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by

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Parental Perspectives on the Walking School Bus: Survey Evidence from Ferrara, Italy

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Abstract

Walking School Bus (WSB) programmes, in which children walk to school in groups under adult supervision, are increasingly promoted as a sustainable alternative to private car use. However, participation remains limited and uneven across cities. This paper examines the behavioural, social, and economic factors associated with parental participation in Ferrara (Italy). It draws on a survey of 711 parents from 15 primary schools. The analysis compares three groups of parents: those whose children actively participate in a WSB, those in schools where the service exists but is not used, and those in schools without the service. The findings show broad agreement on the environmental and educational value of the WSB. At the same time, they reveal a persistent reliance on private transport. Logistical and organisational barriers, such as distance from collection points, schedule incompatibility, and the scarcity of volunteers, are more relevant than value-based resistance. Interpersonal trust and civic engagement are associated with participation, but they need to be combined with organisational and institutional support to translate into stable participation. Willingness to Pay and Willingness to Accept suggest that parents perceive the WSB as a collective good with high symbolic value, rather than as a monetizable service. The paper provides the descriptive and theoretical foundation for a companion paper that will estimate ordered logit models on WTP and WTA

Keywords: Walking School Bus, parental perspectives, active school travel, survey data, sustainable mobility, social practice.

1. Introduction

Sustainable and active school mobility occupies a central place in urban and environmental policy agendas, where climate objectives intersect with social, educational, and health concerns. Within this landscape, the Walking School Bus (WSB) has emerged as a distinctive instrument: a supervised group of children walking to school along fixed routes. Its appeal lies in its low cost and community-based structure, which help reduce car dependency, traffic congestion, and local air pollution. Yet participation remains limited and uneven across cities and understanding why some families choose to join while others do not is essential for designing effective and equitable sustainable mobility policies.

The existing literature on active school travel has concentrated mainly on health outcomes and on the built environment, and it remains dominated by Anglo-Saxon case studies. Behavioural and economic dimensions of participation, including trust, social capital, and willingness to pay, have received comparatively little attention, especially in Southern European contexts where family networks and institutional trust present distinctive features. Furthermore, most studies frame participation as an individual rational choice, overlooking the socially situated nature of mobility practices. In Italy, where WSB programmes (locally known as Pedibus) have been piloted in several cities but rarely evaluated, empirical evidence on parental attitudes and economic valuation is almost absent.

This paper addresses two complementary research questions:

> First, what behavioural, social, and contextual factors characterise parental participation in the Walking School Bus, and how do they vary across the three groups?
>
> Second, how do parents perceive the Walking School Bus as a collective good, and what does this reveal about the symbolic and civic dimensions of sustainable school mobility?

The analytical framework draws on behavioural economics (Simon, 1978; Kahneman & Tversky, 1979), which shows that mobility choices are shaped by bounded rationality, habits, and cognitive biases rather than by full cost–benefit calculations. This framework is combined with two concepts. The first is situated action (Suchman, 1987), which draws attention to the everyday practices, shared norms, and material contexts in which choices are made. The second is social capital (Putnam, 2000; Coleman, 1990), which emphasises the role of interpersonal and institutional trust in enabling collective practices. Taken together, these perspectives allow us to read WSB participation as a socially situated practice, emerging from the interaction between cognitive processes, social networks, and contextual constraints.

The empirical analysis relies on an original survey of 711 parents from 15 primary schools in Ferrara (Italy). The survey builds on a preliminary qualitative study conducted in the same city, which explored the barriers and enablers of participation through 27 semi-structured interviews, interpreted through the lens of social capital theory (Rocco, Mancinelli & Nikitas, 2026). The survey covers socio-demographic characteristics, home–school mobility, perceived benefits and barriers, social capital and trust, and stated Willingness to Pay (WTP) and Willingness to Accept (WTA). Three groups of parents are compared: those whose children actively participate in a WSB, those in schools where the service exists but remains unused, and those in schools without the service. This three-group design makes it possible to separate the role of service availability from that of individual attitudes, and to identify the organisational and relational conditions under which latent demand for sustainable school mobility can be activated. While the qualitative study identified the main barriers and enablers of participation, the present survey extends that work by quantifying the behavioural, social, and economic factors associated with parental participation.
Four hypotheses guide the empirical analysis. H1, on social capital and trust, predicts that interpersonal trust is associated with participation, while institutional trust plays a weaker role. H2, on logistical and organisational barriers, predicts that practical constraints dominate over value-based resistance. H3, on environmental awareness and civic engagement, predicts that parents with higher environmental awareness and civic engagement are more likely to participate. H4, on monetary valuation, predicts that WTP and WTA are limited and symbolic, reflecting the perception of the WSB as a collective good rather than as a monetizable service.

The paper is organised as follows. Section 2 presents the theoretical framework and formulates the hypotheses. Section 3 describes the data and methodology. Section 4 reports the main results, comparing the three groups. Section 5 discusses the findings and their policy implications. Section 6 concludes and outlines directions for future research. The paper provides the descriptive and theoretical foundation for a companion paper (in preparation) that will estimate ordered logit models on WTP and WTA, using the same dataset, to identify the cognitive, social, and economic correlates of monetary valuation.

2 Theoretical frameworks

This section delineates the theoretical frameworks that lead the paper, organised into four sub-sections: behavioural economics and its conceptual complements (2.1), economic valuation (2.2), and hypotheses (2.3).

2.1 Behavioural economics and its conceptual complements

This section outlines the behavioural economics framework that guides the paper and introduces two concepts that qualify and complement it: situated action and social capital.
Behavioural economics provides a useful lens for interpreting choices about participation in sustainable mobility services such as the Walking School Bus. Individual decisions are not purely rational: cognitive biases, habits, and social norms constrain the ability to evaluate costs and benefits fully. Drawing on bounded rationality (Simon, 1978) and prospect theory (Kahneman & Tversky, 1979), behavioural economics treats choice as the outcome of cognitive processes through which people process information and evaluate alternatives within the limits of their rationality. In this framework, the social and institutional context acts as an external factor that guides behaviour without determining it directly.

The theory of situated action (Suchman, 1987) qualifies this perspective by arguing that decisions must be analysed within the social and material contexts in which they occur. Choices emerge from everyday practices, shared norms, and trust relationships, showing how the context not only influences action but contributes to constructing it. Behavioural economics and situated action therefore operate on complementary planes: the former explains the cognitive processes that guide individual decision-making, while the latter highlights the relational and contextual dimension.

Social capital (Putnam, 2000; Coleman, 1990) further complements this framework by emphasising the role of trust, reciprocity, and collective practices. The stability and diffusion of active mobility programmes depend on social capital and on levels of interpersonal and institutional trust. These elements underpin cooperative practices, fostering shared responsibility among families, schools, and local administrations. The Walking School Bus is not merely a logistical service: it operates as a form of community governance that fosters trust and mutual support. Aldred (2012) and Aldred & Jungnickel (2014) show how the culture of sustainable mobility develops within cohesive social networks, where collective participation nurtures pro-social norms and a shared sense of belonging. Oreskovic et al. (2014) further note that the built environment and the perception of safety are closely tied to social capital: families are more likely to participate when the urban context is perceived as safe and when trust relationships exist among those involved.

From this perspective, environmental sustainability intertwines with social cohesion. Participating in the Walking School Bus means reducing daily ecological impact while also building relational capital and strengthening collective responsibility towards the community (Bandura, 2018; Putnam, 2000). The link between social capital and sustainable behaviours reinforces the idea that collective trust and civic engagement are preconditions for long-term participation and for the stability of active mobility initiatives.

This is particularly relevant for the Italian context, where social capital tends to be concentrated in family and proximity networks rather than in generalised or institutional trust (Putnam, 2000). In such a context, participation in collective initiatives such as the Walking School Bus may depend more on interpersonal relationships and shared routines than on formal incentives or institutional campaigns.

Taken together, behavioural economics, situated action, and social capital allow us to read sustainable mobility choices as social practices rooted in everyday life. This integrated perspective is particularly relevant for the Walking School Bus, which requires parents to coordinate with other families, trust volunteer chaperons, and adapt daily routines to collective schedules. Participation is therefore not a simple individual choice between alternative travel modes, but a socially situated practice that depends on relational networks, shared routines, and contextual constraints.

2.2 Economic availability: WTP and WTA

The sustainability of active mobility programmes also depends on their economic feasibility and on how the community perceives fairness. Willingness to Pay (WTP) and Willingness to Accept (WTA) allow researchers to assess the collective value attributed to the benefits generated by the service (Litman, 2018; Eliasson, 2016). The willingness to contribute financially reflects not only spending capacity but also trust in institutions and a sense of civic responsibility (Schuitema et al., 2010; Frey & Jegen, 2001). Parents pay more willingly when they see the Walking School Bus as a collective good, and when trust in the institutions managing the service is present.

The literature shows that the propensity to support environmental initiatives financially is shaped more by psychological and social factors than by income (Díaz et al., 2020; Theisz et al., 2025). The perception of fairness and the recognition of collective benefit play a decisive role in the acceptance of sustainable mobility policies. In this sense, WTP and WTA take on a dual meaning: economic, as they ensure the financial sustainability of the service, and symbolic, as they represent civic commitment and trust in community cooperation.

2.3 Hypotheses

Building on the theoretical framework outlined above, the paper formulates four hypotheses that guide the empirical analysis. Given the descriptive and cross-sectional design of the study, these hypotheses are exploratory in nature and intended to identify associations rather than causal relationships. Each hypothesis links a dimension of the theoretical framework to specific variables measured in the survey.

H1 (Social capital and trust). Parents with higher levels of interpersonal trust, towards family, friends, neighbours, and other parents, are more likely to participate in the Walking School Bus, or to express willingness to participate in the future. Institutional trust, towards local institutions and government, is expected to be less strongly associated with participation, reflecting the prevalence of "narrow" trust in the Italian context (Putnam, 2000; Coleman, 1990).

H2 (Logistical and organisational barriers). Parents who report logistical and organisational barriers, such as distance from collection points, incompatibility between school and work schedules, heavy schoolbags, and lack of volunteer chaperons, are less likely to participate, regardless of their attitudes towards the service. This hypothesis reflects the literature on active school travel (Panter et al., 2010; Chillón et al., 2011; Wilson et al., 2018) and the situated action perspective, which emphasises contextual constraints over individual preferences.

H3 (Environmental awareness and civic engagement). Parents with higher environmental awareness, measured through pro-environmental behaviours such as waste separation, water conservation, and use of sustainable transport, and higher civic engagement, measured through participation in associations or volunteering, are more likely to participate in the Walking School Bus. This hypothesis builds on the literature on social capital and pro-social behaviour (Putnam, 2000; Bandura, 2018) and on the idea that sustainable mobility is embedded in broader sustainable practices.

H4 (Monetary valuation as a collective good). Parents perceive the Walking School Bus as a collective good with high symbolic and civic value rather than as a monetizable private service. As a result, both Willingness to Pay (WTP) and Willingness to Accept (WTA) are expected to be limited and concentrated in the lowest contribution ranges, and refusals to pay are expected to be motivated more by fairness and civic concerns than by income constraints. This hypothesis is consistent with the literature on motivation crowding (Frey & Jegen, 2001) and on the acceptability of sustainable mobility policies (Schuitema et al., 2010), and it provides the bridge to the companion paper (in preparation) that will estimate ordered logit models on WTP and WTA.

3. Data and methodology

This section describes the data and methodology, organised into six sub-sections: research design (3.1), sample (3.2), data collection (3.3), questionnaire structure (3.4), validation (3.5), and data analysis (3.6).

3.1 Research design and context

The study adopts a quantitative descriptive-analytical design to explore parents' attitudes, behaviours, and economic willingness regarding the Walking School Bus service. It is situated within the broader field of sustainable school mobility studies, which examines the social, organisational, and perceptual factors that influence parents' choices of active travel modes for their children (Mendoza et al., 2011; Shaw et al., 2015).

The methodological framework adopts a comparative group design, allowing for the analysis of differences and similarities among three categories of parents: (1) parents whose children participate in an active Walking School Bus; (2) parents whose children attend schools where the Walking School Bus is active but do not participate; (3) parents whose children attend schools without the service. This three-group structure makes it possible to observe variations in perceptions, barriers, trust, social participation, and economic willingness, providing a cross-sectional interpretation of the factors associated with parents' propensity to use the service. Consistent with the theoretical framework, participation is not read as an isolated individual choice, but as a situated practice emerging from the interaction between cognitive processes, relational networks, and contextual constraints (Suchman, 1987; Simon, 1978). Such a comparative approach addresses the need to capture the characteristics of local contexts in sustainable mobility practices (Carlson et al., 2020; Wex et al., 2023).

Within this theoretical and empirical framework, the present study adopts a descriptive and comparative approach to examine how perceptions, trust, and economic availability are associated with parents' willingness to participate in the Walking School Bus in the urban context. This orientation aims to shed light on the behavioural, relational, and economic dimensions of participation, integrating individual, social, and contextual factors relevant to sustainable school mobility.

The study is set in Ferrara, a medium-sized city in the Emilia-Romagna region of northern Italy (approximately 130,000 inhabitants). Ferrara is characterised by a flat urban topography, a compact historic centre, and a widespread network of primary schools, conditions that are generally favourable to active school mobility. The municipality has promoted the Walking School Bus (locally known as Pedibus) since the early 2010s, but the service remains unevenly distributed across schools and is sustained primarily by volunteer associations and school-level initiatives. This local context provides an ideal setting to investigate the behavioural, social, and economic correlates of parental participation in a Southern European city, where family networks and institutional trust have distinctive features compared to the Anglo-Saxon contexts that dominate the literature**.**

3.2 Sample and selection procedures

The sample comprises 711 parents from 15 primary schools in the municipality of Ferrara. Schools were selected through stratified purposive sampling, in order to ensure a balanced representation of areas with and without an active Walking School Bus service. In the academic year 2023/2024, the primary schools in Ferrara were grouped into eight comprehensive institutions (Istituti Comprensivi) for a total of 30 primary schools. Among these, 5 schools had an active Walking School Bus service, while the remaining 25 did not. The survey sample was drawn from 15 primary schools: 10 schools without an active Walking School Bus and 5 schools with an active service. Participation was voluntary, following invitations circulated through school

administration channels. This distribution ensures solid comparability across groups and adequate representativeness of the phenomenon within the urban context.

3.3 Data collection instrument

Data were collected through a structured questionnaire developed on the Confirmit (Forsta) platform and administered between September and November 2024 With the support of BVA Doxa, a research company specialised in social and market surveys. The survey adopted a mixed-mode approach combining Computer-Assisted Web Interviewing (CAWI), where respondents completed the questionnaire online, with Computer-Assisted Personal Interviewing (CAPI), conducted face-to-face by an interviewer. This mixed-mode strategy is consistent with methodological guidance for surveying heterogeneous populations, since it expands sample coverage and mitigates selection bias that might otherwise arise from differential access to digital technologies. A total of 1,894 questionnaires were distributed, and 711 were fully completed and returned, yielding a response rate of 37.6%. The questionnaire[1], titled "Parents' survey on the Walking School Bus", was self-administered in Italian and took an average of 10–13 minutes to complete.

The survey was structured into five thematic sections, each designed to explore progressively different dimensions of family–school mobility, ranging from socio-demographic characteristics to parents' personal and economic willingness to participate. The questionnaire incorporated conditional logic paths, allowing the content to adapt dynamically to each respondent's situation, depending on whether the Walking School Bus service was active at their children's school. Its design integrated items and constructs adapted from validated instruments widely used in active school travel research (Panter et al., 2010; Henne et al., 2014; Savolainen et al., 2024), including measures of travel mode and perceived safety, parental attitudes and trust, and indicators of social participation and environmental awareness. All items were refined linguistically and contextually to align with the specific social and urban characteristics of Ferrara.

3.4 Structure and content of the questionnaire

The questionnaire was designed as a progressive pathway, guiding respondents from general background information towards more specific evaluations related to the Walking School Bus. The first part, dedicated to the socio-demographic and family profile, collected information on age, gender, marital status, family composition, occupation, and area of residence. These variables provide the foundation for interpreting attitudinal and behavioural differences across groups.

A section on home–school mobility and family organisation followed, investigating the means of transport used, average travel time, related costs, and perceived safety of the route. This part makes it possible to reconstruct families' daily mobility patterns and to identify logistical or organisational constraints relevant to the decision to use the service.

The third section explored the perceived benefits and barriers of the Walking School Bus, using items formulated on a five-point Likert scale that measured the degree of agreement with statements concerning environmental, social, and educational benefits (traffic reduction, children's autonomy, socialisation, safety) and possible barriers (inadequate infrastructure, incompatible schedules, heavy schoolbags, distance to meeting points). In addition, the level of trust in adult volunteers and the willingness to encourage children's participation were recorded, since both are considered central factors in the literature on the topic (Henne et al., 2014; Savolainen et al., 2024).

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[1] *The questionnaire is available upon request. The original language is Italian, as the respondents are predominantly Italian parents; however, when required, the survey company ensured translation into the appropriate language*

The fourth section then investigated social participation and social capital, including questions on civic or associative engagement, frequency of contact with friends, neighbours, and colleagues, levels of trust towards individuals and institutions, and the adoption of environmentally responsible behaviours. The aim was to analyse the relationship between social networks and parents' willingness to engage in collective initiatives such as the Walking School Bus, in line with studies emphasising the role of social capital in promoting sustainable mobility (Savolainen et al., 2024).

Finally, the questionnaire addressed personal and economic willingness, analysing parents' propensity to serve as volunteer chaperons, their interest in activating the service at their school, and their economic valuation, both in terms of Willingness to Accept (WTA) a compensation for a deterioration of the service and Willingness to Pay (WTP) for its improvement or activation. Questions were also included to clarify the motivations of respondents who indicated a zero willingness, in order to distinguish between economic, organisational, or value-based reasons. This section allows for assessing the sustainability of the service in terms of both personal commitment and economic participation.

3.5 Validation and reliability

The questionnaire was developed following a preliminary qualitative phase based on 27 semi-structured interviews with parents in Ferrara, analysed through thematic analysis (Rocco, Mancinelli & Nikitas, 2026). This phase informed the design of the survey items and the selection of the constructs measured. Before administration, a qualitative pre-test with a selected group of 27 parents assessed the clarity and relevance of the items. The pre-test was conducted through semi-structured interviews, and feedback helped improve the comprehensibility of the questions and adapt the language to the local school context.
The internal reliability of the Likert-scale items was assessed using Cronbach's alpha, which produced a coefficient of 0.82, indicating good internal consistency (Gliem & Gliem, 2003).

3.6 Data analysis and ethical considerations

Data analysis was performed using Stata 18. Descriptive statistics were calculated for all variables, and differences across groups are described in comparative terms. Results are presented using bar charts, highlighting differences among categories.

The analysis is descriptive in nature. No multivariate regression models are estimated in this paper, given its focus on mapping attitudes, barriers, and stated willingness across the three groups. A subsequent study will estimate ordered logit models on WTP and WTA, using the same dataset, to identify the cognitive, social, and economic correlates of monetary valuation. The present study should therefore be read as the descriptive and theoretical foundation of a broader research agenda on parental participation in active school mobility.

All data were anonymised and processed in full compliance with the European General Data Protection Regulation (EU) 2016/679.

Three main limitations should be acknowledged. First, the cross-sectional design does not allow causal inference: the associations identified in the analysis should be interpreted as correlations rather than as factors associated with participation. Second, the voluntary nature of participation in the survey may introduce self-selection bias, as parents who are more sensitive to sustainability issues may be over-represented. Third, the sample is geographically confined to a single medium-sized Italian city, which limits the external validity of the findings, although it provides rich contextual detail that is often missing in large-scale comparative studies.

4. Results

This section reports the main results, organised into seven sub-sections: sample characteristics (4.1), perceived benefits (4.2), social capital (4.3), barriers (4.4), willingness to volunteer (4.5), economic valuation (4.6), and comparative analysis (4.7).

4.1 Sample characteristics and mobility patterns

The final sample comprises 711 parents from 15 primary schools in Ferrara. Most respondents are married or cohabiting (78%). As Table 1 shows, 51% of respondents (n = 364) are parents from 10 schools without an active Walking School Bus. Among the remaining 49% from five schools with an active service, 39% (n = 274) are parents whose children do not participate, while 10% (n = 73) are parents whose children actively participate.

Table 1 also reports the main home–school mobility patterns. At the level of the full sample, most children reach school by car or motorcycle (65%), while 22% go to school on foot and 10% by bicycle. Only 3% use public or school transport. The costs sustained to accompany children to school vary: 29% of families do not incur direct expenses, while 44% report costs within 100 euros per month. Travel times confirm that home–school trips are relatively short: for more than 75% of children, the journey takes less than fifteen minutes, and only 5% exceeds half an hour.

When disaggregated by group, active travel modes are slightly more widespread among parents whose children participate in the Walking School Bus (car/motorcycle 66%, walking 26%, bicycle 7%, public transport 1%). Among non-participants in schools with an active service, car/motorcycle use is 69%, walking 20%, bicycle 10%, and public transport 1%. Among parents in schools without the service, car/motorcycle use is 62.3%, walking 23.1%, cycling 11%, and public transport 3.3%. Overall, the data suggest that children's daily mobility remains strongly dependent on private vehicles, even for distances that could be managed through active modes.

Table 1. Sample characteristics and mobility patterns

Variable	***Full sample***	***Active participants***	***Non-participants (active schools)***	***Schools without service***
N (parents)	711	73 (10%)	274 (39%)	364 (51%)
N (schools)	15	5	5	10
Married/cohabiting (%)	78%	79%	79%	79%
Car/motorcycle (%)	65%	66%	69%	62.3%
Walking (%)	22%	26%	20%	23.1%
Bicycle (%)	10%	7%	10%	11%
Public/school transport (%)	3%	1%	1%	3.3%
Travel time < 15 min (%)	75%	79%	79%	>70%

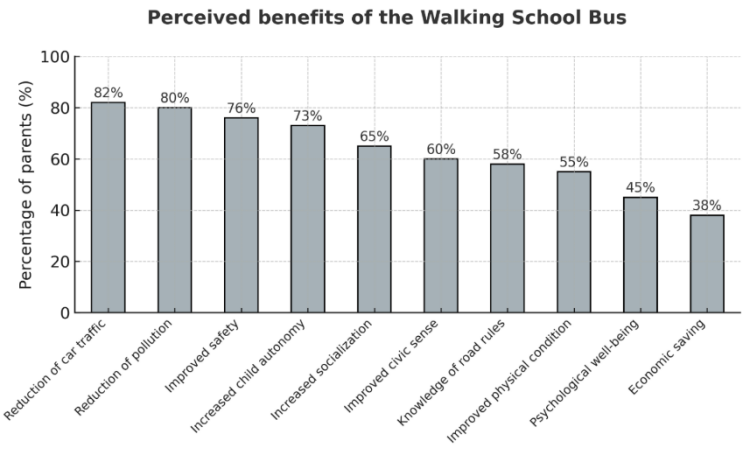
No direct costs (%)	29%	29%	26%	28%
Costs < 100 €/month (%)	44%	44%	44%	44.8%

Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

4.2 Perceived benefits and attitudes towards the WSB

Parents' opinions on the benefits of the Walking School Bus are broadly positive (Figure 1). At the level of the full sample, most parents attach great importance to reducing traffic (82%) and pollution (80%), improving road safety (76%), and increasing children's autonomy (73%). Other perceived advantages concern socialisation (65%), civic awareness (60%), and knowledge of traffic rules (58%). Economic or psychological benefits are considered to a lesser extent (38%), indicating that the value of the Walking School Bus is mainly perceived on educational and environmental grounds.

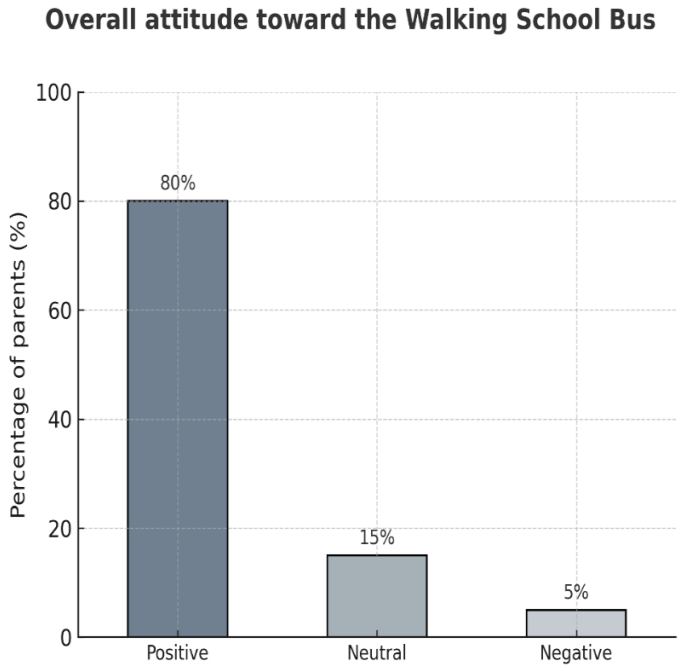
Figure 1 Perceived benefits of the Walking School Bus



Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

The overall attitude towards the service is clearly favourable (Figure 2). More than 80% of parents in the full sample express a positive evaluation, while neutral (15%) or negative (5%) positions are marginal. This consensus represents a strength for potential policies of expansion or consolidation of the service.

Figure 2 Overall attitude toward the Walking School Bus



Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

When disaggregated by group, the level of positive evaluation is highest among active participants (89%), followed by non-users in active schools (87%) and parents in schools without the service (87%). This uniformity indicates a shared consensus on the value of the initiative, independent of direct experience, suggesting that the Walking School Bus enjoys broad legitimacy among families.

Among active participants, the service is valued both for its environmental contribution and for the practical convenience of time saving (58%). This emergence of the time dimension as an additional benefit indicates that, for many parents, the Walking School Bus is not only a sustainable choice but also a practical solution in the daily management of family schedules.

Non-users and parents in schools without access to the service also acknowledge environmental and educational benefits, as more than 80% recognise the potential for reducing traffic and pollution. However, their appreciation remains largely theoretical, as they have not experienced the organisational advantages of the programme firsthand.

4.3 Social capital, trust, and environmental behaviours

Parents' participation in associations or organised groups appears rather low. At the level of the full sample, about 60% of respondents do not take part in religious, cultural, or political activities, and only about 12% are engaged in volunteering or participate in trade union or environmental organisations. About one fifth of the sample (20%) declare that they have not participated in any form of association over the last twelve months. This suggests the presence of a limited organised social capital, which may affect the capacity for collective involvement.

Informal social relations are more widespread. Most parents (over 70%) meet friends and relatives regularly during the week, while contacts with neighbours (about 40%) and work colleagues (35%) are less frequent.

The network of relationships thus appears concentrated in the private and family sphere rather than in the community dimension, an element that may influence the willingness to participate in cooperative initiatives such as the Walking School Bus.

The level of interpersonal trust shows a selective pattern. Trust is high towards friends and family members (over 80%) and much lower towards strangers (25%), local institutions (30%), and the government (20%). This profile highlights the prevalence of narrow trust, typical of contexts where social relationships are based on personal ties rather than on generalised or institutional trust.

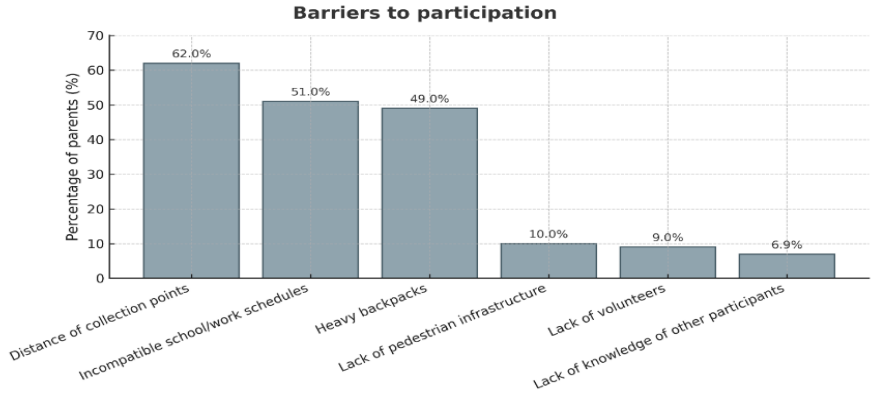
Environmental practices are generally widespread. Almost all parents (95%) declare that they separate waste, and most report reducing water waste (87%), purchasing local products (76%), and preferring reduced packaging (72%). The use of environmentally friendly means of transport is less frequent (38%), but overall, a high level of environmental awareness emerges, representing a favourable precondition for the promotion of sustainable mobility behaviours.

When disaggregated by group, parents of active participants demonstrate higher levels of civic and environmental coherence, with 90% using eco-friendly transport and widespread adoption of other sustainable practices. Conversely, both non-participating groups exhibit weaker social engagement: around 70% of parents in the non-participating groups report no membership in cultural, political, or religious organisations. Despite this, interpersonal trust towards family and friends remains high (over 80%) in all groups, while institutional trust remains limited (around 30%), a condition that may hinder collective coordination.

4.4 Barriers to participation

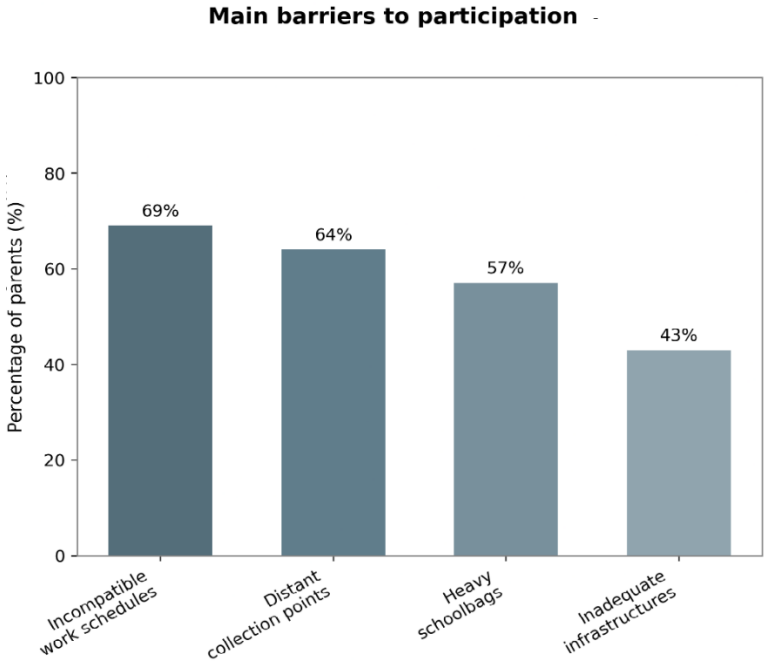
The barriers to participation reported by parents are mainly organisational and logistical (Figure 3; Figure 4). Among non-participants in schools with an active service, the most frequently cited factors are distance from collection points (62%), incompatibility between school and work schedules (51%), and the perception that schoolbags are too heavy (49%). Relational and organisational factors, such as the lack of acquaintance with other children or parents involved (6.9%), limited availability of chaperons (9%), and the perception of inadequate pedestrian infrastructure (10%), are cited less frequently. Together, however, they point to a still weak local grounding and a poorly visible organisational network.

Figure 1 Barriers to participation: active schools, non-participants



Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

Figure 4 Main barriers to participation: schools without service



Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

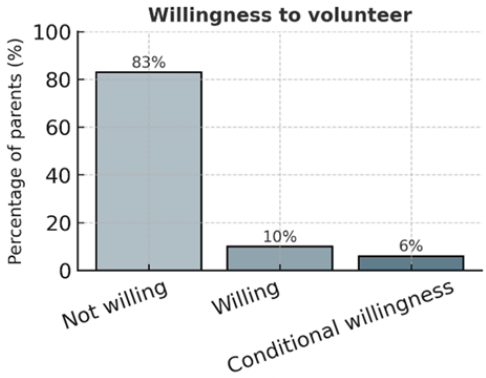
Among parents in schools without the service, the barriers reflect similar operational difficulties: 69% report work schedules incompatible with the service, 64% cite the lack of nearby collection points, 57% mention the excessive weight of schoolbags, and 43% point to inadequate infrastructure.

Overall, the findings indicate that logistical and organisational barriers clearly prevail over motivational or value-based ones. Difficulties related to time, logistics, and organisation outweigh any lack of consensus about the service. This suggests that improvements may be primarily associated with local coordination and communication regarding participation procedures. This pattern is consistent across the two non-participating groups, although the intensity of specific barriers varies slightly between schools with and without an active service.

4.5 Willingness to volunteer and future participation

Willingness to act as a volunteer chaperon appears limited across all groups (Figure 5). Among active participants, 83% declare that they are not willing to take on this role, while only 10% would do so and an additional 6% would consider it under certain conditions. This result highlights that the organisational sustainability of the service still largely depends on the commitment of a few stable volunteers.

Figure 5 Willingness to volunteer

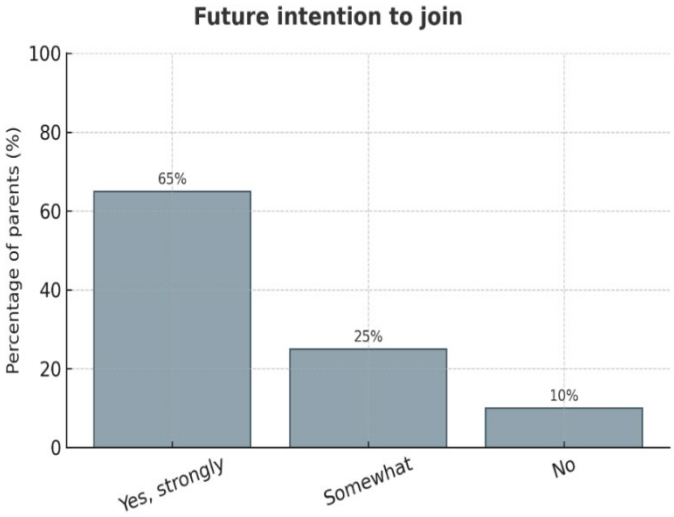


Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

Among non-participants in active schools, willingness to contribute actively as chaperon remains limited: 87% declare that they are not willing to take on this role, while only 9% would be available and 3% would do so under certain conditions. Among parents in schools without the service, 80% declare that they are not willing to act as volunteer chaperons, while about 9% are willing to do so and about 10% would accept under certain conditions.

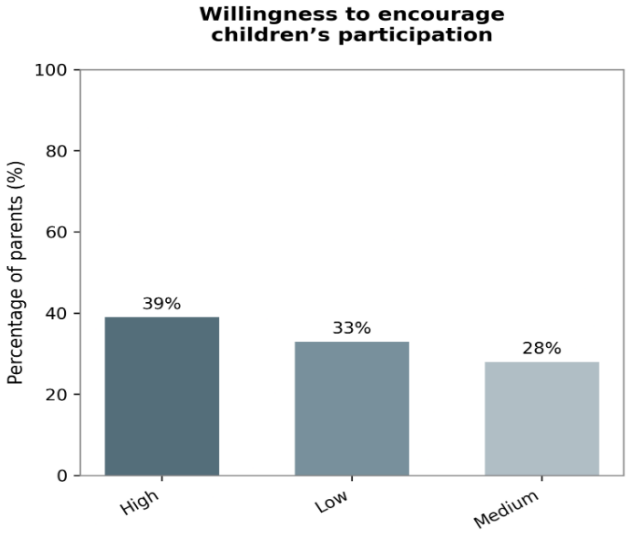
Despite the limited willingness to volunteer, openness to future participation is more widespread. More than 65% of non-participants in active schools express a certain openness to encouraging their child's participation in the future (Figure 6). Among parents in schools without the service, about 67% express medium or high interest in introducing the service in their school (Figure 7).

Figure 6 Future intention to join



Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

Figure 2 Willingness to encourage children's participation



Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

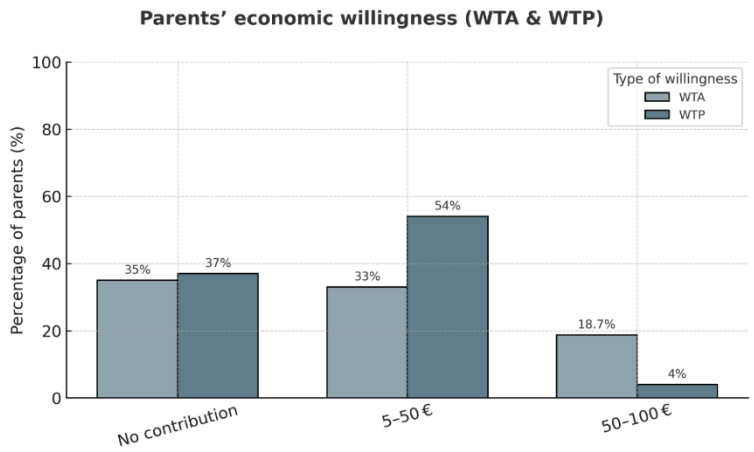
Among active participants, the intention to continue participation is strong: 58% of parents strongly encourage the continuation of the service and an additional 31% support it to some extent.

Overall, the data reveal a gap between latent demand and active engagement: while interest in the service and openness to future participation are widespread, the willingness to take on operational roles (volunteer chaperon) remains limited. This suggests that although interest in the service is widespread, the translation of such interest into concrete participation depends on the presence of stable organisational structures and greater institutional support.

4.6 Economic valuation: WTP and WTA

Parents' economic valuation of the Walking School Bus reflects a cautious and largely symbolic attitude (Figure 8). Among active participants, 35% would not accept any compensation (WTA) in case of service reduction or deterioration, while 33% would accept a contribution between 5 and 50 euros per year, and 18.7% would accept a contribution between 50 and 100 euros. On the WTP side, 37% would not be willing to contribute financially, while 54% would be willing to pay between 5 and 50 euros per year, and only 4% between 50 and 100 euros.

Figure 8 Parents' economic evaluation (WTA & WTP)



Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

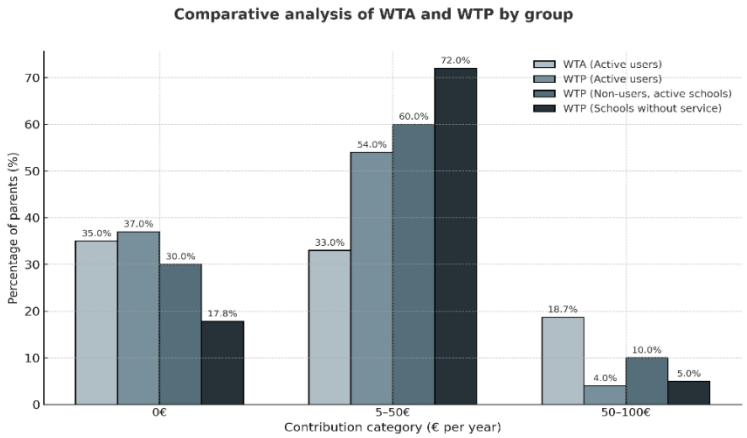
Among those who indicated zero euros, the majority of active participants (56%) justify their choice with the belief that the service is "too important" to be monetised. On the WTP side, 47% of zero-WTP participants believe that the service should be free, and a further 21% consider it already adequate in its current form. This response suggests a symbolic attitude towards the Walking School Bus, perceived as a common good rather than as a service to be economically quantified.

Among non-participants in active schools, the WTP pattern confirms a cautious trend: 30% would not be willing to pay any amount, while 60% would contribute between 5 and 50 euros per year, indicating a broader willingness than that observed among active participants. Among those who indicated zero euros, the majority (67%) justify their choice by stating that the service "is not relevant to their child", while 24% consider it "unfair to pay for a service that should be free". In this case, the economic motivation appears intertwined with the experiential distance from the service: the refusal does not concern the cost itself but rather its meaning in the absence of direct use.

Among parents in schools without the service, the level of WTP appears cautious but not null: only 17.8% would not be willing to contribute, while a large majority (72%) would be willing to pay between 5 and 50 euros per year, and a smaller proportion (5%) would go up to 100 euros. Among those who indicated zero euros, the prevailing motivation (77.8%) is that the service should be free rather than a matter of cost or lack of interest.

When comparing WTA and WTP across groups, a consistent pattern of prudence emerges (Figure 9). Among active participants, WTA and WTP values are closely aligned: 35% would not accept any compensation and 37% would not pay any contribution, while 33% (WTA) and 54% (WTP) would fall within the 5–50 € range. This parallel between WTA and WTP indicates that, for participants, the Walking School Bus holds an intrinsic social value that is not easily translated into monetary terms.

Figure 9 Comparative analysis of WTA and WTP by group



Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

When extending the comparison to the other groups, similar prudence emerges, though with increasing openness where the service is not yet active. Among non-users in active schools, 30% would not pay and 60% would contribute between 5 and 50 €, while among parents in schools without the service, reluctance decreases further: only 17.8% are unwilling to pay and 72% are willing to offer a modest financial contribution.

Overall, these patterns reveal a gradual progression from symbolic adherence among active participants to potential economic readiness among those who have not yet experienced the service firsthand. The convergence of WTA and WTP values across all groups suggests that the Walking School Bus is perceived as a public good whose support derives more from shared educational and environmental values than from financial incentives, emphasising a widespread yet measured form of collective commitment.

4.7 Comparative analysis across the three groups

The comparative analysis of the three groups highlights significant differences in behavioural patterns, perceptions, and readiness to engage with the Walking School Bus. At the same time, it reveals a shared background of environmental awareness and favourable attitudes towards sustainable mobility.

Two elements are common to all groups. First, attitudes towards the service are broadly favourable: the level of positive evaluation is highest among active users (89%) but remains high among non-users in active schools (87%) and parents in schools without the service (87%). Second, interpersonal trust towards family and friends is high in all groups (over 80%), while institutional trust remains limited (around 30%). These similarities suggest that the service enjoys widespread acceptance among families, while interpersonal trust remains high across all groups.

The main differences emerge in three domains. In terms of mobility, active participants are slightly more inclined towards active travel modes, while all groups remain predominantly reliant on private transport. In terms of engagement, parents of active participants show higher levels of civic and environmental coherence (90% using eco-friendly transport), while both non-participating groups report weaker social engagement (around 70% with no membership in associations). In terms of barriers, logistical and organisational constraints dominate among non-participants: distance from collection points (62% in active schools; 64% without service) and incompatibility between school and work schedules (51% and 69%, respectively). In terms of economic valuation, a similar pattern of prudence emerges across all groups, with a general preference for modest contributions rather than for higher amounts or outright refusal.

Overall, the results outline a consistent framework of positive attitudes, moderate economic engagement, and selective forms of participation. Differences are mainly associated with the actual availability of the service and to local organisational conditions rather than to variations in personal values. The evidence suggests that while awareness and consensus are broadly shared, the practical expression of participation remains uneven, depending on contextual and structural factors that shape each group's degree of involvement.

5. Discussion

This section discusses the main findings, organised into five sub-sections: social capital and trust (5.1), logistical and organisational barriers (5.2), environmental awareness and civic engagement (5.3), monetary valuation (5.4), and policy implications (5.5).

5.1 Social capital and trust (H1)

Social capital and trust emerge as relevant but ambivalent factors in explaining participation. On the one hand, parents of active participants show higher levels of civic and environmental coherence, with a greater tendency towards cooperative practices (see Section 4.3). On the other hand, trust remains predominantly "narrow": it is high towards family and friends but much lower towards institutions. This pattern is consistent across all three groups, including active participants and non-participants (see Section 4.3).

This suggests that interpersonal trust alone is not sufficient to explain participation. In other words, social capital functions as a necessary but not sufficient condition for the stable dissemination of the service. This is consistent with the literature on social capital (Putnam, 2000; Coleman, 1990) and on sustainable mobility cultures (Aldred, 2012; Aldred & Jungnickel, 2014), which shows that participation in collective initiatives is embedded in networks of reciprocity and shared norms of mutual support. Participation is thus rooted in these norms, which in the Italian context tend to develop within family and proximity networks.

The gap between high interpersonal trust and low institutional trust is particularly relevant in the Italian context. For the Walking School Bus, this implies that participation depends not only on trusting other parents and volunteers, but also on the presence of institutional mechanisms of coordination, public recognition, and integrated local governance that can transform interpersonal trust into stable collective action.

5.2 Logistical and organisational barriers (H2)

Logistical and organisational barriers emerge as the most consistent explanation for non-participation, providing strong support for the second hypothesis. Across both non-participating groups, the most frequently cited obstacles are practical rather than value-based: distance from collection points, incompatibility between school and work schedules, and the perception that schoolbags are too heavy (see Section 4.4). Relational and organisational factors, such as the lack of acquaintance with other children or parents involved, the limited availability of chaperons, and the perception of inadequate pedestrian infrastructure, are cited less frequently (see Section 4.4). Together, however, they point to a still weak local grounding and a poorly visible organisational network.

These findings are consistent with the literature on active school travel, which identifies distance, time constraints, and infrastructure as the main barriers to participation (Panter et al., 2010; Chillón et al., 2011; Wilson et al., 2018). They also align with the situated action perspective, which interprets behaviour as emerging from the interaction between individual dispositions and contextual constraints, rather than from

purely cognitive or value-based factors (Suchman, 1987). The perception of inadequate pedestrian infrastructure, reported by a minority of parents, resonates with the literature on the built environment and perceived safety, where participation tends to be higher when the urban context is experienced as safe and when trust circulates among those involved (Oreskovic et al., 2014).

Taken together, these barriers suggest that parents weigh immediate practical losses, such as time and organisation, more heavily than symbolic gains, a pattern that prospect theory helps to make sense of (Kahneman & Tversky, 1979). This imbalance is further sustained by the resilience of consolidated routines: mobility habits do not give way to symbolic appreciation alone, as the behavioural economics literature on habits suggests (Simon, 1978).

The strong approval of the service even among non-participants suggests the existence of a latent potential for participation hindered more by coordination problems than by a lack of interest. This reinforces the idea that the promotion of the Walking School Bus should rely primarily on logistical and temporal facilitation strategies, such as reorganising collection points, adapting schedules to family routines, and providing organisational support, rather than on persuasive campaigns or individual incentives.

5.3 Environmental awareness and civic engagement (H3)

Environmental awareness and civic engagement emerge as relevant factors associated with participation, providing support for the third hypothesis. Parents of active participants display higher levels of environmental coherence, and sustainable practices such as waste separation, water conservation, and the purchase of local products are widespread (see Section 4.3). Participation in the Walking School Bus thus appears embedded in broader sustainable routines, rather than being an isolated behaviour.

However, environmental awareness is widespread across all three groups, not only among active participants (see Section 4.3). Waste separation, water conservation, and the use of sustainable transport modes are widespread, although the latter is more common among active participants. This suggests that environmental awareness alone does not distinguish participants from non-participants.

Civic engagement, in contrast, appears more clearly associated with participation. Only a minority of parents are involved in volunteering or environmental associations, but the difference between active participants and non-participants is more marked than for environmental practices (see Section 4.3). This is consistent with the literature on social capital (Putnam, 2000; Bandura, 2018) and on sustainable mobility cultures (Aldred & Jungnickel, 2014), which shows that participation in collective initiatives is associated with broader civic engagement and to the internalisation of sustainable practices as shared social habits. What emerges here is a form of shared responsibility that extends beyond individual environmental concern, and that finds its natural ground in everyday routines and local relationships.

The Walking School Bus thus acts as a device of ecological socialisation, capable of integrating family routines, relationships of trust, and civic values. This result is consistent with the approach of situated action (Suchman, 1987) and with developments in behavioural transport economics (Schwanen, Banister & Anable, 2011; Böcker & Meelen, 2017), which interpret mobility not merely as the sum of individual choices but as the expression of socially constructed collective practices.

5.4 Monetary valuation as a collective good (H4)

Monetary valuation emerges as the dimension in which the perception of the Walking School Bus as a collective good is most clearly expressed, providing support for the fourth hypothesis. Both WTA and WTP are concentrated in the lowest contribution ranges, and refusals to pay are motivated more by fairness and civic

concerns than by income constraints (see Section 4.6). Among active participants, WTA and WTP values are closely aligned, indicating that, for participants, the service holds an intrinsic social value that is not easily translated into monetary terms (see Section 4.6).

The motivations behind zero responses reinforce this interpretation (see Section 4.6). Among active participants, those who indicated zero WTA justify their choice with the belief that the service is "too important" to be monetised, while zero-WTP respondents believe that the service should be free. Among non-participants in active schools, the majority of zero-WTP responses are motivated by the belief that the service "is not relevant to their child", while a smaller share considers it "unfair to pay for a service that should be free". Among parents in schools without the service, the prevailing motivation for zero WTP is that the service should be free. In all cases, the economic motivation appears intertwined with symbolic and civic considerations rather than with cost alone.

As noted in Section 4.6, reluctance to pay decreases progressively across the three groups. This pattern suggests that direct experience with the service reinforces its perception as a collective good, while the absence of experience leaves room for a more open, though still cautious, disposition towards financial contribution.

These findings are consistent with the literature on motivation crowding (Frey & Jegen, 2001) and on the acceptability of sustainable mobility policies (Schuitema et al., 2010), which shows that monetary incentives can either reinforce or undermine intrinsic motivations depending on how they are framed. The perception of gratuity observed in this study does not express a rejection of expenses but rather reflects the conception of the Walking School Bus as an educational and environmental public service whose management should remain shared and accessible. This conception is itself revealing. It suggests that parents do not evaluate the service through a full cost–benefit calculation, but through symbolic and civic categories, in line with the idea of bounded rationality (Simon, 1978).

The balance between high symbolic appreciation and low economic willingness to contribute suggests the need to support the financial sustainability of the service through hybrid funding models, combining institutional support, public–private partnerships, and community funds, rather than relying exclusively on voluntary contributions. This is also the dimension that opens the way to the companion paper (in preparation), which will estimate ordered logit models on WTP and WTA to identify the cognitive, social, and economic correlates of monetary valuation.

5.5 Policy implications

The findings of this study suggest that the promotion of the Walking School Bus could benefit from an integrated approach combining five fundamental dimensions.

First, strengthening social infrastructures. Since participation is associated with interpersonal trust and civic engagement (see Section 4.3), policies should support networks of parents, teachers, and volunteers through co-design and territorial coordination initiatives. This includes creating spaces for dialogue among families, recognising the role of volunteer chaperons, and fostering a shared sense of ownership over the service.

Second, ensuring adequate institutional support. The gap between high interpersonal trust and low institutional trust (see Section 4.3) suggests that the sustainability of the service cannot rely solely on voluntary commitment. Public institutions should provide formal recognition, organisational resources, and stable funding mechanisms that guarantee the continuity of the service. This may include integrating the Walking School Bus into municipal school mobility plans, providing insurance and training for volunteers, and coordinating routes across schools.

Third, communicating the collective value of the Walking School Bus. Since WTP and WTA responses reveal that parents perceive the service as a collective good with high symbolic value rather than as a monetizable service (see Section 4.6), communication policies should emphasise environmental and community benefits rather than individual ones. This may help consolidate a shared civic identity and a greater sense of community responsibility, transforming individual awareness into collective commitment.

Fourth, adopting hybrid funding models. The limited but present willingness to pay (see Section 4.6) suggests that the financial sustainability of the service should not rely exclusively on voluntary contributions. Hybrid models combining institutional support, public–private partnerships, and community funds could ensure both inclusivity and long-term viability, without undermining the perception of the Walking School Bus as a public good.

Fifth, addressing logistical barriers directly. Since distance from collection points, schedule incompatibility, and heavy schoolbags emerge as the main obstacles (see Section 4.4), policies should focus on reorganising collection points, adapting schedules to family routines, and providing organisational support. These interventions are likely to be more effective than awareness-raising campaigns or individual incentives.

These considerations suggest an integrated vision of sustainable mobility as a relational, educational, and community process in which cognitive, social, and economic dimensions may converge to foster lasting and participatory behaviours.

6. Conclusions

This paper investigated the behavioural, social, and economic correlates of parental participation in the Walking School Bus, drawing on an original survey of 711 parents from 15 primary schools in Ferrara (Italy). The findings suggest that participation cannot be reduced to individual cost–benefit calculations. Rather, it emerges from the interaction between cognitive processes, social networks, and contextual constraints, in line with behavioural economics, combined with situated action and social capital. In other words, parents do not simply weigh costs and benefits: they navigate habits, trust relationships, and organisational barriers that shape what is feasible and meaningful in their daily routines.

Four hypotheses guided the empirical analysis. H2 (logistical and organisational barriers) and H4 (monetary valuation as a collective good) are confirmed: practical constraints dominate over value-based resistance, and WTP/WTA responses reveal that parents perceive the service as a collective good with high symbolic value rather than as a monetizable service. H1 (social capital and trust) and H3 (environmental awareness and civic engagement) are partially confirmed: interpersonal trust and civic engagement are associated with participation, but they are not sufficient on their own (see Sections 5.1 and 5.3). Taken together, these results suggest that participation is shaped more by contextual and relational conditions than by individual attitudes or values.

The limitations discussed in Section 3.6 apply to this study. These include the cross-sectional design, which does not allow causal inference, the voluntary nature of participation, which may introduce self-selection bias, and the geographical confinement to a single medium-sized Italian city, which limits the external validity of the findings.

Despite these limitations, the study contributes to the interdisciplinary debate on sustainable school mobility by showing how cognitive, social, and contextual factors jointly shape collective participation. It also provides the descriptive and theoretical foundation for a broader research agenda that will estimate ordered logit models

on WTP and WTA, using the same dataset, to identify the cognitive, social, and economic correlates of monetary valuation.

The policy implications discussed in Section 5.5 suggest rethinking sustainable mobility as a form of social innovation grounded in collective commitment. This means reinforcing the relational and institutional infrastructures that make participation possible, rather than relying on awareness campaigns or individual incentives alone. In this sense, the Walking School Bus is not merely a mobility service: it is a laboratory for collective practices that can strengthen trust, reciprocity, and civic engagement in urban contexts.

Acknowledgments

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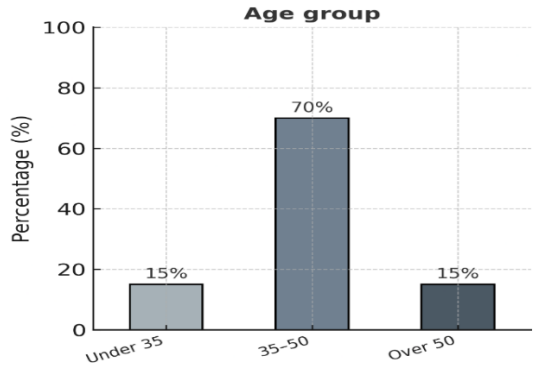
Appendix A. Supplementary figures

This appendix [2]contains supplementary figures that are not included in the main text. All figures are based on data from the Parents' Survey on the Walking School Bus (2024).

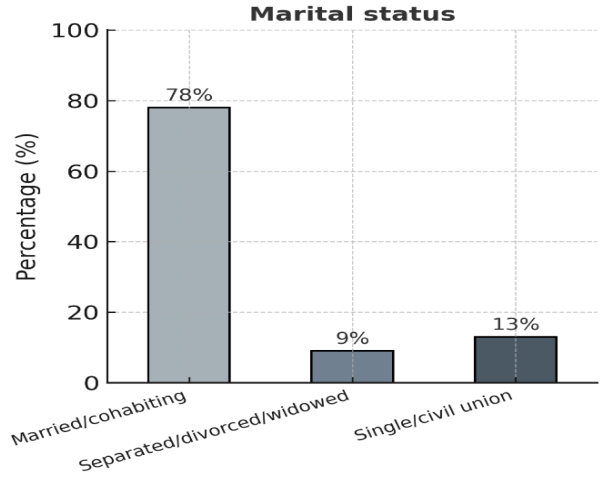
[2] *This appendix contains supplementary figures that provide additional detail on the sample and on parental perceptions. Some figures present data that are also summarised in Table 1 and in the main text; they are included here for completeness*

Figure A.1 Age groups



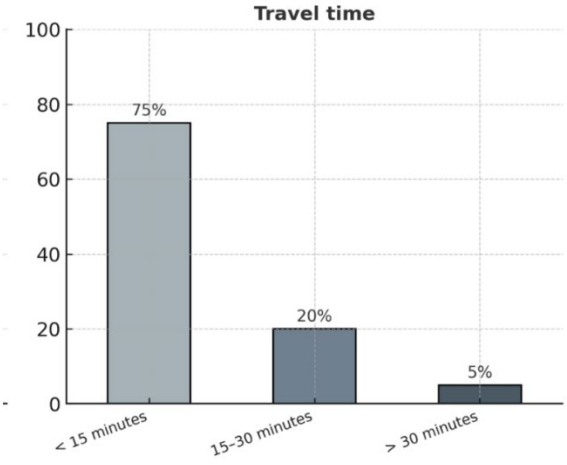
Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

Figure A.2 Marital status



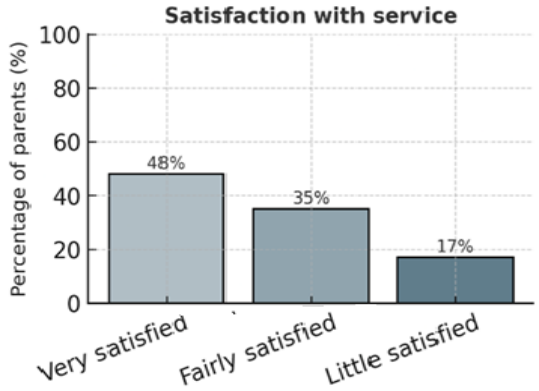
Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

Figure A.3 Travel time



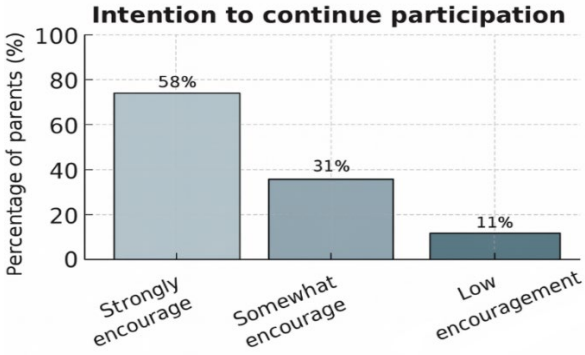
Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

Figure A.4 Satisfaction with the service



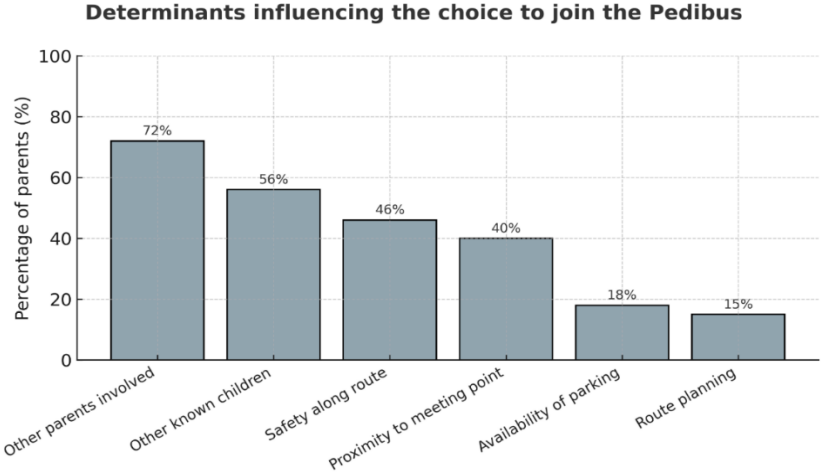
Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

Figure A.5 Intention to continue participation



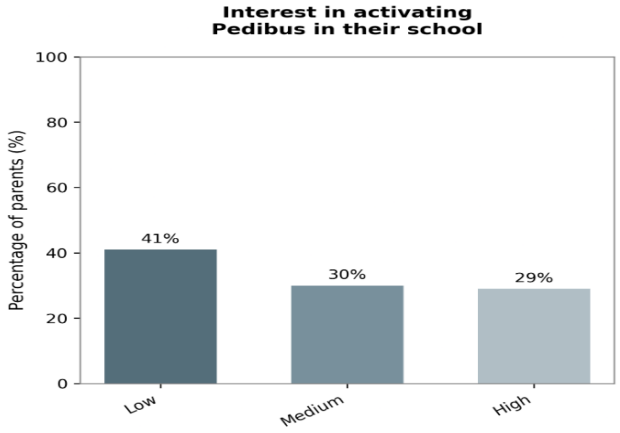
Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

Figure A.6 Determinants influencing the choice to join the Walking School Bus



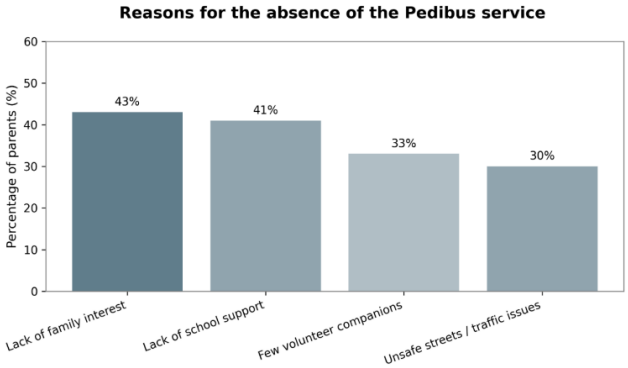
Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

Figure A.7 Interest in activating Walking School Bus in their school



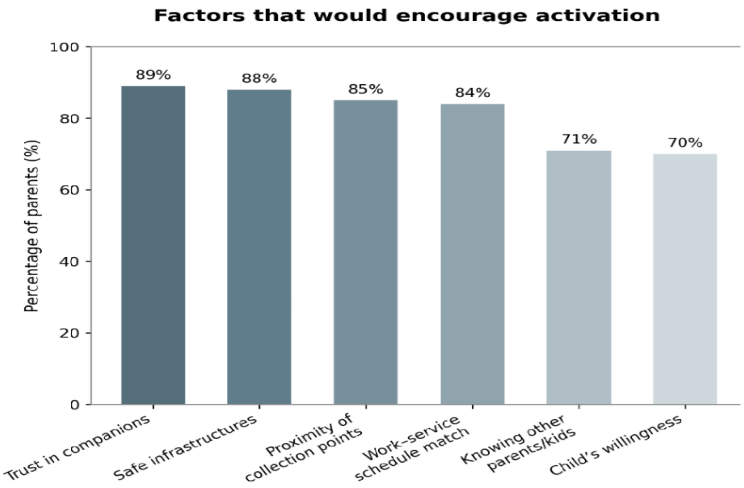
Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

Figure A.8 Reasons for the absence of the Walking School Bus



Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).

Figure A.9 Factors that would encourage activation



Source: Author's elaboration based on data from the Parents' Survey on the Walking School Bus (2024).