

# Urban Vulnerability and School Commuting: Implications on Children's Well-Being - A Conceptual Review

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**Abstract:** *Rapid urbanization in cities has increased children's exposure to unequal urban conditions. Nevertheless, the concept of school commuting has not been recognized as a part of the role of urban vulnerability in the well-being of children. This paper hypothesizes the development of an integrative model between the city vulnerability, commute satisfaction, and the well being of school children with Kuala Lumpur as the case study. As the study is based on the ecological systems theory, which is informed by the Socio-Ecological Model (SEM) by Bronfenbrenner (1979) and the Mobility-Well-being Model (MWM) of De Vos et al. (2013), the conceptualization of the urban vulnerability is grounded in the multidimensional nature of this phenomenon, which is influenced by environmental, social, and financial factors that influence the daily mobility of children. It asserts commute satisfaction; according to the perceptions that the children of the city have towards safety, comfort, reliability and emotional experience that has a mediating role on the relationship between the vulnerability of the city and the well-being of kids. Through an emphasis on the school commute as a daily but not unimportant zone of child-city interaction, the study presents a child-specific perspective on metropolitan inequality that transcends the context of the household and school. This project will use Structural Equation Model (SEM) to discuss the response and outcomes using a quantitative design. The framework states the testable hypotheses and provides Kuala Lumpur as a model of a high-growth urbanisation city, where mobility availability is not evenly distributed. This research is relevant to urban transport research and child well-being research by establishing school commuting as an important concern in urban policy that addresses children in a way that is both equal and child-centered.*

**Keywords:** children well being, urban vulnerability, commute satisfaction, school commuting

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## 1. Introduction

The well being of children incorporates physical, psychological and social aspects, which are influenced by their daily environments and practices (Rudd et al., 2023). The school commute across different urban environments is one of them, and its contribution can be overlooked. The daily commuting not only affects physical activity but the well-being on a bigger scale (Friman et al., 2019). The relationship between the movement of children in urban spaces and their subjective well-being is especially important in the fast-developing cities like Kuala Lumpur (Macedo et al., 2021).

As much as urbanization is a good factor in the economic development, it also subjects the children to the inequitable urban life. This fact relates to the fact that the urban environment affects daily experiences of children, and in particular, the process of school transportation (Liu et al., 2024). Nonetheless, commuting is a little-researched aspect of urban vulnerability and its impact on the well-being of children, especially in rapidly growing cities such as Kuala Lumpur (Liu et al., 2024). The current work fills the given gap by introducing an integrative framework which connects urban vulnerability, commute satisfaction, and the general well-being of children. It approaches the research of urban inequality in a child-oriented way (Mustafa et al., 2025; Sari and Lai, 2023).

This research brings out a different angle by focusing not on the home and school environments but the everyday experiences of children in the city when they are out commuting (Aguilar-Farias et al., 2022). It states that the connection between urban vulnerabilities such as environmental, social, and financial, and well-being depends on the experiences of safety, comfort, reliability, and emotional experiences of children during commuting (Aguilar-Farias et al., 2022; Sulaiman et al., 2023). The framework is based on ecological systems theory and specifically Bronfenbrenner Socio-Ecological Model and De Vos et al. Mobility-Well-being Model to show the stratified effects on children movement (Ikeda et al., 2019; Shang et al., 2024) It situates school commuting as a paramount setting to examine the urban inequality in terms of children experiences, as opposed to adult-based metrics.

Hence, the research fills this gap by using an Ecological Systems Theory (Bronfenbrenner, 1979, 1994) to frame the connection of the relationships between urban vulnerability, commute satisfaction, and the well-being of children. According to Ecological Systems Theory, child development is explained as a result of a complex network of environmental systems, or the immediate contexts to the entire structures of the society. In this context, school commute is a mesosystemic process, which links the school and home microsystems. It is influenced by the exosystemic variables like the transport infrastructure, policies concerning mobility, and the safety of the neighborhood, and by the macrosystemic variables like urban planning and socioeconomic inequality.

The current body of literature tends to give a divided picture of school commuting, which is usually investigated with the help of different fields like health, social environment, or transportation, without incorporating these variables into a comprehensive picture of how children travel in cities on a daily basis (Hasanli and Mirzeyev, 2021). Such a narrow methodology is more likely to perceive a child as an individual actor, overlooking the interaction between the influence of the geographic location, age, race, culture, and socioeconomic status on the interactions that children have in their neighborhood and their commuting behavior (Amen and Nia, 2021; Benninger et al., 2022). The existing literature also pays much attention to the adult travel behavior and satisfaction without considering the unique experiences and vulnerabilities children may face, specifically in the conditions of high density urban areas where traffic congestion and safety concerns are widespread (Harumain et al., 2024; van den Berg et al., 2019). This negligence exists in the presence of evidence showing that active travel to school, including walking or cycling, fosters exploration, interacting with other people, and being in the environment, which encourages shared agency and consciousness (Tupper et al., 2023). Movement of children has however been curtailed because of safety issues. These constraints decrease the developmental advantages of active commuting and indicate the necessity of more knowledge of the socio-ecological conditions that influence the perception of safety and travel behavior (Friman et al., 2019; Mitra and Manaugh, 2019). The limitations are especially harsh against those children of lower socioeconomic status that

tend to use active transportation more. This leads to the further reinforcement of inequalities in access to health and developmental opportunities related to active commuting (Westman et al., 2019).

### **Commute Satisfaction**

In the meantime, commute satisfaction can be defined as the subjective ratings of people on the topic of their daily commute, such as safety impressions, comfort, predictability, autonomy, and emotional reaction (Vos et al., 2022). Although the application of the concept has been extended to adult commuters, the literature on its application in school travel by children has been minimal (Waygood et al., 2017). The commuting experiences of children are not that of adults. Adult choices, school schedules and degree of independence define their travel. It might be stressful, tiresome, or anxiety-inducing, but the commute can be enjoyable, social, and even give a person a feeling of autonomy (Westman et al., 2019). These are emotional and experience-based factors that can be significant in the interpretation of how mobility helps in well being. Although commute satisfaction is essential, it is not a common feature of the research on urban vulnerability. Majority of the studies investigate the structural risks without the subjective experiences. This constrains the knowledge of the way children react to commuting conditions, and the ways in which these reactions are associated with the wider distributions of inequality. In this paper, the researcher suggests the use of commute satisfaction as the process, which interconnects urban vulnerability and children lived experiences.

### **Children's Well-Being and Commute Satisfaction**

The level of satisfaction with commuting is becoming an indicator of the overall well-being of children, and it is proven that positive travel experiences help in the psychological and cognitive growth (Vos et al., 2020; Westman et al., 2019). Research indicates that the higher the level of satisfaction with the school commute, the higher the life satisfaction, with the independence, confidence, mood, and enjoyment of being at the travel depending on the children (Friman et al., 2019; Westman et al., 2019). These results imply that the mental health and cognitive outcomes can be improved through the betterment of the commute conditions especially in the aspects of safety and enjoyment (Maghelal, 2025; Ortegon-Sanchez et al., 2025).

Communicating to work or school accompanied by stress, fear, or boredom, on the other hand, may lower the level of well-being and, consequently, lead to environmental anxiety, social isolation, and delays in the acquisition of motor, spatial, social, and analytical skills (Lopes et al., 2018). It follows that safe and active commuting routes are necessary to assist in the development of the area, stimulate environmental involvement, and foster healthier habits (Cleveland et al., 2023).

Walking, public transportation, and school buses also have a positive impact on social capital due to the increased social networks and connection with the community as a consequence of positive travel experiences (Waygood, 2019; Westman et al., 2019). Socio-ecological platform focuses on the importance of the environmental and social factors that determine mobility of children and allow or restrict their possibilities to engage in active commuting on the basis of parental attitudes and community norms (Viola et al., 2021; Waygood, 2019).

### **Urban Vulnerability and Children's Well-being**

Children tend to understand the environment as less safe than adults, as this is a spatial preference, attention, emotional reaction, and interpretation of the environmental features

(Wang et al., 2025). Their dissimilarity points to the need to consider the views of the children in the urban planning and go beyond the adult-oriented models to design the environments that are more responsive to the safety and developmental requirements of children (Sadler and Lafreniere, 2017).

The sensitivity of children as well as their cognitive development especially at the stage of concrete operation affect how they will interact with the environment. Their sensations are more inclined to the intuitive and instant emotional reactions, and they demonstrate certain safety inclinations towards such features like the sky, water, and sidewalks (Wang et al., 2025). Such preferences tend to be more different than the adult judgments that are based more on acquired experience and general contextual judgments.

The concept of the urban experience and vulnerability of children is complex and requires a complex approach to understanding how individual, social, and environmental factors interact (Maghelal, 2025). Such an approach should take into consideration the developmental stages of children and their peculiarities of understanding their well-being. Consequently, needs investigation involving individual-level information on the lived experiences of children in urban areas and perceived safety (Pei et al., 2023; Wang et al., 2025).

## 2. Conceptual Framework

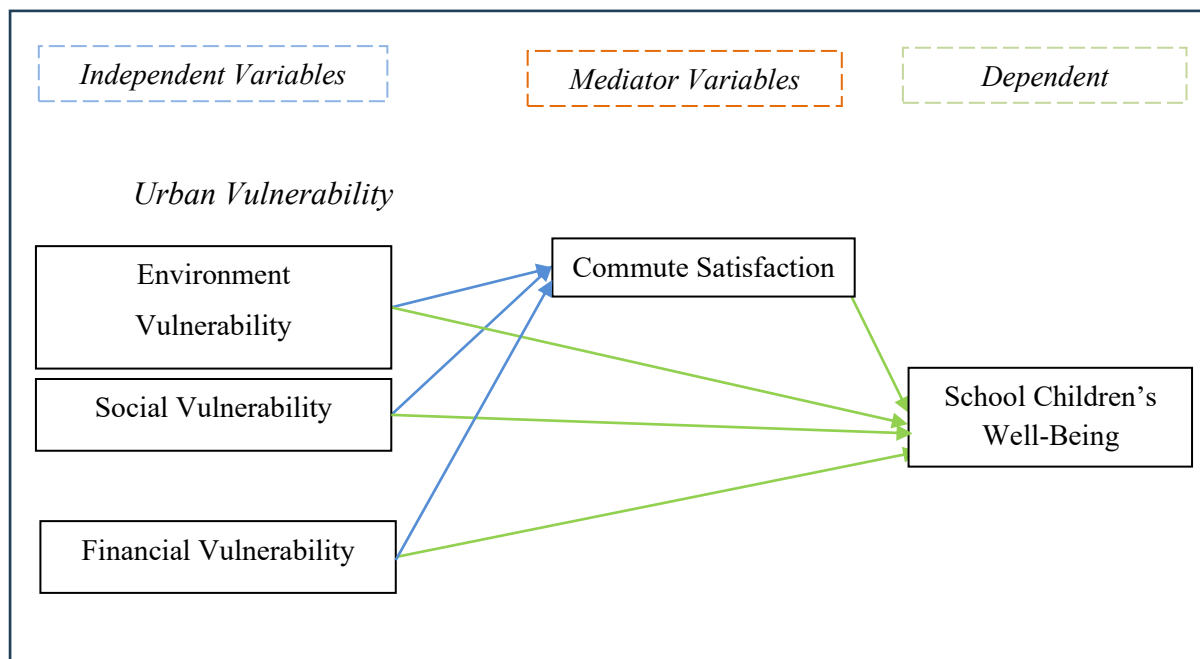


Figure 1: Conceptual Framework

This paper suggests a conceptual framework where the well being of school children is at the crossroad of the vulnerability of living in urban areas and the experiences of commuting to school. Instead of considering children mobility as a specific behavioural outcome, the conceptual framework takes the school commuting as a relationship and experience process in which the wider urban vulnerabilities are reflected in daily well-being. By so doing, it addresses the demand in the literature on urban and transport studies of more child-centred, well-being-oriented approaches that go beyond efficiency-best-practice analyses (Chatterjee et al., 2019; De Vos et al., 2013; Mitra and Manaugh, 2019).

The main concept in the framework is the urban vulnerability, which is a multidimensional state resulting due to the quality of the residential environment, financial vulnerability, and social vulnerability. These dimensions are structural and contextual factors which affect the everyday life of children in cities. The environment vulnerability means the neighbourhood attributes such as land-use patterns, the quality of infrastructure, and school accessibility. Household economic constraints which restrict access to transport and negotiating urban risks are captured under financial fragility. Social vulnerability involves exposure to traffic risks, accidents and care giving limitations. A combination of these dimensions demonstrates that the vulnerability of children is entrenched in domestic circumstances and urban structures, and it cannot be traced to the personal characteristics of children.

In this model, the commute satisfaction plays an intermediate role between the vulnerability to urban living and the well being of children. Being a subjective measurement of school travel, it consists of thoughts of safety, comfortability, reliability and emotional perceptions. The framework is based on transport satisfaction studies, which consider commuting to be different based on the quality of the urban setting and available resources in the household (De Vos et al., 2013). The experiences play a central role in the formation of emotional states and everyday social interactions among children whose mobility is usually restricted, and who are supervised during such experiences. The framework shows that the vulnerability of urban living affects the ability of commuting to either facilitate or impede the ability to obtain education, peer interaction, and extracurricular activity. When the environment is unsafe, with bad infrastructure or economic status, school travel can be stressful, time consuming or physically challenging. These aspects may limit the social interactions and diminish learning preparedness. On the other hand, secure and reliable travels can increase autonomy, social bond, and emotional health. The framework is based on the Ecological Systems Theory and places these dynamics at the nested levels of the environment. The vulnerability of urban living is exosystemic and macrosystemic impacts on urban living caused by urban planning, transport systems and socio-economic systems. The mesosystem level of the commute satisfaction is the connection between home and school environment. The well being of children is due to recurring of such commuting conditions over a period of time. With a commute satisfaction identified in this structure, the framework establishes the means of experiencing and internalising structural inequalities in day to day mobility.

The framework does not consider children as passive receivers of the urban conditions. Rather, it does acknowledge them as subjective interpreters of their commuting lives, whose feelings and impressions form their well being. This school of thought is in line with the latest studies that focus on children as the voices and lived experiences on urban and mobility studies (Chatterjee et al., 2019; Mitra and Manaugh, 2019). The framework connects both structural analytical views of the vulnerability and the experiential, child-based view through placing commute satisfaction in the centre.

In general, the framework provides a theoretically based method of explaining the impact of the disadvantage of urban life on the well-being of children in their daily commuting. It gives a basis to empirical studies and supports a normative point: to enhance child well-being in urban places, it is necessary not only to focus on residential and educational contexts, but also on the paths between them. School commuting is an essential but understudied area of child responsive policy and planning identified by the framework in the rapidly urbanizing contexts like Kuala Lumpur where mobility inequalities are determined by urban form and governance structure.

The research uses the current gaps in the literature since it aims at filling the existing gaps by exploring the connection between urban vulnerability and the experiences of school commuting and the well-being of children. It dwells on two overriding questions: How do different types of urban vulnerability like environmental hazards, social disorder, and poor infrastructure influence children in their school commuting experience in different urban contexts? And what are the mediating and moderating variables between urban vulnerability and the overall well-being of children; that is; commute satisfaction, perceived safety, and independent mobility?

This article contributes in 3 ways by combining the ecological systems theory and the study of vulnerability in urban settings and commute satisfaction. First, it constructs child-based approach to the issue of urban vulnerability that prioritizes everyday mobility over residential context. Second, it broadens the research on commute satisfaction by placing the issue of school travel by children into greater ecological and structural frameworks. Third, it redefines school commuting as a focus city practice defining child well-being and has implications on fair and child-centered transport and urban planning in fast-urbanizing contexts.

### **Hypothesis Development**

RQ 1: Does the urban vulnerability affect the welfare of urban schoolchildren?

H 1: Environmental vulnerability has an adverse impact on the well-being of children.

H 2: Children the well-being is adversely affected by financial vulnerability.

H 3: Social vulnerability affects the well-being of children adversely.

RQ 2: To what degree commute satisfaction has an effect on the well-being of urban schoolchildren?

H 4: Commute satisfaction has a positive effect on children well-being.

### **3. Conclusion**

This paper analyzes the interaction between urban vulnerability, school commuting, and the well-being of children in the intricate way. It combines various theoretical approaches to demonstrate how the urban conditions like accessibility, safety, and infrastructure influence the day-to-day school trips of children and how they affect their development. This summary provides the foundations to be used in the future by empirical studies especially studies on psychological and cognitive well-being to explain the links between travel behaviors of children and developmental outcomes. The subjective well-being of children concerning urban mobility and how the various forms of travelling and levels of autonomy affect the experiences of children are areas that further research should examine.

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### **Conflict of Interest Statement**

The authors can state that there exists no conflict of interest in the publication of this study.

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