



Understanding child-friendly commuting: policy discourses and community realities in Nanjing, China

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ABSTRACT

Child-friendly commuting has become an important focus in recent international discussions on children's rights, mobility justice and urban governance. Yet little empirical work examines how policy commitments translate into everyday commuting environments in rapidly urbanizing contexts. This study investigates three pilot child-friendly communities in Nanjing by combining policy and media content analysis, systematic field observation, and children's descriptions of their commuting experiences. The findings reveal a significant gap between the safety-oriented, infrastructure-focused logic emphasized in local policies and news, and the everyday conditions encountered by children. While physical improvements such as crossings, signage, and sidewalk upgrades were widely implemented, children continued to report environmental discomfort, inconsistent maintenance, traffic behavior and the lack of psychological and social support. The analysis further shows that children's participation remains limited, and spatial variations across communities reflect broader inequalities in governance capacity and neighborhood conditions. These results demonstrate that child-friendly commuting cannot be achieved through infrastructural provision alone. Sustainable improvement requires a shift toward continuous, child-centered governance systems that balance safety, participation, emotional well-being and spatial equity. The study contributes to children's geographies and urban planning scholarship and offers insights for improving child-friendly mobility initiatives in diverse governance contexts.

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1. Introduction and background

The Child-Friendly Cities (CFC) Initiative, launched by UNICEF in 1996, provides a rights-based framework for supporting children's wellbeing in urban environments (United Nations Children's Fund 2001). As cities increasingly attempt to integrate children's needs into policy and planning, the community has become a key spatial unit through which child-friendly principles are implemented in practice. In China, recent national and municipal guidelines have encouraged the development of child-friendly communities as a means to improve children's daily environments, including public space, services, and mobility conditions (United Nations Children's Fund 2018; Shen et al. 2021).

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Among the everyday spaces that reflect children's interaction with their neighborhoods, the journey to and from school is one of the most frequent and meaningful. School commuting contributes to children's physical activity, social experiences, and sense of familiarity with their surroundings (Friman, Westman, and Olsson 2019; Ross 2007). It also embodies broader concerns related to safety, accessibility, and autonomy, which are key elements emphasized in international research on children's environments (Gill 2008; Tranter and Sharpe 2008). A recent systematic review conducted by the author identified five dimensions of child-friendly school commuting environments, safety and security, accessibility and equity, child-centered participation, environmental comfort and aesthetics, and social and cultural support, which together highlight the multifaceted nature of children's commuting experiences (Quan, Binti Zainol, and Dali 2026).

In Chinese cities, policy documents and media reports increasingly frame school commuting as an important expression of child-friendly development. However, little is known about how these institutional narratives correspond to on-the-ground conditions in local communities. Existing studies tend to focus on general CFC indicators or specific safety interventions, without examining the relationship between policy representations and the everyday environments children encounter along school routes. This study addresses this gap through an analysis of national and local policy documents and news reports, followed by field assessments of school commuting environments in three certified child-friendly communities in Nanjing. By comparing institutional narratives with neighborhood-level conditions, the study aims to deepen understanding of how child-friendly principles are interpreted and materialized through children's everyday mobility in the Chinese context.

2. Literature review

2.1. Child-friendly cities and communities

The concept of Child-Friendly Cities and Communities (CFCs) provides an overarching rights-based framework for integrating children's needs into urban governance. Originating from the United Nations Convention on the Rights of the Child and formalized through UNICEF's Child-Friendly Cities Initiative, the framework emphasizes protection, participation, equitable access to services and supportive everyday environments as essential components of children's wellbeing (United Nations Children's Fund 2001). International research has documented how CFC agendas have evolved from normative aspirations to place-based interventions at the neighborhood scale, where children interact with physical spaces, institutions and social networks in their daily lives (Bridgman 2004; Corsi 2002; Carroll et al. 2015). Such interventions increasingly focus on environments that support children's autonomy and their opportunities for independent exploration within the local community (Francis and Lorenzo 2002; Giles-Corti et al. 2016).

As cities continue to urbanize, children's access to safe, inclusive and high-quality neighborhood environments has become a central concern. Studies have highlighted how rising traffic volumes, densification pressures and the privatization of public space have reduced opportunities for outdoor play and spontaneous interaction, thereby limiting children's independent mobility (McKendrick, Bradford, and Fielder 2000; Björklid and Nordström 2007). These studies indicate that child-friendliness should not be understood solely as improvements to physical facilities, but rather as a focus on children's emotional experiences, social connections, and freedom to explore. This enables them to experience daily life in their communities as safe, seen, and supported.

Research in recent years has also underscored the importance of governance processes in shaping child-friendly communities. Empirical studies show that policy agendas often emphasize visible and symbolic constructions of child-friendliness, such as playgrounds, murals and themed streetscapes, while giving less systematic attention to children's own perspectives or everyday use patterns in these spaces (Weir 2023; Cortés-Morales 2021; Ding, Ao, and Bahmani 2023). Current empirical studies suggest that children's participation in urban planning is frequently tokenistic or episodic, primarily serving to validate adult-defined agendas rather than redistributing decision-making

power (Abatay 2019; Shier 2001; Loureiro et al. 2020). This adult-centric logic often prioritizes visible symbolic outcomes over substantive mechanisms that incorporate children's lived experiences into final policy decisions (Ding, Ao, and Bahmani 2023; Jung and Kim 2024; Malone 2006). A similar trend is observed in school commuting research; while several studies examine school commuting satisfaction, they are often based on adult-centric perspectives, focusing on parental concerns about safety and accessibility (Cadima, von Schönfeld, and Ferreira 2024; Farstad 2023; Rachel et al. 2022), whereas few studies focus on children's direct input regarding their daily commuting experiences, preferences, and emotional well-being (Chakma, Matsuo, and Sugiki 2025; Lu, Yu, and Liu 2024). This has led scholars to argue for more participatory and rights-based approaches that embed children's viewpoints within planning and design processes rather than treating child-friendliness as a purely visual or decorative outcome (Jung and Kim 2024; Loureiro et al. 2020).

2.2. *Children's school commuting as everyday practice*

The journey to school has been conceptualized not merely as a transportation task but as a central component of children's everyday spatial experience. It forms a recurring pathway through which children encounter streets, public spaces, mobility norms and social actors on a daily basis. As such, commuting mediates children's physical engagement with the built environment and reflects broader community-level affordances and constraints (Fyhri et al. 2011; Panter, Jones, and Van Sluijs 2008). The school route forms an important everyday space in which children encounter streets, public spaces, social interactions, and mobility norms.

School commuting contributes to children's sense of autonomy, competence, and spatial belonging. Daily movement between home and school allows children to observe environmental changes, develop spatial knowledge, and engage in micro-level social interactions that are not easily captured in home-based or school-based studies (Johansson 2006; Tranter and Sharpe 2008). The repetitive nature of commuting also shapes children's emotional geographies, affecting how they perceive comfort, familiarity, risk, or enjoyment in their everyday environments. These commuting environments form part of the wider system of public space, and their deterioration reflects how urban development often sidelines children's spatial rights (Valentine 2017).

Moreover, school commuting reflects the broader sociocultural context in which children's mobility is embedded. Decisions about whether and how children travel independently often reveal cultural values related to protection, responsibility, and trust between generations (McDonald et al. 2011). In this sense, the journey to school is not only a physical transition but also a social and symbolic process that embodies family practices, community norms, and institutional expectations. This perspective provides an essential theoretical foundation for understanding how built environment conditions, governance arrangements, and family decision-making collectively shape children's everyday mobility, which will be further examined in the next section.

Beyond technical safety metrics, recent scholarship identifies the 'CalmMobility' paradigm as a conceptual framework for navigating transitions in sustainable mobility (Turoñ 2025). This paradigm advocates a shift from a focus on mere infrastructure efficiency to citizen-centered stability and long-term resilience, aiming to reduce the inherent controversies in transportation policy and provide residents with a more equitable mobility system and emotional support. In the context of child-friendly urban planning, sustainable mobility depends on the subjective well-being of young pedestrians and on reducing their perceived environmental stress during daily commutes (Balant and Lep 2020). It suggests that a supportive environment must mitigate environmental stressors to foster children's subjective well-being during everyday journeys.

2.3. *Factors influencing child-friendly school commuting*

Studies on children's school commuting generally agree that children's mobility is shaped by a combination of environmental and social factors. Much of the existing literature focuses on the physical

conditions of the built environment. Research has shown that the quality of pedestrian infrastructure (Ding, Ao, and Bahmani 2023; Leung et al. 2021; Wu et al. 2023), such as sidewalk continuity, crossing facilities, and street connectivity (Manouchehri and Burns 2023; Rachel et al. 2022; Zannat et al. 2023), plays an important role in shaping whether children are able to walk or cycle safely between home and school (Villanueva et al. 2014; Carver, Timperio, and Crawford 2008). Traffic volume and vehicle speed are frequently noted as major barriers, especially in neighborhoods where children must cross busy roads or navigate environments designed primarily for motor vehicles (McMillan 2005).

In addition to objective environmental features, perceived safety is a recurring theme in the literature. Parents' concerns about traffic hazards, personal security, and environmental risks often influence children's opportunities for independent mobility (Johansson 2006; Tranter and Sharpe 2008), and school zone surveillance are critical to creating a safe commuting environment (Manouchehri and Burns 2023; Rachel et al. 2022). These perceptions do not always correspond directly to measurable environmental conditions, suggesting that parental decision-making is shaped by broader social and cultural contexts. As several studies note, even relatively minor concerns can lead parents to restrict children's autonomy, especially for younger age groups (Mitra 2013).

Social factors also play an important role in shaping commuting experiences. Neighborhood cohesion, familiarity with local surroundings, and the presence of peers or adults along school routes may encourage children to walk and provide a sense of comfort during daily travel (Fyhri et al. 2011; Panter, Jones, and Van Sluijs 2008). These social dynamics can influence not only route choices but also children's confidence and willingness to participate in active forms of commuting. Environmental comfort and route quality are further discussed in the literature. Elements such as shade, greenery, and protection from noise or air pollution have been identified as relevant to children's physical and emotional experience of traveling to school (Carver, Timperio, and Crawford 2008). Although these factors may appear secondary compared with safety considerations, they contribute to the overall friendliness of commuting environments.

Institutional and planning factors also influence commuting conditions. Decisions related to school siting, land-use planning, and transport management can determine travel distances and shape the feasibility of non-motorized travel (McMillan 2005). Several studies have pointed out that even well-designed neighborhood environments may become less child-friendly if schools are located far from residential areas or if safe routes are not integrated into broader community planning (McMillan 2005; Mitra 2013; Carver, Timperio, and Crawford 2008).

Taken together, these studies suggest that child-friendly school commuting is shaped by the interaction of physical environments, social relationships, parental attitudes, and local planning practices. This multidimensional perspective provides a useful foundation for examining how child-friendly ideas are interpreted and implemented in specific urban contexts.

3. Research methods

3.1. Study area

Nanjing provides a relevant context for examining child-friendly community practices. As the first city in China to incorporate children's prioritized development into its governmental agenda, Nanjing has established a community-based child protection mechanism and issued 55 supporting policy documents, including the Nanjing Child-Friendly City Construction Action Plan (2022–2025) (Jiangsu Development & Reform Commission 2023). Rapid urbanization since the early 2000s has reshaped its built environment, generating challenges related to children's health, safety, and mobility (Gracey 2003; Lopes, Cordovil, and Neto 2014; Pirgon and Aslan 2015). By 2020, children aged 0–14 accounted for 12.75% of the city's population (Nanjing Municipal Bureau of Statistics 2021).

Jianye District (Figure 1), the youngest district in the city, is one of the leading areas in implementing child-friendly initiatives. Children aged 0–14 represent 13.32% of its population, and the district maintains a 100% school enrollment rate at all compulsory education levels (Government of

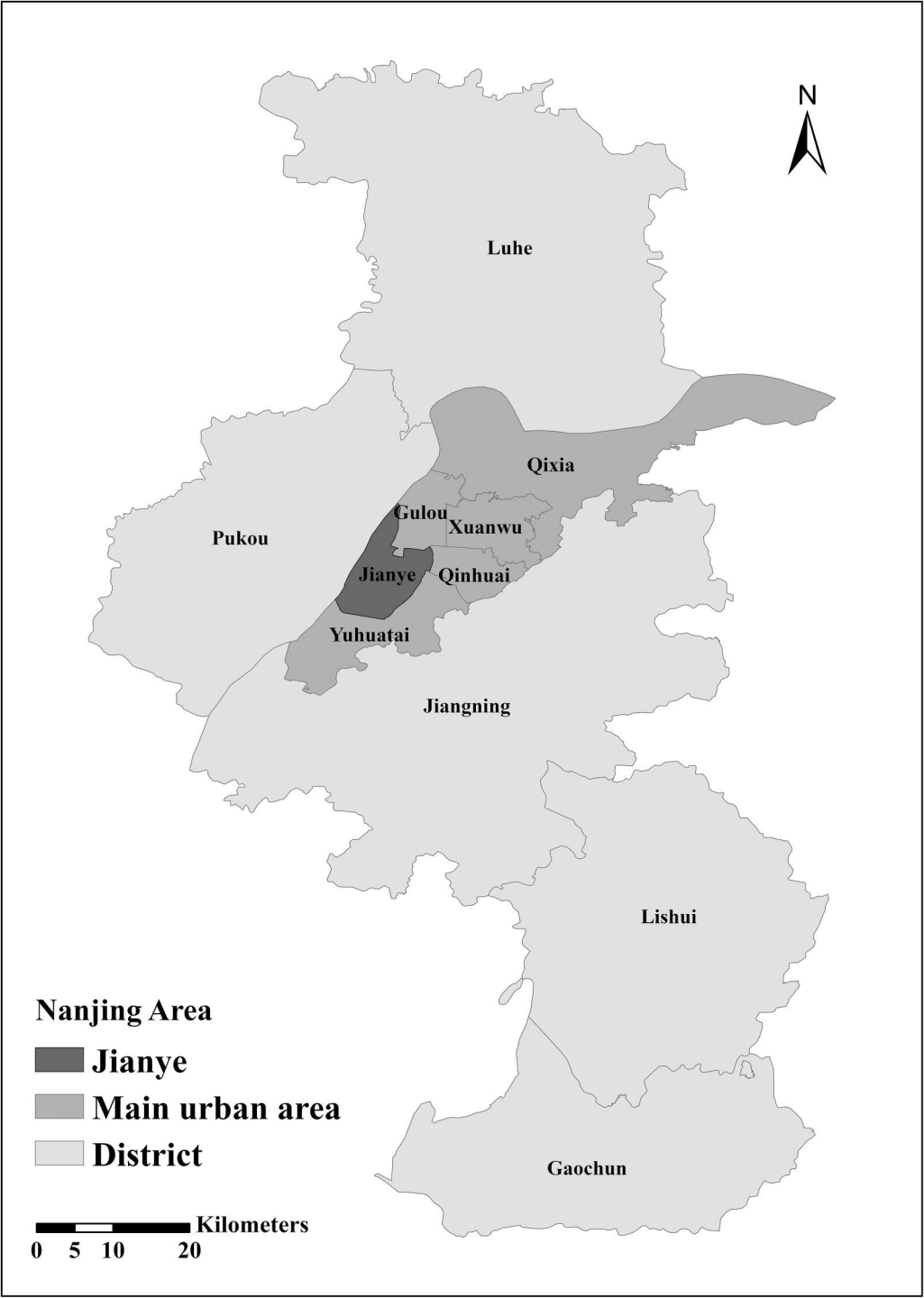


Figure 1. Location map of study area.

Jianye District 2023). Notably, ten of Nanjing’s sixteen child-friendly pilot communities designated in 2019 are in Jianye District. These characteristics make the district an appropriate setting for examining how child-friendly principles are reflected in everyday school commuting environments.

To capture the diversity of child-friendly implementations, three representative pilot communities in Jianye District were selected. These sites reflect distinct urban development stages and social structures within Nanjing. Detailed profiles are summarized in [Table 1](#).

Lushan represents a high-value established neighborhood where child-friendly facilities are well-integrated but faces challenges with aging infrastructure. Zhoudao Jiayuan, as a resettlement project, experiences significant spatial pressure due to its high density and complex social structure, often leading to obstructions of pedestrian paths. Xinting, while the newest in construction, reflects an emerging residential tier that benefits from recent planning guidelines but still grapples with peak-hour traffic management.

3.2. Research design

The study employed a three-stage research design. The first stage focused on analyzing how child-friendly commuting is represented in Chinese policy documents and media reports. This stage involved content analysis of national policy guidelines, municipal documents and mainstream media coverage related to child-friendly cities and children's mobility. The analysis aimed to identify the major themes, priorities and narratives that frame child-friendly commuting in public and institutional discourse.

The second stage consisted of field assessments conducted in the three selected communities. The assessment items were derived from the thematic findings of the document and media analysis, combined with child-friendly community elements identified in previous chapters of this study. This approach allowed the fieldwork to focus on specific environmental and spatial features relevant to children's school travel, such as route continuity, pedestrian safety, accessibility, and environmental comfort.

The third stage incorporated children's perspectives collected through a structured questionnaire administered in the three case communities. The questionnaire included two open-ended questions inviting children to describe unfriendly commuting experiences and suggest improvements. These qualitative responses provided rich experiential insights that complement the observational and documentary data. The answers were imported into NVivo and analyzed through thematic coding to identify key concerns and expectations expressed by children. This constitutes the third analytical component of the study, enabling a more comprehensive understanding of the child-friendly commuting environment from the users' standpoint.

3.3. Document and media analysis

Policy documents were collected from national and municipal sources, including guidelines on child-friendly cities, community governance and urban public space development. The selected policies are listed in [Table 2](#). Guidelines on Promoting the Construction of Child-Friendly Cities (Development and Reform Commission 2021) serves as a general guide for the construction of

Table 1. Detailed information of selected communities.

Feature	Lushan	Zhoudao Jiayuan	Xinting
Sub-district	Nanyuan	Jiangxinzhou	Shuangzha
Area (km ²)	0.50	0.51	0.71
Construction Year	2005	2016	2018
Residential Scale	2 districts; 26 buildings	3 districts; 39 buildings	3 districts; 28 buildings
Housing Typology	Premium established commercial housing	High-density resettlement (rehousing)	Emerging modern commercial residential
Governance Context	Mature professional property management	High density; complex community-led governance	Professional management; developing services
Proximity to School	Within 10-min walk; adjacent to unfenced river	Within 15-min walk; high traffic pressure	Within 10-min walk; prone to drop-off congestion

Table 2. Policies selected for content analysis.

NO.	Document Title	Issuing Body	Year	Relevance
1	Planning Standards for Urban Pedestrian and Bicycle Transportation Systems	Ministry of Housing and Urban-Rural Development	(2021)	Clearly stated construction standards for sidewalks and bike lanes.
2	Guidelines on Promoting the Construction of Child-Friendly Cities	National Development and Reform Commission	(2021)	Guiding the construction of child-friendly cities in China, with clear requirements for child-friendliness.
3	Guidelines for the Construction of Child-Friendly Spaces in Cities (Trial)	National Development and Reform Commission	(2022)	Promoting the construction of child-friendly spaces in cities to meet the needs of children's healthy growth and development

child-friendly cities in China and as a reference for this research to categorize the requirements for child-friendliness into five dimensions. The Planning Standards for Urban Pedestrian and Bicycle Transportation Systems (Ministry of Housing and Urban-Rural Development 2021) emphasizes the construction of sidewalks and bike lanes in cities, which are relevant to children's commute to school. The Guidelines for the Construction of Child-Friendly Spaces in Cities (Trial) (National Development and Reform Commission 2022) focuses on the construction of child-friendly spaces, with references to disaster prevention, transportation systems, public service facilities, and places for in-school and out-of-school activities all highly relevant to this research.

This study collected news reports related to child-friendly communities in Jianye District, Nanjing, China, between 2022 and 2024 from publicly available Chinese online news platforms (e.g. The Paper, IFENG.COM, etc.). The documents and news reports were screened to ensure relevance to children's mobility, school commuting or child-friendly community development.

Content analysis was conducted following a thematic approach. This study used NVivo software for coding and thematic analysis in order to systematically extract the infrastructural and supportive measures involved in the news stories and to provide empirical evidence for following study. This study used the Hierarchical Coding method, which is divided into Tier 1 coding (core dimensions) and Tier 2 coding (specific measures). Tier 1 coding consists of five core dimensions: social policy, public services, rights protection, space for growth, and development environment (Development and Reform Commission 2021), and specific information is shown in the Table 3.

Based on this Tier 1 coding, this research further proceeds to Tier 2 coding to extract the specific supportive measures involved in the news reports. For example, under the public service dimension, specifics such as school guard posts, children's priority access signs, and school bus pick-up and drop-off points can be further extracted, while under the rights protection dimension, facilities such as barrier-free access and surveillance cameras can be extracted. These Tier 2 codes provide a further interpretation of statements related to child-friendly commuting in the relevant materials, translating relatively abstract concepts into concrete support measures that children can see or experience. The specific codes are provided in Supplementary File 1.

3.4. Field survey

The field survey aimed to verify how the measures described in policy documents and news reports were reflected in the built environment of the three child-friendly pilot communities. A structured

Table 3. The classification of the Tier 1 for content analysis.

Core Dimensions	Focus
Social Policy	Government support
Public Services	Infrastructure
Right Protection	Safety and fairness
Growth Spaces	Community physical environment
Developmental Environment	Community engagement and culture

checklist was developed with reference to the Guidelines for the Construction of Complete Residential Communities (Ministry of Housing and Urban-Rural Development 2022) and Child Friendly Cities and Communities Handbook (United Nations Children's Fund 2018), and aligned with China's child-friendly city framework consisting of five key dimensions: social policies, public services, rights protection, growth spaces, and the developmental environment (Development and Reform Commission 2021).

During on-site visits, the presence, condition, and accessibility of child-related facilities were recorded through photographs and written notes. The survey not only confirmed whether reported facilities existed but also examined their usability and maintenance, such as whether children were permitted to use them and whether any deterioration was observed. Dynamic issues affecting children's school commuting, such as parked vehicles blocking walkways, damaged traffic signals, or obstructed crossings were also documented. For facilities highlighted in media coverage, targeted verification was conducted to assess the accuracy of such reports. Community workers and parents who volunteered to participate assisted in completing the checklist to enhance the reliability of the assessment.

The collected information was organized through descriptive comparison of facility completeness across the three communities. Photographs and field notes were used to describe dynamic problems that were not easily quantified. Cross-validation between field observations and media representations was conducted to identify potential exaggerations, omissions, or inconsistencies between reported initiatives and their on-the-ground implementation. To strengthen objectivity and reduce observer bias, the checklist was completed collaboratively with community workers and parents familiar with local commuting practices. All participants joined voluntarily, and no identifiable personal information was collected during the process. Their contributions were recorded anonymously and were used solely for research purposes to ensure full protection of privacy and confidentiality.

3.5. Analysis of children's open-ended responses

To complement the findings from policy analysis and field observations, the study incorporated children's subjective experiences through two open-ended questions embedded in the questionnaire survey. These questions invited respondents to (1) describe any unfriendly factors they had encountered during their school commute, and (2) provide suggestions for improving the commuting environment. This qualitative component provided experiential evidence directly from child users and allowed the study to capture commuting issues that may not be observable in documentary or on-site data.

A total of 82 primary school students with the age of 9–12 provided answers to at least one open-ended question. After removing blank or non-substantive responses, 40 complete textual answers were retained for qualitative analysis. All valid responses were transcribed and imported into NVivo Software for thematic analysis. Consistent with established procedures in child-centered qualitative research, the analysis followed an inductive – deductive coding strategy. The deductive component was informed by the five analytical dimensions used throughout this study, Social Policy, Public Services, Rights Protection, Growth Spaces, and Developmental Environment, while inductive coding was applied to identify emerging concerns beyond the predefined framework.

To protect participant confidentiality, all responses were anonymized prior to analysis and no identifiable information was retained. Because the respondents were minors, the research adhered to ethical principles for child participation, including voluntary participation, non-sensitive questioning, and the absence of any intervention in children's routine school activities.

4. Results

This section integrates findings from the content analysis of policy documents and local news with the results of the field survey across the three child-friendly pilot communities in Jianye District,

Xinting, Lushan, and Zhoudao Jiayuan. The discussion evaluates how local authorities design, implement, and communicate child-friendly school commuting initiatives, and how these measures materialize in the lived environment of children. The results reveal both advancements in physical and institutional provision and persistent systemic and environmental gaps that affect the quality of children's commuting experiences. Full NVivo coding outputs are presented in the appendary File 1.

4.1. Media and policy priorities

The content analysis of policy documents and local news reveals how child-friendly school commuting is framed at the institutional and discursive levels, and how these narratives compare with conditions observed in the three pilot communities. Overall, both policy documents and media reporting highlight government-led initiatives, visible construction achievements, and efforts to institutionalize child-friendly development. However, the distribution of policy emphasis, media priorities, and on-site findings demonstrates several misalignments that help explain why certain issues reappear in children's commuting experiences despite extensive policy attention.

The policy documents place the strongest emphasis on public services, rights protection, and growth spaces, particularly in areas related to traffic safety, sidewalk continuity, school-zone management, and the spatial provision of child activity areas. This infrastructure-oriented vision aligns with national technical guidelines and reflects a governance logic centered on physical improvement and risk mitigation. This institutional priority is further evidenced by Table 4, which shows that the Public services dimension received 45 references in policy. In contrast, institutional arrangements for children's participation, differentiated needs, psychological support, and community-level care appear far less frequently. For example, while the Guidelines on Promoting the Construction of Child-Friendly Cities (Development and Reform Commission 2021) mention 'building participatory mechanisms' and 'public awareness', there is no detailed description of how children's voices are incorporated into school route planning or how to ensure that commuting designs comply with the principle of equality. These low-frequency themes suggest that policy formulations remain predominantly supply-driven, addressing children's needs from an adult-defined perspective rather than through child-centered engagement.

Local media reporting presents a somewhat different emphasis. While still acknowledging construction outcomes, news coverage more frequently highlights policy implementation, community participation, and family – school – community cooperation. Narratives about community activities, educational program, or thematic campaigns create an impression of active engagement and social integration. Yet, these reports rarely address the durability, accessibility, or day-to-day usability of infrastructure, nor do they reflect challenges such as congestion, maintenance shortcomings, or inconsistent enforcement, which were issues that consistently observed in the field survey.

Despite their differences, both policy documents and media reports devote comparatively limited attention to the operational and experiential dimensions of commuting. Issues such as peak-hour congestion, maintenance of facilities, and children's emotional responses are rarely addressed in detail. The absence of these perspectives in formal and public narratives indicates a shared blind spot that may hinder a comprehensive understanding of child-friendly commuting. These discursive tendencies help explain why certain problems continue to appear in the lived environment, despite strong institutional emphasis on building child-friendly communities.

Table 4. Thematic category and number of references.

Thematic Category	Number of References (policies)	Number of References (news)
Social policy	16	17
Public services	45	7
Rights protection	34	10
Growth space	35	12
Developmental environment	21	12

4.2. Findings from field survey of case communities

The field survey conducted in Xinting, Lushan and Zhoudao Jiayuan communities provides empirical evidence on how child-friendly commuting requirements are translated into everyday spatial practices. Drawing on the checklist developed from the policy and media analysis, the field investigation assessed the presence, accessibility and condition of commuting-related facilities across the three communities. Although all sites were officially designated as child-friendly pilot communities, their built environments revealed notable variations in implementation quality and everyday usability. This section presents the major findings from the on-site observations.

Across the three communities, most physical infrastructure items identified in policy documents, such as zebra crossings, traffic lights, and basic safety measures, were largely present. Xinting and Lushan demonstrated higher consistency with policy expectations, while Zhoudao Jiayuan showed several gaps in facility provision and maintenance. Despite these differences, all communities exhibited a shared emphasis on institutional visibility, including bulletin boards, announcements on commuting safety and children's participation mechanisms. These findings align with local news representations that highlighted governance-led initiatives and community mobilization.

However, practical challenges emerged when assessing the everyday usability of these facilities. In Xinting, although almost all checklist items were present (15 out of 17), pedestrian paths were frequently obstructed by private vehicles, especially during drop-off and pick-up periods. Certain traffic warning signs were obscured by vegetation, reducing their effectiveness. The absence of resting benches and visible psychological support information further indicated a narrow interpretation of child-friendliness that prioritizes physical infrastructure over developmental needs. These conditions are visible in the field photographs (Figure 2).

Lushan Community demonstrated the highest level of completeness among all three sites, with 16 out of 17 checklist items observed during the field survey. The community had incorporated child-friendly symbols, child-scale signage and diverse activity spaces. Yet, a significant safety concern was identified along the unfenced river segment adjacent to a main commuting path near the school. Although warning signs and life-saving devices were placed, the lack of physical barriers posed a clear hazard for younger children. This illustrates that infrastructural presence alone does not guarantee safety if key risk points remain unaddressed (Figure 3). The checklist results are shown in Supplementary File 2.

Zhoudao Jiayuan, a resettlement community with high population density, presented the most pronounced challenges. Continuous sidewalks were often compromised by parked cars and bicycles, and certain protective facilities such as fences or emergency contact points were absent or inaccessible. While the community demonstrated strong engagement by involving children in designing colorful walkways and participating in public decision-making, several amenities, such as the basketball court and activity areas, were poorly maintained or locked during the field visit (Figure 4). These findings demonstrate a tension between symbolic representation of child-friendly values and the long-term operational capacity required to sustain them.

This field survey shows that the three child-friendly pilot communities have largely implemented the infrastructure-related measures emphasized in policy documents and reported in local news. Most checklist items were consistently observed. These findings confirm that local authorities have achieved considerable progress in improving the physical conditions of school commuting environments. Nevertheless, the observations also revealed gaps that extend beyond the issues previously reported in the media. Across the three communities, the availability and visibility of developmental and emotional support for children were notably limited. None of the communities displayed psychological support posters, hotline information, or other mental health – related guidance in public areas, despite the emphasis on holistic child development in national and municipal policies. Additionally, while various community activities were mentioned in local news, these initiatives were not accompanied by consistent, on-the-ground communication materials that would support children on a daily basis.

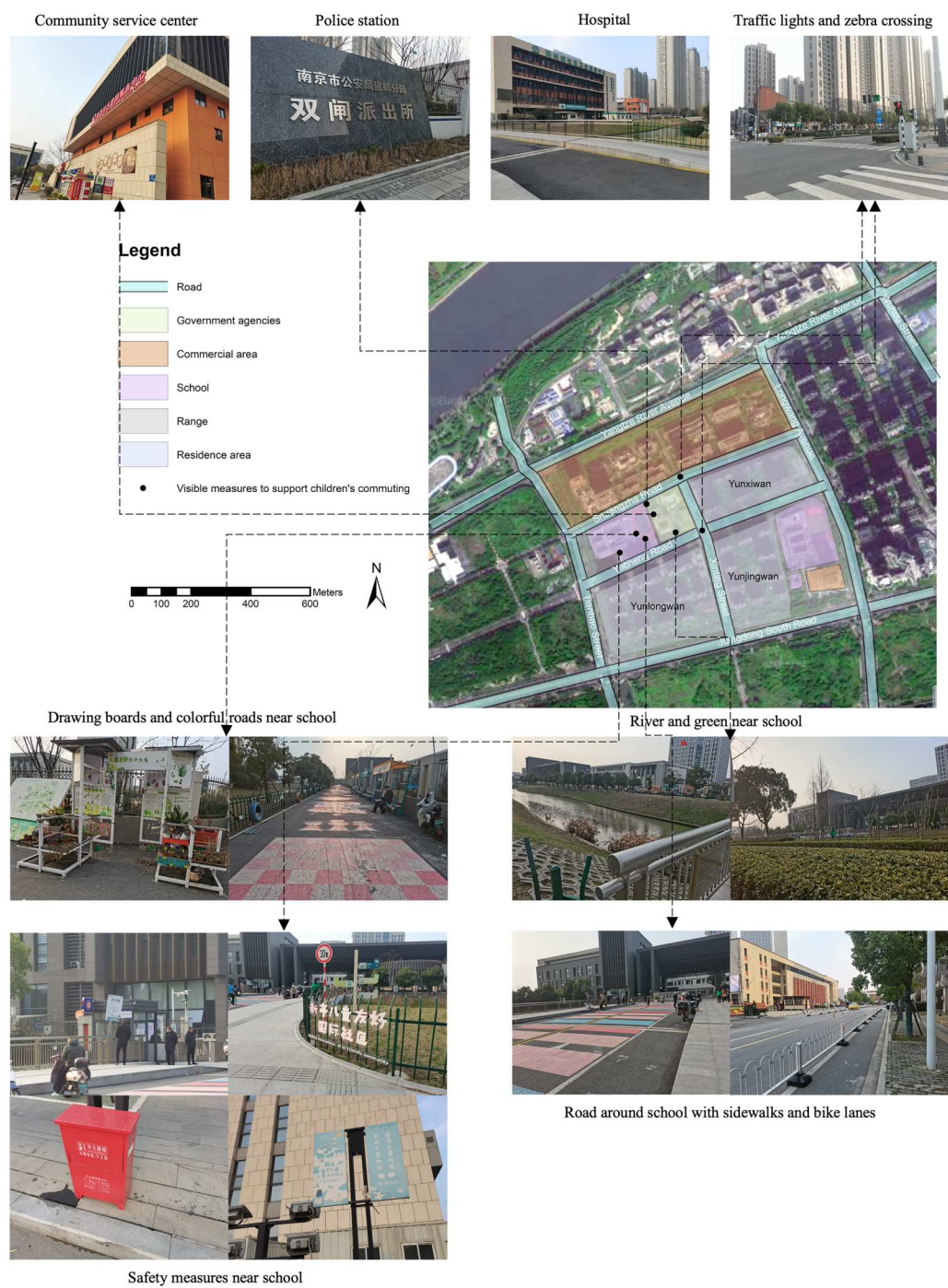


Figure 2. Map and Photos in Xinting Community.

These findings suggest that local efforts have focused primarily on the construction of physical facilities, whereas the non-physical dimensions, such as psychological support, sustained informational outreach, and everyday visibility of supportive resources remain underdeveloped. This discrepancy between policy expectations, media narratives, and spatial realities underscores the



Figure 3. Map and Photos in Lushan Community.

need for communities to move from one-time project implementation toward continuous child-centered support embedded in everyday environments.

4.3. Findings from children's responses

The open-ended responses provide important insights into children's lived experiences and subjective perceptions of their daily school journeys. These qualitative answers reveal specific concerns, frustrations and expectations that quantitative measures alone cannot adequately represent. A



Figure 4. Map and Photos in Zhoudao Jiayuan Community.

total of 40 complete responses were analyzed, and several consistent themes emerged across communities.

Traffic safety emerged as the most common issue across responses. Children frequently pointed to violations by motor vehicles and electric bikes, describing behaviors such as running red lights, failing to yield, or mixing with pedestrian flows. One child noted that ‘there are motorbikes running red lights’ (Child 1, age 11), while another expressed anxiety about congestion, stating that ‘too many cars on the road may lead to traffic accidents’ (Child 2, age 12). These statements reflect

functional path but also as a potential space for learning, play, and social interaction. A small number of responses touched on broader ideas of inclusion and agency. Some children proposed adding convenience stores or breakfast stands, while others expressed a desire for greater involvement in planning: ‘form a group for us and talk to each other’ (Child 16, age 12). This demonstrates an emerging awareness of their rights to participate, which is an element underrepresented in policy documents and only sporadically noted in news coverage.

A word cloud was generated based on the children's suggestions (Figure 6). The visualization highlights high-frequency terms such as 'cars', 'traffic', 'road', and 'green'. The aspects targeted by the children's suggestions align with the parts they perceive as unfriendly in the school commute environment. These findings illustrate that children's concerns align partially with policy priorities, particularly regarding safety and infrastructure, but they also reveal gaps that are not visible through adult-led assessments. Children emphasize maintenance, micro-scale hazards, environmental comfort, and opportunities for participation.

5. Discussion

The combined findings illustrate a tension that is widely observed in contemporary children's mobility scholarship: policy commitments to 'child-friendliness' often translate into visible infrastructural upgrades, yet children's actual experiences of mobility remain shaped by deeper structural, cultural, and governance conditions. The case communities examined in this study demonstrate this divergence clearly. Although substantial improvements have occurred, the everyday reality described by children reveals that commuting remains a negotiated and sometimes uncertain process. Understanding this gap requires situating the findings within broader debates in children's geographies, mobility justice, and participatory urban governance.

5.1. Institutional logics and the limits of infrastructure-centered child-friendliness

The policy content analysis and local news review in Section 4.1 show that current policy instruments establish a clear safety-and-infrastructure orientation: requirements for sidewalks and bike lanes, traffic management near schools, and measures to provide open or temporary child activity



Figure 6. Word cloud of children's responses on suggestions.

spaces were prominent in official documents and reporting (Ministry of Housing and Urban-Rural Development 2021; National Development and Reform Commission 2022; United Nations Children's Fund 2018). This policy focus explains why the field checklist detected widespread 'hard' measures such as zebra crossings, traffic lights, CCTV, school-adjacent traffic calming, in the three pilot communities.

This pattern resonates with longstanding critiques in children's geographies that highlight how child-friendly policies often prioritize adult-defined notions of safety and order, while underrepresenting the relational, emotional, and experiential dimensions of children's mobility (Malone 2006; United Nations Children's Fund 2018). In this sense, child-friendliness becomes synonymous with environmental provision rather than with reshaping governance processes or redistributing power. The low policy emphasis on psychological well-being, differentiated needs, and long-term maintenance further illustrates how infrastructural delivery is privileged over continuous child-centered governance.

This infrastructure-driven logic stands in stark contrast to the emerging 'CalmMobility' paradigm (Turoń 2025). Many of the issues identified in this study, such as children's anxiety regarding motorists running red lights, psychological stress caused by congested intersections, and a sense of uncertainty stemming from uneven maintenance of manhole covers, represent significant environmental stressors that physical provision alone has failed to mitigate. This suggests that even if hardware facilities meet standards, a transportation system cannot truly be called 'child-friendly' without predictability, emotional comfort, and guaranteed routine maintenance. Therefore, achieving child-friendly commuting requires a shift toward reducing environmental stress and enhancing psychological support, so that children feel seen, supported, and psychologically secure during their daily journeys.

5.2. Participation, agency, and the persistence of adult-centric governance

Although policy documents frequently reference 'participation,' the findings indicate that institutionalized mechanisms enabling children to influence mobility planning remain limited. These findings correspond with the international Child-Friendly Communities framework, which emphasizes that transportation policies should extend beyond physical safety to encompass rights protection, participatory mechanisms, and well-being enhancement. For instance, UNICEF's Child-Friendly Cities Initiative underscores the imperative to safeguard children's rights to access services, participate in decision-making, and enjoy equitable and sustainable environments (United Nations Children's Fund 2018). Similarly, participation theories such as Hart's Ladder (Hart 1992) and Pathways to Participation (Shier 2001) stress that effective institutional arrangements must create genuine opportunities for children to influence urban design and commuting policies.

A central issue emerging from the analysis is the persistence of an adult-centric planning logic. Even where physical improvements align with international best practice, the framing of child-friendly commuting remains dominated by adult perceptions of risk, order, and compliance. This tendency has been noted extensively in the literature, where adult-defined priorities, such as efficiency, traffic control, or standardized safety measures often overshadow children's lived spatiality and emotional needs (Malone 2006). The limited institutionalization of children's participation observed in this study is consistent with critiques that participation is frequently tokenistic, episodic, or oriented toward validating predetermined agendas rather than enabling children to articulate their own mobility priorities (Abatay 2019; Shier 2001; Loureiro et al. 2020). The children's open-ended responses, which offered suggestions beyond the scope of existing policies, underscore this asymmetry: children envision commuting environments that are not only safer but also more comfortable, expressive, and socially meaningful.

To bridge the gap between children's subjective experiences and formal urban management, these experiential insights must be institutionalized through specific technical and administrative mechanisms. For example, children's recurring concerns regarding insufficient signal timings

suggest a need to recalibrate pedestrian crossing standards in school zones by using children's average walking speeds rather than adult-centered metrics. Furthermore, these micro-scale observations can be integrated into a routine reporting system where feedback on environmental hazards triggers an official review by municipal maintenance departments. Establishing a regular pedestrian safety audit mechanism specifically for school routes will ensure issues like uneven pavement and visibility gaps are addressed as standard operating procedures. Integrating children's feedback into daily maintenance schedules and budget decisions allows local authorities to move from short-term interventions toward a consistent and responsive management approach.

5.3. Spatial inequality and mobility justice in child-friendly initiatives

The variation observed among the three communities points to broader issues of spatial and social inequity. Although all are located within the same district, disparities in historical development, governance capacity, and demographic composition shape the quality of children's commuting experiences. Newer communities with planned infrastructures achieve closer alignment with policy goals, while resettlement communities face constraints related to overcrowding, limited public space, and uneven maintenance.

This pattern reflects broader discussions on spatial justice and environmental inequality in children's access to safe and supportive environments (Khanian, Laszkiewicz, and Kronenberg 2024; Zannat et al. 2023; Laszkiewicz and Sikorska 2020). The differences observed here suggest that even well-intentioned policy frameworks can inadvertently reinforce disparities when implementation relies heavily on local administrative will, resource availability, or neighborhood activism. The case therefore highlights the need for child-friendly mobility strategies that explicitly integrate equity considerations and ensure that the benefits of urban improvements are distributed evenly across communities.

5.4. Governance capacity, everyday maintenance, and the need for long-term child-centered systems

A final implication concerns the nature of governance capacity required to sustain child-friendly mobility. While infrastructural provision has improved substantially, many issues identified by children, such as blocked sidewalks, chaotic traffic behavior, poor maintenance, inconsistent safety enforcement, are problems of everyday governance rather than of physical design. This distinction is essential because it expands the notion of child-friendly mobility from project-based construction toward ongoing relational work involving coordination, maintenance, and care.

The findings point to a gap between infrastructure provision and ongoing operational management, including maintenance, behavioral regulation, and cross-departmental coordination. This reinforces a recurring conclusion in urban governance literature: child-friendly mobility requires systems of everyday care, accountability, and relational governance involving families, schools, communities, and public agencies (Jung and Kim 2024; Leung et al. 2021; Michail and Ozbil Torun 2024). Additionally, digital feedback platforms and child-facing reporting mechanisms may help bridge the persistent gap between children's lived experiences and administrative priorities (Tori et al. 2024). In this sense, the study suggests that advancing child-friendly commuting demands a shift from project-based delivery toward continuous, child-centered, and collaboratively maintained systems.

6. Conclusion

This study examined child-friendly school commuting through an integrated analysis of policy narratives, media representations, field-based assessments, and children's own descriptions of their

everyday experiences. By bringing together these complementary sources, the research highlights the ways in which institutional priorities, built-environment interventions, and children's perspectives converge and diverge within contemporary child-friendly city initiatives.

The findings show that substantial progress has been made in improving physical safety conditions for children's school journeys. Policies and local media strongly emphasize infrastructural upgrading, and many of these measures were evident across the three pilot communities. Sidewalk improvements, traffic calming, and child-oriented public facilities reflect a sustained governmental effort to build more supportive mobility environments. At the same time, the study reveals important gaps between visible infrastructural achievements and the wider conditions that shape children's mobility. Children's comments point to persistent concerns about congestion, unsafe traffic behavior, and inconsistent maintenance, indicating that physical provision alone does not fully meet their expectations for safety and comfort. The findings also show that participation, psychological support, and everyday governance practices remain underdeveloped compared with the prominence of physical interventions. Variations among the three communities further underscore the influence of neighborhood characteristics and governance capacity in shaping the quality of commuting environments.

By synthesizing these empirical observations with policy analysis, this study offers a conceptual contribution to the field of child-friendly mobility. It demonstrates that the transition from infrastructure-centered provision to continuous, relational governance is not merely a technical adjustment but a necessary evolution in fulfilling children's spatial rights. These findings advance existing debates by clarifying how governance gaps and maintenance shortcomings fundamentally shape children's everyday experiences, even within designated child-friendly communities. They further address the persistent disconnect between rights-based visions and community-level implementation.

This study demonstrates several methodological and analytical strengths that enhance its academic contribution. The research design brings together policy and media content analysis, systematic field observation, and children's own descriptions of their commuting experiences. The integration of these complementary sources enables a multidimensional examination of child-friendly commuting and provides a clearer understanding of how institutional intentions, infrastructural practices and children's lived realities interact with one another. Another strength lies in the inclusion of children's open-ended responses, which provide insight into their subjective interpretations of safety, comfort and environmental quality. This approach is consistent with contemporary scholarship in children's geographies that advocates for grounding empirical research in children's everyday experiences. It also allows the study to move beyond adult-centered interpretations and acknowledge children as competent social actors. A further contribution is the provision of empirical evidence from a rapidly urbanizing context where child-friendly initiatives are actively promoted but academic evaluations remain limited. The findings therefore offer insight that is locally grounded yet relevant to broader discussions on child-friendly mobility across diverse governance environments.

The findings regarding the disconnect between physical infrastructure and everyday governance represent a broader pattern that is likely to resonate with many other urban contexts. While the study is grounded in Nanjing, the challenges identified are structural issues common to many cities undergoing rapid urbanization and implementing similar child-friendly policy agendas. The gap between technical implementation and operational management reflects a widespread tension in urban governance where the speed of construction often exceeds the capacity for long-term oversight. However, the study has several limitations that warrant consideration. The field investigation was conducted in three communities within a single district, which may limit the extent to which the findings capture variation across broader urban or rural settings. Differences in governance capacity, neighborhood demographics and built environment characteristics in other areas may produce distinct commuting conditions that are not reflected in this study. The qualitative component based on open-ended responses was completed by a subset of participants, which restricts

the range and depth of perspectives represented. Younger children may have provided shorter or less detailed descriptions, affecting the richness of the data. The field observations were conducted during selected time periods and could not fully reflect daily or seasonal fluctuations in traffic patterns, facility maintenance or enforcement practices. Although efforts were made to document dynamic issues, real-world commuting conditions may vary beyond what the study was able to capture. The analysis also focused primarily on local policies and local media sources. National policies, social media discourses and school-level governance practices were not systematically included, which creates boundaries for the interpretive scope.

In conclusion, the results suggest that advancing child-friendly school commuting requires moving beyond project-based infrastructure delivery toward more comprehensive forms of child-centered governance. This includes sustained maintenance mechanisms, coordinated management, and platforms that allow children to express their perspectives and contribute to decision-making. Strengthening these aspects can help align institutional intentions with children's lived experiences, while also reducing disparities across different communities. Building on these insights, future research may further explore children's mobility through longitudinal community studies, comparative analyses across cities, and mixed-methods approaches that incorporate school-level governance, digital participation tools, and seasonal commuting variations. Such work can deepen understanding of how child-friendly mobility policies function over time and across diverse urban environments and can help support the development of more equitable and meaningful child-centered mobility systems.

Disclosure statement

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