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Differences in pupils' school commute characteristics and mode choice based on the household registration system in China

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ABSTRACT

Population mobility and rapid urbanization have caused migrant pupils to have commuting problems. Taking Jinjiang as an example, this research focused on the differences in school commute characteristics and mode choices between pupils from registered households and migrant households. Using two-stage (schools and students) sampling, we designed questionnaires based on pupils' school commuting patterns and collected the data for the two groups. In addition to descriptive statistics, the pupils' choices of weekday active commuting to school were analyzed with a binary logistic model. We found that most pupils commute. Furthermore, for their weekday school commutes, most migrant pupils walk (77.48%) or commute by motorcycle (17.57%), whereas most household registered pupils walk (34.51%) or commute by private car (29.53%) or motorcycle (24.67%). Trip distance has a more significant influence on the active school commuting of household registered pupils than on the active school commuting of migrant pupils. Age significantly affects the commuting of migrant pupils only.

1. Introduction

Recently, the migrant population has grown in China because of the development of urbanization. According to the 2012 "Report on Migrant Population Development in China" (Migrant Population Service Management Department of China's Family Planning Commission, 2012), by 12 a.m. on October 1, 2011, the total national migrant population reached 229 million. One inevitable problem of this substantial population mobility is that some members of the migrant population, such as low-income migrants who travel from rural areas to work in urban areas, do not receive the same treatment as those who are registered in their own urban household. This situation is caused by the Chinese household registration system. According to this system, the Chinese population is divided into an agricultural population and a non-agricultural population (The People's Republic of China, 1958). This system is a long-standing policy in China, preventing a large amount of the agricultural population from moving from an area with a low urbanization rate to an area with a high urbanization rate, particularly moving from the west of China, which has a low urbanization rate, to the east, which has a high urbanization rate. According to the Chinese household registration system, migrant people without urban household registration cannot be paid equally or have equal access to job opportunities as people who are local urban registered residents. Additionally, many migrant people without household registration cannot afford houses in the city or receive the public welfare that is available to urban registered residences, and their children are unable to attend schools that offer high-quality education. All these situations place those people in a state of half-urbanization (Huang et al., 2012). Therefore, two different groups of people exist and develop as time passes. The migrant group that moves into cities with their school-aged children is more likely to have school commuting problems.

Studies on students' commutes to school, especially students' active commuting to school, have been conducted in many countries. Students' active commuting to school is defined as students (5–18 years old) who walk or ride a bike as their commuting mode. Some studies state that students' active commuting to school can help reduce the risk of obesity (McDonald, 2007). Susilo and Waygood (2012) examined the mechanisms underlying children's activity and travel engagements and how these mechanisms have changed over time in the Osaka metropolitan area of Japan. Hinckson et al. (2011) described trends in active commuting to school among children from the Auckland region of New Zealand by following the implementation of the School Travel

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Plan (STP) program. Buliung et al. (2009) explained temporal and spatial trends in active transportation for school trips in the Greater Toronto Area, Canada's largest city-region. McDonald (2007) identified the causes of change in active transportation to school over the past 30 years in the U.S.

In addition to the trend of pupils' active commuting, several studies have also found the impact of personal characteristics, distance, built environment, parents and other influence factors on pupils' active commuting. Leslie et al. (2010) and McDonald (2012) studied the effect of gender on students' active commuting and found that boys biked to school more than girls. Hinckson et al. (2011) reported a high likelihood of older children engaging in active commuting. Distance is an important influential factor in pupils' active commuting to school. Analyzing the United States National Personal Transportation Survey data, McDonald (2007) showed that distance from home to school might account for a decline on the number of students who walk or bike to school. In the aspect of built environment, Mitra and Buliung (2012) found that block density, signalized intersections and walking density were associated with active travel. In addition, the impact of parents on students' active commuting mainly included parents' perception of traffic danger (Rothman et al., 2015), parental employment status and commute patterns (McDonald, 2008b). The latter is caused by the fact that many children who commute to school are accompanied by their parents.

Studies on students' active commuting from the perspective of household registration are rare because household registration systems are uncommon worldwide. Foreign research on different groups of people focuses mainly on analyzing of low-income and minority groups. McDonald (2008a) showed that low-income and minority groups, particularly blacks and Hispanics, use active travel modes to commute to school at much higher rates than whites or higher-income students. Moreover, few people pay attention to students' active commuting to school in China. Sun et al. (2015) examined the mode of transport to school in China in terms of the physical and mental well-being of national representative samples of children. In China, most scholars studying students' commuting focus mainly on analyzing the composition of students' travel mode; then, they put forward the corresponding traffic improvement measures (Han et al., 2011; He and Li, 2007). The survey of a primary school in Nanjing found that the pupils who commute to schools mainly take private cars, electric bicycles and bicycles, and measures to encourage public transportation and school bus service were proposed (Han et al., 2011). Several scholars have also begun to pay attention to the influence of parents' travel mode and employment status on students' mode of commuting (He et al., 2014; Ma et al., 2016).

Students' active commuting is affected by personal characteristics, the built environment, family and so on, but few studies have analyzed the differences in students' active travel in different groups from the perspective of household registration. Therefore, this paper aims to conduct research on this aspect. The overall framework is as follows: Sections 2 and 3 describe the study areas and investigation process of student commutes. Through the data obtained, Section 4 provides descriptive statistics on characteristics of students' commutes to school, which includes statistics of modes and distance regarding students' commutes to school; Section 5 establishes the logistic regression model of students' active commuting to school; Section 6 discusses and summarizes this research and prospects for the next stage of the study.

2. Geographical setting

Located in the southeast coast of Fujian Province, Jinjiang is one of the most developed cities in China. Its comprehensive competitiveness, it ranked fifth of the top 100 counties (cities) in 2012. Most enterprises in Jinjiang are labor-intensive enterprises that attract a large number of migrant workers to work in Jinjiang. According to the sixth national Chinese census data (Jinjiang Statistics Bureau, 2012), the permanent population in Jinjiang is 1.99 million, of which the migrant population with registration in other cities is 1.01 million. At the end of 2012, the number of pupils in Jinjiang reached 164,100, of which the number of local household registered pupils was 54,900 and the number of migrant pupils was almost twice as large (109,200). Most migrants in Jinjiang do not have urban household registration, and the differences in employment and income between migrant people and household registered people cause differences in their children's school commute characteristics. This paper uses Jinjiang as an example to provide a basis for school commutes between different groups of pupils during the urbanization process in China.

3. Data sources and investigation design

Because of the unknown amount of household registered and migrant pupils for all schools, a two-stage sampling survey was adopted; sampling was first conducted on schools and then on students. Moreover, because of the different distances between students' residences and schools, the school commute pattern may vary. Therefore, this study designed the questionnaire based on students' school commuting patterns.

3.1. Phased sampling design

Provision 12 of the "People's Republic of China Compulsory Education Law" stipulates that local governments at all levels should guarantee the education rights of school-age children and adolescents to attend nearby schools in household registered districts without entrance exams. In recent years, a student who enters a school outside of household registered districts must pay high-priced school selection fees, which attempt to deter students from attending these schools and thereby avoid overcrowding in schools that offer higher-quality education. Meanwhile, housing prices increase every year in the districts with high-quality schools. To some extent, high-quality schools are often surrounded with students from high-income families. Therefore, the research data includes commuting conditions for pupils throughout the city and also reflect that different groups of people have different access to education resources. School samples were collected from various districts, and student samples were collected from different schools.

The total urban area of Jinjiang is 721.7 km^2 and includes the following four districts: the main urban district; the west urban district; the Andong district; and the Jinnan district. According to their education quality, primary schools are classified into demonstration schools and regular schools, where demonstration schools offer higher education quality than regular schools. Because Jinjiang city is a balanced development, each district has demonstration schools and regular schools. The difference is that the demonstration schools are located in the central area of each district, and the density of the road network is higher. Because of the implementation of zone divisions and the policy of admission into the nearest school in Jinjiang, housing prices are high around demonstration schools, and many migrant children have no opportunity to attend these demonstration schools. According to the district distribution, one primary school was selected from each district. Then, two demonstration schools and two regular schools were sampled on the basis of different types of schools. The specific sampling method is shown in Fig. 1.

Given the strict management of Jinjiang primary schools, it is difficult to investigate all students at all schools after the school sampling, so the better choice is conduct a sampling survey in classes. Two classes (excluding experimental classes, key classes and other special classes) were randomly selected in each grade, and students were randomly selected from the sampled classes for investigation. Special classes were excluded because the proportion of students in these types of classes is less than 10% of a regular class (Fig. 2).

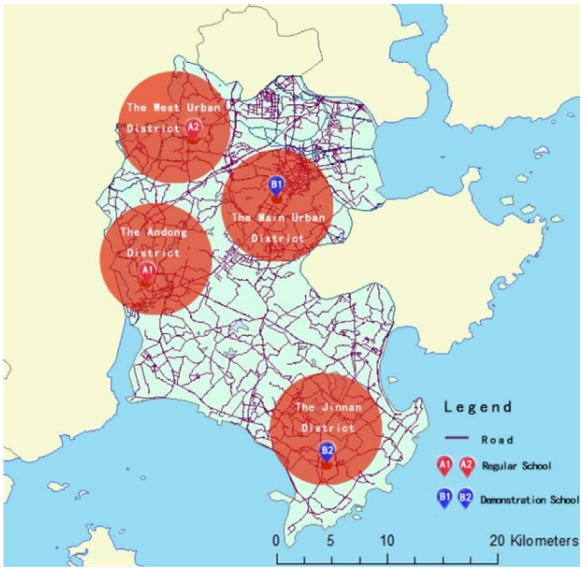


Fig. 1. Distribution Map of Four Schools in Jinjiang.

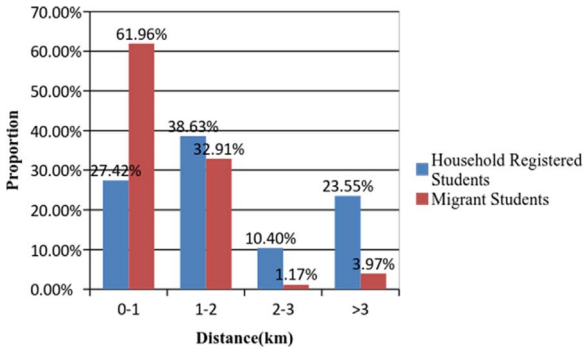


Fig. 2. Distribution of Pupils' Weekday School Commute Distance.

3.2. Questionnaire design based on school commuting patterns

3.2.1. School commuting patterns

Because the distances between students' residences and the school vary, some local parents shorten their children's school commute distance by adjusting their residence. For instance, some parents may rent an apartment that is closer to the school, thus creating a school commuting pattern: renting housing near schools. Commuting to school means that students go back and forth between schools and home on weekdays. Renting housing near schools is a special school commute pattern in which students live in a rented place during weekdays and return home on the weekends. The two patterns are very different from one another and can easily be distinguished.

These different school commute patterns generate weekday commutes and weekend commutes. Students who commute to schools only have weekday commutes, and students who rent housing close to schools have both weekday and weekend commutes. To obtain a detailed understanding of students' school commuting characteristics when designing the questionnaire, we investigated weekday school commutes according to the students' school commuting patterns.

3.2.2. Main content of the questionnaire

The questionnaire includes the following: (1) students' individual characteristics, including age, gender, place of household registration, school attended, grade, address during school time, weekend address, etc.; and (2) students' school commute characteristics and records of types of school commuting modes, commuting time and whether or not they are picked up by their parents.

Table 1
Gender, Grade, Household Registration, Parents' Accompaniment and School Commuting Pattern Distribution for Samples.

	School A1	School A2	School B1	School B2
Gender				
Girls	47.95%	47.06%	37.45%	40.68%
Grade				
Low-grade	29.51%	33.46%	33.33%	32.54%
Household Registration				
Migrants	72.13%	90.07%	2.25%	9.83%
Parents' Accompaniment				
Low-grade	44.44%	74.73%	83.15%	92.71%
High-grade	16.28%	23.76%	71.91%	79.40%
School Commuting Pattern				
Commuting	100%	100%	92.51%	96.95%
Renting housing nearby schools	0.00%	0.00%	7.49%	3.05%

3.2.3. Survey implementation

From September 5 to September 10, 2012, the questionnaires were distributed to each school, and the survey was organized by the corresponding teachers. The number of students in Schools A1, A2, B1, and B2 is 274, 746, 2902 and 1589, respectively. Because there are fewer demonstration schools, the number of students in the demonstration schools is higher than that in the regular schools. Schools A1, A2, B1, and B2 returned 244, 272, 267, and 295 surveys with valid information, respectively, which were equally distributed in each grade, as we sampled 2 classes in each grade in every school. Low-grade pupils (1–2 grades) were represented by teachers who completed the questionnaires after consulting the students, whereas high-grade pupils (3–6 grades) filled in the questionnaire by themselves with the help of their teachers.

According to Table 1, female students account for 40%–50% of all students (according to statistics, the proportion of female pupils was 43.8% in Jinjiang City by the end of 2012.). In the course of the investigation, some students are registered as "Xusui" (In China, "Xusui" means one year or two years older than the actual age), which makes statistical analysis a difficult task. Therefore, we count the pupils in each grade for replacement, and the proportion of low-grade pupils is approximately 30% of the sample. In addition, migrant pupils attend mainly regular schools (the proportion of migrant pupils in school A2 was 90%), and almost no migrant pupils attend demonstration schools. From the perspective of school education quality, the household registration system leads to an uneven allocation of education resources. Consequently, schools A1 and A2 represent migrant pupils, whereas schools B1 and B2 represent the household registered pupils. We also find that the proportion of parents accompanying household registered pupils to and from school is much higher that the corresponding proportion for migrant pupils. Even high-grade household registered pupils, the proportion of parents accompany is also high (more than 70%). However, for migrant pupils, the proportion of parents accompanying high-grade and low-grade students varies greatly, and the proportion of parents accompanying high-grade pupils is low (Table 1). In addition, the school hours of the 4 primary schools investigated are 8:10–11:25 a.m. to 2:20–5:05 p.m., and they all have bicycle parking for students.

4. School commuting characteristics

The average daily trip distance of the surveyed students is 1.57 km, which indicates that most of the students reside close to schools. All the migrant pupils commute to school, with a commuting ratio (the proportion of the commute between schools and home on weekdays) of 100%. Small numbers of household registered pupils rent housing near their schools, with a commuting ratio exceeding 90% (Table 1). These

findings are related to the relatively small size of the city, and the sampled schools do not have boarding students.

The weekday school commute may cause many traffic problems, so the following section of this paper analyzes the relationship between pupils' weekday school commute modes and active commuting characteristics. The commuting distance is a significant factor affecting students' active commuting to school. Therefore, this study further analyzes the school commute distance distribution for different groups.

4.1. Weekday school commuting mode

Currently in Jinjiang, the weekday school commuting modes include walking and commuting via bicycle, electric bicycle, private car, motorcycle, bus, or taxi. Walking and commuting by motorcycle and private car are the main commuting modes for pupils' school trips, accounting for 92.79% of all school trips.

The distribution of pupils' weekday school commuting modes among household registration groups was tested using Pearson's chi Square. The results show that 77.48% of migrant pupils walk to school, whereas 34.51% of household registered pupils walk to school. However, the proportion of private car trips for household registered pupils is much higher than the proportion of private car trips for migrant pupils (29.53% versus 2.06%, respectively). It is also worth noting that motorcycle trips represent a certain proportion of Jinjiang pupils' school commutes for both household registered pupils and migrant pupils (Table 2).

4.2. Weekday active commuting to school

The pupils' primary commuting modes are walking, which is characterized as active commuting, and commuting via private car and motorcycle, which are classified as inactive commuting. The proportion of pupils' active commuting (accounting for the above three trip modes) is 59.91%, and the proportion of parents accompanying pupils' active commuting is only 14.14%. That is to say, most students are independent active commuters. Table 2 shows that the proportion of household registered pupils' active commuting is much lower than migrant pupils' active commuting (38.9% compared with79.79%). Household registration is strongly associated with pupils' active commuting ($\chi^2 = 102.122$, df = 1, $p < 0.001$).

4.3. Weekday school commute distance distribution

The trip distance of the pupils' three primary trip modes reveals that the majority of the migrant pupils attend nearby schools. More than 90% of the migrant pupils' commute distances are within 2 km, while the corresponding percentage for household registered pupils is 66.06%. It is worth noting that 23.55% of the household registered pupils' commute distance exceeds 3 km. The commute distance of the household registered pupils exceeds the commute distance of the migrant pupils by more than 2 km, which increases the motorized trips for the household registered pupils. Meanwhile, the proportion of the household registered pupils whose trip distance is within 2 km is more than 60%, while the proportion of their active commuting is less than 40%. Therefore, some household registered pupils who live near schools also use motorized transportation.

Table 2
Pupils' Weekday School Commuting Modes.

	Household registered pupils	Migrant pupils	Total
Mode			
Walking	34.51%	77.48%	55.37%
Private car	29.53%	2.06%	16.19%
Motorcycle	24.67%	17.57%	21.22%
Other	11.29%	2.89%	7.22%
Active commuting			
Active commuting	38.90%	79.79%	59.91%

5. Weekday active commuting and school choice

To analyze the individual commuting regularity of different groups, this study uses age, gender, and trip distance as factors to analyze the two groups of students because trip distance is a significant factor of students' active commuting choice. In Jinjiang, 6-year-old children enter primary schools for compulsory education; therefore, the majority of students' age in the same grade is the same. In the modeling process, the grade index is used instead of age.

5.1. Analysis method

A binary logistic regression model was conducted to examine the effect of multiple factors on pupils' choices of weekday active commuting to school. Grade is a dummy variable, and gender is a categorical variable. The specific formula is shown below:

$$P = \exp(\alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_m x_m)/(1 + \exp(\alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_m x_m)) \quad (1)$$

P– Probability of pupils' weekday active commuting to school; $x_1, x_2, \ldots, x_m$- Factors that influence pupils' weekday active commuting to school; and $\alpha, \beta_1, \beta_2, \ldots, \beta_m$– Regression coefficient.

We used the odds ratio (OR value) to judge the differences in influencing factors between the two groups, which is an index that reflects the correlation intensity:

$$OR = P/(1 - P) \quad (2)$$

5.2. Model results

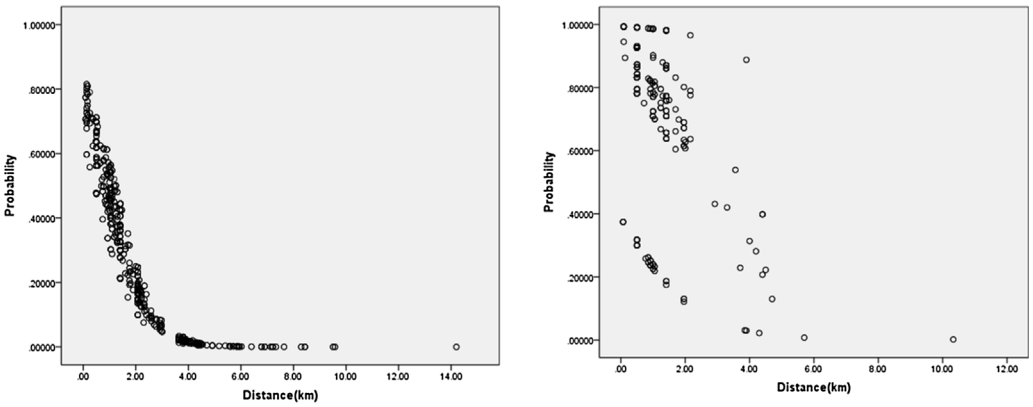
The model fits better for the migrant pupils (Nagelkerke $R^2 = 0.382$) than for the household registered pupils (Nagelkerke $R^2 = 0.362$). Table 3 shows that for household registered pupils, grade has no significant influence on their active commuting to school ($p > 0.05$), while gender and commute distance significantly impact their active commuting to school ($p < 0.05$). For migrant pupils, both grade and trip distance significantly influence their active commuting to school ($p < 0.001$).

Age was found to be a significant contributor (Hinckson et al., 2011). The probability of weekday active commuting to school among migrant pupils from first grade to fourth grade increases each year. The OR value for first grade is 0.004, and for fourth grade, it is 0.123, which shows that the students' independence becomes increasingly stronger with the increase in age. However, active commuting to school decreases beginning in fifth grade (OR = 0.062). For the household

Table 3
Odds ratios (OR) of Pupils' Weekday Active Commuting to School Choice.

Pupil		Household registered pupil (OR(95%CI))	Migrant pupil (OR (95%CI))
Grade	First	1.36 (0.82–2.25)	0.00 (0.00–0.02)***
	Second	1.17 (0.72–1.89)	0.04 (0.01–0.15)***
	Third	1.03 (0.63–1.67)	0.05 (0.01–0.21)***
	Fourth	0.65 (0.38–1.11)	0.12 (0.03–0.55)***
	Fifth	1.25 (0.75–2.07)	0.06 (0.02–0.27)***
Gender	Male	0.70 (0.52–0.95)*	0.92 (0.64–1.34)
Commuting distance (km)		0.26 (0.21–0.30)***	0.46 (0.36–0.58)***
n		1084	883
-2 Log likelihood		1030.95	685.72

** $p < 0.01$.
* $p < 0.05$.
*** $p < 0.001$.



(a) Household registered pupils (b) Migrant pupils

Fig. 3. Impact of Commute Distance on Pupils' Weekday Active School Commuting.

registered pupils, grade is not significantly associated with active commuting to school.

In terms of commute distance, the probability of active commuting to school because of trip distance is greater for the migrant pupils than for the household registered pupils. For household registered pupils, the OR value of the trip distance is 0.263; however, for migrant pupils, the OR value of the trip distance reaches 0.461. The household registered pupils' active commuting to school is influenced significantly by the trip distance, and its probability distribution based on the variable trip distance is shown in Fig. 3. There is a nonlinear relationship between trip distance and the probability of household registered pupils' weekday active commuting to school. With increasing trip distance, the probability of household registered pupils' weekday active commuting to school gradually decreases. When the commute distance is 2 km, the probability of the household registered pupils' active commuting to school drops below 20%. When the commute distance is 4 km, the probability of the household registered pupils' active commuting to school is approximately 0%, but for migrant pupils, the commute distance is 6 km (Fig. 3).

6. Discussion and conclusion

We designed the questionnaire according to domestic pupils' school commuting patterns (commuting and renting housing near schools) and conducted the survey to obtain data on the household registered and migrant pupils' weekday school commuting. Although we still need to investigate students' family and built environment as future work, we nevertheless found differences between migrant and household registered pupils' commutes in the context of urbanization in China.

In China, several scholars have found that the travel mode varies by the type of primary school (Han et al., 2011; He and Li, 2007). He and Li's (2007) study of two demonstration schools and one regular school in Wuhan City found that pupils from the demonstration schools mainly use cars (> 30%) followed by buses, and approximately 70% of pupils from regular schools walk to school. In addition, Han's (Han et al., 2011) study of a demonstration school in Nanjing City revealed that electric bicycles and cars are the main commuting modes; the proportion of private cars used was 29%. Due to the different sizes of different cities (Wuhan and Nanjing are big cities in China, while Jinjiang is a medium-sized city), students' commuting distance is different, which in turn makes the students' travel modes different. Meanwhile, these differences can also apply to different types of schools. Private motorized transportation modes are the most common among pupils of demonstration schools, and walking is the main mode for pupils of regular schools. This result reveals that pupils from regular schools mainly attend nearby schools. Unlike other cities, Jinjiang has a larger proportion of migrants, most of whose children study in regular schools. Meanwhile, Jinjiang has a higher level of economic development, which leads to a higher proportion of private cars used for commutes to demonstration schools. Moreover, the rate of pupils walking to schools is high, which has a certain relationship with the subtropical climate zone in which Jinjiang is located.

Commuting distance has a significant impact on active transportation in Jinjiang city. Moreover, the commute distance has a greater influence on household registered pupils than on migrant pupils; 2 km is a barrier for household registered pupils' weekday active school commuting, which is related to the pupils' active commuting mode: walking. In addition, given that pupils' independence is relatively low, these students are unable to walk or ride bikes to schools independently because they do not have enough capabilities to navigate the neighborhood environment when the distance exceeds a certain limit. At the same time, according to He et al. (2014), the commuting constraints related to the occupations of students' parents have an impact on the travel modes of different groups. Since most of the migrant population in Jinjiang is low-income workers, the probability of migrant pupils' active commuting is higher than that for household registered pupils. Moreover, most of parents in migrant group accompany pupils to and from school only when students are at low-grade, while the proportion of parents accompany is high for both low-grade and high-grade household registered pupils. Therefore, age significantly affects only migrant pupils. Because the proportion of migrant pupils' parents who accompany their children when commuting is low and regular schools are not usually at the center of the district, the corresponding measures should be taken to build a safe route for migrant pupils, while the safety education of migrant pupils should address this issue, as children's safety behavior is not yet mature.

Existing studies have found that the school commuting modes among pupils of different groups are comprehensively affected by individual characteristics, such as the family, built environment and other factors. However, there are other aspects that we are unable to cover in our research. Parents' subjective attitudes towards younger pupils' independent commuting is not considered here. Additionally, the influence of cultural differences between migrant populations and household registered populations on students' commutes is uncertain. Transportation facilities such as school buses and city buses should also be further assessed in terms of school commutes. In conclusion, we leave these influential factors for future work to be able to provide more exact and comprehensive results for traffic measures based on different groups

Conflict of interest

The authors declare that there is no conflict of interest.

References

Buliung, R.N., Mitra, R., Faulkner, G., 2009. Active school transportation in the Greater Toronto Area, Canada: an exploration of trends in space and time (1986–2006). Prevent. Med. 48 (6), 507–512.

Han, J., Cheng, G.Z., Li, H.Q., 2011. Characteristics and management strategies for commuting trips of primary school student. Urban Transp. China 9 (2), 74–79.

He, J.L., Li, J.Z., 2007. Analysis and improvement suggestions on elementary and secondary school Commuting traffic characteristics in Wuhan. Urban Transp. China 5 (5), 87–91.

He, B.H., Liu, Y., He, M., 2014. Influence of commuter constraints degree on children accompany travel decision-making process. J. Transp. Syst. Eng. Inf. Technol. 14 (6), 223–230.

Hinckson, E.A., Garrett, N., Duncan, S., 2011. Active commuting to school in New Zealand children (2004–2008): a quantitative analysis. Prevent. Med. 52 (5), 332–336.

Huang, Y.P., Chen, Z., Xie, L.R., 2012. The feature and trends of the remote urbanization in the context of the new urbanization. Dev. Small Cities Town 02, 41–45.

Jinjiang Statistics Bureau, 2012. Main Data Bulletin of Jinjiangnos Sixth National Population Census in 2010. http://www.jinjiang.gov.cn/show.aspx?ctlgid=471554&id=36363.

Leslie, E., Kremer, P., Toumbourou, J.W., Williams, J.W., 2010. Gender differences in personal, social and environmental influences on active travel to and from school for Australian adolescents. J. Sci. Med. Sport 13 (6), 597–601.

Ma, S.H., Han, Y.H., Yao, Z.G., Ge, Y., 2016. Students' travel mode choice based on parents' travel mode. J. Transp. Syst. Eng. Inf. Technol. 16 (2), 225–231.

McDonald, N.C., 2007. Active transportation to school: trends among U.S. schoolchildren, 1969–2001. Am. J. Prevent. Med. 32 (6), 509–516.

McDonald, N.C., 2008a. Critical factors for active transportation to school among low-income and minority students: evidence from the 2001 National Household Travel survey. Am. J. Prevent. Med. 34 (4), 341–344.

McDonald, N.C., 2008b. Household interactions and children's school travel: the effect of parental work patterns on walking and biking to school. J. Transp. Geogr. 16 (5), 324–331.

McDonald, N.C., 2012. Is there a gender gap in school travel? An examination of US children and adolescents. J. Transp. Geogr. 20 (1), 80–86.

Migra nt Population Service Management Department of China's Family Planning Commission, 2012. 2012 Report on China's Migrant Population Development. China Population Publishing House.

Mitra, R., Buliung, R.N., 2012. Built environment correlates of active school transportation: neighborhood and the modifiable areal unit problem. J. Transp. Geogr. 20 (1), 51–61.

Rothman, L., Buliung, R., To, T., Macarthur, C., Macpherson, A., Howard, A., 2015. Associations between parents perception of traffic danger, the built environment and walking to school. J. Transp. Health 2 (3), 327–335.

Sun, Y., Liu, Y., Tao, F.-B., 2015. Associations between active commuting to school, body fat, and mental well-being: population-based, cross-sectional study in China. J. Adolesc. Health 57 (6), 679–685.

Susilo, Y.O., Waygood, E.O.D., 2012. A long term analysis of the mechanisms underlying children's activity-travel engagements in the Osaka metropolitan area. J. Transp. Geogr. 20 (1), 41–50.

The People's Republic of China, 1958. Regulations of the People's Republic of China on Residence Registration.