

WORKING PAPER N° IDB-WP-01781

Navigating School Journeys:

Barriers and Enablers for Children and Caregivers in Nassau, Bahamas

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Transport Division

November 2025

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November 2025

**Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library**

Navigating school journeys: barriers and enablers for children and caregivers in Nassau, Bahamas / Lynn Scholl, Daniel Oviedo, Orlando Sabogal-Cardona, Camila Casas, Llando Chea, Jose Luis Saboin.

p. cm. — (IDB Working Paper Series ; 1781)

Includes bibliographic references.

1. School day-Bahamas. 2. School children-Transportation-Bahamas. 3. Traffic safety and children-Bahamas. I. Scholl, Lynn. II. Oviedo, Daniel. III. Sabogal-Cardona, Orlando. IV. Casas-Cortes, Camila. V. Llando, Chea. VI. Saboin, José Luis. VII. Inter-American Development Bank. Transport Division. VIII. Series.

IDB-WP-1781

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Acronyms

EFA	Exploratory Factor Analysis
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
KMO	Kaiser-Meyer-Olkin
MoEVTT	Ministry of Education and Vocational and Technical Training
MOW&FIA	Ministry of Works and Family Island Affairs
NPRIP	New Providence Road Improvement Project
SIDS	Small Island Developing States

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Abstract

This study explores the multiple enablers and barriers to school transportation and their broader social implications in Nassau, the capital of The Bahamas. We examine the complex interplay between physical, functional, and social factors shaping children's, parents', and caregivers' daily access to school. A central revelation is the profoundly gendered nature of school transportation responsibilities in Nassau, with women constituting 83% of our sample who organize or undertake these daily journeys. Drawing on semi-structured interviews, focus groups, and a survey of 477 caregivers across Nassau, we adopt a mixed-methods approach combining descriptive statistics, factor analysis, and cluster modelling. We identify four distinct groups based on their perceptions of traffic safety, harassment risks, and climate-related barriers, including one cluster for whom flooding and other extreme weather concerns are central drivers of school transportation challenges. Our findings reveal that inadequate infrastructure, minimal enforcement of school zone traffic laws, and the perceived threat of harassment or violence pose significant barriers to children's safe and enjoyable access to education. At the same time, extended family support and targeted school-zone measures emerge as notable enablers, alleviating some of the burdens placed on caregivers. Building on these insights, we offer evidence-based recommendations for policy and practice, underscoring the need for cross-sector collaboration to enhance infrastructure, strengthen traffic law enforcement, and address social vulnerabilities. By highlighting cluster-specific concerns—from gender-based violence to climate impacts—this paper provides a nuanced understanding of how school transportation challenges intersect with gender norms and broader societal issues, offering practical pathways toward more inclusive and resilient mobility systems for children and their caregivers. The paper also outlines future research directions around the consequences of these barriers and enablers for caregivers' time use, labor participation and well-being.

Keywords: School Transportation, Caregivers, Enablers, Barriers, Mobility of Care

JEL Classification: I23, I28 R40, R48

1. Introduction

School transportation in the urban Caribbean presents various challenges that can limit children's access to education and place a particular burden on caregivers, most of whom are women. In Nassau, the capital of The Bahamas, these challenges become more apparent given rising poverty rates, pronounced inequalities, and insufficient transportation infrastructure. Although The Bahamas is classified as a high-income country, recent data indicates that the lowest 40% of the population accounts for only 16% of total consumption, highlighting uneven access to the resources required for reliable mobility, and signaling inequalities in the ability of different households to navigate access to school (The World Bank, 2023).

In Nassau, fragmented public transit services and inadequate pedestrian infrastructure lead to concerns about cost, safety, and the time needed to ensure children arrive at school without incident for families relying on these transportation options. Studies in other Global South contexts show that absent or poorly maintained infrastructure and a lack of traffic safety measures can make children's commutes hazardous, contributing to an over-reliance on motorized transportation (Aranda-Balboa et al., 2020). Private vehicle dependency for school commutes disrupts household schedules, the distribution of caregiving responsibilities, and contributes to congestion across the city, particularly during drop-off and pick-up school peak times. Research has also identified concerns about crime and harassment as significant factors in many caregivers' decisions to avoid walking or using public transportation, which further limits the feasibility of less expensive and active travel options (Montoya-Robledo et al., 2020; Roy et al., 2024).

Despite its relevance for households and the city's mobility, and after checking on specialized academic databases, there has been no prior research on the various determinants of access to school in The Bahamas. Furthermore, there is currently no empirical evidence on the strategies children, and their caregivers use to secure access to school or the consequences they face on individual, household, and community scales. Therefore, as the first study that examines **what transportation barriers and enablers children and their caregivers of different income levels and neighborhood characteristics face when traveling to and from school in Nassau**, this paper serves to fill an important gap in the research on school transportation.

Understanding how school transportation barriers intersect with gendered caregiving responsibilities is central to this objective. Numerous studies have shown that women bear a disproportionate share of household and caregiving tasks, often involving arranging or accompanying children during daily commutes (Schwanen, 2008; McDonald, 2008). In contexts with limited transportation services, these responsibilities can lead to decreased labor market participation, increased time poverty, and emotional strain (Schwanen et al., 2015). Societal norms regarding children's independence, along with concerns about road safety or harassment, may further drive protective behaviors, such as insisting on private vehicle use or close supervision (Montoya-Robledo et al., 2020).

These gendered mobility patterns have been observed in various urban areas worldwide but have received little attention in Caribbean islands, beyond occasional mentions of youth safety in high-crime neighborhoods (Roy et al., 2024; Sener et al., 2019). Recent demographic shifts in The Bahamas, including rising unemployment, food insecurity, and changing household sizes (The Government of The Bahamas, 2023; Karpyn et al., 2021), increase the need to examine how caregivers navigate daily journeys to school amidst financial and infrastructural stress. Additionally, climate-related factors further complicate access to schools. Storms and heavy rainfall can disrupt transportation operations and render parts of existing infrastructure unusable, while extreme heat makes it difficult for everybody (but particularly for vulnerable population groups) to travel by non-motorized means. Extreme heat also makes the use of public transit more challenging, disrupting the functional aspect of mobility in cities like Nassau (UNDP, 2025).

This paper proposes a framework that classifies the various challenges and enabling factors for access to school into three interconnected dimensions—physical, functional, and social. To address these multidimensional enablers and barriers, the study adopts a mixed-methods design, combining a household survey with qualitative data from focus groups in four schools (two primary and two secondary) and interviews at the school level. Quantitatively, factor analysis reveals latent perceptions of road safety, gender-based violence, and climate risks, while cluster analysis groups respondents by risk awareness and transportation preferences. Qualitative data is gathered through focus groups and one-on-one interviews with government officials, civil society actors, and school staff. An iterative, inductive-deductive coding process refined the codes and connected themes, allowing a balanced understanding of how families negotiate unsafe roads, limited services, and high transportation costs.

Following this introduction, the paper reviews global and regional literature on key determinants of school transportation, followed by a contextualization of Nassau. The paper then introduces a framework to analyze physical, functional, and social barriers and enablers, as well as their intersection with household-level factors. The methodology section outlines the study's design, followed by findings that combine qualitative themes with factor and cluster analysis results. The final sections present our discussion and conclusion, assessing the implications for policymakers and practitioners in The Bahamas and providing a concise reflection on the broader significance of the evidence for future research, policy, and practice.

2. Literature Review

2.1 An Overview of Global Evidence on School Transportation

The configuration of the built environment and the transportation ecosystem can enable or create challenges for a seamless, safe, and enjoyable journey to and from school using various transportation alternatives. Features of the built environment, such as the availability and quality of physical infrastructure affect how children commute. Aranda-Balboa et al. (2020) emphasize that a lack of pedestrian crossings, sidewalks, and traffic calming measures near schools can make walking or cycling to school particularly dangerous.

The transportation ecosystem is crucial for children's school attendance, often impacting academic performance (Hopson et al., 2024). A study by Edwards (2022) using public school records (2012 to 2019) from Michigan and regression discontinuity revealed that families identified transportation as the primary barrier to regular school attendance. However, free bus services can alleviate logistical and financial challenges for parents, especially those with economically disadvantaged backgrounds or those with rigid work schedules (Blumen and Currie, 2014; Edwards, 2024).

The unique conditions of Small Island Developing States (SIDS) exacerbate the challenges faced by the physical and functional configurations of transportation systems, particularly given these regions' climate vulnerabilities. Socioeconomic difficulties, such as rising inequalities, poverty, and exposure to the loss of material assets, along with an increased incidence of non-transmissible diseases resulting from climate change (Karner et al., 2015), prompted the Alliance of Small Island States to advocate for limiting temperature rise to 1.5°C above pre-industrial levels, as outlined in the 2015 Paris Agreement (Thomas and Benjamin, 2018; Monioudi et al., 2018). Their specific geography and limited resources intensify the hazards posed by climate-change—such as extreme temperatures, flooding, storms, and rising sea levels—which especially impact the infrastructure necessary for reliable transportation (Aroke et al., 2021; Robinson, 2018; Thomas et al., 2020).

This is particularly evident in Caribbean contexts, where these climate vulnerabilities disrupt commuting for a large share of the population, highlighting the urgent need for adaptation measures to ensure safe school access via public transit and non-motorized

transportation. Increased rainfall leads to persistent flooding, erosion, and landslides, affecting more local walking pathways and sidewalks without appropriate drainage. By the same token, rising temperatures exacerbate urban heat islands and compound drought conditions, which affect most of those walking and waiting for public transit without shelter, challenging the ability of children and caregivers to navigate their routes to and from schools (de Abreu et al., 2022). To counteract these compounded challenges, research has identified a need for preventing infrastructure damage and protect critical transportation structures—including those facilitating access to education— while enabling real-time monitoring of environmental conditions to keep all users informed and safe in a way that remains accessible across the life course (Moretti & Loprencipe, 2018).

Societal factors, such as school choice, further complicate school commuting. Parents, particularly mothers, often face a dilemma regarding their choices of residence and modes of transportation, balancing their children's needs with economic realities. They frequently rely on motorized transportation due to concerns over road safety and societal norms regarding children's independence, which can be both costly and time-consuming. In the US, when children attend schools outside their neighborhoods, walking declines. Extended commutes boost driving distances, expand bus use, heighten air-pollution emissions, and, in some cases, impose additional financial and scheduling strains on households (Wilson et al., 2007). However, a study by (Bhatnagar et al., (2022) in Delhi, India reveals that school travel should advance environmental objectives by prioritizing active modes (i.e. walking or cycling), and, where distances are longer, shared buses instead of private cars.

Policies assigning students to their nearest public school, alongside requirements for private schools to provide bus services, most effectively foster sustainable commutes. Such arrangements must also satisfy users' expectations for safety, anti-bullying measures, punctuality, and comfort. The burden of these transportation-related challenges extends beyond logistical concerns; it produces significant trade-offs for caregivers, particularly women. They often find themselves making sacrifices in labor participation and facing increased time poverty to ensure their children attend school. This situation negatively impacts on their emotional well-being, especially when societal pressures and the absence of supportive systems fail to recognize their dual roles as both primary caregivers and workers. Research indicates that women without sufficient support are more likely to experience emotional exhaustion, which can detrimentally affect their ability to care for themselves and their children (Schwanen et al., 2015).

Attention to the links between school transportation and academic outcomes has increased recently across various contexts. Several lines of research find that extended or complex commutes may exacerbate tardiness, increase family expenses, and indirectly diminish children's engagement in school. For example, a study in Baltimore (United States) analyzed 4,200 school trips in regression models and found that students with trips that include walking along streets with high violent-crime rates are more likely to have higher rates of absenteeism (Burdick-Will et al., 2019). The study by Burdick-Will et al., (2019) estimated that when the amount of violent crime on the streets students walk through on their way to school doubles, students are expected to miss about 6% more school days. Also in the United States, free district-provided bus services have been linked to fewer student absences, stronger attendance, and the potential for better academic performance (Edwards, 2021; Cordes et al., 2018, 2019). In the study by Edwards (2021), it was estimated that school bus eligibility increases school attendance by 0.63% (equivalent to one day per school year) among economically disadvantaged students. Although these insights illustrate how certain interventions can alleviate logistical and financial burdens, the importance of such programs in the Caribbean remains underexplored, as publicly funded school buses are not always a standard feature.

2.2 Barriers and enablers in their different dimensions

We categorized literature on school transportation exploring specific factors that enable or pose barriers into three overarching dimensions: physical, functional, and social. This serves as an analytical lens for navigating global literature. It illustrates how each dimension shapes children's and caregivers' daily mobility to school and intersects with broader caregiving demands. A detailed outline of this framework is presented in Section 4.

2.2.1 *Physical Barriers and Enablers*

The physical dimension is often the most addressed type of factor shaping children's access to education in literature. It encompasses aspects of the built environment such as sidewalks, traffic calming measures, pedestrian crossings, and cycling lanes. It has been linked with the dependency on motorized modes and its associated costs in time and resources, as well as the effect on children's autonomy, congestion and pollution (Aranda-Balboa et al., 2020; McDonald, 2008). Furthermore, public space—including parks and recreational areas—can promote active and shared commutes, but only if they are safe and accessible; otherwise, parents perceive them as risks rather than assets (Parnell et al., 2022). In SIDS like The Bahamas, climate vulnerabilities, such as flooding and heat, further challenge the physical infrastructure necessary for safe walking or cycling, highlighting the role of specific infrastructure, such as drainage, in enabling continuous access to school in flood-prone environments (Monioudi et al., 2018).

While much research focuses on how the lack of specific built-environment features creates barriers, these elements can be enablers when adequately planned, designed, and maintained. Investments in high-quality multimodal infrastructure and physical road safety measures have increased the likelihood of children walking or cycling to school (Roy et al., 2024). Strategically placed and well-maintained green spaces, along with adequate drainage and protection against extreme weather, can create more enjoyable commutes and alleviate parental concerns about exposure to crime or severe weather (McCarthy et al., 2017). Consequently, improvements to the physical environment can positively impact households by reducing travel times, enhancing children's autonomy and sense of belonging, and easing the overall burden on caregivers—especially women—who might otherwise have to compromise on work obligations or personal well-being to manage school commutes.

2.2.2 *Functional Barriers and Enablers*

The functional dimension of school transportation highlights regulatory, operational, and adaptive factors that affect children's commutes beyond the physical traits of the built environment. Although much of the transportation literature concerned with operational and regulatory aspects focuses on general mobility rather than school-specific travel—apart from enforcement of school zones—, these elements are equally relevant to children's commutes. Regulations set safety standards for buses and crossing zones, establish allowable speeds near schools, and encourage traffic calming measures to enhance children's access to education (He, 2013). In practice, though, weak or inconsistent enforcement can undermine these potential benefits, as drivers may ignore speed limits or fail to yield to pedestrians (Schwanen, 2008). This enforcement gap worsens inequalities, as car-dependent households can navigate congested or unsafe roads more easily than those without private vehicles.

Regulatory actions also intersect with road space allocation and the management of public spaces. Cities that prioritize motorized vehicles often restrict pedestrian and cycling pathways, limiting safe travel options for children (Uteng & Turner, 2019). In contrast, evidence indicates that well-monitored public spaces—such as squares, community pathways, and transitional areas near schools—can encourage families to trust that their children can safely commute on their own (Roy et al., 2024). When officials and local communities collaboratively enforce speed limits, monitor high-traffic areas, and coordinate traffic around school arrival and departure times, children's safety improves and reliance on private cars may decrease.

Another aspect of the functional dimension is the maintenance, operation, and availability of transportation services. Poorly maintained infrastructure, such as roads filled with potholes or intermittently functioning pedestrian signals, undermines confidence in public transportation options and lengthens commutes (McDonald, 2008). Additionally, if school bus routes have limited coverage or frequency, families in peripheral neighborhoods may experience increased absenteeism and tardiness, or children who have after school activities in periods not covered by public busing services may be forced to walk long distances or rely on informal means of transportation. Climate-related disruptions further challenge these services, necessitating adaptive strategies that extend beyond physical fortifications. Measures such as staggered schedules, contingency plans for extreme weather conditions, and real-time service updates can help ensure safe, reliable school commutes (McCarthy et al., 2017).

Finally, transportation affordability remains an important factor. High transportation fares can deter low-income families from using public transit, compelling them to walk long distances, skip trips, or compromise on other household expenses (Blandin et al., 2024). Without subsidies or cost-reduction policies, the financial burden can become overwhelming, limiting children's access to education. When governments or transit agencies adopt equitable fare structures and targeted support for underserved areas, evidence suggests that this leads to improvement in attendance and greater inclusivity in daily travel.

Collectively, these functional elements—regulation, enforcement, road space management, operations, service availability, climate responsiveness, and affordability—are shaped not only by the daily experiences of traveling to school but also the broader inequalities among school children and their caregivers of different socioeconomic groups.

2.2.3 Social Barriers and Enablers

The social dimension, informed by recent literature on gender and transportation, addresses issues such as social cohesion, crime, gender-based violence, and the availability of support networks and extended care structures. Crime and fear feature prominently in contexts with elevated theft, assault, or gang activity, leading parents to drive children even over short distances rather than allowing them to walk or cycle (Sener et al., 2019). Concerns about road safety in contexts characterized by heavy traffic, inadequate infrastructure, and poor lighting reinforce this reliance on private vehicles, adding financial strain for families (Aranda-Balboa et al., 2020). Harassment, particularly gender-based harassment, also emerges as a significant factor that discourages girls and women from using non-motorized or public transportation, intensifying caregiving burdens as families adjust schedules or incur higher transportation costs (Montoya-Robledo et al., 2020).

Discrimination creates additional obstacles. Children with disabilities or from marginalized racial and socioeconomic groups may face inaccessible facilities or biased treatment from transportation providers, impacting their ability to attend school regularly (Landby, 2019). Cultural norms and personal experiences also contribute. A qualitative study in Kolkata interviewed 64 women who primarily relied on public transportation and intermediate public transportation. The study found that barriers such as poor pedestrian infrastructure, crowded and unsafe buses, and unreliable services influence their travel choices. While private vehicles were generally unaffordable for most participants, the study notes that improved infrastructure and a greater sense of safety could increase the acceptability of walking and public transportation (Roy et al., 2024). Meanwhile, perceptions about children's independence and concerns about their exposure to the risk of crime or injury often prompt parents to closely supervise commutes, which can restrict autonomy, particularly for older students (Aranda-Balboa et al., 2020).

Time allocation and social support networks further influence school travel decisions. Mothers in dual-earner households often reduce their work hours or rearrange schedules to manage drop-offs and pick-ups, amplifying gender disparities related to time poverty

(Bernardo et al., 2015). In low-income neighborhoods, caregivers lacking strong community ties or extended-family assistance may turn to more expensive or time-consuming modes of transportation that increase everyday stress (McDonald, 2008). Empirical evidence shows that in areas with good physical and functional conditions, concerns about harassment or crime tend to diminish, potentially allowing for greater independence and self-reliance of children during their school trips (Aranda-Balboa et al., 2020).

This literature overview highlights how physical, functional, and social dimensions can inhibit or enable educational access, particularly for lower-income or marginalized groups. In the next section, we introduce The Bahamas and Nassau's geographical, economic, and cultural characteristics to set the stage to localize the dimensions identified in international research in the city's unique context.

3. About The Bahamas and Conditions for School Transportation in Nassau

3.1 General context of the Bahamas

The Bahamas is a Caribbean archipelago consisting of 700 islands and 2,400 cays situated north of Cuba, northwest of Haiti, and east of Florida, United States. Administratively, The Bahamas is a relatively young nation that gained independence from the United Kingdom in 1973. According to the 2000 census by the government of The Bahamas, there were 306,611 inhabitants, which rose to 351,461 in 2010 and nearly 400,000 in 2021 (Bahamas National Statistical Institute, 2024). With 74.5% of the population, New Providence Island — where the capital, Nassau, is located — is the country's housing, economic, and employment hub.

The Bahamas has a subtropical climate characterized by relatively high average temperatures and moderate levels of precipitation (UNDP, 2025). Annual rainfall ranges from approximately 1,470 mm in wetter areas to around 865 mm in drier regions. Mean daily temperatures typically range between 17°C and 32°C, with the period from May to October constituting the summer season, which also coincides with the peak of the rainy season. The country is frequently impacted by tropical storms and hurricanes during the Atlantic hurricane season (June 1 to November 30).

Despite being classified as a high-income nation, The Bahamas has experienced an increase in poverty throughout the twenty-first century, rising from 9.3% in 2001 to 12.5% in 2013. Similarly, access to jobs has emerged as a significant social issue in the country. The unemployment rate was 6.9% in 2001, grew to 8.7% in 2008, and reached 15.4% in 2013 (The Bahamas National Feeding Network, 2013). A high level of inequality also characterizes the country, with a Gini Index estimated at 41.4. In other words, the lowest 40% of the population accounts for only 16% of total consumption in the country (The World Bank, 2023). This contrasts with the top 10% of Bahamians, who account for 31% of consumption. Despite income inequality, the country's average household size (3.3 individuals per household) is relatively low. New Providence reports a slightly higher figure of 3.7.

Economic strain is reflected in several issues faced by Bahamians. For instance, official figures suggest that around 17.2% of the population endures moderate to severe food insecurity (The Government of The Bahamas, 2023). Other studies have indicated that this figure can rise to 21%, with at least 10% facing severe food insecurity (Karpyn et al., 2021). This is also partly due to a food system that relies on imports (ibid). Another ongoing issue is the increase in food prices. A recent study reveals that the cost of eggs surged by 128% between 2017 and 2023 (Hepburn et al., 2024). These economic challenges are likely to underpin and shape decisions around other household expenses, including school transportation.

3.2 The school system in The Bahamas

The education system in The Bahamas is governed by the 1996 Education Act, which states that education should be free for individuals from 5 to 16 years old. It also structures the education cycles and levels. According to the Education Act, the system comprises three cycles: i) a six-year cycle for primary education expected to enroll children from 5 to 11 years old; ii) a three-year cycle for junior high school aimed at the population between 11 and 14 years old; and iii) a senior high school for adolescents aged 14 to 17 years old. Junior and senior high schools constitute secondary education, and some institutions offer both cycles. In The Bahamas, preschool education for children under 5 years old and post-secondary education is not mandatory, though it is rapidly gaining attention. For example, by 2022, 82% of children between three and four years old were already attending school (Bahamas National Statistical Institute, 2024). The government operates some preschool institutions, while most preschools and nurseries are provided by local churches and private investors.

Despite the interest in preschool education, this does not necessarily extend to other educational cycles, and the Bahamas has relatively high rates of individuals not attending school. For example, 12.55% of adolescents are out of school (USAID, 2024), a figure below the world average (15.03%) but significantly higher than the 3.45% average of high-income countries (USAID, 2024). Similarly, while the global average for children (individuals younger than 10 years old) out of school is 10.38% and 3.96% for high-income nations, the rate for The Bahamas is 29.35%. According to USAID (2024), the expenditure on education by the Government of The Bahamas is 2.84% of GDP, below the 4.35% average for the rest of the world.

According to the Planning and Research Section from Bahamian Ministry of Education, Science and Technology Census Data (2016/2017), there are 121 primary schools, with 93 being public and 28 being private. Similarly, there are ten public junior high schools, nine public senior high schools, one private junior high school and one private senior high school. Secondary schools encompass junior and senior high school cycles, totaling twenty-six public institutions and five private schools. In terms of student enrolment, there were 28,407 students in primary education, 6,408 in junior high school, 3,627 in senior high school, and 4,913 in institutions offering junior and senior high school cycles. By 2016, there were 2,935 teachers in the Bahamas, with 1,705 focused on primary education and 752 on secondary education (The Planning and Research Section, 2018). For the specific case of New Providence, there are fifty-four educational institutions, including 25 primary schools, seven junior high schools, and 7 senior high schools.

3.3 Planning, regulation, and institutions connected with School Transportation

Within The Bahamas' increasing rates of motorization, urban sprawl and car-centric urban development have led to several mobility challenges including increased rates of congestion, extended travel time¹, and increased vehicle operating costs, as well as negative effects in road safety, emissions, and air quality. has contributed to numerous urban mobility challenges including high levels of congestion, traffic accidents and long travel times. The country is highly car-dependent, with approximately 73% of the population relying on private vehicles, 19% riding on public transit and 5% walking as their primary mode of transportation.

The population of New Providence, which accommodates 74.5% of the country's residents (Bahamas National Statistical Institute, 2024), grew to 296,522 in 2022, which represents a 20.38% increase since 2010².the motorization rate increased from 0.39 to 0.64

¹ Travel time to work, school and into town for errands is 28.79, 26.93 and 39.53 minutes respectively (IDB, 2018).

² [Bahamas National Statistical Institute](#), 2022.

vehicles per capita in the same period^{3,4}. Particularly in the capital city of Nassau (New Providence), congestion is a significant problem, with several intersections exceeding their design capacity⁵, exacerbated during peak hours. The city's transportation system and related infrastructure tend to incentivize private vehicle usage over sustainable modes of transportation, exacerbating the problem.

Pedestrian infrastructure, in terms of sidewalks, crosswalks, and crossing controls at signalized intersections, is limited, with inadequate and incomplete pedestrian facilities on many roads. The lack of integration between urban and mobility planning often results in reactive investments in transportation infrastructure that respond to unplanned urban developments as they emerge. This has resulted in gaps in the quality and availability of inclusive transportation infrastructure and services, hindering the integration of sustainable transportation modes, such as walking, cycling, and public transportation.

With over 6,000 traffic accidents reported annually, road safety constitutes a significant public policy concern. The road traffic fatality rate in 2024 is estimated at 16.2 deaths per 100,000 inhabitants in 2021. Moreover, approximately 40 percent of residents in New Providence report that they or a household member have been involved in a traffic accident within the past five years.

At the national level, the Ministry of Works and Family Island Affairs (MOW&FIA) and the Ministry of Energy and Transport are responsible for identifying and responding to transportation-related challenges linked to public transportation, traffic safety and environmental considerations ranging from pollution and emissions to climate change. Concerning the physical dimension of school transportation, MOW&FIA focuses on the design, construction, and maintenance of road networks and pedestrian infrastructure, including sidewalks, crosswalks, and guardrails in school zones. It also employs traffic control measures—such as roundabouts and signal systems—to guide vehicle flows. These interventions include an annual assessment in school areas to check striping, signage, and pavement quality. The annual budget for maintenance, including pothole patching, paving, sidewalks, drainage, and others, is roughly around \$14 million (BSD) in New Providence. However, there are several institutional and organizational challenges in terms of asset management and maintenance of road infrastructure, including that for pedestrian and school zone safety (according to conversations with the MOW&FIA), leading to under maintenance of road and pedestrian infrastructure.

In the functional dimension, MOW&FIA's responsibilities also extend to congestion management and the operational regulation of traffic, which can be particularly relevant during peak times for school drop-off (8–9 a.m.) and pick-up (2:30–6 p.m.), as well as midday breaks (12–1 p.m.). To address these peak loads, the Ministry uses Miovision One, an integrated platform that collects and analyzes traffic data, adjusts signal timing, and supports road safety assessments. Surveillance cameras placed at major intersections serve as an additional resource, complementing Royal Bahamas Police Force systems and potentially aiding crime deterrence near schools. While MOW&FIA does not directly oversee public bus operations, decisions around road layouts, intersection design, and traffic regulations influence the reliability of both public and private transportation services.

Efforts like the New Providence Road Improvement Project (NPRIP), an IDB finance investment program of over 120 million USD whose objective was to improve the efficiency of the transportation system, and was implemented between 2001 to 2014 in two phases, have introduced pedestrian signals, street lighting, guardrails, drainage systems, additional sidewalks, pavement markings and landscaping near schools, potentially improving conditions for pedestrians and cyclists. This project initiative also included the construction of 11.6 miles

³ [IDB](#), 2018.

⁴ [Road Traffic Department](#), 2022.

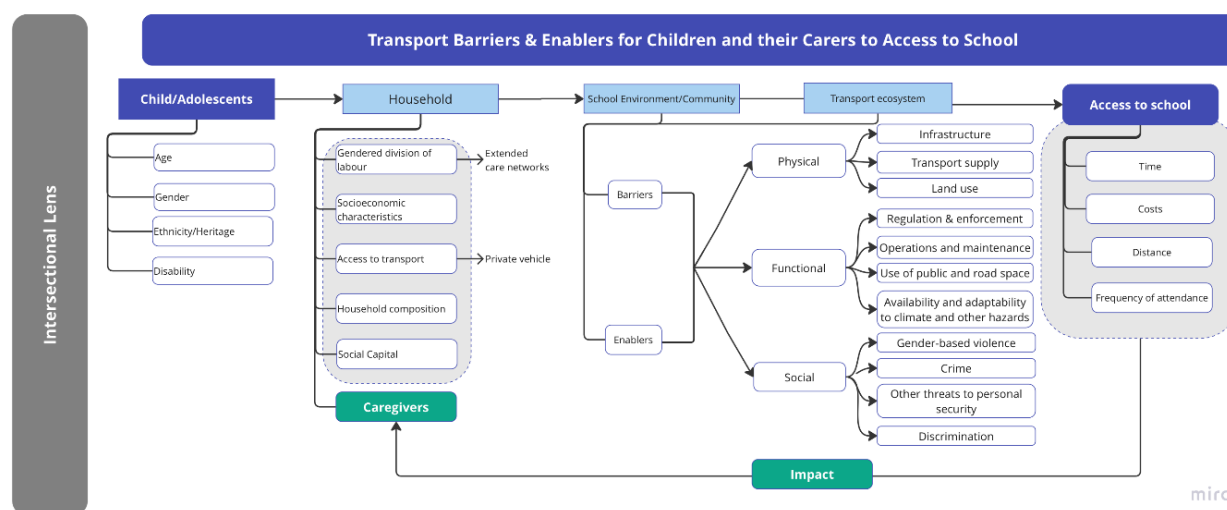
⁵ [The Nineteen-Sixty-Two Foundation](#), 2011.

of roads, comprising of nineteen corridors in total with nine being new and ten existing. This project accounted for approximately 14% of roads in New Providence. Although these measures are not solely aimed at school travel, they form part of broader institutional strategies that intersect with children's daily mobility. By coordinating road design, traffic signal management, and safety checks in school zones, MOW&FIA's mandate and policy decisions reflect how local institutions can influence educational access through the physical and functional dimensions of the transportation system.

4. Analytical Framework

The relationship between transportation barriers and enablers sheds light on the reciprocal relations between conditions of the built environment, the ways in which transportation ecosystems operate, and the socioeconomic and cultural factors underpinning individual and collective decisions around how to get to and from school. According to the literature reviewed above, these barriers and enablers manifest at the scales of the school environment, the community, and the household. Figure 1 summarizes the dimensions and determinants of barriers and enablers of school transportation, as well as their specific factors and the outcomes related to children's access to school that were identified from our literature review. The latter include time, costs, distance and frequency of attendance, which in turn influence caregivers' well-being and participation in society. By considering the intersectional aspects of age, gender, socioeconomic status, and ethnicity, the analytical framework provides a comprehensive understanding of how these barriers and enablers can have a differentiated effect on children and their caregivers across the Bahamian society. This model is informed by our guiding research question and informs the design and implementation of quantitative and qualitative instruments for collecting evidence.

Figure 1. Analytical framework for the research: enablers and barriers of school transportation and impacts on children and caregivers' access to school



Source: Authors' elaboration

5. Methodology

This paper deploys a mixed methods approach described by Creswell (2022) and Creswell & Plano Clark (2018). By adopting this approach, the study moves further from the traditional quantitative methods used in transportation studies and the growing, yet still niche, use of qualitative methods in isolation (Delbosc, 2023; Hopkins & Schwanen, 2022). In doing

so, the paper joins a rising number of studies using mixed methods in transportation research -particularly in the global south- (Aberle et al., 2025; Tiznado-Aitken et al., 2020), including research focusing on school transportation (Ikeda et al., 2020; Pelletier et al., 2018).

The study used semi-structured interviews, focus groups, photos, and a participatory workshop to explore the multiple factors summarized in Figure 1. Based on preliminary qualitative data analysis, we designed and deployed a survey on school transportation targeting a broader sample of adult school transportation stakeholders. This design enabled the team to explore experiences as felt and lived by individuals while reserving the possibility to triangulate results and understand overall trends to produce a more complete view of the school transportation dynamics in New Providence. Doing so facilitated testing our framework and allowed us to make some statistical generalizations, while enabling close contact with stakeholders from different policy sectors and the school community. Mixed methods were primarily a mechanism to listen to the voices of individuals navigating the daily challenges of school transportation that are not considered in exclusively quantitative approaches.

5.1. Sampling

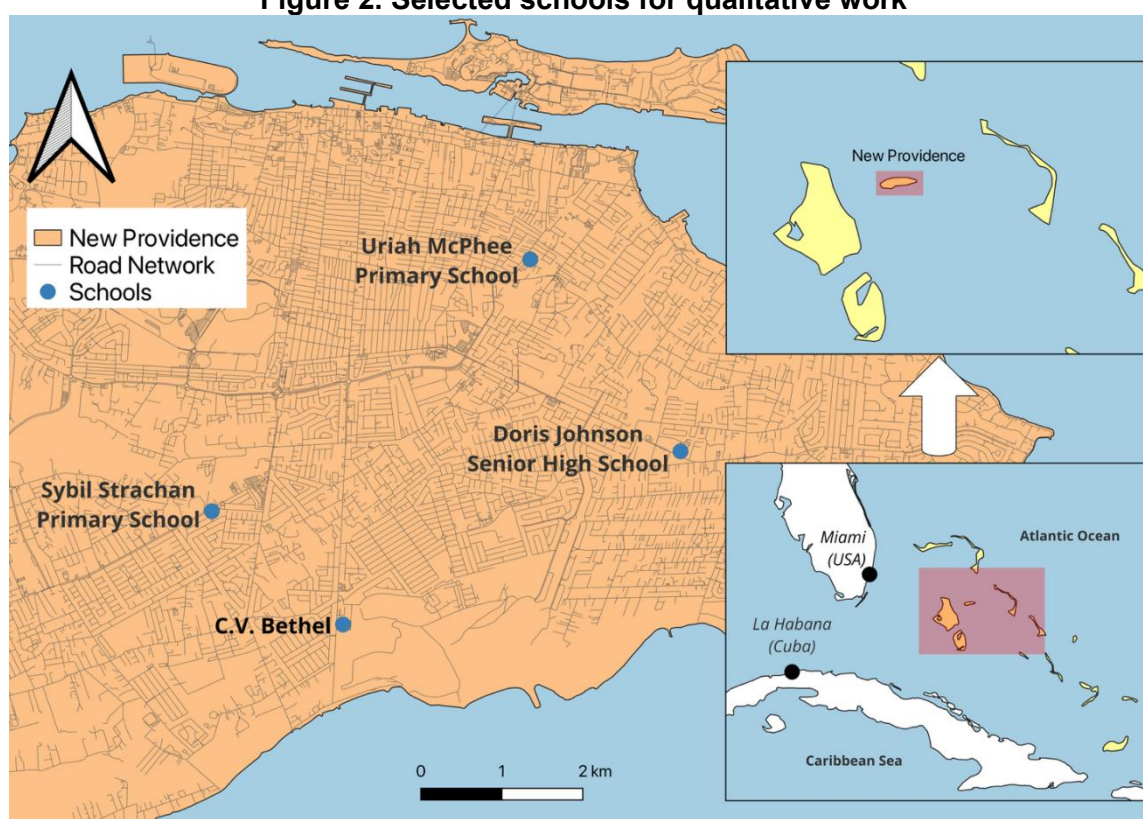
The study targets a diverse group of participants from four schools located in Nassau (The Bahamas), representing various socio-economic contexts and infrastructural challenges. The research team selected these schools based on three criteria. First, two primary and two secondary schools were chosen to reflect the organization of the education system in The Bahamas. Second, the four schools illustrate diverse sociodemographic conditions of children and parents and the challenges and facilitators they might encounter for school transportation. The choice of schools was made in consultation with government technicians in education, transportation, and urban planning. The third criterion also relies on knowledge from professionals in the government, as the team selected schools where plans have been drawn to intervene in areas around or near the schools as part of the country's current policy agenda (See Figure 2).

- **Uriah McPhee Primary School:** Located in a low-income area in the northeast on Kemp Road, Uriah McPhee Primary School represents a critical case for understanding the challenges schools face in disadvantaged contexts. The school is characterized by poor road infrastructure and significant traffic safety issues, making it a strategic focus for the study. This school's inclusion provides insights into the specific infrastructural and safety challenges that impact educational access in lower-income communities.
- **Sybil Strachan Primary School:** Located on Carmichael Road in the southwest, Sybil Strachan Primary School is in a middle-income area. The road infrastructure around the school is generally good; however, the pedestrian infrastructure, including sidewalks and crossings, is inadequate. This school is strategically interesting due to its location on a major road, which raises concerns about pedestrian safety. The study will explore how these infrastructural shortcomings affect the daily experiences of students and caregivers.
- **C.V. Bethel Senior High School:** Located on East Street in the South, is another example of a middle-income school with good road infrastructure but inadequate pedestrian safety features. The school's history of work on walkability, combined with challenges such as poorly placed crosswalks and frequent flooding during rainstorms, makes it a significant case for examining the effectiveness of existing infrastructure and identifying areas for improvement. This school's inclusion supports an analysis of pedestrian safety in high school environments.
- **Doris Johnson Senior High School:** located on Prince Charles Drive in the East, it is distinguished by its newer road infrastructure. However, the absence of pedestrian safety features, such as crosswalks and proper signage, combined with high vehicular traffic, presents significant challenges. This school's location, far from other schools,

extends the geographic coverage of the study, providing insights into the infrastructure and safety issues in more isolated educational settings.

The selected schools provide a cross-section of the challenges faced by educational institutions across different socio-economic contexts in Nassau, enabling the team to use different approaches that can later be scaled up. This sampling strategy ensures that the study captures a range of infrastructural and policy-related issues affecting school access.

Figure 2. Selected schools for qualitative work



Source: Authors' elaboration

5.2 Research methods and analytical approaches

5.2.1 Qualitative component

Qualitative data collection strategies included semi-structured interviews, primarily with school staff, Focus Group Discussions (FGDs) with parents and caregivers, and descriptive image analysis of the natural and built environment characteristics of the area surrounding the schools. The images were captured with 360-degree cameras, drone overflights, and mobile devices for the four selected schools. Entry permission at each school and the recruitment and logistical process were supported by a local company experienced in data collection, following the Ministry of Education and Vocational and Technical Training (MoEVTT) protocols, after MoEVTT confirmed their endorsement of the research and the selected schools. The Deputy Director from MoEVTT notified the school Administrators and District Superintendent who were visited during fieldwork.

For the semi-structured interviews, the research team, with the support of MoEVTT, selected initial key actors at each school to gather insights on perceptions of the challenges faced by parents, caregivers, and children when travelling to and from school. Other relevant

actors were recruited through snowball sampling until reaching saturation (Braun & Clarke, 2021). Twenty-eight interviews were held with principals, teachers, cross guards, counsellors, and bus drivers. A summary of the interviewees is presented in Table 1.

Table 1. Semi-structured interviews – summary

Role	Number of interviewees
Principals	3
School administrators	1
Teachers	12
School bus driver	3
Security Guard	2
Parent/caregiver	2
Counselor	2
Janitor	1
Police officer	1
Crossing Guard	1
TOTAL	28

Source: Authors' elaboration based on fieldwork data

Table 2. Focus groups – summary

School	Number of participants	
	Women	Men
Sybil Strachan Primary School	3	2
C.V. Bethel Senior High School	10	---
Doris Johnson Senior High School ⁶	2	1
Uriah McPhee Primary School	9	---
TOTAL	24	3

Source: Authors' elaboration based on fieldwork data

Parents and caregivers were invited to participate in the study through an open call. They were given incentives, including refreshments and compensation for their transportation costs for the Focus Group Discussions. Recruitment was initially done via online self-registration for each school, complemented by invitations to parents dropping off their children in the morning to attend the evening meetings. The research team facilitated one FGD in each school, exploring shared experiences and common challenges that parents and caregivers

⁶ Given the small number of participants in this case study we conducted one-to-one interviews rather than a focus group discussion.

encounter with school transportation through collaborative discussions, comprising a minimum of 5 and a maximum of 13 participants. Table 2 shows a summary of the total participants.

Table 3. Analysis of qualitative data from parents' focus groups and school staff interviews.

Theme	Sub-theme (n° of references)
Physical barriers and enablers	Infrastructure (18)
	Supply (20)
	Land use (2)
Functional barriers and enablers	Regulation and enforcement (15)
	Operations and maintenance (40)
	Behaviors in the use of public and road space (13)
	Road safety in the use of public and road space (6)
	Availability and adaptability to climate hazards (5)
Social barriers and enablers	Gender-based violence (5)
	Crime (2)
	Other treats to personal security (6)
	Discrimination (5)
	Inequalities (11)
Access to school	Tardiness, attendance and academic performance (11)
	Children's transportation responsibilities (3)
	Costs (1)

Source: Authors' elaboration

Guiding questions for the individual and group data collection mechanisms are presented in Annex 1. We transcribed the focus group discussions and semi-structured interviews, which were then quality-checked for accuracy. The analysis was conducted in three stages using NVivo software, version 14. We conducted inductive and deductive thematic analyses of qualitative data, an iterative research process informed by themes identified based on the analytical framework identified in Figure 1 and fieldwork data that guided the study (Silverman, 2014; Westhues et al., 2008). Second, an intermediary stage focused on codification and categorization based on the research questions and framework described in Sections 1 and 4. For this stage, an initial list of codes and subcodes (n = 36) along with their frequencies was generated to organize the data, linking fragments from the participants' comments to relevant codes, and searching for themes (LeCompte, 1999). The list of codes and subcodes was revised through the process as we identified emerging codes or variations on codes. Then, we linked codes and subcodes using analytic memos to identify patterns, nuances, and relations (Ponic & Frisby, 2010). Finally, the analytic memos enabled the research team to produce results that provided insight from opinions, realities, and experiences from a multistakeholder perspective, informing the understanding of barriers, enablers, and effects of school transportation in The Bahamas for children and caregivers, as outlined in this article. Table 3 summarizes the themes and sub-themes from the qualitative data. The four main themes from the framework were analyzed include: 1. Physical barriers and enablers; 2. Functional barriers and enablers; 3. Social barriers and enablers; and 4. Access to school. In themes where participants did not consistently differentiate among related outcomes, such as tardiness, attendance, and academic performance, we grouped them

under a single aggregate category to reflect how these issues were discussed in practice and to avoid overstating distinctions that the data do not clearly support.

5.2.2 Quantitative Component

For the quantitative component, a survey was disseminated among the Bahamian population with school-aged children or with school transportation responsibilities. The survey had a demographic section (age, gender, level of education, etc.) where participants were also asked to fill in information about the household composition. We were interested in the age of their children, whether they were attending school (primary or secondary), and whether the school was public or private. Based on the household list of children, one child was selected, and the respondent was asked to report his/her trip from home to school and from school to home. According to stakeholders, government officials, and the survey firm, asking about income was not advised. Instead, they recommended inquiring about the number of rooms and residents in the household. These data allow calculation of household density (residents per room), serving as a proxy for income.

The survey also included a section on enablers and barriers according to the physical, functional, and social dimensions of the conceptual framework presented in Figure 1. These questions were asked in the context of the reference child's journey to school. Qualitative data and observations from fieldwork visits influenced the content of the survey, leading to inclusion of questions about the presence of threats to personal security such as stray dogs, discrimination and other sources of perceived danger. Enablers and barriers were queried about across 15 perception questions in a scale ranging from strongly disagree to strongly agree. Other sections explored perceptions on how school transportation responsibilities affected caregivers' access to labor, well-being, and time use. Given the focus of this paper, we will focus only on results from the demographics, school trips, and enablers and barriers sections.

Table 4 presents a summary of the quantitative sample. In total, 477 surveys were collected. The sample concentrates individuals between 36 and 45 years old (43.3%) followed by those between 46 and 55 years old (29.3%). Taking the overall age distribution of The Bahamas as reference, the sample is overrepresenting these two age cohorts. According to the latest census (Bahamas National Statistical Institute, 2024), 24.5% of the population concentrates people in the 36 to 45 years old cohort, with a similar number for the 46 to 55 cohort. This was expected, considering that the survey targeted respondents with school-aged children.

The survey data was first analyzed using descriptive statistics. Then we used a two-step analytical process combining factor analysis and k-means clustering (De Vos et al., 2024; Mokhtarian et al., 2009) to the 15 questions on perceived enablers and barriers. This analytical procedure helps identify distinct groups of parents and caregivers according to their school transportation perceptions and then makes comparisons in key variables. The factor analysis was conducted before clustering because, apart from the conceptual clarity gained with the latent variables, factor analysis also reduces the dimensionality of the variables, making the clustering methods easier to interpret, more robust, and less likely to have convergence issues.

Table 4. Survey – Summary Statistics

Variable	Total	Percentage (%)
Age group		
18 to 25	11	2.3%
26 to 35	83	17.6%
36 to 45	204	43.3%

Table 4. Survey – Summary Statistics

Variable	Total	Percentage (%)
46 to 55	138	29.3%
56 to 65	24	5.1%
More than 65	11	2.3%
Null Value	6	---
Gender		
Female	390	83.0%
Male	80	17.0%
Null Value	7	---
Marital status		
Never married	203	42.9%
Married	196	41.4%
Living together/common law	9	1.9%
Divorced	35	7.4%
Legally separated	20	4.2%
Widowed	10	2.1%
Prefer not to say	4	---
Level of education		
Primary School	5	1.1%
Secondary School	173	36.5%
Technical Qualification (e.g., plumber, electrician)	53	11.2%
University undergraduate degree (associates or bachelor)	199	42.0%
Post Graduate degree	44	9.3%
Prefer not to say	3	---
Household Density (Individuals per room)		
Minimum	0.1	---
1st Quartile	1.0	---
Median	1.3	---
Mean	1.5	---
3rd Quartile	2.0	---
Maximum	7.0	---
Standard Deviation	0.7	---
Disabilities		
Yes	63	13.2%
No	414	86.8%
Relationship with the head of your household		
Self / Head of the household	274	57.7%
Partner (including spouse, living together, or unmarried partner)	144	30.3%
Son / daughter	45	9.5%
Other	12	2.5%
Prefer not to say	2	---
Motorized vehicles (e.g., cars, trucks, and motorcycles) in the household?		
0	16	3.4%
1	189	39.8%
2	199	41.9%

Table 4. Survey – Summary Statistics

Variable	Total	Percentage (%)
3	71	14.9%
Prefer not to say	2	---
Frequency of access to a private vehicle for personal mobility		
Never	24	5.1%
Occasionally (1-3 times a week)	21	4.4%
Frequently (4-6 times a week)	11	2.3%
Always	418	88.2%
Other	1	---
Don't know	2	---
Main activity (for last week)		
Employed full time (more than or equal to 35 hours per week)	431	90.4%
Employed part-time (less than 35 hours per week)	6	1.3%
Unemployed (looked for a job in the last week)	11	2.3%
Retired	9	1.9%
Studying/in School	2	0.4%
Homemaker (taking care of my household full time)	15	3.1%
Long-term sick or disabled	2	0.4%
Unemployed (did not look for work in the last week)	1	0.2%

Source: Authors' elaboration based on survey data

5.3 Ethical Considerations

The research obtained ethical approval for exploratory qualitative research in August 2024 and full approval from the National Medical Ethics Committee (NMEC) of the Ministry of Health and Wellness, Nassau, The Bahamas, on November 26, 2024. The study design inherently minimized risks by focusing solely on adult participants and utilizing non-invasive data collection methods. The research activities were conducted in a manner that respects participant privacy and dignity, ensuring that the study poses minimal risk to all involved. Stringent confidentiality protocols were followed to protect participant data, particularly for sensitive topics such as harassment, violence, and crime. All collected data was anonymized and securely stored to ensure that participant identities were not disclosed. The research team adhered to best practices in data management and confidentiality, ensuring compliance with the General Data Protection Regulation (GDPR).

Participants were provided with a project information sheet, and informed consent was obtained from all participants before their voluntary involvement in the study. They also received a comprehensive briefing on the study's objectives, methods, authorization of using photo and voice data, and potential risks.

6. Findings

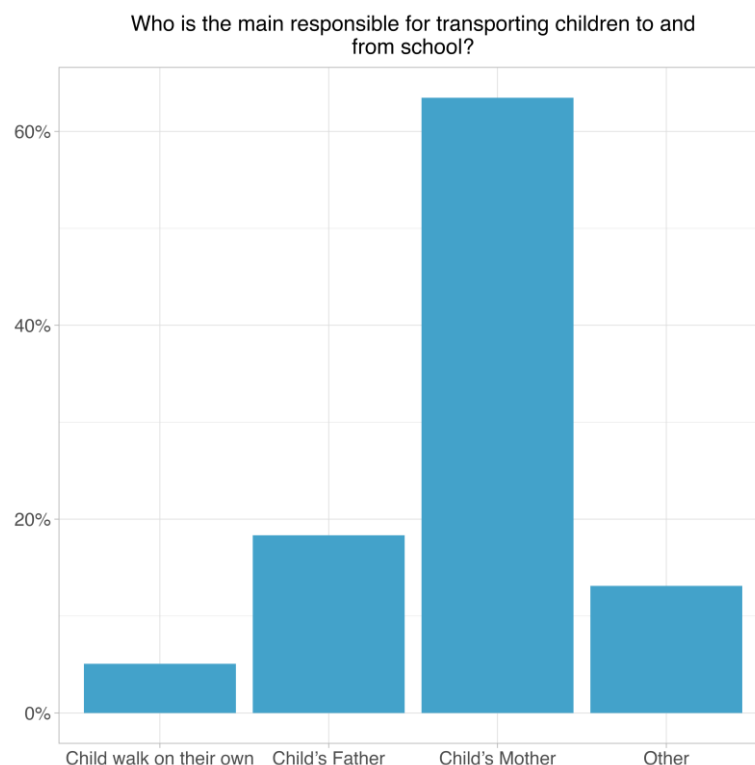
The distribution of school transportation responsibility in Nassau is a gendered issue. Eighty three percent of the adults who organize or perform the daily trip to school in our survey are women. In contrast, women make up just 52% of the national population. More than half of these women are heads of household (53.8%), and almost half belong to the 36- to 45-year cohort (44.3%). They are also highly educated: 51.3% hold an undergraduate or postgraduate degree, more than twice the census figure of 22.7%. Household size does not explain the

gap—the average in our sample (3.6 members) mirrors the national mean (3.3)—so the overrepresentation of women suggests a gendered division of care work.

The pattern deepens when we look at who escorts children: Figure 3 shows that 63.5% of the people who drive, walk with, or accompany students on public transportation are women. Women were likewise the most vocal participants in our focus groups, often steering the discussion toward practical obstacles that rarely surfaced when men spoke. Previous research on school mobility reports the same skew, with women both organizing and undertaking most child-related travel (He 2013; Herrador-Colmenero et al., 2022; Scheiner 2016).

Testimonies behind the numbers make this bias tangible. “I’m a single mom with three kids, and it’s overwhelming trying to get everyone to school on time,” one mother explained. A father acknowledged the imbalance: “I help with the morning drop-off, but my wife handles the rest—she’s better at coordinating everything.” Another caregiver captured the difficulties school transportation responsibilities impose: “I’m always rushing, juggling between work, school runs, and household responsibilities.” Together, the statistics and voices confirm that school transportation in Nassau is a gendered responsibility with significant costs for women’s time, energy, and opportunities.

Figure 3. Distribution of school transportation responsibilities



Source: Authors' elaboration based on survey data

The rest of this section connects survey statistics, stakeholder interviews, and school-level focus groups to map the barriers and enablers Nassau’s transport landscape poses. Guided by the three-dimensional framework introduced earlier—physical, functional, and social—we first trace the missing pavements, unreliable bus services, and regulatory gaps that shape caregivers’ choices; we then turn to the fears of crime, harassment, and extreme weather that color everyday risk calculations (Montoya-Robledo et al., 2020; Roy et al., 2024;

Sener et al., 2019). Finally, we examine how extended family networks, school-zone measures, and other local resources can alleviate—but rarely erase—those pressures.

6.1 Physical and Infrastructural Barriers and Enablers

The physical dimension significantly shapes school commutes in Nassau, encompassing the quality of the built environment, the range of available transportation options, and the interplay between transportation systems and surrounding land uses. Evidence from interviews, focus groups, and the survey reveals how these factors collectively create barriers and enablers for students and caregivers.

6.1.1 Infrastructure Quality, Availability, and Resilience to Climate

A predominant theme emerging from the qualitative data gathered is the inadequacy of physical infrastructure for ensuring safe and resilient school journeys. While functional facilities like sidewalks were occasionally cited as enablers, participants across different school contexts frequently highlighted deficits as critical impediments. The absence or poor condition of pedestrian infrastructure emerged as a primary concern (see Figure 4). Participants described perilous crossings due to a lack of marked crosswalks and traffic signals, forcing children to navigate traffic unsafely. "I've seen kids running to avoid being hit while crossing the street" (Participant, Sybil Strachan Primary FGD), and near C.V. Bethel Senior High, "kids just dash across the road" due to the lack of a proper crosswalk. The absence of continuous sidewalks often forces students onto roadways, a danger magnified by speeding vehicles and insufficient traffic calming measures, particularly near schools on major roads like Doris Johnson Senior High, described as "very hazardous." A crossing guard noted, "They walk on narrow streets with no sidewalks, and motorists don't always slow down." This lack of safety infrastructure extends to public transportation access points, with inadequate crossings near jitney stops.⁷ These barriers are shown in Figures 4 and 5.

Compounding these issues are climate-related vulnerabilities and a lack of protective amenities. Poor drainage infrastructure leads to frequent flooding during rain events, making walking routes impassable or hazardous. "When it rains, it's a disaster; roads flood and kids end up soaked," stated a parent at Uriah McPhee Primary FGD, with another citing health risks like rashes from wading through floodwaters. This lived experience is strongly corroborated by survey data (Table 5), where 72.3% of respondents disagreed that existing infrastructure protects adequately against flooding. Similarly, lack of shelter exposes children to sun and rain while waiting for transportation or school entry, a concern reflected in 82.9% of survey respondents reporting insufficient shade (Table 5). School staff emphasized the need for basic amenities like covered waiting areas or pavilions with seating. While qualitative accounts stressed these deficits, survey results indicated a more divided perception on certain elements: 52.8% perceived sidewalks and crossings as high quality, and 62.4% found pick-up/drop-off areas safe (Table 5), suggesting potential variability across locations or differing user expectations. These differences were also evident from the fieldwork visits where the research team noted that some schools have better walking environments, pick-up/drop-off areas, and zones for public transportation buses.

⁷ Jitneys are minibuses or vans that typically accommodate: 15 to 30 passengers depending on the size and configuration of the vehicle. The most common jitney models usually seat around 20 to 25 passengers. They operate on fixed routes; however, have no timetables or schedules, are loosely and poorly regulated. As a result, there are significant safety issues and the quality of service of the buses is low. (IDB, 2024 *The Bahamas Program for Resilient, Inclusive, and Sustainable Urban Mobility, Sustainable and Inclusive Public Transit Services Diagnosis and Action Plan for Abaco and New Providence*)

Figure 4. Examples of inadequate walking infrastructure



Source: Authors' elaboration based on fieldwork data

Figure 5. Examples of bus stops and signaling in Nassau



Source: Authors' elaboration based on fieldwork data

Table 5. Descriptive survey results: Enablers and barriers - Physical Infrastructure

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Along the way to/from school, there is enough shade to shelter from the sun.	17.1%	65.8%	7.8%	8.4%	0.8%
The infrastructure along the route is protected from flooding during heavy rains.	18.2%	54.1%	12.2%	14.3%	1.3%
Sidewalks, ramps, crosswalks, and similar features around the school are of high quality.	4.0%	22.2%	20.9%	43.3%	9.5%
The pick-up/drop-off area is safe for children to walk around.	4.4%	19.3%	13.9%	53.4%	9.0%

Source: Authors' elaboration based on survey data from this study.

Furthermore, the research identified significant gaps in universal design, creating barriers for children with disabilities. The absence of ramps, accessible crossings, or suitable facilities necessitates reliance on private transportation, often provided by guardians. A teacher at one high school illustrated this, stating, "A student in a wheelchair is always dropped off and picked up by her guardian," highlighting systemic inequities within the existing infrastructure.

6.1.2 Availability of Transportation Alternatives

The modes of transportation available to families fundamentally shape the school journey experience, revealing significant disparities. Qualitative accounts indicate a mix of commuting methods across Nassau, including walking, jitneys, private vehicles, and limited school bus services. Walking is common for those living within the school's catchment area, as explained by a Primary School Senior Teacher at: "A lot of students are here in this catchment [area], so they basically walk" (it is difficult to establish the distance of the "catchment area" mentioned by the interviewee; however, a typical walking distance is around 600 meters). As established, this often involves navigating unsafe infrastructure.

Public transportation, primarily jitneys, serves a substantial portion of students, particularly those travelling longer distances or from lower-income households. A school principal estimated that 70-75% of their high school students rely on jitneys or walking. Yet, this mode presents considerable challenges: buses are often overcrowded, especially during peak morning hours, forcing students to wait and risk tardiness. As one administrator described, "Some students have to take two buses, and in the morning, the buses are full, so they have to wait." The journey itself can be taxing; a high school counsellor observed students arriving "already drained" from long walks or waits in the heat. The commute can be particularly complex for young children, such as a six-year-old navigating two bus routes daily, commented by a primary school counsellor.

Private cars are utilized extensively, often perceived as the only reliable or safe option. "I drop my son off every morning by car. It's the only way I can ensure he gets here on time," explained one parent during a FGD at one of the primary schools in the study. However, access to private transportation often correlates with socioeconomic status. A high school principal noted, "Parents who can bring their kids by car are usually more middle class (...); their kids tend to perform better because they don't face the same challenges." Dedicated school bus services, while recognized as potential enablers, "are great for those who can get them" (Teacher, High School), and have limited reach, therefore "not every student has access" (Reserved Officer, High School), often leaving families to rely on less suitable alternatives. Moreover, social stigma can influence mode choice, with one parent observing

that the public bus "is seen as something you use if you don't have other options," potentially hindering the uptake of shared transportation solutions and reinforcing socioeconomic divides. Other solutions, like carpooling or private pick-up services, were deemed uncommon due to cost and logistics, although essential for specific groups, such as children residing in hostels: "We have a bus... for our situation, the bus works best" (Caregiver, Children's Hostel).

6.1.3 Transportation and Land Use Interactions

Interactions between transportation infrastructure and the surrounding land use patterns further shape the physical realities of school transportation. High reliance on private vehicles, driven partly by infrastructural deficits and limited alternatives, contributes significantly to school traffic congestion, particularly during peak drop-off and pick-up times. Participants described a cyclical problem, especially on roads hosting multiple schools, like Carmichael Road: "It's like a chain reaction. One school's traffic backs up, and the rest follow" (Participant, Primary School FGD). This congestion, coupled with inadequate parking and poorly designed school access points, creates hazardous conditions. Administrators at the high schools and primary schools interviewed for this research highlighted the dangers stemming from the high volume of vehicles maneuvering in limited spaces, with parents forced to "double-park or squeeze into unsafe spots".

The location of schools relative to residential areas and the concentration of educational facilities also influence transportation dynamics. The fact that C.V. Bethel is the only government high school in its area concentrates demand, placing additional strain on local transportation infrastructure and services. Furthermore, commercial activities near school premises can introduce additional risks. A senior teacher at a primary school noted the danger posed by vendors operating nearby, stating, "We need a crossing guard here, especially with vendors near the school attracting children across the street," illustrating how adjacent land uses can directly impact student safety within the school zone. These interactions underscore how effective school transportation planning must consider not only infrastructure and services but also the broader urban context and land use management.

6.2 Functional Barriers and Enablers

Beyond the physical landscape, functional aspects—spanning regulation, enforcement, operations, maintenance, road user behavior, and climate adaptation—critically shape the daily school commute in Nassau. These functional elements determine how transportation systems operate in practice, often creating significant barriers even where physical infrastructure exists, while targeted measures can act as crucial enablers.

6.2.1 Regulation and Enforcement

The effectiveness of traffic regulations and their enforcement in school zones emerged as a major concern impacting safety. Participants frequently cited a lack of enforcement of speed limits, with one crossing guard stating, "It's supposed to be 15 mph, but they're going 50 mph or 90 mph, especially in the mornings when they're late for work." This perception is mirrored in the survey data (Table 6), where only 42.9% of respondents agreed or strongly agreed that school zone traffic laws are enforced. Parents expressed alarm at the risks posed by speeding and reckless driving near schools "It's a matter of time before someone gets hurt" (Primary School FGD), linking danger directly to lax enforcement "The absence of enforcement means cars are speeding even during school hours" (Security Guard interview, Primary School).

Table 6. Descriptive survey results: Functional enablers and barriers

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
School zones' traffic laws (e.g., slower speeds) are enforced	7.3%	27.6%	22.2%	38.4%	4.5%
Cars pulling over to drop off or pick up children pose a danger to children	2.7%	24.9%	14.1%	44.9%	13.3%
Drivers stop appropriately at the crosswalks around the school	6.2%	19.7%	17.5%	48.7%	7.9%

Source: Authors' elaboration based on the analysis of survey data collected.

Figure 6. Example of a lack of protected crosswalks lead to dangerous crossings at a high school in New Providence along a wide multilane arterial road.



Source: Authors' elaboration based on fieldwork data

The presence of crossing guards was identified as a vital safety enabler, directly mitigating risks associated with poor driver behavior (see Figure 6). Their role was deemed essential, particularly given past tragedies “There was one incident before I started where a

student was killed. That's why the principal pushed for a permanent crossing guard" (Crossing Guard interview, High School). However, the provision of crossing guards appears inconsistent and insufficient, with participants noting their absence or removal "We had a crossing guard last term, but they've now gone back to their original post" (Security Guard interview, Primary School) and the precariousness of the role "We're paid very little for the risks we take, and there aren't enough guards to cover all schools" (Crossing Guard interview, High School). Additionally, the absence of proper horizontal and vertical signage at these crossings presents significant road safety risks for the students and crossing guard.

Enforcement issues also extend to public transportation operations. Participants reported that jitney drivers often disregard rules, stopping unsafely or driving recklessly "Jitney drivers don't always follow the rules. They'll stop anywhere... putting the kids at risk" (Parent, Primary School FGD; "The buses just drop the kids anywhere" (Principal interview, High School). While school security personnel monitor school premises, their focus is often broader than traffic management "I'm here to keep vigilant on crime" (Reserved Officer interview, High School), leaving a gap in consistent oversight of road safety regulations directly around schools.

6.2.2 Operations and Maintenance

Operational inefficiencies within the transportation system create significant daily hurdles. Public bus (jitney) services were frequently described as unreliable and unpredictable, posing a major barrier, particularly for families without private vehicles. Issues included inconsistent schedules "Some days, the buses come two at a time, and then you don't see one for an hour. It's so unpredictable" (Caregiver interview, Primary School), leading to prolonged waiting times "Sometimes, they'll be waiting for half an hour before the next bus comes" (Crossing Guard interview, High School) and overcrowded conditions "Public transportation usually takes long to come, and when it does, it's often full" (Counsellor interview, High School). This lack of predictability makes planning commutes difficult, turning the daily journey into "a gamble every morning" for parents lacking real-time information or tracking systems.

While dedicated school bus services exist and are perceived by some as safer than jitneys "More kids are feeling safer on school buses" (Bus Driver interview, High School), their operation is limited in scope and frequency. Service may only run once at the start and end of the school day, leaving students participating in extracurriculars or serving detentions without transportation. Some school bus drivers demonstrate proactive operational measures like adhering to schedules, having backup buses, exercising flexibility in pick-ups, setting behavioral rules, and taking personal safety initiatives "I wear an orange vest and stop traffic to help kids cross safely". Still, these practices are not universally mandated or applied.

School operational hours frequently clash with parental work schedules, creating significant logistical challenges. The standard school day often misaligns with typical work hours "Our system is stuck in the 9-to-3 model, while most parents work 9-to-5" (Caregiver interview, Children's Hostel, Primary School). This forces many parents to drop children off very early, often before official supervision begins "Some parents have to be at work for 7:30... so they drop their children off early" (School Administrator interview, Primary School), or pick them up late, leading to extended, sometimes unsupervised, waiting times for students "We've had kids here until 6 or even 7 PM" (Security Guard interview, Primary School). In extreme cases, this mismatch necessitates police intervention to ensure child safety. The resulting early departures and late pick-ups contribute to traffic congestion, as caregivers adjust their commutes "Everyone leaves early to avoid traffic, but it causes more congestion" (Caregiver interview, Children's Hostel). Furthermore, inadequate maintenance of road infrastructure, such as potholes, adds another layer of operational difficulty and risk "You're dodging holes in the road... It's dangerous for everyone" (Parent, Senior High FGD).

6.2.3 *Use of Public and Road Space*

The behavior of road users significantly contributes to functional barriers, primarily through heightened safety risks. Participants consistently reported dangerous driving practices in school zones, including excessive speeding “Drivers don’t respect school zones. Some zoom past at 50 mph while kids are crossing” (Parent, Primary School FGD) and a disregard for pedestrian crossings “There’s a zebra crossing, but drivers don’t slow down. They treat it like it’s not there” (Crossing Guard interview, High School). This aligns with survey findings where only 56.6% agreed drivers stop appropriately at crosswalks (Table 6). Motorists were also reported to ignore school bus signals “Drivers blow their horns and pass us while students are crossing, even with flashing lights on” (School Bus Driver interview, High School) and engage in distracted driving “too many drivers on their phones—it’s an accident waiting to happen” (Caregiver interview, Children’s Hostel).

Parental behaviors during drop-off and pick-up also contribute to unsafe conditions. Haphazard parking “Parents park wherever they can, creating bottlenecks” (Senior Teacher interview, Primary School) and unsafe practices like calling children across active roadways “Parents pile up on the side of the sidewalk... calling their children across the road, which is very dangerous” (Security Guard interview, Primary School) were frequently observed. The danger posed by vehicles maneuvering in drop-off/pick-up areas was recognized by survey respondents, with 58.2% agreeing these situations pose a danger to children (Table 6). These collective behaviors transform school zones into high-risk environments, leading to accidents and near-misses “Last year, a public transportation accident injured multiple students... it was a wake-up call” (Counsellor interview, High School).

6.2.4 *Strategies to Mitigate the Impacts of Climate Change*

While the physical impacts of weather were discussed previously (Section 6.1.1), the functional or operational responses to climate hazards like heavy rain, flooding, and extreme heat appear limited. Participants reiterated how weather severely complicates commutes, particularly for vulnerable users like walkers and those waiting for public transportation “When it rains or gets extremely hot, students who walk or wait at bus stops suffer the most” (Teacher interview, High School), sometimes preventing school attendance altogether, especially in flood-prone areas (see Figures 7 and 8). “Despite the regularity of these disruptions, June to September are the worst. The roads flood...” (Parent, Primary School FGD), systemic operational adaptations seem lacking. An exception was noted among some school bus drivers who proactively adjust their operations “When it rains heavily, we have to modify our routes to avoid leaving children in unsafe conditions” (Bus Driver interview, Primary School). However, this appears to be an individual initiative rather than a widespread, coordinated strategy, leaving most students and caregivers to navigate weather-related disruptions without systematic operational support.

6.3 **Social Barriers and Enablers**

Physical and functional barriers to school transportation in Nassau are frequently compounded by social dynamics, conventions, and conflicts, creating differential experiences across neighborhoods and communities. Factors such as gender, age, and socioeconomic status intersect to shape the safety and efficiency of school commutes, with significant implications for time use and caregiver well-being. While social barriers often manifest as tensions and safety concerns, participants also highlight the strength of community ties, cultural values, and informal support systems as relevant enablers.

6.3.1 *Gender-based Violence and Harassment*

Concerns related to gender significantly shape transportation choices and experiences, particularly for girls. Participants consistently expressed heightened fears about

harassment and potential violence targeting female students during their commutes. This anxiety translates into protective behaviors, primarily by mothers, who often adjust personal schedules, incur extra costs, or sacrifice work opportunities to provide private transportation. One teacher explained, “Parents of girls are especially protective... They’re more likely to adjust their schedules to drop them off themselves” (Teacher interview, Primary School).

Figure 7. Flooding at the entrance of the Uriah McPhee Primary School



Source: Authors' elaboration based on fieldwork data

Figure 8. Flooding near Doris Johnson High School



Source: Authors' elaboration based on fieldwork data

Table 7. Stated Perceptions of Perceived Security for a Child Hypothetically Traveling to and from School on Their Own.

Rating of security of [reference child's] imaginary journey by themselves to and from school	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I would worry children might experience discrimination	5.9%	40.8%	12.4%	29.9%	10.9%
There is a risk that children could get involved in a fight	8.5%	27.3%	10.2%	40.7%	13.3%
I would worry that children would be robbed	3.8%	11.0%	9.5%	48.7%	26.9%
I would worry children may be attacked by stray dogs	3.2%	10.3%	5.7%	51.1%	29.7%
I would worry children might experience sexual violence	2.7%	10.5%	6.9%	44.8%	34.9%
I would worry children might experience harassment	0.8%	9.7%	5.3%	51.3%	33.0%
Crime on the way to/from school would make me worry	1.3%	6.9%	3.8%	43.7%	44.3%
I would worry that strangers might approach	0.8%	6.7%	3.6%	48.1%	40.8%

Source: Authors' elaboration based on the analysis of survey data collected⁸

Specific incidents reported included verbal harassment from bus drivers and peers “My daughter was verbally harassed by a bus driver” (Mother, High FGD); “My daughter was harassed by older kids on the bus” (Mother, Uriah McPhee Primary FGD), being followed while waiting for transportation “My daughter was followed... She was terrified” (Mother, High School), and unwelcome approaches by adults “A 15-year-old girl was approached by an adult while walking to school” (Teacher, High School). A high school counsellor noted an “unfortunate culture where some bus drivers or strangers... harass the girls,” suggesting a normalization of such behavior. These experiences and fears strongly discourage the use of walking and public transportation for girls. The quantitative data underscores these pervasive anxieties: 84.3% of survey respondents worry about harassment, 79.7% worry about sexual violence, and 88.9% worry about strangers approaching children (Table 7). Factor analysis further confirmed a strong latent dimension related to the “Perceived Risk of Gender-Based Violence” in the context of school travel.

6.3.2 Crime

Beyond gendered risks, broader concerns about crime during the school commute were prevalent. Fear of robbery was substantial, with 75.6% of survey respondents expressing worry (Table 7), alongside a general worry about crime enroute (88.0%). The qualitative data revealed specific crime-related barriers, notably neighborhood conflicts and territorial disputes among youth aged 11 to 17. Students travelling through rival areas often reported feeling unsafe due to the potential for physical altercations. A high school principal remarked, “It’s not just about getting to school; for some kids, it’s about crossing territories where they’re not welcome. It creates anxiety for them every single day.” These conflicts, frequently occurring outside school grounds, pose significant safety threats, with participants recounting incidents including students being attacked while walking “Sometimes those walking get attacked on

⁸ Note: Respondents were asked to please rate the statements regarding the security of [reference child] imaginary journey by themselves to and from school on a scale from 1 to 5, where 1 is strongly disagree and 5 strongly agree)

the way home ... it's a neighborhood thing" and even stabbings on public transportation "One of our students was stabbed on a bus" (Teacher interview, High School).

6.3.3 Other Threats to Personal Security

Caregivers and students face additional threats that contribute to a sense of insecurity during the school journey. The fear of children being approached by unknown adults was palpable "You have people who approach kids with candy or pretend to know their parents. It's terrifying" (Parent, Primary School FGD), aligning with the high level of worry about strangers reported in the survey (88.9%, Table 7). Stray dogs (see Figure 9) were frequently cited as another hazard "Children walking to school face dangers from traffic, stray dogs..." (Teacher interview, High School), a concern shared by 80.8% of survey respondents (Table 7). Furthermore, the supervision gaps created by early drop-offs and late pick-ups (discussed in Section 6.2.2) contribute to vulnerability, leaving children potentially unattended in semi-public spaces around the school "Security opens the gates at 7:30, but if they're earlier, they have to wait under the tree" (Reserved Officer interview, High School).

Figure 9. Stray dogs on the way to school are a threat to the personal security of students



Source: Authors' elaboration based on fieldwork data

6.3.4 Discrimination and Conflict

Social interactions during the commute can also involve discrimination and bullying. Participants reported instances of bullying among students, both on public transportation and while walking "Older kids picking on younger ones is common" (Parent, Primary School FGD), sometimes escalating to physical attacks leaving lasting trauma "He's now in 11th grade but still wary of interacting with other students" (Parent, High School FGD). Worry about children getting involved in fights was expressed by 54.0% of survey respondents (Table 7). Critically, authorities like jitney drivers were sometimes perceived as unresponsive or dismissive when bullying was reported "Instead of addressing the bullies, the driver told my son to get off the bus" (Parent, C High School FGD). Discrimination also manifested socioeconomically through the stigma attached to certain transportation modes; school buses, for instance, were sometimes avoided as they were "seen as something only poorer kids use" (School Bus Contractor interview, High School). While some schools reported proactive anti-bullying measures, and some bus drivers enforced strict behavioral rules, these issues remain a

concern during unsupervised portions of the commute. Worry about children experiencing discrimination more broadly was noted by 40.8% of survey respondents (Table 7).

6.3.5 Social Enablers and Community Support

Despite the numerous social barriers, participants also identified important social enablers that help mitigate challenges. Extended family networks play a crucial role, with grandparents frequently assisting with school transportation “My mother picks up my kids every day when I can’t. I don’t know what I’d do without her” (Caregiver, High School). Informal peer support systems also emerged, such as children walking or taking the bus in groups for collective security “The kids look out for each other on the bus. It’s like an unspoken rule—they stick together” (Parent, Primary School). Individual acts of kindness and support from figures like school bus drivers were also noted “If I see a child struggling, I’ll help however I can” (Bus Driver, Primary School). For some, like children at the emergency hostel, the shared bus ride provided a positive social experience “a time for them to unwind and share stories” (Caregiver, Children’s Hostel).

6.3.6 Distrust and Barriers to Collective Solutions

Counteracting these enablers, however, is a prevalent sense of distrust, particularly towards public transportation and shared commuting arrangements. Concerns about unreliable service and unprofessional driver conduct deter many parents “You hear too many stories about buses breaking down or drivers being rude” (Parent, High School FGD). This distrust extends to reluctance towards organizing community-based solutions like walking groups or carpools, primarily due to anxieties about entrusting children to others. Even school-led initiatives like PTA efforts faced challenges, as parental protectiveness sometimes hindered participation in collective transport arrangements “Parents are protective... it makes it harder to create community-driven solutions” (Principal interview, Sybil Strachan).

6.4 Cross-Cutting Findings: Socioeconomic Disparities and Impacts on Education

The barriers and enablers identified across the physical, functional, and social dimensions do not affect all families equally. Socioeconomic status emerges as a critical cross-cutting factor that significantly influences vulnerability and access, ultimately impacting educational outcomes for children in Nassau.

6.4.1 Socioeconomic Inequalities and Vulnerabilities

The findings consistently underscore how socioeconomic status shapes exposure and vulnerability to school transportation barriers. Families with fewer resources disproportionately struggle with unreliable public transportation, longer and more dangerous commutes, and the direct costs of transportation. As one janitor bluntly stated, “The system isn’t designed for the poor; it’s designed for those who already have.” This sentiment reflects a reality where lower-income households have fewer choices and less capacity to buffer against systemic failures.

Financial strain forces difficult choices, with limited household budgets meaning transportation costs directly compete with essential needs like food and utilities. One participant estimated transportation and rent consume over half (\$200/\$350) of a typical weekly income in their area, leaving “very little for food, school supplies, or even utilities” (Janitor interview, High School). This economic pressure often necessitates complex coping strategies. A frequently cited example was older siblings assuming responsibility for transporting younger ones, navigating complex public transportation routes or walking long distances, often involving multiple school drop-offs before reaching their own “A 10-year-old or 11-year-old is supervising the little one”; “They’ll have to take the younger ones to school first... before coming to school themselves”. These added responsibilities can be overwhelming “especially for teenagers who are also trying to keep up with their own studies”

(Teacher interview, C.V. Bethel High School) and directly impact the older child's own educational access and participation, perpetuating cycles of disadvantage.

6.4.2 Consequences for Access to Education

Ultimately, the culmination of physical, functional, and social barriers, mediated by socioeconomic status, directly impacts children's access to education and their learning experience in tangible ways. Financial constraints are a direct barrier, preventing some families from affording bus fares or associated costs like lunch money, leading to absenteeism "If they don't have bus money or lunch money, they just stay home" (Parent, High School FGD). "Some families can't afford transportation, so their children miss school" (Counsellor interview, High School).

Transportation difficulties related to unreliable services, long commutes, weather disruptions, or sibling care duties contribute significantly to tardiness and absenteeism. This not only disrupts the child's learning but can have formal consequences, jeopardizing their ability to meet attendance requirements crucial for graduation "Students who miss the 80% attendance requirement... risk not graduating" (Teacher interview, High School). The commute itself can be physically and mentally taxing. Students arrive tired, stressed, or hungry after difficult journeys, negatively affecting their concentration, mood, and ability to learn "Some students come to school already tired or stressed... it affects their ability to focus"; "We've seen kids falling asleep in class" (Teacher interview, Primary School; "The way they get to school sets their whole mood... Constantly being late puts them in a bad disposition to learn" (Teachers interview, Primary School). Missing crucial instructional time due to late arrivals, particularly in foundational subjects like reading, creates cumulative academic disadvantages that hinder overall educational progress.

6.5 Cluster Analysis Results

Results presented in the previous subsections shed light on the multiple problems perceived by parents for the journey to and from school by their children. The next step is to identify common patterns among parents and see how school transportation problems are distributed among the sample. For this, we followed a two-step analytical procedure of factor analysis and k-means (De Vos et al., 2024; Mokhtarian et al., 2009). We first took the 15 perception questions about enablers and barriers and identified factors (also known as latent variables). These factors help to reduce the dimensionality of the data while adding theoretical value since each factor must have conceptual clarity and express an underlying common process causing the scores observed in the original variables.

To achieve this, we tested several Exploratory Factor Analysis (EFA) (Brown, 2015; Ledesma et al., 2021) changing the specification, estimation method, and type of rotation. Three factors were identified and supported by the scree plot method based on eigenvalues, parallel analysis, empirical Kaiser criterion, and interpretability. On average, the three factors have Alpha values of 0.73, Omega values of 0.78, Kaiser-Meyer-Olkin KMO factor adequacy values close to 0.7, and all Bartlett's sphericity test were significant (p-values below 0.001). Results are presented in Table 8, which were computed with maximum likelihood estimation, oblimin oblique rotation, and Bartlett scores (Mîndril, 2009). The three factors were standardized to have a mean of zero and a standard deviation of one.

The three factors are "perceived traffic safety", "perceived risk of gender-based violence", and "perceived risk of other threats to personal security". The first factor, perceived traffic safety, captures perceptions of traffic-related elements, including enforcement of traffic laws and the quality of infrastructure surrounding schools. For this factor, high and positive values are associated with positive perceptions and low and negative values are associated with negative perceptions. The second factor, perceived risk of gender-based violence, reflects concerns about personal safety of children, encompassing perceptions about the risks of children experiencing verbal, physical or sexual harassment. The last factor, the perceived

risk of other threats to personal security, encompasses the perceptions about issues along the journey to and from school that may place the child at risk of experiencing physical or psychological harm. This includes threats of robbery, discrimination, stray dogs, or conflicts with peers. Positive values mean that individuals are concerned. For the second and third factors, high and positive values mean that individuals are concerned, while negative values mean that individuals are not concerned.

After the dimensionality reduction of the EFA, we moved to compute the clusters with the k-means algorithm. In the specification, the three factors previously explained were included plus the other four variables of the survey that were not associated with any of the three factors. The final decision of the number of clusters was based on running models for different number of clusters ranging from two to six. The elbow method suggested that four clusters was the optimal number. More importantly, the four clusters solution was the most interpretable and theoretical sound. The results of the size of the clusters and the average value for the enablers and barriers variables are presented in Table 8.

Figure 10 presents a parallel coordinates plot with the values of the variables standardized to enhance comparability and interpretability. It is important to note that the direction of the enablers and barriers presented in Table 8 is not consistent, meaning that in some questions positive values are associated with positive perceptions and in others with negative perceptions. Therefore, we prepared an additional summary in Table 9 with a direct interpretation of the results. There, we labelled the interpretation as negative, neutral, and positive.

Cluster analysis allows us to understand the topology of perceptions by creating coherent profiles of concerns. The profile of the clusters for the three latent variables and the other four variables from the survey included in the cluster computation.

The first cluster, *“Concerned about traffic safety, gender-based violence, and other threats to personal security”*, is the largest cluster and is composed of the parents who perceives more risks and challenges for school transportation. Individuals in this cluster had the lowest average level of perceived traffic safety (-0.19). It is also the cluster with the second highest average for perceived risks of gender-based violence and perceived risk of other threats with 0.25 and .31, respectively (though these values are close to the top averages reported by the second cluster). Other distinguishing features of this cluster is that its members tend to believe that protection from sun along the route to school of their children is insufficient and that cars around the school are a danger for children.

The second cluster, *“Concerned about gender-based violence, other threats to personal security, and climate events”*, is similar to the first cluster in terms of its concern for personal security. It has the highest values for perceived risks of gender-based violence (0.32) and perceived risk of other threats (0.32), though these values are close to the reported by the first cluster. The main difference between the first and second cluster is that the second cluster is not worried about traffic safety. On the contrary, it is the cluster with the most positive perceptions (0.40). Other differences are that the second cluster does not have negative perceptions towards climate conditions (exposure to sun and floodings).

Table 8. Results – Exploratory Factor Analysis (EFA)

Variable	First Factor Perceived Traffic Safety	Second Factor Perceived risk of gender-based violence	Third Factor Perceived risk of other threats to personal security	Communality
School zones' traffic laws (e.g., slower speeds) are enforced	0.740	0.030	-0.020	0.550
Drivers stop appropriately at the crosswalks around school	0.720	-0.030	0.030	0.517
Do you agree that the sidewalks, ramps, crosswalks, and similar features around the school are of high quality?	0.440	0.020	0.010	0.193
The pick-up/drop-off area of school is safe for children to walk around	0.380	0.000	-0.040	0.150
I would worry my child might experience physical sexual violence (e.g. being touched inappropriately against their will) on the way to school	0.040	0.610	0.240	0.591
I would worry that strangers might approach my child on the way to/from school	-0.010	0.880	-0.070	0.713
I would worry that my child might experience some form of harassment (unwanted comments, being followed, inappropriate looks, whistles, etc.) to/from school if they were to travel alone	-0.010	0.760	0.040	0.619
I would worry that my child might get robbed on the way to/from school if they were to travel alone	0.010	0.160	0.700	0.643
I would worry that my child may be attacked or scared by stray dogs along the way to school if they were to travel alone	-0.080	0.300	0.470	0.492
I would worry my child might experience discrimination along their way to/from school if they were to travel alone.	0.050	0.100	0.320	0.153
There is a risk that my child could get involved in a fight with another child on the way to/from school if they were to travel alone.	0.000	-0.150	0.720	0.417

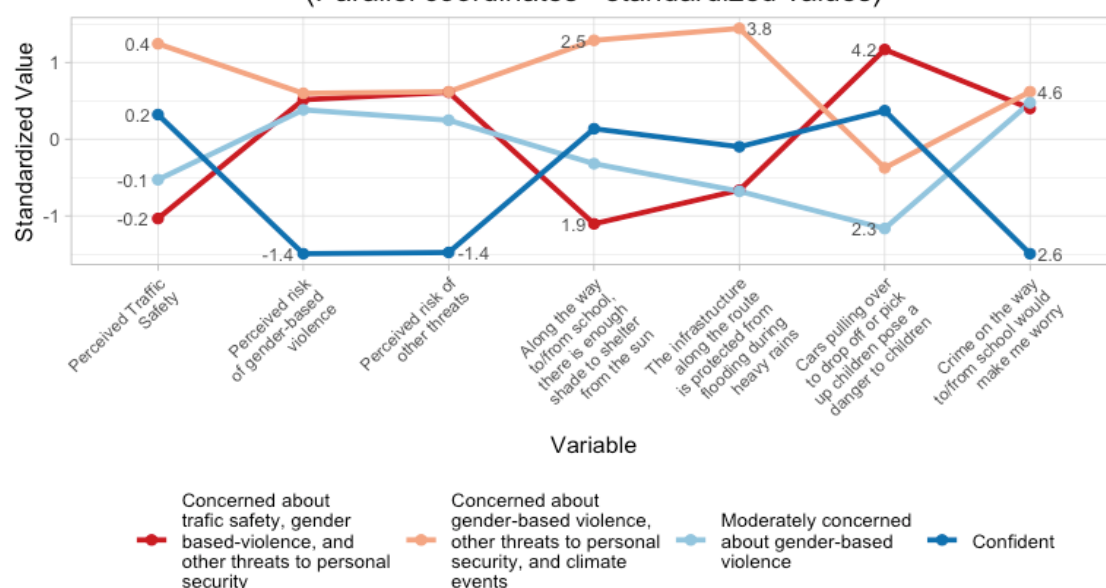
Source: Authors' elaboration based on the analysis of survey data collected Scale: 1: Strongly Disagree 2: Disagree 3: Neutral 4: Agree 5: Strongly Agree

Note: For children being transported by their parents, the questions were framed asking respondents to imagine that children had to travel by themselves

Figure 10. Clusters and average value per variable

Mean values per cluster on enablers and barriers

(Parallel coordinates - standardized values)



Source: Authors' elaboration based on survey data

Table 9. Results – Clusters and average values for enablers and barriers to school transportation

Variable	Clusters			
	Concerned about traffic safety, gender-based violence, and other threats to personal security	Concerned about gender-based violence, other threats to personal security, and climate events	Moderately concerned about gender-based violence	Confident
Percentage (%)	190	77	106	59
Percentage (%)	43.98%	17.82%	24.54%	13.66%
Perceived Traffic Safety	-0.19	0.40	-0.05	0.16
Perceived risk of gender-based violence	0.25	0.32	0.14	-1.43
Perceived risk of other threats	0.31	0.32	0.01	-1.45
Along the way to/from school, there is enough shade to shelter from the sun	1.88	2.47	2.08	2.19
The infrastructure along the route is protected from flooding during heavy rains	1.85	3.79	1.84	2.37
Cars pulling over to drop off or pick up children pose a danger to children	4.21	2.92	2.26	3.54
Crime on the way to/from school would make me worry	4.40	4.61	4.47	2.58

Source: Authors' elaboration based on survey data

The third cluster, “Moderately concerned about gender-based violence”, is neutral about issues of traffic safety (-0.05) and other threats that children can encounter (0.01), but it is concerned about gender-based violence. The average value for Perceived risk of gender-based violence is 0.14, which is almost half the reported by the first cluster and less than half the reported by the second cluster. As the first cluster, the third cluster does not feel like children have enough protection from sun and flooding. In line with the first and second cluster, the third cluster believes that crime on the way to school poses a danger for children. The third cluster has the lowest average value of perceptions about cars around the school (2.26) that are interpreted as neutral.

Lastly, the fourth cluster, the “*Confident*”, is only worried about issues of lack of shelter from sun the risks of cars around the school. This has positive perceptions about traffic safety (though much lower than the reported by the second cluster) and neutral feelings towards flooding. Its most important characteristic is that individuals in this cluster tend to believe that personal security is not a major risk. This cluster has the lowest values (that are interpreted as having less concerns) for perceptions of risks of gender-based violence and risks of other threats (-1.43 and -1.45, respectively). This is the only cluster that appears to have low levels of concerns around personal security, something that is also reflected in the fact that it is the only cluster with no negative perceptions of crime on the way to school (average value of 2.58 that is to be interpreted as neutral). One last element to highlight in the fourth cluster is its gender distribution. Even though, as mentioned in the sample description, the sample is primarily composed of women (83%), this distribution is not retained only for the fourth cluster. While other clusters have more than 80% of women, this cluster has 70.2%. The interpretation is that the more confident cluster is the cluster with the comparative, lowest participation of women.

While the clusters themselves were derived solely from attitudinal data, analyzing how these groups differ in terms of characteristics like gender, household density, education, marital status, or access to transportation allows for a deeper understanding of the lived realities behind these perceptions. In annexes two and three we present and compare the distribution, per cluster, of additional demographic and transportation variables. This comparison helps to contextualize the clusters within broader socio-demographic patterns.

The first cluster (“Concerned about traffic safety, gender-based violence, and other threats to personal security”) features a slightly elevated household density (1.51 individuals per room) This cluster also shows a strong presence of secondary school education (39.47%) and a high rate of full-time employment (92.63%). In contrast, the fourth cluster (“*Confident*”) has a similar household density (1.5 individuals per room) and the highest share of technical qualifications (17.24%), along with the highest proportion of household members reporting disabilities (16.95%). This group also reports the most frequent access to private vehicles, potentially reinforcing their higher sense of confidence and autonomy in mobility.

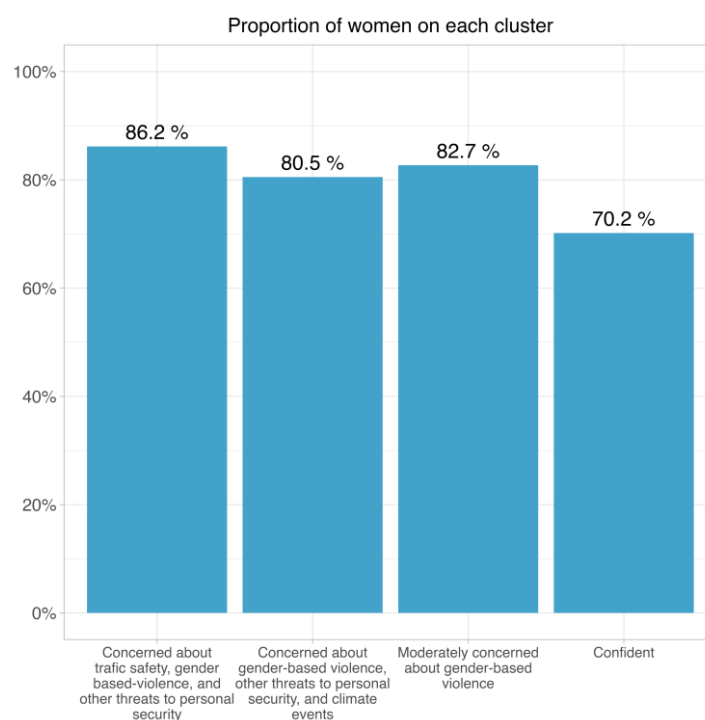
Looking at marital status and relationship to the head of household, the “Moderately concerned about gender-based violence” and “*confident*” clusters stand out with the highest proportion of never-married individuals and the greatest share of self-identified heads of household, possibly indicating more independent living arrangements. Conversely, in the “Concerned about gender-based violence, other threats to personal security, and climate events” group, a larger proportion of participants are married (45.45%) and living in less dense households (1.15 individuals per room). This cluster also displays the highest percentage of university graduates (57.14%), suggesting a correlation between higher education and the inclusion of broader environmental concerns in perceived barriers. Across all clusters, access to private vehicles is fairly consistent.

Table 10. Results – Clusters and summary of interpretation of enablers and barriers perceptions

	Clusters			
	Concerned about traffic safety, gender-based violence, and other threats to personal security	Concerned about gender-based violence, other threats to personal security, and climate events	Moderately concerned about gender-based violence	Confident
<i>Total</i>	190	77	106	59
Percentage (%)	43.98%	17.82%	24.54%	13.66%
Perceived Traffic Safety	Negative (-)	Positive (++)	Neutral	Positive (+)
Perceived risk of gender-based violence	Negative (-)	Negative (-)	Negative (-)	Positive (++)
Perceived risk of other threats	Negative (-)	Negative (-)	Neutral	Positive (++)
Shelter from the sun	Negative (-)	Neutral	Negative (-)	Negative (-)
Protection from flooding	Negative (-)	Positive (+)	Negative (-)	Neutral
Cars around the school	Negative (--)	Negative (-)	Neutral	Negative (-)
Crime on the way to/from school	Negative (--)	Negative (--)	Negative (--)	Neutral

Source: Authors' elaboration based on survey data

Figure 11. Clusters – Gender distribution



Source: Authors' elaboration based on survey data

7. Discussion and Conclusion

This study sought to uncover the complex landscape of barriers and enablers shaping school transportation for children and their caregivers in Nassau, The Bahamas, paying particular attention to the gendered dimensions of these daily journeys. Employing a mixed-methods approach grounded in a framework encompassing physical, functional, and social dimensions, our findings reveal a transportation ecosystem fraught with challenges and punctuated by crucial points of resilience and support. The insights derived offer valuable contributions to understanding urban mobility in a Caribbean Small Island Developing State (SIDS) context, with direct implications for policy, practice, and future research to foster more equitable and accessible education.

7.1 Barriers, Enablers, and their Social Consequences

The convergence of qualitative insights from caregivers and school staff with quantitative survey data strongly affirms the necessity of adopting a multidimensional perspective to grasp the realities of school travel in Nassau. Our findings demonstrate how physical, functional, and social factors intertwine to create complex challenges and opportunities. Infrastructural deficits emerged as a consistent theme, particularly the lack of safe pedestrian pathways, adequate crossings, and climate-resilient features like effective drainage and shade. This resonates with global research identifying poorly built environment and pedestrian infrastructure as significant contributors to increased reliance on motorized transportation and compromised safety (Aranda-Balboa et al., 2020; McDonald, 2008). SIDS vulnerability was highlighted by the distinct concern for climate-related disruptions, especially flooding, voiced by a specific segment of our sample (Cluster 2). This vividly illustrates how climate impacts directly threaten transportation reliability and infrastructure integrity in contexts like the one in The Bahamas (Monioudi et al., 2018; Aroke et al., 2021; Robinson, 2018; Thomas et al., 2020; de Abreu et al., 2022).

Beyond the physical landscape, functional barriers significantly shape daily commutes. The perceived lack of consistent enforcement of traffic laws within school zones, coupled with the unreliability of public 'jitney' services, creates substantial hurdles. These findings echo existing literature demonstrating how weak enforcement can undermine safety regulations (Schwanen, 2008) and how poor public transportation operations disproportionately burden lower-income families (McDonald, 2008; Blandin et al., 2024). Compounding these issues are pervasive social fears surrounding crime, harassment, and gender-based violence. These anxieties act as powerful deterrents, influencing transportation choices and compelling caregivers—overwhelmingly women in our study—towards more resource-intensive protective strategies, such as relying on private vehicles even for short trips. This aligns closely with research linking fear of crime and harassment to reduced use of active and public transportation options, especially for women and girls (Montoya-Robledo et al., 2020; Roy et al., 2024; Sener et al., 2019).

The analytical framework guiding this study proved robust in navigating this complexity. The statistical analyses further supported its validity. Exploratory factor analysis identified underlying constructs related to perceptions of traffic safety (linking physical and functional aspects), gender-based violence (social), and other threats to personal security (social). Crucially, the subsequent cluster analysis solidified the framework's utility by revealing four distinct groups of caregivers whose primary concerns map onto these dimensions. We identified Cluster 1, exhibiting broad concern across traffic safety, gender-based violence, and other threats; Cluster 2, with no major concerns about climate and personal security threats; Cluster 3, showing moderate concern focused on gender-based violence; and Cluster 4, demonstrating relative confidence regarding personal security risks. These distinct perceptual profiles confirm that caregiver experiences are not monolithic and underscore the value of the multidimensional framework. This clustering can serve as a practical diagnostic tool for policymakers, enabling the tailoring of interventions to specific

audience concerns—for example, prioritizing drainage infrastructure to mitigate flooding and to address the urgent needs expressed by Cluster 2, while focusing on traffic safety and gender-based violence prevention for Cluster 1. The clear differences between clusters strongly suggest that generic, one-size-fits-all approaches to school transportation policy will likely fall short.

Examining how these four perceptual profiles intersect with caregivers' sociodemographic characteristics further reinforces their practical relevance. The cluster most concerned with gender-based violence, other threats to personal security, and climate events is composed of caregivers who are more frequently married, live in less dense households, and have the highest share of university degrees, suggesting that higher levels of education and relatively less crowded living conditions may be associated with greater awareness of climate risks and a broader framing of school journeys as an environmental and social vulnerability issue. By contrast, the respondents in the cluster expressing broad concern across traffic safety, gender-based violence, and other threats tend to live in more crowded homes and are more likely to be caregivers with a secondary rather than tertiary education, which points to how material constraints and residential conditions, which can be associated with increased exposure to everyday road dangers, can also sharpen sensitivities. Clusters characterized by moderate concern about gender-based violence or by relative confidence include a higher proportion of never-married respondents who identify as heads of household and, in the case of the “confident” group, more frequent access to private vehicles despite a higher share of household members with disabilities. This helps explain both their greater reliance on motorized trips and their lower reported concern about crime and harassment. At the same time, cross-cutting issues emerge clearly from the cluster analysis: a large majority of caregivers across groups report insufficient shade and inadequate protection from flooding along routes to school, and most perceive cars maneuvering around school gates as a danger. Taken together, these patterns indicate that the clusters do not simply capture abstract attitudes but reflect differentiated caregiving realities that can guide the prioritization of interventions, combining universal measures in all school zones (continuous sidewalks, safe crossings, basic shade and drainage) with more targeted communication, enforcement, and gender-based violence prevention efforts tailored to the specific risk profiles and sociodemographic characteristics associated with each cluster.

These findings carry significant weight for policy, practice, and community engagement. A central revelation is the profoundly gendered nature of school transportation responsibilities in Nassau, with women constituting 83% of our sample who organize or undertake these daily journeys. This starkly confirms global patterns where women disproportionately bear the time, cost, and stress burdens associated with child-related mobility (Schwanen, 2008; McDonald, 2008; Bernardo et al., 2015), often limiting their own economic participation and impacting their well-being (Schwanen et al., 2015). Effectively tackling school transportation challenges, therefore, demands multi-sectoral collaboration, extending beyond transportation and public works to include education, social services, gender affairs, and law enforcement agencies. Caregivers themselves consistently highlighted priority intervention areas: improving walkability via continuous sidewalks and safe crossings, strengthening traffic law enforcement in school zones, providing basic weather protection like shade and shelter, and enhancing infrastructure resilience, especially against flooding. While physical upgrades are essential, addressing functional gaps, like unreliable public transportation or inconsistent crossing guard deployment, by providing safe, reliable and adequate school bus services and improving public transit, and mitigating social fears -through visible policing, community safety programs, and tackling harassment- are equally critical. Importantly, this research amplifies the voices and lived experiences of caregivers, particularly women. This empirical grounding is vital for designing targeted community engagement strategies and ensuring that future interventions are genuinely responsive to the needs and realities faced by families navigating school journeys in Nassau.

7.2 Future Research Directions and Policy Relevance

This study provides a comprehensive snapshot of the barriers and enablers defining school transportation in Nassau and identifies distinct caregiver profiles based on their primary concerns. It lays a crucial foundation and points towards important avenues for future inquiry. While we have mapped the challenges and identified how factors like gender and socioeconomic status appear to mediate experiences, the next critical step is to rigorously investigate the consequences of these transportation realities for caregivers themselves. As foreshadowed in our introduction, future research should delve deeper into how the daily burdens and stresses associated with navigating inadequate, unsafe, or unreliable school journeys impact caregivers'—predominantly women's—time use, labor force participation, income-earning potential, and overall physical and mental well-being. The identified clusters offer a valuable starting point for exploring these differentiated outcomes: how do the specific anxieties and coping mechanisms of those primarily concerned with climate impacts (Cluster 2) differ in their effect on well-being compared to those most concerned about traffic safety (Cluster 1) or those feeling relatively secure (Cluster 4)? Understanding these links is essential for quantifying the broader societal costs of inaction and building a stronger evidence base for policy interventions.

Furthermore, exploring the interplay between household structure, socioeconomic positioning, neighborhood characteristics, and gender identity in shaping these outcomes will provide a more granular understanding of vulnerability and resilience within the Nassau context. Such research can directly inform policy by highlighting the potential co-benefits of investing in school transportation—not only improving educational access for children but also potentially unlocking economic opportunities and reducing time poverty and stress for caregivers.

The findings and insights presented here are relevant for ongoing and future policy initiatives in The Bahamas. The detailed mapping of physical deficits, functional bottlenecks, and social fears can inform the design of safer, more inclusive school zones, potentially enhanced through innovative tools like simulations of changes in school zones and their visualizations by policymakers via tools such as Virtual Reality. Identifying specific concerns within distinct caregiver groups allows for more targeted public awareness campaigns and intervention designs. Ultimately, this research underlines the interconnectedness of transportation, education, gender equity, climate resilience, and community safety. By continuing to explore these linkages and translating findings into actionable recommendations, future work can contribute to building more equitable, accessible, and resilient mobility systems that support the well-being and aspirations of both children and their caregivers in Nassau.

Acknowledgments

We would like to express our deepest gratitude to the Ministry of Education and Vocational and Technical Training (MoEVTT) and the Ministry of Works and Family Island Affairs (MOW&FIA). Their support was essential in making this research and publication possible. Both ministries provided valuable background information, engaged in technical discussions, and played a key role in facilitating data collection. We also extend our sincere thanks to the principals and staff of the four participating schools—Uriah McPhee Primary School, Sybil Strachan Primary School, C.V. Bethel Senior High School, and Doris Johnson Senior High School. We are truly grateful for their openness in welcoming us into their schools and for fostering meaningful exchanges with the school communities.

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Annexes

Annex 1. Guiding questions for the individual and group data collection mechanisms

Guiding Questions for Focus Group Discussions

A) General Perceptions

- What does access to school mean to you?
- Why did you choose to send your children to this school?
- What modes of transport do your children use to get to school?
- What challenges are associated with different modes of transport (e.g., school buses, being driven by parents, walking) regarding safety, cost, reliability, and overall effectiveness?

B) Barriers and enablers of access to school

- What are the main barriers or enablers children face when trying to access the school, regardless of the mode of transport?
 - Physical challenges (e.g., infrastructure, road conditions, sidewalks)
 - Transport challenges (e.g., traffic congestion, road safety, accidents)
 - Social challenges (e.g., insecurity, crime, harassment)
 - Cultural challenges (e.g., social expectations, discrimination, preferences)
- How do these access barriers or enablers impact your daily lives?
- Are these aspects of school access consistent throughout the morning and afternoon commutes and across different seasons or weather conditions?
- Are there sufficient modes of transport available for the children's school commute? What are the alternatives you rely on?
- Is public transportation reliable for commuting to school? Why?

C) School and Community Infrastructure

- What do you think about the current infrastructure in the school's surrounding area?
- How could the infrastructure and transport options around the school be improved to better support your children's access, regardless of the mode of transport?
- What specific improvements would make a difference for children who walk, take the bus, or are driven by their parents?
- Who would benefit the most from improved school access and better infrastructure in the area?
- How would these improvements impact parents and caregivers?

D) Impacts on caregivers: Time Use, Well-being and Labor Market Participation

- Do you feel the daily time spent on your child's school commute affects your ability to manage other responsibilities? What concerns do you have, if any?
- How satisfied are you with your current routine regarding your child's school commute?
- Do you feel concerns about getting your children to school impact your...?
 - Quality of life (a sense of security, income level, freedom)
 - Physical health (tiredness, healthy habits and pain)

- Mental health (emotional well-being, handling stress, relating to others, and making choices)
- Do you believe parents/caregivers are supported by other people in their family or social circles (family, friends, schools, community) to manage the child's school journey? How?
- Have you perceived employment disadvantages due to the demands of your child's school commute? Could you mention some of them?
- Would better transport options enable parents/caregivers to participate more fully in the labor market? Why?
- Do you believe transport costs associated with your child's school commute impacts your household budget? Why?

E) Future Perspectives

- Would you support initiatives to improve the infrastructure around the school, such as widening sidewalks, improving crosswalks, enhancing bus routes, or managing traffic flow? Why?
- In the future, how would you like the transport around the school to evolve to better serve children and their parents/caregivers, considering all modes of transport?
- How would you describe the ideal environment around the school that supports safe and reliable access for your children, regardless of the mode of transport?
- Would you prefer more pedestrian-friendly options, better bus services, or improved traffic management for private vehicles?
- What role can the school play in advocating for better infrastructure and transport options in the community?

F) Additional Thoughts

- Is there anything else you would like to add regarding school access and infrastructure, or how the community could better support students and parents/caregivers, particularly about different modes of transport?

Guiding Questions for Semi-structured interviews

[This semi-structured interview guideline provides the interviewer with a broad roster of questions that must be adapted to the interviewee's expertise. Not all participants should be asked all questions].

A) Role & Responsibilities of the Interviewee & Institution

- What is your role within your institution?
- How long have you been working for this institution?
- What is your institution's role/objectives? How does it function?
- How does your work engage with transport, education, and/or caregiving issues in The Bahamas?
- What does access to education and/or caregiving responsibilities mean to you in the context of your work?

B) General Perceptions

- What are the most significant challenges related to school access in New Providence/Nassau?
- In your opinion, who is primarily responsible for transporting children to and from school?

- From your perspective, what are the biggest challenges for caregivers in ensuring their children can safely and reliably access school?
- How do transportation and infrastructure issues impact school attendance and the well-being of caregivers?
- What is the role of transport infrastructure in supporting or hindering access to education in New Providence/Nassau?
- In your opinion, what makes a transport route or school environment conducive to safe and reliable access for students and their caregivers?
- What factors drive the current patterns of school access in New Providence/Nassau?

C) Policy Priorities and Investments for supporting access to school

- From your perspective, what are the current policy priorities for improving access to education in New Providence/Nassau?
- What are the main priorities related to transport and infrastructure in this context?
- What are the most significant investments being made to improve school access?
- Where does the budget/financing for transport and educational infrastructure come from in New Providence/Nassau?
- Do you know how budget allocations are made for planning infrastructure that supports school access?
- How are current initiatives targeting improvements in school access integrated with other policies and interventions within or outside the transport and education sectors?
- Who has responsibility for planning and implementing infrastructure and policies that support school access?
- Who has responsibility for maintaining infrastructure that supports school access and caregiving, and where does the funding come from for this?

D) Impacts on Parents and Caregivers

- How does the current state of school access affect parents' and caregivers' ability to participate in the labor market?
- In what ways does managing school access for children impact the availability of time for parents and caregivers?
- What are the broader implications of these time constraints on the overall well-being of parents and caregivers?
- To what extent does the need to ensure safe and reliable school access influence parents' and caregivers' employment choices or working hours?
- How does the responsibility for school access and caregiving affect the mental and physical health of parents and caregivers?
- What support systems or interventions do you think are necessary to alleviate the burdens on parents and caregivers caused by challenges in school access?
- What role do you believe employers and the wider community could play in supporting parents and caregivers dealing with these challenges?

E) Target Populations

- Are there specific population groups facing unique challenges related to school access New Providence/Nassau?
- Please explain what these challenges are.
- What do you think needs to change to improve school access for these groups and reduce the negative impacts on caregivers?
- Who should be prioritized when considering interventions in policy, infrastructure, and support for school access and reducing the impact of access on carers?

- What are the social and cultural factors most influencing the prioritization of interventions related to school access in New Providence/Nassau?

F) Practical Implementation Issues

- What are the challenges in delivering policy priorities that improve school access and support caregivers in New Providence/Nassau?
- To what extent are current transport and education policies addressing the needs of caregivers and students in accessing school?
- From your perspective, what are the main challenges for developing safe and accessible infrastructure that supports school access?
- What are the main challenges from the perspective of regulation and enforcement in ensuring that school access is safe and inclusive in New Providence/Nassau?

G) Future Perspectives

- What are the future challenges the city will likely face in the coming years in improving school access and supporting caregivers?
- And what are the future opportunities?
- To what extent can technological developments present challenges or opportunities for improving school access in New Providence/Nassau?
- Which policies could accelerate the improvement of school access and the support for caregivers in the city?
- What is your ideal scenario for school access and caregiving support in New Providence/Nassau in the medium and long term

Annex 2. Clusters – demographic variables distribution

	Concerned about traffic safety, gender-based violence, and other threats to personal security	Concerned about gender-based violence, other threats to personal security, and climate events	Moderately concerned about gender-based violence	Confident
Women (%)	86.2%	80.5%	82.7%	70.2%
Household Density (median, individuals per room)	1.5	1.25	1.33	1.42
Total members at home	3.79	3.39	3.52	3.50
What is the highest level of education you have completed?				
Primary School	0.00%	1.30%	2.86%	1.72%
Secondary School	39.47%	29.87%	35.24%	39.66%
Technical Qualification (e.g., plumber, electrician)	12.11%	6.49%	10.48%	17.24%
University undergraduate degree (associates or bachelor)	38.95%	57.14%	39.05%	34.48%
Post Graduate degree	9.47%	5.19%	12.38%	6.90%
What is your marital status?				
Never married	42.02%	35.06%	46.67%	50.00%
Married	42.55%	45.45%	37.14%	36.21%
Living together/common law	1.06%	2.60%	3.81%	1.72%
Divorced	8.51%	7.79%	6.67%	5.17%
Legally separated	3.19%	9.09%	3.81%	5.17%
Widowed	2.66%	0.00%	1.90%	1.72%
Disabilities				
Yes	11.05%	15.58%	12.26%	16.95%
No	88.95%	84.42%	87.74%	83.05%
What is your relationship with the head of your household?				
Self / Head of the household	55.32%	57.89%	62.14%	67.86%
Partner (including spouse, living together, or unmarried partner)	32.45%	31.58%	29.13%	19.64%
Son / daughter	12.23%	9.21%	5.83%	10.71%
Son-in-law / daughter-in-law	0.00%	1.32%	0.00%	0.00%
Parent / Parent-in-law	0.00%	1.32%	1.94%	1.79%
Sibling / Sibling-in-law	0.00%	0.00%	2.91%	1.79%

Source: Authors' elaboration based on survey data

Annex 3. Clusters – distribution of other variables

	Concerned about traffic safety, gender-based violence, and other threats to personal security	Concerned about gender-based violence, other threats to personal security, and climate events	Moderately concerned about gender-based violence	Confident
How many motorized vehicles (e.g. cars, trucks, and motorcycles) are in your household?				
0	4.23%	2.60%	4.72%	0.00%
1	37.04%	42.86%	40.57%	45.76%
2	41.27%	40.26%	42.45%	42.37%
3	17.46%	14.29%	12.26%	11.86%
How often do you have access to a private vehicle for your personal mobility?				
Never	5.79%	2.67%	9.43%	1.69%
Occasionally (1-3 times a week)	5.26%	5.33%	3.77%	3.39%
Frequently (4-6 times a week)	2.11%	2.67%	2.83%	3.39%
Always	86.84%	89.33%	83.96%	91.53%
How would you describe the main activity that you were doing last week?				
Employed full time (more than or equal to 35 hours per week)	92.63%	88.31%	90.57%	86.44%
Employed part-time time (less than 35 hours per week)	0.00%	1.30%	0.94%	3.39%
Unemployed (actively looked for a job in the last week)	1.58%	1.30%	3.77%	5.08%
Retired	2.11%	1.30%	0.94%	5.08%
Studying/in School	0.00%	1.30%	0.94%	0.00%
Homemaker (taking care of my household full time)	2.63%	5.19%	2.83%	0.00%
Long-term sick or disabled	0.53%	1.30%	0.00%	0.00%
Unemployed (did not actively look for work in the last week)	0.53%	0.00%	0.00%	0.00%

Source: Authors' elaboration based on survey data