008) and the significant positive coefficients on Ph1or2 for the spiteful (p=0.07) profile. In all these cases, the coefficients on Ph2 are insignificant, implying that there are no significant differences between allocation choices of children who have one parent at home and those who have two parents at home. The implication is that, contrary to H1 and much of the existing literature, it is being left behind by both parents and not just one parent that is associated with the significantly different other-regarding preferences that emerge in Grade 5. Moreover, those children who are left behind by both parents exhibit significantly stronger and more mature other-regarding preferences as they are more sharing and less spiteful by Grade 5 than those with at least one parent at home. This surprising result is in

diametric opposition to the predictions of H1 that being left-behind would lead to weaker and less mature preferences.

Second, regarding preference development, we find no support for H2. Examining the interaction effects between grade level and parental migration status, there is a significant difference in the development of more mature preferences only for the spiteful profile and that is marginal and in the opposite direction than predicted with the incidence of more spiteful preferences increasing more from Grade 3 to Grade 5 among those children with at least one parent at home compared to those left behind by both parents (p=0.06).

Furthermore, despite the lack of significant differences in the development of more mature altruistic preferences by parental migration status, it is interesting to note that those who are left behind by both parents appear to develop more mature altruistic preferences from Grade 3 to Grade 5. In particular, significantly more are classified as altruistic (p=0.03) in Grade 5 than in Grade3. In contrast, there is no such development apparent between Grade-3 and Grade-5 for rural children who have at least one parent at home. Again this surprising result runs counter to the predictions of H2.

Finally, the frequency of the egalitarian profile falls significantly for children left behind by both parents (p=0.03) and for those with no parents at home (p=0.04), but not for children with just one parent at home. Again, this is contrary to the predictions of H2.

Insert Table 4 about here

Taken together, these results suggest that children who are left behind by both parents develop more altruistic and less egalitarian other-regarding preferences in their formative years from aged 8-9 to 10-11, consistent with the results for Austrian children of the same age in Fehr et al. (2013). In contrast, for those who have at least one parent at home, such a developmental trajectory is not significant for altruism. As a result, by Grade 5, we observe significantly more altruistic other-regarding behavior from those left-behind children with no parents at home than for the other two rural sub-samples. Moreover, while in Grade 3, there are no significant

differences in sharing behavior based on parental migration status, by Grade 5 children left behind by both parents exhibit more sharing and less self-interested behavior than children with at least one parent at home.

4.3 The effects of parental migration, rural/urban status and age

We continued our investigation by examining whether and to what extent rural versus urban residence influences children's other-regarding preferences using the dummy-coding estimation framework. Specifically, Rural Ph0(1)[2], is defined as a dummy variable equal to 1 for rural children when there are 0 (1) [2] parents at home and zero otherwise. This choice of coding makes urban Grade 5 children the benchmark group. The coefficient on Rural Ph0 (1) [2] indicates whether rural Grade 5 children left behind by both parents (by one parent) [with both parents at home] make different allocation choices than their urban counterparts.

As in the previous section we first tested for gender differences by using a gender dummy and interacting it with all other independent variables. Again, there are no gender differences on the impact of any independent variables on any of the allocation tasks or preference profiles except for sharing (p=0.017). We hence aggregate the data in the analysis that follows, and report separate sharing regressions for boys and girls in Appendix 2.

Table 5 reports the results based on both the urban and rural data. For the Grade-3 children, there are significant behavioral differences between rural left-behind children and their urban counterparts. Specifically, rural children left behind by one or both parents exhibited less altruism (p=0.02 and 0.05 respectively) and more egalitarianism (p=0.02 and 0.05 respectively) than their urban counterparts. A glance at Figure 1b confirms that 91% of Grade-3 rural children with no parents at home and 90% of Grade-3 rural children with one parent at home chose the envious allocation of (1, 1) consistent with egalitarian preferences rather than the more generous and social-welfare maximizing allocation of (1, 2) consistent with altruistic preferences. The comparable frequency for Grade-3 urban children was 76%. For Grade-3 rural children with both parents at home, the corresponding figure was 85%, which was not significantly different from either the urban or other rural numbers. Compared to urban children, a significantly higher

proportion of Grade-3 rural children with both parents at home also chose the sharing versus the self-interested allocation. This represents partial support for H3 in that the more mature altruistic preference profile is more prevalent among urban than among left-behind rural children. However, in contrast to H3, such left-behind children did not differ significantly from urban children in the prevalence of a self-interested versus a sharing choice, while rural children with both parents at home chose to share more frequently than urban children.

For the Grade-5 children, the behavioral differences in altruism between rural children with one parent at home and urban children persist (p=0.01). For all three subgroups of Grade-5 rural children, a lower proportion chose sharing over self-interest than for Grade-5 urban children (p=0.10, 0.002 and 0.05 for Rural Ph0, Rural Ph1and Rural Ph2 respectively). These Grade-5 results lend support to H3 in that rural children with one parent at home exhibited a greater prevalence of weaker, less mature other-regarding preferences, manifested by more self-interested and less altruistic behavior than their urban counterparts. For other rural children, H3 was supported only with regards to the lower incidence of sharing versus self-interested choices when compared to urban children.

Concerning the developmental trajectory, over the span of two years, urban children grow significantly more altruistic (p=0.10) and less egalitarian (p=0.10), mirroring the results reported in Fehr et al. (2013) and significantly more sharing (p<0.001) as in the one-shot non-strategic dictator task in Brocas et al. (2017). Among rural children, such a trend toward altruism is only present for those who have been left behind by both parents as reported in the lower panel of Table 5, while for the other rural children who live with at least one parent we observe no such statistically significant development. In contrast, the prevalence of egalitarianism falls significantly for all three rural subgroups (p=0.006, 0.08 and 0.01 for Rural Ph0, Rural Ph1and Rural Ph2 respectively). Finally, there is no significant developmental change in the prevalence of sharing for any of the rural subgroups, and the resulting contrast between the increase in sharing behavior among the urban children and the lack of such an effect among the three rural

groups is significant for all three groups (p=0.04, 0.02 and 0.008 for Grade3·RPh0, Grade3·RPh1, and Grade3·RPh2 respectively).

Taken together, these results provide strong support for H4 in that urban children develop more mature altruistic other-regarding preferences at a faster pace than most rural children with the surprising exception of those rural children who are left behind by both parents. The development of sharing behavior among urban children is significantly greater than among any of the rural subgroups.

Insert Table 5 about here

In this paper, we report a large number of statistical tests and obtain some surprising results. It is important to consider whether those results could be instances of type-1 error. Multiple comparisons do not change the probability of type-1 error for an individual hypothesis test. Rather, they increase the probability of obtaining at least one false positive among the collection of hypotheses run. This is the "overall risk of error" which is "sometimes referred to as the familywise error rate" (Gelman et al., 2012). A null hypothesis rejected at the 5% level implies there is a 5% chance of type-1 error, and if there are multiple tests, we know that the probability of obtaining **at least one** such error will increase with the number of statistical tests. This applies to the entire collection of tests run, not to any one specific test for which the probability of type-1 error is still 5%. We have a total of 118 in tests tables 3, 4, and 5 of the paper. Among these, 22 (38) yield p-values less than or equal to 0.01 (0.05). That represents 22/118 = 0.18 (38/118 = 0.32) of the sample. This is substantially more than the 1% (5%) of the sample that we would expect to produce such a p-value by random chance. Thus, while we cannot rule out instances of type-1 error, we believe the majority of our results accurately reflect the preferences of our population despite the number of statistical tests performed.

5. Conclusions

Individual social preferences, a key component of "non-cognitive skills", are largely shaped by one's life experience (Cunha and Heckman, 2007; Carneiro and Heckman, 2003;

Heckman and Kautz, 2012) and have profound influence on both individual and societal success (Ostrom and Walker, 2003). In the context of China, which has experienced in recent decades the largest rural-to-urban migration in human history, identifying the effects of rural versus urban background and parental migration status on the formation of preferences during childhood is pivotal to understanding the persistent inequality between urban and rural populations and has important implications for timely policy interventions targeting children from disadvantaged environments. Building on the emergent literature that focuses on the formation of social preferences in childhood and adolescence, we investigate the impact of two characteristics of family background, parental migration and rural/urban status, on both the level and the developmental trajectory of social preferences in middle childhood (aged 8-9 and 10-11), a crucial phase in one's life time.

While the majority of the literature on internal migration in China (e.g., Liu, Li, and Ge, 2009) defines a migrant family as having at least one parent who has migrated to an urban area, several studies have found that while having one parent at home makes little difference compared to having two parents at home, significant differences do occur when both parents have migrated to the city (e.g., Zhang et al. 2014; Zhou, Murphy, Zhou, and Tao, 2014). We therefore consider four subject groups in our current study: rural children left behind by both parents; rural children left behind by one parent; rural children with both parents at home; and urban children.

Employing three allocation games to measure pro-sociality, envy and sharing, we utilize the behavioral categories of egalitarian, altruism and spite developed by Fehr et al. (2008; 2013). Our results suggest that rural children left behind by both parents seem to move more quickly along the development path documented by Fehr et al. (2013) from egalitarianism to altruism. However, contrary to our hypothesized expectations, children with at least one parent living at home do not exhibit such a development in other-regarding preferences. Therefore, while there are no significant differences between rural subgroups in Grade 3, by Grade 5 rural children left behind by both parents exhibit a significantly greater prevalence of altruistic preferences.

Moreover, they also exhibit less self-interested sharing behavior than the other two rural sub-samples.

These results are also broadly consistent with some of the previous literature that focused on other measures of achievement or well-being. For example, Zhou et al. (2015) examined indicators of health, nutrition, and education, and found that children left behind by one or both parents performed as well or better than those with both parents at home. Similarly, Xu and Xie (2015) found that children left-behind by one or both parents were neither better nor worse off "in nearly every aspect of their lives." (p. 510). Moreover, Chen et al. (2009), Bi and Oyserman (2015) found that children left behind by one or both parents did as well academically as those with both parents at home. It is worth noting that none of these studies examined children left behind by both parents separately from children left behind by one parent so they were unable to identify any differences such as those we found between these two groups of children.

Regarding the impact of rural versus urban status, we also find important differences. In Grade 3, rural children left behind by one or both parents are more envious and hence less altruistic than their urban peers. By Grade 5, the rural children left behind by both parents exhibit much less envy and hence more altruism, catching up to their urban counterparts. However, for rural children with at least one parent at home, this is not the case. This is puzzling, suggesting that the observed urban-rural differences in the development of other-regarding preferences are not due to lack of parental care. Indeed, the children left behind by both parents are the rural children who most resemble their urban counterparts in their allocation decisions.

A full explanation of this unexpected finding is beyond the scope of this study. It is possible that rural children left behind by both parents mature more quickly when they are given more responsibility to take care of themselves. It is also possible that the correlation between being left behind by both parents and more rapid development of altruistic preferences may arise from selection issues. As mentioned in footnote 4 above, Hao et al. (2016) find differences in preferences between adult migrants and non-migrants in some contexts. Moreover, perhaps both parents choose to migrate more often when their children are apparently on a more stable

development path, comparable to the urban children. In any case, it does not appear that being left behind by both parents has a deleterious or retarding effect on the development of other-regarding economic preferences.

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Table 1 Definition of other-regarding preference types

Other-regarding Type	Task 1: Pro-social (1,1) or (1,0)	Tasks 1-3 Task 2: Envy (1,1) or (1,2)	Task 3: Sharing (1,1) or (2,0)
Egalitarian	(1,1)	(1,1)	(1,1) or (2,0)
Altruistic	(1,1)	(1,2)	(1,1) or (2,0)
Spiteful	(1,0)	(1,1)	(2,0)

Table 2 Sample sizes across grades and family background characteristics

	Rural 0 Parents at Home	Rural 1 Parent at Home	Rural 2 Parents at Home	Urban	**Total**
Grade 3	69	42	28	91	**230**
Grade 5	63	56	22	99	**240**
Total	**132**	**98**	**50**	**190**	**470**

Table 3 χ2-tests for behavioral differences in Grade 3 (8-9 years old) versus Grade 5 (10-11 years old)

	Pro-social	Envy	Sharing	Egalitarian	Altruistic	Spiteful
Rural 0 Parents at Home	p=0.001	p<0.001	p=0.469	p<0.001	p<0.001	p=0.009
Rural 1 Parent at Home	p<0.001	p=0.344	p=0.216	p=0.644	p=0.001	p=0.004
Rural 2 Parents at Home	p=0.008	p=0.282	p=0.361	p=0.477	p=0.018	p=0.110
Urban	*N/A*	p<0.001	p=0.009	p=0.035	p=0.035	*N/A*

Table 4 The impact of grade and parental migration status on social preferences: Rural data

	Sharing	Altruistic	Egalitarian	Spiteful
Grade3	0.02	-0.22**	0.35**	-0.10
	(0.11)	(0.07)	(0.11)	(0.09)
Ph1or2	-0.15**	-0.21***	0.09	0.07*
	(0.05)	(0.05)	(0.10)	(0.03)
Ph2	0.07	0.14	-0.15	-0.06
	(0.07)	(0.10)	(0.13)	(0.06)
Grade3·Ph1or2	0.14	0.19	-0.07	-0.07*
	(0.13)	(0.13)	(0.15)	(0.03)
Grade3·Ph2	0.05	-0.08	0.10	0.06
	(0.14)	(0.11)	(0.14)	(0.06)
Raven and its interactions	Yes	Yes	Yes	Yes
Other Demographics	Yes	Yes	Yes	Yes
Constant	0.92***	0.24*	0.67***	0.07
	(0.18)	(0.10)	(0.10)	(0.08)
Grade 3 Effects				
Ph1or2 in Grade 3	F=0.01	F=0.03	F=0.03	F=0.60
(H_0: Ph1or2+ Grade3·Ph1or2=0)	n.s.	n.s.	n.s.	n.s.
Ph2 in Grade 3 (H_0:	F=1.24	F=0.51	F=0.48	F=1.03
Ph2+Grade3·Ph2=0)	n.s.	n.s.	n.s.	n.s.
Difference between Grade 3 and Grade 5 for Ph1 and Ph2				
For Ph1	F=1.09	F=0.13	F=3.35	F=2.63
(H_0: Grade3+ Grade3·Ph1or2=0)	n.s.	n.s.	n.s.	n.s.
For Ph2	F=2.41	F=0.47	F=7.73	F=1.43
(H_0: Grade3+ Grade3·Ph1or2+	n.s.	n.s.	p=0.04	n.s.
Grade3·Ph2=0)				

Notes: All coefficients are estimated with linear probability models for binary variables with robust standard errors, reported in parentheses, adjusted for clusters (urban and rural classes) to control for unobserved class effects. ***, ** and * denote significance at 1%, 5% and 10% respectively. n.s. denotes non-significance.

Table 5 The impact of grade, parental migration and urban/rural status on social preferences: All data (n=470)

	Sharing	Altruistic	Egalitarian	Spiteful
Grade3	-0.26***	-0.16*	0.16*	0.000
	(0.05)	(0.09)	(0.09)	(0.004)
Rural Ph0	-0.20*	-0.06	-0.08	0.08
	(0.11)	(0.10)	(0.12)	(0.08)
Rural Ph1	-0.35***	-0.27**	0.01	0.15
	(0.10)	(0.08)	(0.16)	(0.09)
Rural Ph2	-0.29**	-0.14	-0.13	0.09
	(0.13)	(0.15)	(0.12)	(0.07)
Grade3·RPh0	0.29**	-0.08	0.22*	-0.10
	(0.12)	(0.11)	(0.14)	(0.09)
Grade3·RPh1	0.42***	0.11	0.14	-0.17
	(0.15)	(0.10)	(0.17)	(0.010)
Grade3·RPh2	0.47**	0.06	0.21	-0.10
	(0.14)	(0.17)	(0.16)	(0.08)
Raven and its interactions	Yes	Yes	Yes	Yes
Other Demographics	Yes	Yes	Yes	Yes
Constant	1.07***	0.31**	0.72***	-0.004
	(0.16)	(0.13)	(0.12)	(0.03)
Grade 3 Effects				
RPh0 in Grade 3 (H_0: RPh0+Grade3·RPh0=0)	F=1.84	F=6.87	F=7.33	F=1.39
	n.s.	p=0.02	p=0.02	n.s.
RPh1in Grade 3 (H_0: RPh1+Grade3·RPh1=0)	F=0.25	F=5.39	F=5.36	F=1.86
	n.s.	p=0.05	p=0.05	n.s.
RPh2 in Grade 3 (H_0: RPh2+Grade3·RPh2=0)	F=7.67	F=1.29	F=1.29	F=1.30
	p=0.02	n.s.	n.s.	n.s.
Difference between Grade 3 and Grade 5 for RPh0, RPh1 and RPh2				
For RPh0 (H_0: Grade3+Grade3·RPh0=0)	F=0.08	F=12.23	F=12.75	F=1.25
	n.s.	p<0.01	p<0.01	n.s.
For RPh1 (H_0: Grade3+Grade3·RPh1=0)	F=1.17	F=0.57	F=3.92	F=2.81
	n.s.	n.s.	p=0.08	n.s.
For RPh2 (H_0: Grade3+Grade3·RPh2=0)	F=2.61	F=0.50	F=9.19	F=1.67
	n.s.	n.s.	p=0.01	n.s.

Notes: All coefficients are estimated with linear probability models for binary variables with robust standard errors, reported in parentheses, adjusted for clusters (urban and rural classes) to control for unobserved class effects. ***, ** and * denote significance at 1%, 5% and 10% respectively. n.s. denotes non-significance.

Figure 1a-c: Frequencies of choices in the three allocation games across grades and treatments

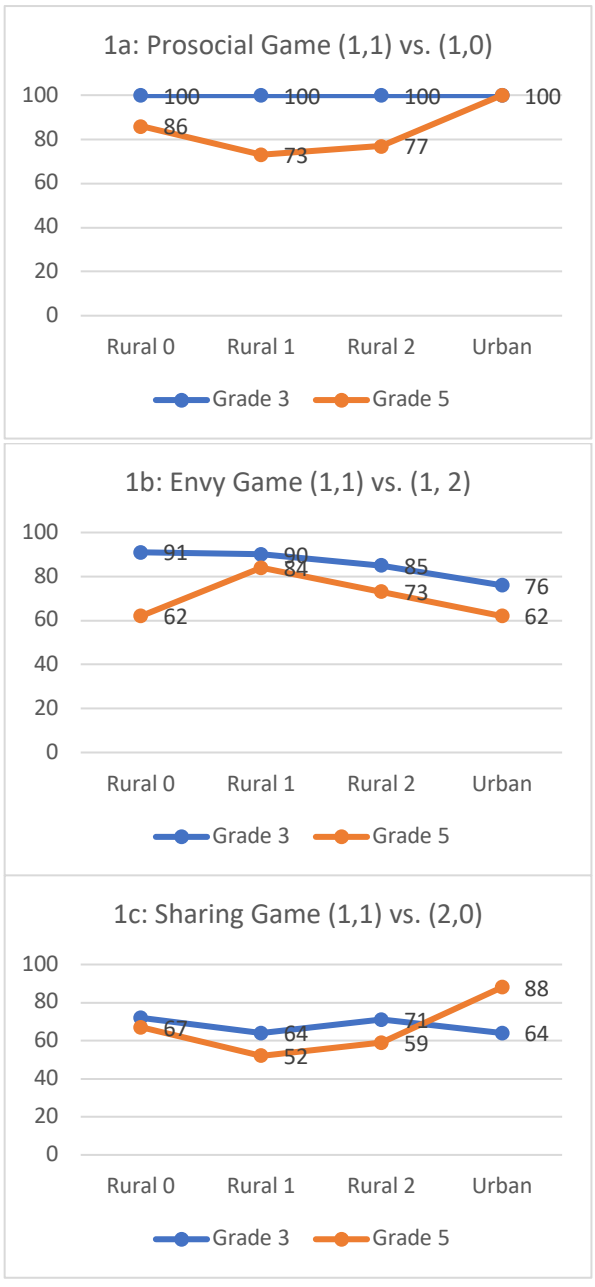


Figure 2a-c: Frequencies of behavioral types across grades and treatments

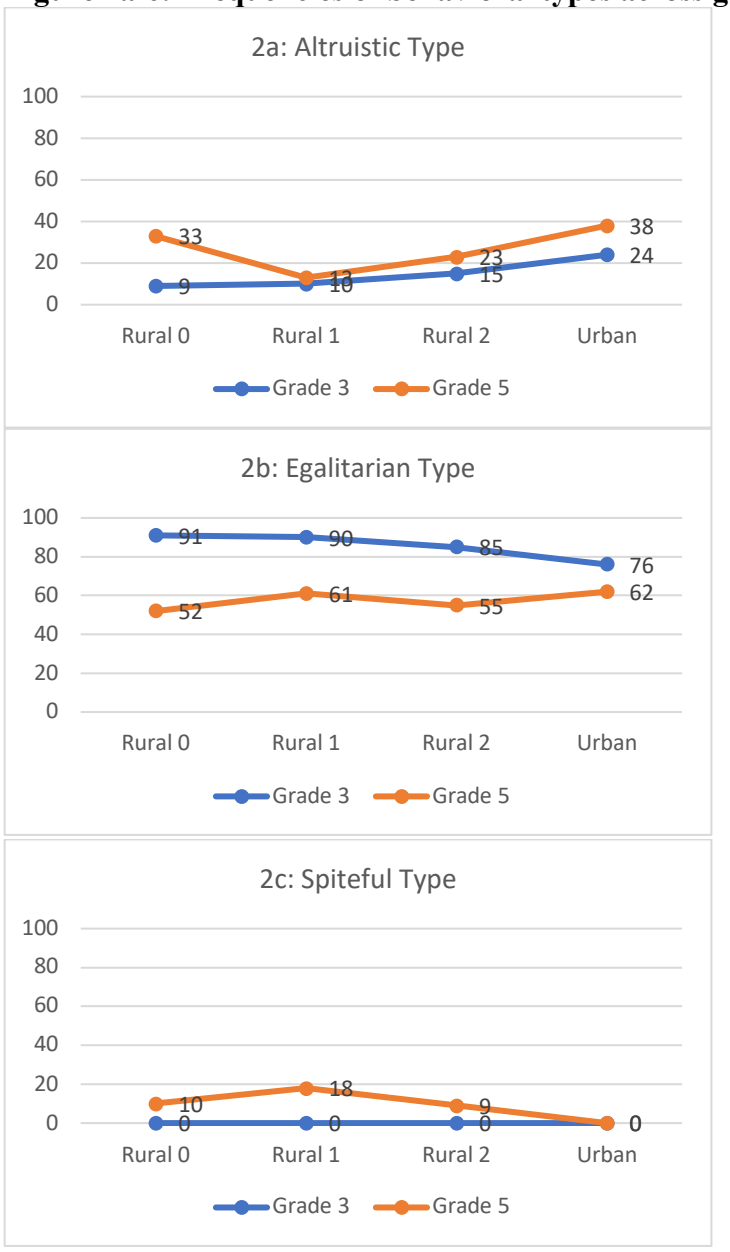
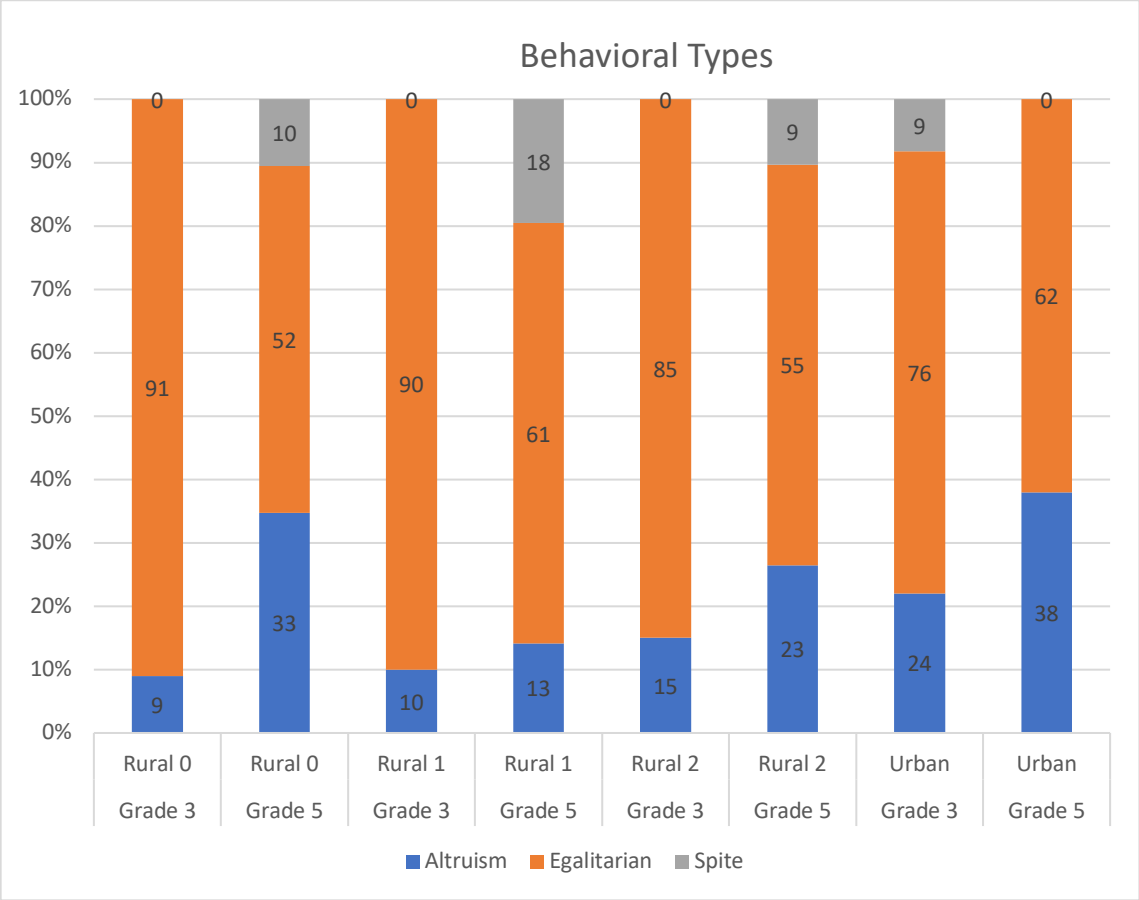


Figure 3: Relative frequencies of behavioral types across grades and treatments



Appendix 1 Experimental Instructions and Post-Experiment Questionnaire

INSTRUCTIONS AND SCRIPT

Hello everybody! My name is ___, this is ___(RA). Thanks for letting us come to your class today. It's really nice to be here. Today we're going to play a few games with each one of you. We have brought some small items that you can earn by playing the games. These items are displayed here on the teacher's desk for you to see. There are chocolate bars, candies, other types of snacks, stickers, mechanical pencils, color pencils, erasers and some small toys. If you listen carefully and learn how to play the game, you may earn these items and they will be yours to take home.

It is very important that you listen very carefully and pay attention to the rules of the games. After you understand how each game works, you can then go ahead and play it and earn the items. Each of you will have your own space in which to play. The 3-sided cardboard will create the space for you. You can think and play the games carefully in your own space.

In many of these games, you will be paired with another student in this class. However, you won't know exactly whom you are paired with when you play the games. All you know is that one student in this class is paired with you in a game. You won't be paired with the same student in all the games. Instead, in each game you will be paired with a different student. When you play the games, please note that your decisions will influence how many items you will earn as well as how many items the student you are playing with will receive as well.

We will give each of you a booklet. On each page of the booklet, there is a game to play. Please follow our instructions, and turn the page only when you are asked to. Now please turn to page 1.

Rainbow Candy Allocation Game

On this page, there are two choices. Please read them carefully and pick the one you like better. Remember that at the end of the game you will receive the exact number of items according to your choice. Similarly, a student from your class will get the exact number of items according to your choice. Here are the two choices.

Choice 1:
You will get 1. Someone from your class will get 1.
Choice 2:
You will get 1. Someone from your class will get 0.
Comprehension Check:
If you choose "Choice 1", how much will you get? ____ How much will your classmate get?_____
If you choose "Choice 2", how much will you get? ____ How much will your classmate get?_____

Decision Box:

I will choose (please just circle one):	Choice 1	Choice 2

Please raise your hand quietly to let us know you have finished playing this game. When everyone is done, we will ask you to turn to the next page.

Gummy Bear Allocation Game
On this page, there are two choices. Please read them carefully and pick the one you like better. Remember that at the end of the game you will receive the exact number of items according to your choice. Similarly, a student from your class will get the exact number of items according to your choice. Here are the two choices.

Choice 1:
You will get 1. Someone from your class will get 1.
Choice 2:
You will get 1. Someone from your class will get 2.

Comprehension Check:
If you choose "Choice 1", how much will you get? ____ How much will your classmate get?_____
If you choose "Choice 2", how much will you get? ____ How much will your classmate get?_____

Decision Box:

I will choose (please just circle one): Choice 1 Choice 2

Please raise your hand quietly to let us know you have finished playing this game. When everyone is done, we will ask you to turn to the next page.

Oreo Cookie Allocation Game
On this page, there are two choices. Please read them carefully and pick the one you like better. Remember that at the end of the game you will receive the exact number of items according to your choice. Similarly, a student from your class will get the exact number of items according to your choice. Here are the two choices.

Choice 1:
You will get 1. Someone from your class will get 1.
Choice 2:
You will get 2. Someone from your class will get 0.

Comprehension Check:
If you choose "Choice 1", how much will you get? ____ How much will your classmate get?_____
If you choose "Choice 2", how much will you get? ____ How much will your classmate get?_____

Decision Box:

I will choose (please just circle one): Choice 1 Choice 2

Please raise your hand quietly to let us know you have finished playing this game. When everyone is done, we will ask you to turn to the next page.

Post-Experiment Questionnaire

Now that we have finished all the games, we would like you to answer a few questions. Please raise your hand if you need any help to answer these questions.

1. Name:
2. Gender (Please circle one): Male Female
3. Age: _____
4. What grade are you in? _____
5. What is your ethnicity (Please circle one): Han Other (please specify)_____
6. Who lives with you in your home (please circle):

Mother, Father, Brothers and Sisters, Maternal Grandma, Maternal Grandpa, Paternal Grandma, Paternal Grandpa, Others (please describe)_____.

7. Do you have brothers and sisters? (please write a number in each space):

___ older brother, _____older sister, ____younger brother, ___younger sister

8. If your mom is not living with you currently, when did you last see her and how often does she come back to see you? _____
9. If your dad is not living with you currently, when did you last see him and how often does he come back to see you? _____
10. Are there these items in your home? (please circle the items in your home):

TV, Computer, Cell Phone, Car, Motor Bike, Fridge, Microwave.

11. Raven's Progressive Matrices (Raven 1948), a widely used nonverbal test of intelligence.
12. Other potential measures using 1(strongly disagree) to 4 (strongly agree) scale.

School engagement

1. I follow school and classroom rules.
2. I enjoy doing homework.
3. I go to school every day.

Locus-of-control

1. My future is to a large extent in my own hands.
2. My future is in my own creation.

Appendix 2

Table A1 The impact of age and parental migration status on Sharing: Rural data

Model 1: With no cognitive intelligence or other demographic controls			Model 2: With cognitive intelligence or other demographic controls	
	Boy	Girl	Boy	Girl
Grade3	0.009	0.11	-0.03	0.09
	(0.14)	(0.14)	(0.12)	(0.12)
Ph1or2	-0.27**	0.02	-0.29***	0.07
	(0.07)	(0.14)	(0.02)	(0.09)
Ph2	0.22	-0.15*	0.23***	-0.23**
	(0.13)	(0.06)	(0.06)	(0.07)
Grade3·Ph1or2	0.22*	0.14	0.33	-0.13
	(0.10)	(0.18)	(0.21)	(0.17)
Grade-3·Ph2	-0.34*	0.53**	-0.20	0.56**
	(0.15)	(0.19)	(0.19)	(0.16)
Raven			-0.03	0.06*
			(0.03)	(0.03)
Raven·Grade3			0.04	-0.05
			(0.03)	(0.04)
Raven·Ph1or2			0.05	-0.09*
			(0.03)	(0.05)
Raven·Ph2			0.06**	0.01**
			(0.02)	(0.01)
Raven·Grade3·Ph1or2			-0.04	0.09
			(0.08)	(0.07)
Raven·Grade3·Ph2			0.008	-0.03
			(0.05)	(0.03)
Other Demographics			Yes	Yes
Constant	0.69***	0.63***	0.75**	1.01***
	(0.13)	(0.12)	(0.26)	(0.17)
		Grade 3 Effects		
Ph1or2 in Grade 3	F=0.46	F=0.90	F=0.05	F=0.24
(H_0: Ph1or2+	n.s.	n.s.	n.s.	n.s.
Grade3·Ph1or2=0)				
Ph2 in Grade 3 (H_0:	F=3.14	F=4.43	F=0.03	F=4.76
Ph2+Grade3·Ph2=0)	n.s.	p=0.09	n.s.	p=0.08

Notes: All coefficients are estimated with linear probability models for binary variables with robust standard errors, reported in parentheses, adjusted for six clusters (rural classes) to control for unobserved class effects. ***, ** and * denote significance at 1%, 5% and 10% respectively.

Table A2 The impact of age and parental migration status on Sharing: All data

Model 3: With no cognitive intelligence or other demographic controls			Model 4: With cognitive intelligence and other demographic controls	
	Boy	Girl	Boy	Girl
Grade3	-0.32***	-0.18***	-0.29***	-0.24***
	(0.08)	(0.03)	(0.06)	(0.07)
Rural Ph0	-0.16	-0.27**	-0.14	-0.31*
	(0.14)	(0.12)	(0.16)	(0.14)
Rural Ph1	-0.43***	-0.25***	-0.42**	-0.22**
	(0.09)	(0.07)	(0.16)	(0.08)
Rural Ph2	-0.21	-0.40***	-0.21	-0.46***
	(0.17)	(0.10)	(0.15)	(0.12)
Grade3·RPh0	0.33*	-0.29*	0.27**	0.36**
	(0.16)	(0.13)	(0.12)	(0.15)
Grade3·RPh1	0.55***	0.15	0.59**	0.18***
	(0.13)	(0.18)	(0.21)	(0.18)
Grade3·RPh2	0.21	0.67***	0.38***	0.77***
	(0.19)	(0.10)	(0.12)	(0.10)
Raven			-0.03***	-0.01
			(0.005)	(0.03)
Raven·Grad3			0.008	0.04
			(0.02)	(0.05)
Raven·RPh0			-0.007	0.08
			(0.02)	(0.04)
Raven·RPh1			0.04	-0.02
			(0.03)	(0.03)
Raven·RPh2			0.10***	-0.007
			(0.01)	(0.03)
Raven·Grade3·RPh0			0.03	-0.09
			(0.03)	(0.05)
Raven·Grade3·RPh1			-0.001	-0.003
			(0.06)	(0.05)
Raven·Grade3·RPh2			0.007	-0.02
			(0.03)	(0.05)
Other Demographics			Yes	Yes
Constant	0.86***	0.90***	0.87***	1.20***
	(0.05)	(0.01)	(0.20)	(0.20)
		Grade 3 Effects		
RPh0 in Grade 3 (H_0: RPh0+Grade3·RPh0=0)	F=4.03 *p*=0.08	F=0.05 n.s.	F=1.37 n.s.	F=0.48 n.s.
RPh1in Grade 3 (H_0: RPh1+Grade3·RPh1=0)	F=2.00 n.s.	F=0.32 n.s.	F=0.68 n.s.	F=0.08 n.s.
RPh2 in Grade 3 (H_0: RPh2+Grade3·RPh2=0)	F=0.00 n.s.	F=112.69 *p*<0.001	F=7.04 *p*=0.04	F=18.38 *p*=0.002

Notes: All coefficients are estimated with linear probability models for binary variables with robust standard errors, reported in parentheses, adjusted for 10 clusters (urban and rural classes) to control for unobserved class effects. ***, ** and * denote significance at 1%, 5% and 10% respectively.