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Families' perception of safety on school pathways

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ABSTRACT

Children's independent mobility is essential for fostering autonomy, participation, and inclusion in urban spaces. However, many families remain reluctant to allow their children to walk to school alone, often citing safety concerns. This study examines parental perceptions of urban safety and its influence on children's mobility autonomy. A questionnaire was administered to 97 families in Leioa (Bizkaia, Spain), gathering demographic data, school travel habits, and open-ended responses on perceived safety. The responses were analysed using the Reinert method in Iramuteq, revealing six distinct thematic classes. Four classes highlighted key safety concerns: "Poor road safety for pedestrians," "Low police presence," "Roads passing through the town," and "Poor lighting." The remaining two classes reflected contrasting perspectives: "T Perceived neighbourhood safety " and " Perceived safety-enhancing strategies." These findings underscore the need for safer, more inclusive urban environments that encourage children's active mobility. The study aligns with the *Eskolabideak* [School Pathways] project, which promotes healthier, participatory, and inclusive learning environments across 16 municipalities. To enhance children's independent mobility, initiatives must combine urban planning improvements with awareness campaigns targeting families. By addressing safety concerns and fostering a cultural shift towards active mobility, communities can create more child-friendly public spaces, contributing to broader social transformation.

1. Introduction

1.1. Decline of children's independent mobility in contemporary societies

Although a number of studies have highlighted the multiple benefits of children independently walking to school—including positive effects on physical and mental health, social interaction, cognitive development and the acquisition of autonomous mobility skills—this practice is not common in contemporary societies, particularly in wealthier countries where children in the final years of primary education show low levels of independent mobility (Lee et al., 2023). Children in this age group rarely travel unaccompanied to multiple destinations, a pattern that reflects broader cultural, infrastructural and parental-perception changes shaping children's everyday mobility (Malone & Rudner, 2011; Porter & Blaufuss, 2002; Riazi et al., 2022; Tranter & Pawson, 2001; Van Vliet-Lanoë, 1985).

Some researchers have argued that today's children are part of a "bubble wrap" generation, in which active travel around the home environment is restricted by a combination of family anxieties, time pressures due to homework and daily chores, and environmental changes (Kamargianni et al., 2015; Malone, 2007). Indeed, compared to the past, children worldwide are now less likely to be afforded the freedom to walk unaccompanied by an adult from their homes to various destinations (Kyttä, 2004; Prezza et al., 2005).

1.2. Determinants of children's independent mobility: a multifactorial perspective

Recent research suggests that several factors may contribute to this lack of autonomous mobility among children in urban environments. These factors include the growing reliance on cars for transportation, the preference of families for private schools that are usually located further

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away from home, the burden of heavy backpacks, the desire to spend more time with their children, and involvement in after-school activities (Carver et al., 2012; Fotel & Thomsen, 2004; Fyhri et al., 2011; Kyttä, 2004; Steinbach et al., 2012; Timperio et al., 2004).

Additionally, other variables also directly influence child mobility, such as demographic conceptions of the environment, age, gender, cultural perspectives of childhood or parenthood, and concerns about the potential dangers children may encounter when travelling alone (McMillan, 2007; Riazi et al., 2022; Silva Pineiro, 2018). Moreover, many of these influences are interconnected, making it difficult to isolate individual factors and their relationship with perceived risk (Spallek et al., 2006a, 2006b).

1.3. Parental perceptions of safety and risk

Despite the significance of the above-mentioned factors, two factors have proven to be particularly influential in regard to children's autonomous mobility: families' perceptions of safety in their environment and their belief in their child's ability to cope with potential risks (Alparone & Pacilli, 2012). Indeed, previous studies investigating the reasons why parents accompany their children to school often point to concerns related to traffic or 'stranger danger' (Blakely, 1994; Fotel & Thomsen, 2004; Hillman et al., 1990; Jackson & Scott, 1999; Joshi & Maclean, 1995; Lee & Rowe, 1994; Valentine, 1997).

Research on children's independent mobility has conceptualised these parental decisions through the notion of a Children's Independent Mobility (CIM) license, which refers to the degree of autonomy parents grant children to move unaccompanied in public space (Hillman et al., 1990; Kyttä, 2004; Marzi & Reimers, 2018). This "license" is not fixed, but rather negotiated and context-dependent, shaped by perceptions of safety, trust in children's competences, and characteristics of the surrounding environment. From this perspective, parental narratives of safety play a central role in regulating children's everyday mobility, making them a key analytical focus of the present study.

Moreover, these perceived dangers may vary according to children's socioeconomic status, age, gender, ethnicity, and location (Blakely, 1994; Valentine et al., 2004; Weir et al., 2006). However, it is important to note that parents' own descriptions do not necessarily provide an accurate picture of such causal relationships. In particular, individuals often justify their actions according to what they consider socially acceptable (Ahern et al., 2017; Crowne & Marlowe, 1960; Mah et al., 2017).

1.4. Differences between parental and children's perceptions of safety

Recent research on the reasons for using cars for school journeys has identified common responses from family members, including statements such as "the distance to school is too long", "the children are too young" or "it is too unsafe" (Fyhri & Hjorthol, 2009). These studies have revealed that while families are more fearful of traffic and the perceived dangers of crossing the street (Ahlport et al., 2008; Hume et al., 2009; Kerr et al., 2006), this fear is less evident in children (Björklid & Gummesson, 2013).

Instead, children's perceptions of safety are often linked to concerns about encountering strangers, although they generally feel comfortable about walking alone in their neighbourhoods (Björklid & Gummesson, 2013). This implies that we should not necessarily assume that the perceived safety concerns or risks of families and children are aligned, although there may be some degree of mutual influence between them (Hermida et al., 2021; Rudner, 2012).

1.5. Built environment, cultural norms, and mobility imaginaries

Studies conducted in high-income countries show that older primary-school children are often restricted from walking alone, as parents prioritise perceived physical dangers such as traffic, poor lighting and unfamiliar routes (Litsmark et al., 2023; Qiu & Zhu, 2021). These concerns are closely linked to characteristics of the built environment, including road design, traffic volumes and pedestrian infrastructure, which shape everyday mobility practices and perceptions of risk.

Beyond these material conditions, recent scholarship highlights the role of broader socio-cultural norms that frame children's mobility. In particular, the decline of children's independent mobility has been associated with cultural shifts such as intensive parenting and motonormativity. Motonormativity refers not simply to individual car use or parental preferences, but to a dominant socio-technical condition in which automobility is normalised through planning paradigms, infrastructures, institutional practices and shared mobility imaginaries (Walker & te Brömmelstroet, 2025). Within motonormative contexts, streets are primarily designed for motorised traffic, while alternative modes—especially children's independent walking—are framed as inefficient, risky or inappropriate. These dominant imaginaries contribute to expectations of constant adult supervision and reinforce car-oriented school travel as the normative option (Dickinson & Larouche, 2023).

From this perspective, children's independent mobility emerges as the outcome of an interplay between environmental affordances, parental perceptions and broader cultural norms around safety and responsibility. While earlier research foregrounded structural barriers such as traffic density and road design, more recent studies emphasise how parental beliefs, social expectations and risk perceptions mediate children's freedom to move within urban space (Aranda-Balboa et al., 2020; Cadima & Pinho, 2024). This shift underscores the importance of examining how dominant mobility imaginaries and safety narratives are reproduced at the family level, shaping everyday decisions about children's school journeys.

1.6. Urban design, policy initiatives, and active school travel

Recent research has considerably expanded our understanding of children's active and independent school travel, highlighting the multifactorial nature of mobility decisions. International reviews show that parental safety concerns, commuting distance, traffic density and the quality of pedestrian infrastructure remain among the strongest predictors of whether children are allowed to walk independently (Aranda-Balboa et al., 2020; Cadima & Pinho, 2024; Wilson et al., 2028).

Built-environment research has shown that interventions such as School Streets, low-traffic zones and improved pedestrian visibility can increase parents' willingness to allow unaccompanied walking (Srivastava et al., 2025). In Spain, the PACO project ("Pedalea y Anda al Cole") has provided extensive evidence on psychosocial, behavioural and environmental factors associated with active commuting (Chillón et al., 2021). PACO is highlighted here because it offers a nationally grounded framework that informs the interpretation of local mobility patterns in the Spanish context, within which the present study is situated, rather than as an isolated or exceptional case.

Hence, it becomes evident that walking is not merely an individual choice, but is intricately tied to a complex set of psychological, economic, social, cultural, environmental, and political factors (Hermida et al., 2021). According to Johansson's model, various elements, including physical and social environmental factors, individual factors, and child characteristics collectively shape the emotional decision-making process within families when choosing their child's mode of mobility (Johansson, 2006).

1.7. Research gap and aims of the study

Consequently, it is imperative not only to design or adapt environments to be more pedestrian-friendly in order to foster children's inclusion in everyday urban life, but also to understand how families

interpret and negotiate safety and risk when making decisions about children's mobility. Existing research has identified a wide range of built-environment characteristics that encourage autonomous and active child mobility, including schools located closer to home (Babey et al., 2009; Larsen et al., 2009; Schlossberg et al., 2006; Timperio et al., 2006; Yarlagadda & Srinivasan, 2008), higher neighbourhood densities (Braza et al., 2004; Kerr et al., 2006; McDonald, 2008), reduced exposure to busy roads along school routes (Timperio et al., 2006), pedestrian-friendly design features such as improved street-level visibility (McMillan, 2007), wider pavements (Fulton et al., 2005), increased traffic signalling (Buliung et al., 2017; Lopes et al., 2014), and well-connected street networks with dedicated cycling infrastructure (López-Centeno et al., 2021).

However, despite this extensive body of research on infrastructural and environmental determinants, less attention has been paid to how parental narratives of safety are discursively constructed and negotiated in specific urban contexts, and how these interpretations mediate children's opportunities for independent mobility—particularly in municipalities where school-pathway initiatives are already in place. This gap limits our understanding of how infrastructural improvements interact with parental interpretations and everyday safety narratives to enable or constrain children's independent mobility.

In this context, initiatives aimed at promoting autonomous and active school travel increasingly combine urban design interventions with educational and awareness-raising actions targeting families, seeking to foster safer and more child-friendly public spaces. One such initiative is the Eskolabideak [School Pathways] project, developed within the Haurren Hiria [Children's City] Network and involving over 16 municipalities in the Basque Autonomous Community, which aims to revitalise communities by promoting healthier, more participatory and inclusive learning environments.

Within this framework, the present study aims to explore and characterise families' perceptions of safety in relation to children's school journeys, examining how these perceptions are articulated in a local urban context actively promoting autonomous and active mobility. By focusing on parental narratives within the Eskolabideak initiative, this research seeks to contribute empirical evidence on the social and perceptual dimensions of safety that can either facilitate or constrain children's independent mobility in everyday urban environments (Marzi & Reimers, 2018; Riazi et al., 2022).

2. Methodology

2.1. Instrument

Data collection involved the administration of a questionnaire, which was completed by parents and/or legal guardians. The questionnaire consisted of two parts:

1) Demographic information. This section gathered data on participants' age, gender, and the name of the school their child attended.
2) School travel habits. This section focused on whether the children travelled to school alone or accompanied and whether they did so actively or by using a vehicle. Additionally, questions were included about the distance between their home and school and whether they thought that their village was safe. Finally, an open-ended question was included. Specifically, respondents were asked to answer the following question “Do you think your village is a safe place for children to walk alone? Why?”.

The questionnaire was administered electronically using the Easy Survey application and took approximately 30 min to complete. It was distributed through the municipality's educational centres. This study has obtained the approval of the Ethics Committee of the UPV/EHU [Ref.: M10/2020/297].

2.2. Sample

This study involved 97 families residing in Leioa (Bizkaia), a municipality of 29,794 inhabitants located in the Basque Country (northern Spain). Leioa forms part of the metropolitan area of Bilbao and lies approximately 3 km from the Cantabrian coast. Its geography is characterised by a moderately complex topography, consisting of gentle hills, small valleys and discontinuous elevation changes that shape daily mobility patterns. The urban structure combines compact residential areas with several inter-neighbourhood roads and regional traffic corridors, which generate zones of high traffic density. Although the town contains numerous green areas and pedestrian zones, some peripheral neighbourhoods present limited lighting and low pedestrian visibility, which families frequently identify as safety concerns.Leioa also has a strong institutional commitment to promoting active and independent mobility, as it is part of the *Haurren Hirien Sarea* (Children's City Network) and implements the *Eskolabideak* [School Pathways] project in all its primary schools. This context makes the municipality a relevant case study for understanding how parental perceptions of safety interact with environmental characteristics to influence children's independent mobility.

As shown in Fig. 1, the five participating primary schools are distributed across different neighbourhoods of Leioa, providing a diverse urban context for examining families' perceptions of safety along school pathways. The map is included to provide spatial context for the study area and to support the interpretation of parents' narratives, particularly references to neighbourhood discontinuities, traffic exposure and perceived safety along school routes. While no spatial analysis was conducted, the figure enhances readers' understanding of the urban setting in which these perceptions are embedded.

Participants consisted of fathers, mothers and/or legal guardians of children aged 6 to 10 years. Of the respondents, 70% were mothers (n = 68), 30% fathers (n = 29) and 1% other relatives (n = 1). Regarding children's characteristics, 66% were boys (n = 63) and 34% girls (n = 32). In terms of school year distribution, 9% were in 1st grade (n = 8), 8% in 2nd grade (n = 8), 3% in 3rd grade (n = 3), 19% in 4th grade (n = 18), 20% in 5th grade (n = 19) and 25% in 6th grade (n = 23). These age groups were intentionally included because they represent the developmental stage at which school pathway projects are typically implemented and when children begin to develop the skills and autonomy required for independent mobility.

This age range (6–12 years) was selected because school pathway projects are typically introduced at these ages, which are considered appropriate by different authors and local mobility initiatives for

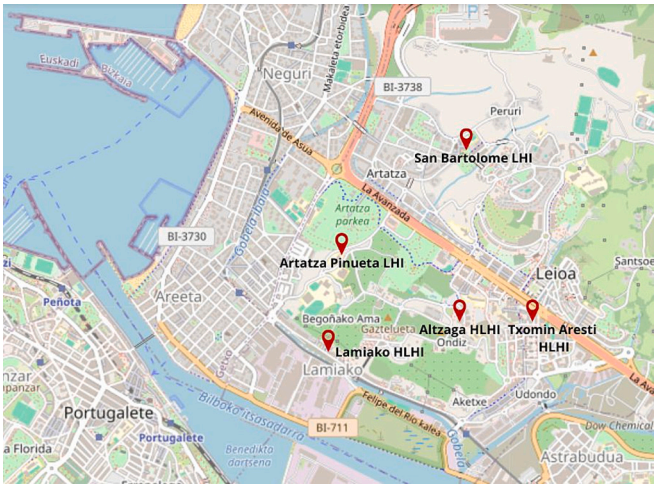

Fig. 1. Location of the five primary schools in Leioa (Bizkaia, Spain) in relation to key urban references.

beginning to work on independent mobility. Parents were selected as participants because the aim of the study was to analyse their perceptions of safety and how these perceptions influence children's travel autonomy.

2.3. Sampling and recruitment procedure

Sampling was conducted using a simple stratification model based on gender and age. The online questionnaire (developed using *Encuesta Fácil*) was sent to all five primary schools in Leioa—four public and one private—each of which distributed it to families through their institutional email systems. All participating schools were actively involved in school pathway initiatives within the framework of the *Haurren Hirien Sarea* network. Participation was voluntary and anonymous.

Although the study was conducted within a municipality actively involved in school-pathway initiatives, the research was designed and carried out independently by the authors. The municipality did not commission the study, intervene in the research design, data collection, analysis or interpretation of results, nor influence the reporting of findings. Municipal participation was limited to facilitating access to schools for questionnaire distribution. This independence was maintained to minimise potential institutional bias and ensure analytical autonomy.

2.4. Data analysis

The Reinert method using Iramuteq software was chosen to analyse the responses of parents regarding safety. This method was used to avoid the reliability and validity issues commonly associated with text analyses (Klein & Likata, 2003; Reinert, 1990). In this study, the responses of children and parents were analysed separately to detect potential differences in their perception of safety.

The choice of a lexicometric approach using the Reinert method is directly aligned with the aims of the study, which seek to explore how families collectively construct and articulate perceptions of safety in relation to children's school journeys. Rather than measuring predefined variables, this method allows for the identification of dominant discursive patterns emerging from parents' own narratives, making it particularly suitable for examining shared meanings, concerns and interpretations of safety within a specific urban context.

The aim of this software is to quantify text and extract its most important structures in order to exploit the essential information contained in the textual data. It has been shown (Reinert, 1990) that these structures are closely linked to the distribution of words in a text and that this distribution is rarely random. The key objectives of this method include describing, classifying, assimilating, and automatically synthesising textual content.

First, the software created a dictionary, focusing solely on the analysis of “whole words” (nouns, verbs, adjectives, adverbs). “Function words” (articles, pronouns, conjunctions) were excluded. Furthermore, the original corpus was segmented into Elementary Contextual Units (ECUs), each comprising approximately the length of a sentence or two, ranging from 30 to 50 words (Kronberger & Wagner, 2000). The software then proceeded to analyse the presence of these words within the ECUs. To facilitate this analysis, the ECUs and their abbreviated forms were cross-referenced to form a contingency table, which showed the distribution of vocabulary according to ECUs. Subsequently, a square distance matrix was generated from this contingency table, where two ECUs are regarded to be in close proximity if they share some of the analysed words (Idoiaga & Belasko, 2019; Reinert, 1990).

Following the creation of the distance matrix, a “top-down hierarchical clustering” analysis was conducted. This analysis aimed to categorise ECUs into groups that most effectively differentiate the vocabulary. By employing this analytical approach, the software facilitated the interpretation of the texts by extracting classes of co-occurring words that best distinguish them from the other classes. To be considered a distinct class, each group must contain at least 5% of the ECUs. Through this process, we identified the main “lexical universes” (Reinert, 1983, 1990; Klein & Licata, 2003) that were present in the corpus.In line with the approach adopted in previous research using the Reinert method (Idoiaga Mondragon et al., 2022), the most significant items of vocabulary in each class were categorised using two criteria: 1) the frequency of the words (specifically only those words with a frequency greater than the mean were selected) and 2) the Chi-square test of association with the class ($\chi\ 2 \geq 32.85$; df = 1). Once these “lexical universes” were identified, they were linked to “passive” variables (independent variables). In the present study, the passive variables were gender (mothers vs. fathers), age, whether or not their children travelled to school independently (boys and girls), whether their children used active modes of transportation (e.g., walking, cycling) or not (e.g., car, bus), the distance between home and school, and whether or not they believed they lived in a safe town (parents).

While the Reinert method provides a systematic, transparent and reproducible approach to identifying lexical structures within large textual corpora, it is not without limitations. As with other lexicometric techniques, the interpretation and labelling of the resulting classes inevitably involve a degree of analytical judgement. Although the statistical classification of textual segments is data-driven, the assignment of conceptual labels relies on researchers' theoretical sensitivity and familiarity with the field.

In order to minimise interpretative bias, class labelling was conducted through an iterative and collaborative process involving multiple researchers, with disagreements discussed until consensus was reached. Nevertheless, the resulting categories should be understood as analytical constructions that capture dominant lexical patterns rather than exhaustive representations of individual experiences. Accordingly, the findings do not aim to generalise at the individual level, but to identify shared discursive patterns shaping parental perceptions of safety.

3. Results

Before analyzing the open-ended question, we first examined the descriptive socio-demographic data and the responses to the most relevant closed-ended items. Table 1 summarizes the distribution of children's school year, parents' gender, proximity between home and school, and the frequency with which children are accompanied on their journey to school. These indicators provide a general overview of the characteristics of the participating families and contextualize the subsequent qualitative analysis.

As shown in Table 1, most participating parents were mothers, and most children were in the final years of primary education, an age range in which independent mobility initiatives such as school pathways are commonly introduced. The predominance of mothers in the sample reflects gendered patterns of caregiving and school-related responsibilities, which are commonly reported in research on children's school mobility. The majority of families perceived their home as

Table 1
Socio-demographic data.

Level of education of parent's children					
1° PE	2° PE	3° PE	4° PE	5° PE	6° PE
%(n)	%(n)	%(n)	%(n)	%(n)	%(n)
14%(13)	15%(14)	3%(3)	19%(18)	20%(19)	25%(23)
In your opinion, your house is close to the school or far?					
Very far	A bit far	middle	Quite close	Very Close	
%(n)	%(n)	%(n)	%(n)	%(n)	
11%(10)	21%(20)	19%(18)	33%(31)	16%(15)	
Regarding how often do you go with the company of adult to the school?					
Never		Sometimes	Many Times	Always	
%(n)		%(n)	%(n)	%(n)	
65%(62)		11%(10)	7%(7)	17%(16)	

Note: PE = Primary Education.

relatively close to the school, although perceptions varied across households. Importantly, a substantial proportion of children reported never being accompanied by an adult, whereas a smaller group reported always travelling with adult supervision. These patterns help frame the analysis of parental perceptions of safety presented in the next section.

The analysis of the open-ended question produced a corpus of 3420 words, including 768 unique lexical items. As illustrated in the dendrogram in Fig. 2, the hierarchical descending classification yielded six distinct classes, each capturing how families conceptualised the safety of their town or city.

Four of these classes reflect perceived sources of insecurity that parents associate with barriers to children's independent mobility, accounting for 62.82% of the total corpus. The remaining two classes capture more positive evaluations of the local environment and parents' perceptions of conditions that may support children's autonomy.

Although key determinants of autonomous mobility—such as traffic volume, vehicle speed and infrastructural characteristics—did not emerge as independent lexical classes, they were consistently embedded across several clusters. In particular, references to speeding vehicles, unsafe crossings, road layout and pedestrian infrastructure were integrated within broader narratives of environmental insecurity, especially in the classes related to pedestrian safety, road structure and lighting. This suggests that parents tend to articulate these determinants as interconnected elements of perceived safety rather than as isolated technical factors.

Some parents also referred to specific areas of the municipality when explaining their safety concerns, mentioning, for example, peripheral zones with poorer lighting, neighbourhoods separated by major traffic corridors, or areas with limited pedestrian visibility. While the study did not conduct a spatial comparative analysis across neighbourhoods, these comments indicate that local environmental characteristics may shape families' perceptions of safety.

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Among the reasons associated with perceptions of insecurity, the first lexical class to emerge through the hierarchical descending classification was labelled *Poor road safety for pedestrians*. This class accounted for 15.38% of the total corpus and was mentioned significantly more often by mothers ($p < 0.05$), as well as by families whose children travel to school by car ($p < 0.05$) or are regularly accompanied by adults ($p < 0.05$).

Narratives within this class frame the urban environment as insufficiently accessible and potentially dangerous for pedestrians, emphasising difficulties related to road safety and pedestrian infrastructure. These perceptions are closely associated with restrictions on children's independent mobility and with a greater reliance on car-based or adult-accompanied school travel. Some of the most significant responses from this class were: "As a woman, I would never walk alone in the afternoon in winter from my neighbourhood to the village because there are areas where traffic is not well regulated and there is little visibility when crossing the zebra crossing" (mother of a 7-year-old girl; $\chi2\ (1) = 158.43$); "The pedestrian crossing is very narrow and there is a risk of being run over when crossing the zebra crossing at the bottom of the school. There is very poor visibility and a pedestrian crossing not regulated by traffic lights, it is difficult to cross certain areas of the village between neighbourhoods" (mother of 8-year-old girl; $\chi2\ (1) = 140.62$); "Because vehicles go too fast they exceed speed limits, there are few signs, zebra crossings are not respected and in winter, lighting is poor and ineffective at zebra crossings" (mother of 9-year-old boy; $\chi2(1) = 136.86$). The predominance of concerns related to pedestrian infrastructure echoes previous evidence showing that inadequate crossings, speeding and limited visibility directly undermine parents' willingness to grant independent walking freedom (Fulton et al., 2005; Kerr et al., 2006). Thus, this class reflects environmental conditions that parents interpret as clear obstacles to children's autonomous mobility.

The second lexical class to emerge also reflects reasons why parents perceive their town or city as unsafe and was labelled *Low police presence*. This class accounted for 15.38% of the total corpus and was mentioned significantly more often by fathers than by mothers ($p < 0.05$). Narratives within this class describe the municipality as lacking sufficient police presence to monitor both road-related and general

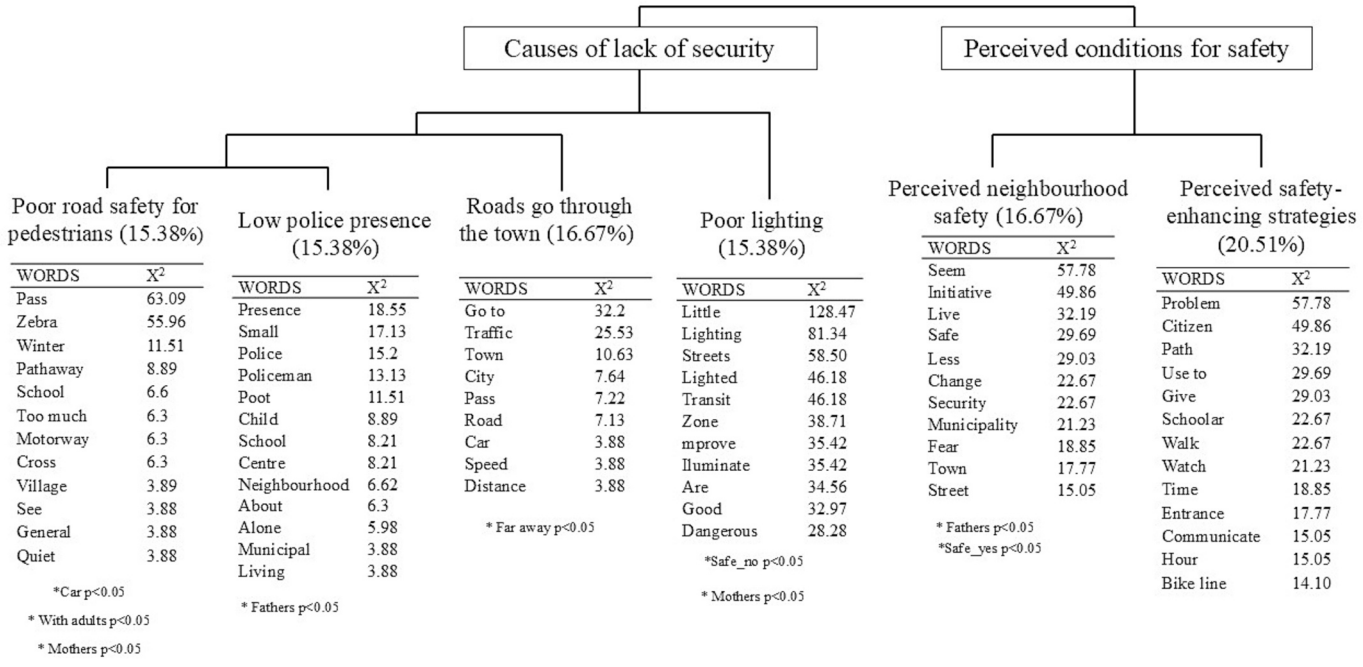

Fig. 2. Hierarchical Descending Classification Dendrogram of parents' responses, showing the most frequent words and those with the most significant association $\chi2\ (1)$, $p < 0.001$ extracted by the Reinert method.

safety, particularly in neighbourhood areas outside the town centre. This perceived absence of institutional surveillance contributes to reduced trust in the environment and reinforces parents' reluctance to allow children to walk to school independently, thereby limiting opportunities for autonomous mobility. Some of the most significant responses in this class were: "We need more police presence throughout the municipality, not just in the centre, I have never seen a municipal police officer on foot in the neighbourhood. The road from here to school is a bit dangerous for such young children" (father of a 9-year-old girl; $\chi2(1) = 117.31$); "Because this weekend a child was mugged in the area and it's not the first time and the police barely pass by where we live. We need more police presence and patrols on foot where the police car cannot pass" (father of 7-year-old boy; $\chi2(1) = 71.16$). This perception contributes to reducing trust in the environment and heightens parents' need for supervision, reinforcing the decline in independent mobility described in multiple studies (Buliung et al., 2017; Malone & Rudner, 2011).

A third thematic pattern, labelled *Roads go through the town*, captures parents' concerns about the presence of major roads or high-traffic corridors crossing the municipality. This class accounted for 16.67% of the total corpus and was mentioned significantly more often by participants who lived farther from the school ($p < 0.01$). Narratives within this class emphasise how traffic-intensive roads divide neighbourhoods and create physical and perceptual barriers for pedestrians, making everyday walking feel unsafe. These spatial discontinuities are perceived as particularly incompatible with children's independent school travel, as they increase exposure to traffic risks and reduce the feasibility of unaccompanied mobility. Some of the most significant responses of this class were: "I live in a town divided by a highway and the streets parallel to the highway are used by drivers to go at an excessive speed. That is why this is a very unsafe town for pedestrians" (parent of a 6-year-old boy; $\chi2\ (1) = 79.37$); "There is an outpost that divides the town, some neighbourhoods are very separated from others, there is a lot of car traffic, the metro is far from the town centre" (parent of a 9-year-old boy; $\chi2\ (1) = 75.10$). High-traffic corridors dividing neighbourhoods are a known barrier to walking autonomy, as they create discontinuities in the environment that families perceive as unsafe (McMillan, 2007; Timperio et al., 2006). This class therefore points directly to structural conditions that discourage children's independent school travel.

Finally, the fourth class related to perceptions of insecurity was labelled *Poor lighting* and captures parents' concerns regarding insufficient illumination in public spaces. This class accounted for 15.38% of the total corpus and was mentioned significantly more often by participants who perceived their town or city as unsafe ($p < 0.05$), as well as by mothers ($p < 0.05$). Narratives within this class emphasise how inadequate lighting, particularly in peripheral or less frequented areas, contributes to feelings of vulnerability and environmental insecurity. These physical characteristics of the road environment are perceived as limiting the safety of pedestrian routes and, consequently, restricting children's opportunities for independent and autonomous mobility. Some of the most significant responses in this class were: "Most of the areas are well lit and busy but the suburbs are a bit more abandoned and it is more dangerous because there is little lighting and few passers-by" (mother of 7-year-old boy; $\chi2\ (1) = 119.35$); "As there are many green areas, there are areas that are poorly lit and not very busy and they are not very well monitored" (mother of 11-year-old boy; $\chi2\ (1) = 100.27$). Poor lighting has been widely documented as a critical deterrent to independent mobility, particularly during winter months or early morning hours (Litsmark et al., 2023). The concerns expressed here illustrate how environmental insecurity limits the perceived feasibility of unaccompanied walking.

In contrast to the classes centred on perceived insecurity, one lexical cluster captures parents' evaluations of the municipality as a generally safe environment. This class, labelled *Perceived neighbourhood safety* (16.67%), was primarily mentioned by participants who described their town as safe ($p < 0.05$) ($p < 0.05$) and by fathers ($p < 0.05$). Rather than denying the existence of risks, these narratives emphasise familiarity, routine use of public space and trust in the local environment, suggesting that perceived safety is constructed through everyday experiences and social presence. Some of the most significant responses from this class were: "I feel that I live in a safe village, which does not mean that there are no risks. I think it is safe to walk on the street, there are some black spots with low lighting at least near my house that should be changed" (parent of 11-year-old boy; $\chi2\ (1) = 105.76$).

A final class, labelled *Perceived safety-enhancing strategies* (20.51%), brings together parents' references to infrastructural features, initiatives and everyday practices that they associate with increased safety and greater feasibility of autonomous mobility. These narratives do not function as prescriptive proposals, but rather reflect parents' interpretations of what makes independent walking feel possible and acceptable in their local context. Some of the most significant responses in this class were: "The town is safer in areas where there are bike lanes or initiatives for children to go on their own, although these do not always reach everyone" (father of 10-year-old girl; $\chi2\ (1) = 75.76$); "Generally speaking, I think I live in a safe town where it is possible to live without fear. The school pathways that have been prepared seem to me to be a good initiative" (parent of 12-year-old boy; $\chi2\ (1) = 73.59$). These two classes, in turn, illustrate that when families perceive the environment as safe or improving, they identify conditions that could support children's autonomy. This mirrors evidence showing that interventions such as school pathways, pedestrian improvements and community-level awareness campaigns can enhance perceptions of safety and increase active and independent school travel (Legorburu Fernández et al., 2023; López-Centeno et al., 2021; Vasey et al., 2022).

Although each class captures a distinct aspect of parental perceptions, clear thematic connections emerged across the clusters. The four classes associated with safety concerns converge on environmental and infrastructural issues that parents identify as barriers to autonomy, while the remaining two classes reflect more positive evaluations or suggestions for improvement. Together, these patterns offer a coherent and multifaceted representation of how families conceptualise safety in their municipality.

These perspectives illustrate how certain environmental and social conditions can either hinder or support children's ability to walk to school without adult supervision, highlighting the central role of independent mobility in families' evaluations of safety. Taken together, the six classes reveal that parental perceptions of safety are strongly intertwined with children's opportunities for independent mobility. In particular, the four classes associated with safety concerns (poor road safety, low police presence, roads cutting through the town, and poor lighting) highlight structural and environmental risks that parents interpret as incompatible with allowing children to walk alone. This pattern aligns with previous research showing that traffic volume, lighting, road structure and visibility are among the most influential factors shaping parental restrictions on autonomy (Marzi & Reimers, 2018; Qiu & Zhu, 2021; Riazi et al., 2022). In contrast, the two classes reflecting positive evaluations of the town and proposed strategies to improve safety suggest that when the built environment is perceived as supportive, parents are more willing to consider autonomous mobility for their children, consistent with findings from studies on Safe Routes to School and child-friendly urban design (López-Centeno et al., 2021; Vasey et al., 2022).

These findings provide the empirical basis for the reflections developed in the discussion section, where the implications of these six classes—particularly the concerns about road safety, lighting, police presence, and structural barriers—are examined in relation to parental fears, safety socialisation and children's independent mobility.

4. Discussion

The findings of this study show that parental perceptions of safety constitute a central mechanism shaping children's opportunities for independent school mobility. Most families in the sample perceived their

town or city as lacking sufficient safety (62.82%), a perception primarily articulated through concerns related to pedestrian infrastructure, traffic intensity, road layout, lighting conditions and police presence. These concerns do not emerge as isolated technical factors, but rather as interconnected elements within broader narratives of environmental insecurity that parents associate with barriers to children's autonomy.

This pattern is consistent with a substantial body of research indicating that parents tend to prioritise physical and environmental risks—such as traffic volume, street lighting, road crossings and pedestrian visibility—when deciding whether to allow children to travel independently (Marzi et al., 2018; Qiu & Zhu, 2021; Riazi et al., 2022). In this sense, our results reinforce evidence documenting the long-term decline in children's independent mobility across many countries, driven by heightened parental risk perceptions, car-oriented urban environments and broader cultural shifts around childhood vulnerability (Ferreira et al., 2024; Marzi & Reimers, 2018; Riazi et al., 2022).

Importantly, parental safety perceptions appear not as discrete assessments of individual risks but as cumulative and relational interpretations of the environment. Traffic conditions, road structure, lighting and surveillance are integrated into broader narratives of insecurity that shape whether children's autonomy is perceived as acceptable or excessively risky. This helps explain why traffic-related determinants, although clearly present in the data, are not articulated as independent concerns but embedded within interconnected safety narratives.

In contrast, children's own perceptions of safety tend to be more strongly associated with fears of encountering strangers or specific situations, such as crossing the street, although these fears are often less pronounced among children themselves (Ahlport et al., 2008; Hume et al., 2009; Kerr et al., 2006; Bjorklid & Gjorthol, 2009). Nevertheless, previous research consistently shows that parental concerns—particularly regarding traffic and so-called "stranger danger"—remain decisive in explaining why adults accompany children to school (Blakely, 1994; Fotel & Thomsen, 2004; Hillman et al., 1990; Jackson & Scott, 1999; Joshi & Maclean, 1995; Lee & Rowe, 1994; Valentine, 1997; Weir et al., 2006). As a result, parental and children's perceptions of safety cannot be assumed to be fully aligned, although reciprocal influence between both perspectives is likely (Hermida et al., 2021; Rudner, 2012).

These findings underscore the importance of examining the social origins of fear and risk perception. Questions such as whether fears of strangers are also present among adults—albeit less openly expressed due to norms of social desirability (Crowne & Marlowe, 1960)—highlight the need to reflect on the safety values transmitted to children through everyday mobility practices. In this sense, it becomes crucial to consider whether current arrangements foster road safety awareness or, conversely, reinforce fears that may constrain autonomy during childhood and beyond (Napier et al., 2011; O'Connor & Brown, 2013).

The composition of the sample, predominantly consisting of mothers, provides an additional interpretative lens for these results. This pattern is well documented in the literature on school mobility and caregiving, where mothers are more frequently involved in everyday decisions regarding children's school journeys and often act as primary gatekeepers of independent mobility (McMillan, 2007; Riazi et al., 2022; Valentine et al., 2004). Rather than representing a methodological limitation, this predominance reflects the gendered organization of care that shapes how safety concerns are articulated and negotiated within families. In this context, the prominence of themes related to pedestrian infrastructure, lighting and supervision may be partly linked to these gendered caregiving roles, while also pointing to the need for future research to explore differences in parental safety narratives.

At the same time, the results indicate that parental perceptions of safety are neither uniformly negative nor static. A proportion of participants perceive their town or village as safe (16.7%), highlighting the relative and contextual nature of fear. Within similar environments, evaluations of safety can vary markedly, shaped by personal experiences, familiarity with the area and broader motivational factors. Moreover, when parents identify safety-enhancing strategies—such as school pathway initiatives or programmes promoting autonomous and active mobility—they tend to interpret these interventions as facilitators of children's autonomy. This finding aligns with previous research showing that infrastructural changes, particularly when combined with educational and community-based initiatives, can increase walking and cycling, reduce pedestrian injury rates and support children's independent mobility (Legorburu Fernández et al., 2023; Lu et al., 2024; Soffian et al., 2022; Vasey et al., 2022).

By situating these findings within the broader literature, the study confirms that parental interpretations of safety remain central to understanding children's mobility patterns, often outweighing children's own perceptions in decisions about autonomy (Aranda-Balboa et al., 2020; Cadima & Pinho, 2024). Our results also resonate with built-environment research demonstrating that traffic-calming measures, improved pedestrian infrastructure and urban reconfiguration can significantly enhance parents' sense of safety (Ikeda et al., 2018; Srivastava et al., 2025). In addition, the value parents attribute to school pathway initiatives mirrors findings from the PACO project, which showed that infrastructural interventions combined with community and school engagement can foster more active and autonomous school travel (Chillón et al., 2021).

The identification of six distinct thematic patterns offers concrete guidance for the design of interventions aimed at promoting children's independent mobility. The four classes associated with perceived insecurity—poor pedestrian safety, low police presence, roads cutting through the town and inadequate lighting—point to specific environmental conditions that parents interpret as incompatible with autonomous school travel. These findings suggest that effective mobility policies should prioritise improvements in pedestrian infrastructure, traffic calming in areas where roads divide neighbourhoods, enhanced lighting in peripheral and less frequented routes, and visible forms of institutional or community surveillance that increase trust in public space. At the same time, the two classes reflecting perceived neighbourhood safety and safety-enhancing strategies highlight the importance of initiatives that reinforce familiarity, continuity of use and collective presence in the streets. School pathway programmes, when combined with educational actions and community engagement, appear particularly well suited to addressing both material conditions and parental perceptions of safety. Rather than focusing solely on infrastructural change, interventions should therefore adopt an integrated approach that acknowledges safety as a relational and socially constructed phenomenon, shaped by everyday experiences, local knowledge and shared mobility cultures.

Several limitations should be considered when interpreting the findings of this study. First, the research was conducted in a single municipality with a relatively small sample size, which limits the generalisability of the results beyond similar urban contexts. While the aim was not statistical representativeness but an in-depth exploration of parental narratives of safety, future studies could extend this analysis to multiple municipalities to examine how local mobility cultures and infrastructural configurations shape safety perceptions in different settings. Second, although the lexicometric approach provides a systematic and transparent method for identifying dominant discursive patterns, the interpretation and labelling of classes inevitably involve analytical judgement. Triangulating these findings with complementary qualitative methods, spatial analyses or objective indicators of the built environment—such as traffic volume, lighting levels or accident data—would strengthen future research. Finally, further studies could explore how parental safety narratives evolve over time in response to school pathway interventions, as well as potential differences between mothers' and fathers' interpretations of risk and autonomy. Such longitudinal and comparative approaches would contribute to a more comprehensive understanding of how perceptions of safety are negotiated and transformed within families and communities.

Overall, this study contributes to the existing literature by providing empirical evidence on how parents interpret safety within an urban context actively promoting school pathway initiatives. Through a lexicometric approach, the identification of six distinct thematic patterns adds analytical nuance to current debates on children's independent mobility, illustrating how infrastructural, environmental and social factors intersect in shaping parental decisions. These findings reinforce the importance of participatory and reflective approaches to urban and school-pathway design that not only address physical barriers but also engage with parental perceptions and local mobility cultures. Strengthening both the physical environment and parents' sense of safety is therefore fundamental for promoting children's independent mobility and advancing more child-friendly, autonomous and sustainable urban contexts.

CRediT authorship contribution statement

Naiara Berasategi Sancho: Writing – review & editing, Writing – original draft, Supervision, Data curation, Conceptualization. **Nahia Idoiaga-Mondragon:** Writing – original draft, Methodology, Conceptualization. **Maitane Picaza Gorrotxategi:** Writing – review & editing, Writing – original draft, Conceptualization. **Maria Dosil Santamaria:** Writing – review & editing.

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Data availability

Data will be made available on request.

References

Ahern, S. M., Arnott, B., Chatterton, T., de Nazelle, A., Kellar, I., & McEachan, R. R. (2017). Understanding parents' school travel choices: A qualitative study using the theoretical domains framework. *Journal of Transport & Health, 4*, 278–293.

Ahlport, K. N., Linnan, L., Vaughn, A., Evenson, K. R., & Ward, D. S. (2008). Barriers to and facilitators of walking and bicycling to school: Formative results from the non-motorized travel study. *Health Education & Behavior, 35*(2), 221–244.

Alparone, F. R., & Pacilli, M. G. (2012). On children's independent mobility: The interplay of demographic, environmental, and psychosocial factors. *Children's Geographies, 10*(1), 109–122.

Aranda-Balboa, M. J., Huertas-Delgado, F. J., Herrador-Colmenero, M., Cardon, G., & Chillón, P. (2020). Parental barriers to active transport to school: A systematic review. *International Journal of Public Health, 65*(1), 87–98.

Babey, S. H., Hastert, T. A., Huang, W., & Brown, E. R. (2009). Sociodemographic, family, and environmental factors associated with active commuting to school among US adolescents. *Journal of Public Health Policy, 30*, S203–S220.

Björklid, P., & Gummesson, M. (2013). *Children's independent mobility in Sweden*. No. 2013: 113.

Blakely, K. S. (1994). Parents' conceptions of social dangers to children in the urban environment. *Children's Environments*, 16–25.

Braza, M., Shoemaker, W., & Seeley, A. (2004). Neighborhood design and rates of walking and biking to elementary school in 34 California communities. *American Journal of Health Promotion, 19*(2), 128–136.

Buliung, R. N., Larsen, K., Faulkner, G., & Ross, T. (2017). Children's independent mobility in the City of Toronto, Canada. *Travel Behaviour and Society, 9*, 58–69.

Cadima, C., & Pinho, P. (2024). Walkability and parental safety perceptions as determinants of children's school commutes: A systematic review. *Urban Planning, 9*.

Carver, A., Timperio, A. F., & Crawford, D. A. (2012). Young and free? A study of independent mobility among urban and rural dwelling Australian children. *Journal of Science and Medicine in Sport, 15*(6), 505–510.

Chillón, P., Gálvez-Fernández, P., Huertas-Delgado, F. J., Herrador-Colmenero, M., Barranco-Ruiz, Y., Villa-González, E., & Mandic, S. (2021). A school-based randomized controlled trial to promote cycling to school in adolescents: The PACO study. *International Journal of Environmental Research and Public Health, 18*(4), 2066.

Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24*, 349–354.

Dickinson, M., & Larouche, R. (2023). Children's right to the city and their independent mobility: Why it matters. *Journal of Epidemiology and Community Health*. https://doi.org/10.1136/jech-2023-221067

Ferreira, I. A., Fornara, F., Pinna, V., Manca, A., & Guicciardi, M. (2024). Autonomy as key to healthy psychological well-being: A systematic literature review on children's independent mobility, cognitive and socio-emotional development. *Journal of Transport & Health, 38*, Article 101837. https://doi.org/10.1016/j.jth.2024.101837

Fotel, T., & Thomsen, T. U. (2004). The surveillance of children's mobility. *Surveillance and Society, 1*(4), 535–554.

Fulton, J. E., Shisler, J. L., Yore, M. M., & Caspersen, C. J. (2005). Active transportation to school: Findings from a national survey. *Research Quarterly for Exercise and Sport, 76*(3), 352–357.

Fyhri, A., Hjorthol, R., Mackett, R. L., Fotel, T. N., & Kyttä, M. (2011). Children's active travel and independent mobility in four countries: Development, social contributing trends and measures. *Transport Policy, 18*(5), 703–710.

Hermida, C., Naranjo, G., Peña, J., Quezada, A., & Orellana, D. (2021). Avances en el conocimiento de la relación entre la movilidad activa a la escuela y el entorno urbano. *Revista de Urbanismo, 45*, 182–198.

Hillman, M., Adams, J., & Whitelegg, J. (1990). *One false move*. London: Policy Studies Institute.

Hume, C., Timperio, A., Salmon, J., Carver, A., Giles-Corti, B., & Crawford, D. (2009). Walking and cycling to school: Predictors of increases among children and adolescents. *American Journal of Preventive Medicine, 36*(3), 195–200.

Idoiaga, N., & Belasko, M. (2019). Understanding menstruation: Influence of gender and ideological factors. A study of young people's social representations. *Feminism & Psychology, 29*(3), 357–373.

Idoiaga Mondragon, N., Berasategi Sancho, N., Ozamiz-Etxebarria, N., & Alonso Saez, I. (2022). Coping with COVID-19: Social representations underlying blaming processes and fear. *Psychology & Health, 37*(7), 828–846.

Ikeda, E., Hinckson, E., Witten, K., & Smith, M. (2018). Associations of children's active school travel with perceptions of the physical environment and characteristics of the social environment: A systematic review. *Health & Place, 54*, 118–131.

Jackson, S., & Scott, S. (1999). Risk anxiety and the social construction of childhood. In *Risk and sociocultural theory: New directions and perspectives* (pp. 86–107).

Johansson, M. (2006). Environment and parental factors as determinants of mode for children's leisure travel. *Journal of Environmental Psychology, 26*(2), 156–169.

Joshi, M. S., & MacLean, M. (1995). Parental attitudes to children's journeys to school. *World Transport Policy and Practice, 1*(4), 29–36.

Kamargianni, M., Dubey, S., Polydoropoulou, A., & Bhat, C. (2015). Investigating the subjective and objective factors influencing teenagers' school travel mode choice–an integrated choice and latent variable model. *Transportation Research Part A: Policy and Practice, 78*, 473–488.

Kerr, J., Rosenberg, D., Sallis, J. F., Saelens, B. E., Frank, L. D., & Conway, T. L. (2006). Active commuting to school: Associations with environment and parental concerns. *Medicine & Science in Sports & Exercise, 38*(4), 787–793.

Klein, O., & Licata, L. (2003). When group representations serve social change: The speeches of Patrice Lumumba during the Congolese decolonization. *British Journal of Social Psychology, 42*(4), 571–593.

Kronberger, N., & Wagner, W. (2000). Keywords in context: Statistical analysis of text features. In *Qualitative Researching with Text, Image and Sound: A Practical Handbook* (pp. 299–317).

Kyttä, M. (2004). The extent of children's independent mobility and the number of actualized affordances as criteria for child-friendly environments. *Journal of Environmental Psychology, 24*(2), 179–198.

Larsen, K., Gilliland, J., Hess, P., Tucker, P., Irwin, J., & He, M. (2009). The influence of the physical environment and sociodemographic characteristics on children's mode of travel to and from school. *American Journal of Public Health, 99*(3), 520–526.

Lee, J. S., Park, Y., & Gim, T. H. T. (2023). Getting to school on your own: The correlates of independence and modes of active school travel. *Journal of Asian Architecture and Building Engineering, 22*(3), 1430–1443. https://doi.org/10.1080/13467581.2022.2085721

Lee, T., & Rowe, N. (1994). Parents' and children's perceived risks of the journey to school. *Arch Behav, 10*(4), 379–389.

Legorburu Fernández, I., Idoiaga Mondragón, N., Alonso Saenz, I., & Berasategi Sancho, N. (2023). Segurua al da eskolara bakarrik joatea? Generoaren eragina haurren mugikortasun autonomoan. *Uztaro, 124*, 5–22.

Litsmark, A., Rahm, J., & Mattsson, P. (2023). Children's independent mobility during dark hours: A scoping review. *Frontiers in Public Health, 11*, Article 1110224. https://doi.org/10.3389/fpubh.2023.1110224

Lopes, F., Cordovil, R., & Neto, C. (2014). Children's independent mobility in Portugal: Effects of urbanization degree and motorized modes of travel. *Journal of Transport Geography, 41*, 210–219.

López-Centeno, F. D., Gálvez-Fernández, P., Herrador-Colmenero, M., & Lara-Sánchez, A. J. (2021). Intervención educativa para incentivar hábitos de desplazamiento activo al colegio en escolares de primaria educational intervention to incentive habits of active commuting to school in primary school. *Journal of Sport and Health Research, 13*(2), 331–346.

Lu, C., Yu, C., & Liu, X. (2024). Evaluating the quality of children's active school travel spaces and the mechanisms of School District friendliness impact based on multi-source big data. *Land, 13*(8), 1319. https://doi.org/10.3390/land13081319

Mah, S. K., Nettlefold, L., Macdonald, H. M., Winters, M., Race, D., Voss, C., & McKay, H. A. (2017). Does parental support influence children's active school travel? *Preventive Medicine Reports, 6*, 346–351.

Malone, K. (2007). The bubble-wrap generation: Children growing up in walled gardens. *Environmental Education Research, 13*(4), 513–527.
Malone, K., & Rudner, J. (2011). Global perspectives on children's independent mobility: A socio-cultural comparison and theoretical discussion of children's lives in four countries in Asia and Africa. *Global Studies of Childhood, 1*(3), 243–259.
Marzi, I., Demetriou, Y., & Reimers, A. K. (2018). Social and physical environmental correlates of independent mobility in children: A systematic review taking sex/gender differences into account. *International Journal of Health Geographics, 17*, 24. https://doi.org/10.1186/s12942-018-0140-5
Marzi, I., & Reimers, A. K. (2018). Children's independent mobility: Current knowledge, future directions, and public health implications. *International Journal of Environmental Research and Public Health, 15*(11), 2441. https://doi.org/10.3390/ijerph15112441
McMillan, T. E. (2007). The relative influence of urban form on a child's travel mode to school. *Transportation Research Part A: Policy and Practice, 41*(1), 69–79.
Napier, M. A., Brown, B. B., Werner, C. M., & Gallimore, J. (2011). Walking to school: Community design and child and parent barriers. *Journal of Environmental Psychology, 31*(1), 45–51.
O'Connor, J., & Brown, A. (2013). A qualitative study of 'fear'as a regulator of children's independent physical activity in the suburbs. *Health & Place, 24*, 157–164.
Porter, G., & Blaufuss, K. (2002, May). *Children, transport and traffic in southern Ghana. In International workshop on children and traffic, Copehagen: Denmark*.
Prezza, M., Alparone, F. R., Cristallo, C., & Luigi, S. (2005). Parental perception of social risk and of positive potentiality of outdoor autonomy for children: The development of two instruments. *Journal of Environmental Psychology, 25*(4), 437–453.
Qiu, L., & Zhu, X. (2021). Housing and community environments vs. independent mobility: Roles in promoting children's independent travel and unsupervised outdoor play. *International Journal of Environmental Research and Public Health, 18*(4), 2132. https://doi.org/10.3390/ijerph18042132
Reinert, M. (1983). Une méthode de classification descendante hiérarchique: application à l'analyse lexicale par contexte. *Les cahiers de l'analyse des données, 8*(2), 187–198.
Reinert, M. (1990). Alceste une méthodologie d'analyse des données textuelles et une application: Aurelia De Gerard De Nerval. *Bulletin of Sociological Methodology/Bulletin de méthodologie sociologique, 26*(1), 24–54.
Riazi, N. A., Wunderlich, K., Yun, L., Paterson, D. C., & Faulkner, G. (2022). Social-ecological correlates of children's independent mobility: A systematic review. *International Journal of Environmental Research and Public Health, 19*, 1604. https://doi.org/10.3390/ijerph19031604
Rudner, J. (2012). Public knowing of risk and children's independent mobility. *Progress in Planning, 78*(1), 1–53.
Schlossberg, M., Greene, J., Phillips, P. P., Johnson, B., & Parker, B. (2006). School trips: Effects of urban form and distance on travel mode. *Journal of the American Planning Association, 72*(3), 337–346.
Silva Pineiro, R. (2018). Los proyectos de caminata rumbo a la escuela para el conocimiento del entorno y favorecer actitudes y hábitos saludables desde educación infantil. *Educación, 27*(53), 177–202.
Soffian, N. S. M., Ahmad, A., & Mohd Rosli, N. (2022). A systematic literature review on safe routes to school (SRTS) program and factors influencing travel mode choice to school. In *In 1st international e-conference on Green and safe cities 2022* (pp. 668–680). Universiti Teknologi MARA.
Spallek, M., Turner, C., Spinks, A., Bain, C., & McClure, R. (2006a). Walking to school: Distribution by age, sex and socio-economic status. *Health Promotion Journal of Australia, 17*(2), 134–138.
Spallek, M., Turner, C., Spinks, A., Bain, C., & McClure, R. (2006b). Walking to school: Distribution by age, sex and socio-economic status. *Health Promotion Journal of Australia, 17*(2), 134–138.
Srivastava, A. K., Sharma, S., & Sahay, A. (2025). Determinants of active travel to school in cities: A systematic review on sustainable travel. *Sustainable communities, 2*(1), 2449263.
Steinbach, R., Green, J., & Edwards, P. (2012). Look who's walking: Social and environmental correlates of children's walking in London. *Health & Place, 18*(4), 917–927.
Timperio, A., Ball, K., Salmon, J., Roberts, R., Giles-Corti, B., Simmons, D., & Crawford, D. (2006). Personal, family, social, and environmental correlates of active commuting to school. *American Journal of Preventive Medicine, 30*(1), 45–51.
Timperio, A., Crawford, D., Telford, A., & Salmon, J. (2004). Perceptions about the local neighborhood and walking and cycling among children. *Preventive Medicine, 38*(1), 39–47.
Tranter, P., & Pawson, E. (2001). Children's access to local environments: A case-study of Christchurch, New Zealand. *Local Environment, 6*(1), 27–48.
Valentine, G. (1997). Oh Yes I Can."Oh no you can't": Children and parents' understandings of kids' competence to negotiate public space safely. *Antipode, 29*(1), 65–89.
Fyhri, A., & Hjorthol, R. (2009). Children's independent mobility to school, friends and leisure activities. *Journal of transport geography, 17*(5), 377–384.
Valentine, G., Holloway, S. L., & Bingham, N. (2004). Transforming cyberspace: Children's interventions in the new public sphere. In *Children's geographies* (pp. 135–149). Routledge.
Van Vliet-Lanoë, B. (1985). Frost effects in soils. *Soils and quaternary landscape evolution, 117*, 158.
Vasey, T., Carroll, S. J., Daniel, M., & Cargo, M. (2022). Changing primary school children's engagement in active school travel using safe routes to school interventions: A rapid realist review. *International Journal of Environmental Research and Public Health, 19*(16), 9976.
Walker, I., & te Brömmelstroet, M. (2025). Why do cars get a free ride? The social-ecological roots of motonormativity. *Global Environmental Change, 91*, Article 102980.
Yarlagadda, A. K., & Srinivasan, S. (2008). Modeling children's school travel mode and parental escort decisions. *Transportation, 35*, 201–218.