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Exploring the effects of perceived accessibility on travel, activity participation, and well-being

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ABSTRACT

Numerous studies have found influential factors of perceived accessibility levels in recent years. What is less well understood is the effect of perceived accessibility on travel, activities, and well-being. This is a significant omission in the respective body of literature as the primary goal of the transport system is to provide users with the necessary opportunities and possibilities to reach destinations and to participate in activities. Arguably, studying perceived accessibility and its determinants is only relevant if these perceptions in turn influence aspects such as travel behaviour, activity participation, satisfaction, and well-being. To fill this gap, this paper systematically identifies and analyses outcomes of perceived accessibility in terms of travel, activity participation, and well-being. For this purpose, we first identify links with outcomes of perceived accessibility in the literature. We then offer a conceptualisation based on the relations identified in the literature, which is empirically validated using a structural equation modelling approach. We find significant relations with activity participation and travel behaviour, but also with daily travel satisfaction, residential satisfaction, and overall life satisfaction. Finally, implications for policy and science as well as a research agenda with possible avenues for future research are presented. The most important lesson is that policies that consider 'calculated' accessibility only may fail to enhance satisfaction with life and to reduce (transport-related) social exclusion. Still, more research is needed to understand what other impacts of perceived accessibility are and how these outcomes of perceived accessibility, in turn, reinforce levels of perceived accessibility over time.

1. Introduction

Perceived accessibility, i.e. the perceived ease of reaching desired destinations, has attracted increasing attention in transportation

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research in recent years. Although its relevance to accessibility evaluations was recognized early on (e.g., Morris et al., 1979), only recently researchers have begun to systematically study perceived accessibility. A predominant reason for this is that, unlike accessibility levels based on spatial data, perceived accessibility captures the individual experiences of accessibility within a given area (Lättman et al., 2018).

Most existing studies focus on identifying and analysing the factors that explain variation in perceived accessibility levels across individuals. These typically include socio-demographic factors, characteristics of the built environment, and attitudes (e.g. Pot et al., 2021). For example, a destination might be considered as inaccessible by public transport for older adults, while individuals with impairments may prefer using a car, illustrating the subjective nature of accessibility.

Another dimension concerns the outcomes that stem from these perceptions. Here, outcomes refer to travel- and/or activity-related decisions as well as domain and overall satisfaction and well-being. To date, studies on such outcomes are limited and the majority of them have examined links with activity participation, travel behaviour or subjective well-being. For instance, Pot et al. (2024) found a weak, non-linear relationship between perceived accessibility and activity participation. Interestingly, nearly two-thirds of the individuals with low participation still reported high levels of perceived accessibility, while only a small group reported high participation but low perceived access (Pot et al., 2024). Additionally, studies found explicit links between perceived accessibility and mode choice (e.g., Scheepers et al., 2016; Blandin et al., 2024) as well as travel frequency and distance (e.g., Lukina et al., 2023; Zhang and Hu, 2024). Lastly, some studies found a direct link from perceived accessibility to subjective well-being, underscoring that higher (lower) perceived accessibility results in higher (lower) satisfaction with life, happiness, and/or positive emotions (e.g. Mehdizadeh et al., 2025; Friman and Olsson, 2023; Kim, 2024; Lättman et al., 2019).

To the best of our knowledge, the effect of perceived accessibility on well-being while accounting for mediating pathways by behavioural decisions and satisfaction therewith has not yet been systematically explored and assessed. While some studies have evaluated mediating pathways through (among others) activity participation and travel satisfaction, a systematic and detailed analysis of multiple (mediating) pathways has not been conducted yet. However, with the primary goal of the transport system to provide individuals with the means to reach destinations and participate in activities and, ultimately, to improve well-being and reduce chances of social exclusion, analysing these direct and indirect effects of perceived accessibility on subjective well-being is indispensable.

With this paper, we aim to explore the broader role that perceived accessibility serves in individuals' travel, activity participation, and subjective well-being in a structured way. For this, we apply a twofold approach. First, potential mediating pathways of the link between perceived accessibility and subjective well-being are identified with a systematic literature search. In turn, a conceptual model of perceived accessibility and its outcomes is tested by applying a structural equation modelling approach. To do so, data from members of the Netherlands Mobility Panel in 2020 is used; a questionnaire in the Netherlands which posed questions on individuals' travel and activity patterns as well as perceived accessibility, domain satisfaction, and life satisfaction. The data allows to empirically analyse the impacts of perceived accessibility for a representative sample of the (Dutch) population.

The remainder of this paper is organised as follows. First, we provide a discussion on the definitions and meanings of perceived accessibility (Section 2). We then present the systematic literature search and findings used to collect all studies related to the outcomes of perceived accessibility (Section 3). Afterwards, a conceptual model of determinants and outcomes of perceived accessibility is offered (Section 4). Next, we discuss the methodological approach used to empirically examine the relationships identified in the literature (Section 5), present the model results (Section 6), and discuss these results in light of earlier studies (Section 7). Lastly, we finish this paper with implications for policy, a research agenda, and concluding remarks (Section 8).

2. Perceived accessibility: Definitions and dimensions

Various definitions of perceived accessibility exist in the literature. In its simplest form, perceived accessibility is defined as 'how an individual experiences its own level of accessibility' (Curl, 2018, p.1148). The discussion on definitions has evolved into a distinction between outcome-based definitions (Negm et al., 2025; Pot, 2025), evaluating 'how easy it is to live a satisfactory life with the help of the transport system' (Lättman et al., 2016a, p.258), and opportunity-based definitions, describing 'the perceived potential to participate in spatially dispersed opportunities' (Pot et al., 2021, p.2). In this study, we apply the definition proposed by Pot et al. (2021), which allows us to conceptualize perceived accessibility and its outcomes through the use of the four components of accessibility (see Geurs and Van Wee, 2004). These are the land-use, transport, temporal, and individual dimensions. In the following bullet points, we briefly discuss the dimensions; for a detailed discussion, we refer to Pot et al. (2021).

- The **land-use dimension** describes the land-use system as perceived by an individual. This component represents the perceived amount and quality of spatially dispersed opportunities at various destinations. It also highlights the confrontation between the supply and demand of those opportunities.
- The **transport dimension** describes how an individual perceives the transport system, potentially highlighting the (lack of) awareness of the supply of transport such as transport modes or travel routes. This component also reflects travel resistance which an individual may experience.
- The **temporal dimension** highlights perceptions on the temporal aspect of accessibility, such as the perceived availability of opportunities on a given day or the perceived time available to participate.
- The **individual dimension** includes sociodemographic characteristics, attitudes and preferences, capabilities, and context factors. This component reflects the needs, desires and abilities of individuals to reach destinations and participate in activities.

As described by Friman et al. (2020), perceived accessibility is driven by 'objective/environmental conditions … and the individual experiences and evaluations of these conditions' (Friman et al., 2020, p.2). In other words, individuals' needs and preferences interact with the other (land-use, transport, and temporal) dimensions which, consequently, leads to a cognitive view of one's level of accessibility (see Pot et al., 2021).

Besides the direct link between the individual component and the land-use, temporal, and transport components, individuals' needs, desires, and abilities may also indirectly influence the way individuals experience their level of accessibility. Through residential self-selection, individuals may select the physical environment with built environment characteristics that match their preferences. This physical environment can also provide the necessary information to form a cognitive view of accessibility.

In turn, perceived accessibility may affect the way individuals travel, participate in activities, and how satisfied they are with their (behavioural) decisions. This paper will focus on the link between perceived accessibility and its outcomes. For this, we systematically identify and analyse potential influences of perceived accessibility. The literature review used to do so will be discussed in the Section 3.

3. Outcomes of perceived accessibility

3.1. Approach

In order to get an overview of existing studies analysing the outcomes of perceived accessibility, a literature review was performed. Articles were retrieved from both Scopus and Web of Science using the following keywords: "perceived access*" and "subjective access*". By doing so, all studies related to individuals' perception on accessibility were collected. We restricted the search to English (peer-reviewed) journal articles in the transport literature by including the Boolean operator "AND" together with the keywords "transport*", "trip*", and "travel*". For this search, no date restrictions or snowballing techniques were applied. The final search date was May 27th, 2025.

Fig. 1 shows the article selection procedure used to carry out the review. Covidence has been used as a review management tool to assess and select articles (see https://www.covidence.org). In total, 229 studies were kept for screening, after removing 150 duplicates. For the screening, studies that explicitly study perceived accessibility as an exogenous variable, influencing other constructs, were selected. By doing so, all studies related to the scope of the review were included. It is beyond the scope of this review to provide a discussion of the determinants of perceived accessibility; for such a review, we refer to Jamei et al. (2022) and Negm et al. (2025). After screening all studies, 54 articles remained. Of these articles, 21 studies were excluded after full-text review because they did not fall within the scope of this review, whereas 2 articles were excluded because they did not present an empirical analysis, which led to the final sample of 31 articles.

Collectively, relations have been found with travel behaviour, travel satisfaction, activity participation, residential satisfaction, and

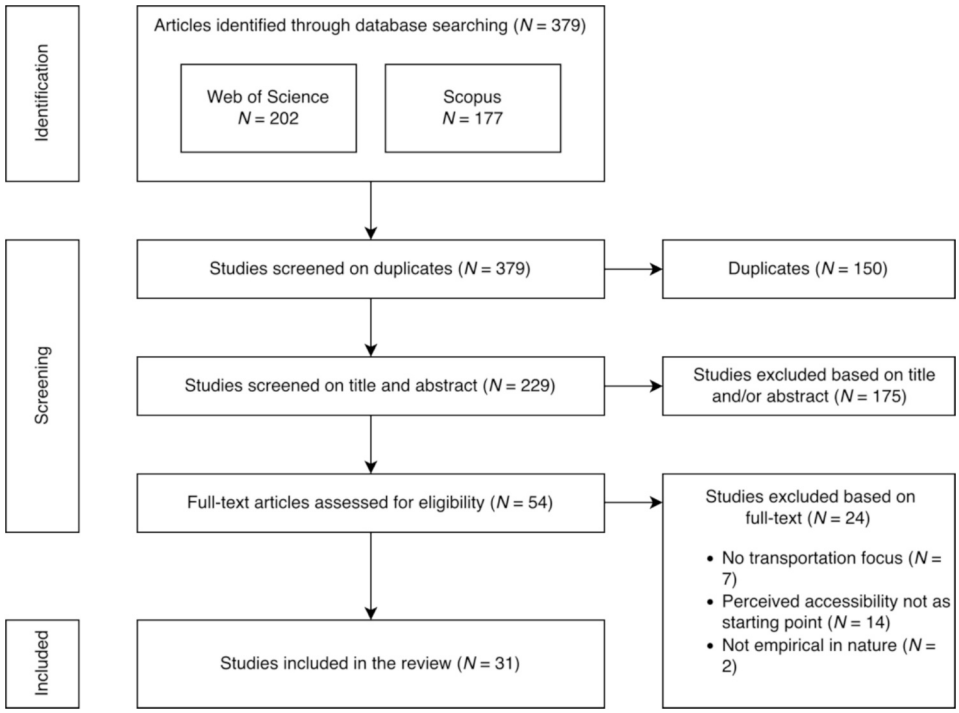

Fig. 1. PRISMA flowchart for the systematic literature search.

subjective well-being. Table 1 presents an overview of these links and corresponding studies, of which most studies (84 %) are carried out in a European or Asian context. For a detailed overview of all studies reviewed, see Appendix A. In Sections 3.2-3.6, the links with travel behaviour, travel satisfaction, activity participation, residential satisfaction, and subjective well-being are discussed in subsequent order. Additionally, challenges related to these effects will be formulated as well.

3.2. Travel behaviour

The majority of studies focus on the relationship with travel behaviour. Perceived accessibility seems to be related to trip characteristics, with studies highlighting its effect on trip duration and travel distance. For instance, Zhang and Hu (2024) found that travel distances by bike were positively correlated with perceived accessibility. In other words, a higher (lower) perceived accessibility is associated with travelling longer (shorter) distances. Still, much of the research on the effect of perceived accessibility on travel behaviour studies how perceived accessibility is related to travel mode choices.

Scheepers et al. (2016) measured perceived accessibility by car, bicycle, and foot, and found that individuals were more likely to drive when the accessibility they experienced by car was high. In contrast, individuals who perceived high accessibility through walking or biking were more likely to choose these modes. In line with Scheepers et al. (2016), Vafeiadis and Elldér (2024) concluded that car use was positively related to perceived accessibility by car and negatively to perceived accessibility by other modes. Similarly for walking behaviour, Liu et al. (2022a) and Van der Vlugt et al., 2022 found that individuals with a higher level of perceived walking accessibility were more likely to walk. For older adults specifically, Hou et al. (2020) found that higher (lower) perceived accessibility to recreational facilities resulted in a higher (lower) number of walking trips. Adding to this, Liu et al. (2022a) concluded that students' perceived accessibility positively influenced the number of walking trips on weekdays, while a negative link was retained for trips made in the weekend. Focusing on shared micromobility, An et al. (2024) rather concludes that (overall) perceived accessibility negatively correlated with shared bike use. Hence, individuals experiencing a lower overall level of accessibility were more frequently using shared bikes.

Whereas Scheepers et al. (2016) found that perceived accessibility by car positively correlated with car use, Blandin et al. (2024) concluded that overall perceived accessibility was negatively associated with car use. In other words, those individuals experiencing a lower level of accessibility are more likely to choose the car. In addition to car use, Blandin et al. (2024) also evaluated the implications of overall perceived accessibility on public transport use, which resulted in an even stronger effect. Hence, lower overall perceived accessibility is also associated with higher public transport use.

Similar to Blandin et al. (2024), Friman et al. (2020) and Andersson et al. (2023) concluded that overall perceived accessibility correlated negatively with public transport use. In addition, Olsson et al. (2021) found that public transport use was negatively correlated with perceived accessibility by public transport. In contrast, Sheng and Zhang (2022), Watthanaklang et al. (2024) and Negm and El-Geneidy (2025) indicated that perceived access to destinations by public transport increased both the intention to use and actual use of public transport. In line with this, Lukina et al. (2023) and Alousi-Jones and El-Geneidy (2025) concluded that the frequency of public transport use positively related to perceived accessibility as well. Additionally, in the context of urban areas of Hanoi (Vietnam), Nguyen-Phuoc et al. (2025) examined the impact of perceived accessibility on switching to urban train services, revealing a positive direct link.

Lastly, with the use of panel data and two-wave cross-lagged panel models, Mehdizadeh and Kroesen (2025) argue that the link between perceived accessibility and travel behaviour is bidirectional. Notably, the effect of mode use on perceived accessibility was even stronger than the influence of perceived accessibility on travel mode choice (Mehdizadeh and Kroesen, 2025).

An important challenge with regard to the link between perceived accessibility and travel behaviour is the use of different measurement scales. While research remains inconclusive on the specific influence of perceived accessibility on travel behaviour, and vice versa, study designs differentiate significantly as well. For perceived accessibility, scales measuring individuals' overall or mode-specific level of accessibility have been used, limiting the ability to compare findings across studies.

Table 1
Outcomes found in the literature.

Outcome	No. of papers	Sources (alphabetical order)
Travel behaviour	16	Alousi-Jones and El-Geneidy (2025); An et al. (2024); Andersson et al. (2023); Blandin et al. (2024); Hou et al. (2020); Liu et al. (2022a); Lukina et al. (2023); Mehdizadeh and Kroesen (2025); Negm and El-Geneidy (2025); Nguyen-Phuoc et al. (2025); Olsson et al. (2021); Scheepers et al. (2016); Vafeiadis and Elldér (2024); Van der Vlugt et al., 2022; Watthanaklang et al. (2024); Zhang and Hu (2024)
Travel satisfaction	2	Lättman et al. (2019); Sukwadi et al. (2022)
Activity participation and social exclusion	6	Al-Rashid et al. (2021); Liu et al. (2021); Pot et al. (2024); Shao et al. (2022); Wang et al. (2019); Zhu et al. (2024)
Residential satisfaction	3	Hamersma et al. (2015); Hu and Ettema (2023); Olfindo (2021)
Well-being	6	Friman and Olsson (2023); Kim (2024); Lättman et al. (2019); Lim et al. (2020); Liu et al. (2022a); Tanimoto and Hanibuchi (2021)

3.3. Travel satisfaction

While most studies on outcomes of perceived accessibility evaluated the links with travel mode choices, studies have revealed explicit links with daily travel satisfaction as well. In general, people tend to be more satisfied with their daily travel when their level of perceived accessibility is high as well (e.g. Lättman et al., 2019; Sukwadi et al., 2022). Specifically focussing on the elderly, Lättman et al. (2019) found that overall perceived accessibility is significantly associated with travel satisfaction for older adults. Differentiating between various age groups (e.g. pre-retirement, early retirement, young old, old, and old with high longevity) did not yield variation in this effects. In contrast, Sukwadi et al. (2022) studied the relationship between perceived accessibility and travel satisfaction in the context of mass rapid transit in Jakarta (Indonesia). Using a similar approach as Lättman et al. (2019), Sukwadi et al. (2022) revealed that the experienced level of accessibility by mass rapid transit was positively related to daily travel satisfaction. In short, a positive influence on travel satisfaction has been revealed in various study contexts.

While research is conclusive on the relation between perceived accessibility levels and daily travel satisfaction, two challenges remain. First, travel behaviour (e.g. travel mode choice, trip characteristics) and activity participation have not been included in the research designs of respective studies that link perceived accessibility with travel satisfaction. Nonetheless, it seems plausible that individuals' perceived accessibility affects satisfaction with daily travel indirectly through travel behaviour and activity participation as well. As highlighted in Section 3.2, a substantial number of studies has highlighted the link between perceived accessibility and travel behaviour (specifically travel mode choice). Given the link between travel mode choice and travel satisfaction as discussed by De Vos and Witlox (2017), it is likely that travel- or activity-related decisions mediate the effect of perceived accessibility on travel satisfaction. Whether the direct effect of perceived accessibility on travel satisfaction will uphold when accounting for this indirect effect has to the best of our knowledge not been empirically evaluated.

Adding to this, it remains unclear whether the link between perceived accessibility and daily travel satisfaction is unidirectional or bidirectional. People who are satisfied with their daily travel may translate these positive emotions associated with travel into a higher experienced level of accessibility. However, the direction of causality between perceived accessibility and travel satisfaction has not yet been explored as well.

3.4. Out-of-home activities and exclusion

Besides the link with daily travel, a key aspect of perceived accessibility is its relationship with out-of-home activities. A high level of perceived accessibility of an activity location will likely result in engaging in the desired activity at the given location. Conversely, lower levels of perceived accessibility may result in lower activity levels and, in turn, exclusion.

Some studies have been employed to study this link with activity participation and social exclusion. Most recently, Pot et al. (2024) found a weak, non-linear relationship between perceived accessibility and activity participation. Interestingly, those individuals that reported low activity levels still experienced a high level of accessibility. On a similar note, Shao et al. (2022) studied the link between perceived accessibility to metro services and space–time flexibility, e.g. 'the degree to which individuals can participate in activities at different locations at different times' (Shao et al., 2022, p.1). Using propensity score matching, Shao et al. (2022) revealed a positive effect of perceived accessibility on space–time flexibility, in line with Pot et al. (2024). In other words, a high experienced level of accessibility to metro services significantly affects the degree to which individuals can participate in activities (Shao et al., 2022). Lastly, Wang et al. (2019) revealed how perceived access to public transport stops positively influenced older adults' physical activity, using data of 1568 adults living in cities in the east of China.

Perceived accessibility has been linked to perceived equity and exclusion as well. Some studies, have explicitly examined the effect of variations in perceived accessibility on equity, concluding that perceived accessibility significantly affects how individuals rate the transport system in terms of equity. For instance, Zhu et al. (2024) employed a structural equation model to estimate the relationship between perceived accessibility on the one hand and perceived transport and housing equity on the other hand. Using a sample of 665 affordable housing residents and 828 commercial housing residents living in various locations across Nanjing, China, Zhu et al. (2024) found that perceived accessibility was positively related to transport equity. Hence, individuals experiencing inaccessibility are prone to perceive the transport system as inequitable. In addition, Liu et al. (2021) evaluated relations between the ease of using smartphone services, perceived accessibility, and transport equity during the COVID-19 pandemic among 569 respondents in Kunming, China. Using a three-wave cross-lagged panel model, Liu et al. (2021) revealed that perceived accessibility significantly impacts perceived transport equity as well. Overall, both Zhu et al. (2024) and Liu et al. (2021) underscore that those individuals who experience higher levels of accessibility also perceive the transport system to be equitable.

With regard to social exclusion, we feel that most studies on this link rather uses perceived accessibility as an indicator of accessibility poverty and/or exclusion (e.g. Moleman and Kroesen, 2025; Lättman et al., 2016a). This may be attributed to difficulties that arise when operationalising (measuring) exclusion. Only one study has found an explicit, direct link from perceived accessibility to social inclusion, underscoring that a higher (lower) perceived accessibility translates into a higher (lower) perceived level of social inclusion (see Al-Rashid et al., 2021). Here, Al-Rashid et al. (2021) used 6 statements of Bude and Lantermann (2006) to measure individuals' perceived social exclusion on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). This measurement scale may be used in future research designs on the link between perceived accessibility and social exclusion.

3.5. Residential satisfaction

Perceived accessibility may influence satisfaction with the neighbourhood as well, while research remains inconclusive on the

specific effects. For instance, the perceived accessibility of bus stops in the neighbourhood significantly impacts neighbourhood satisfaction (Olfindo, 2021). The perceived accessibility of these bus stops also influences the intention to move directly as well as indirectly through residential satisfaction (Olfindo, 2021). Conversely, in the context of highway nuisance, Hamersma et al. (2016) did not find an effect of perceived accessibility of the neighbourhood (in general) on residential satisfaction nor moving intentions. Rather, satisfaction with car commute was found to have a significant effect on perceived highway nuisance and, consequently, on residential satisfaction and moving intentions. Lastly, Hu and Ettema (2023) explored the link between perceived accessibility and residential dissonance e.g. the discrepancy between preferred and actual residential location. Interestingly, individuals categorised as dissonant based on their stated travel preferences still tend to perceive themselves as consonant in terms of perceived accessibility and travel-related attitudes (e.g. Hu and Ettema, 2023). In contrast to Olfindo (2021), Hu and Ettema (2023) thus found that individuals disliking their residents may still perceive high levels of accessibility.

3.6. Well-being

Ultimately, travel should provide the means to reach destinations, enabling individuals to participate in out-of-home activities, and,in doing so,allowing people to enhance their quality of life. Since satisfaction with travel and activities is known to have a clear impact on life satisfaction (e.g. Lättman et al., 2019, De Vos and Witlox, 2017), perceived accessibility will likely have an important effect on life satisfaction as well. Studies on this relationship consistently found that perceived accessibility positively correlates with life satisfaction (e.g. Lättman et al., 2019; Friman and Olsson, 2023; Lim et al., 2020; Kim, 2024). Additionally, Lättman et al. (2019) found a significant mediating effect of respectively travel satisfaction on the relationship between perceived accessibility and life satisfaction, whereas Kim (2024) concluded that perceived accessibility indirectly influenced happiness through satisfaction with life as well. Adding to this, Tanimoto and Hanibuchi (2021) concluded that perceived accessibility positively correlated with individuals' sense of accessibility, which is an individual's overall feeling of (in)convenience in daily life' (Tanimoto and Hanibuchi, 2021, p.1). Therefore, perceived accessibility is in the context of this study identified as an explanatory factor of a much broader concept named

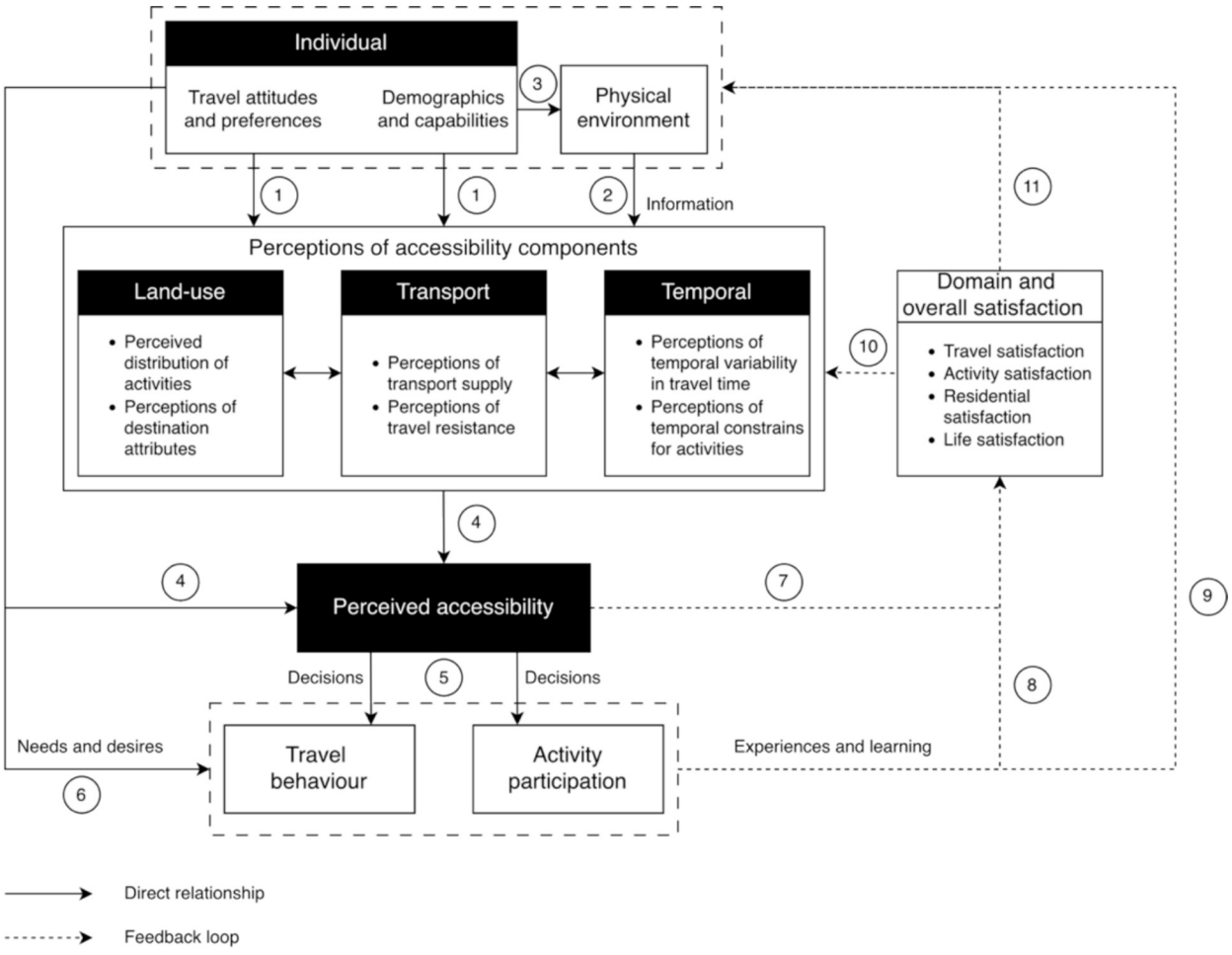

Fig. 2. Determinants and outcomes of perceived accessibility (adapted from Pot et al., 2021).

'sense of accessibility'. In addition, Liu et al. (2022a) found indirect associations between perceived accessibility and overall mental and physical health during the COVID-19 pandemic through walking behaviour as well. Hence, perceived accessibility has an important effect on subjective well-being.

4. Conceptual model

In this section, we extend the conceptual framework of Pot et al. (2021) put forward in Section 2 by the empirical evidence on outcomes of perceived accessibility synthesised in Section 3. Fig. 2 presents this conceptual model. Here, perceived accessibility emerges from the land-use, transport, temporal, and individual components of accessibility, and specifically from the interaction between the individual component (e.g., needs, desires, and abilities) and other components of accessibility. This interaction occurs either directly (path 1) or indirectly (path 2) through residential self-selection (path 3). In the latter case, individuals choose residential locations that align with their needs and desires (such as the need/desire to travel by car), which in turn shape their perceptions of accessibility. Regardless of the path, each individual seeks information (such as public transport timetables) based on their needs and desires, which ultimately translates in a cognitive evaluation of one's experienced level of accessibility (path 4).

Consequently, perceived accessibility can be considered as the basis for decisions regarding participating in activities and opportunities, accessing certain destinations. These decisions, however, do not relate to activities only but may also relate to travel choices. In this regard, multiple studies (see Section 3) found relationships between perceived accessibility on the one hand and travel behaviour and activity participation on the other hand. As articulated in Pot et al. (2021), individuals develop 'mental maps' of the environment based on the knowledge they gather, which is interpreted and evaluated in various ways reflecting one's attitudes and beliefs. This process results in perceptions of the ease of reaching certain activities by different modes, resulting in decisions in this respect. Specifically, studies revealed a directional influence of individuals' perceived accessibility on their mode choices, trip frequencies, and number of out-of-home activities (path 5). However, while many studies report these effects, they often do not control for the direct effect of travel attitudes or other personal needs and desires on travel behaviour. These factors, nevertheless, may also play a role in shaping travel and activity decisions (path 6).

Some studies in Section 3 also identify links between perceived accessibility and satisfaction-related variables (path 7). Beyond a strong association with well-being, studies also found relationships with domain-specific satisfaction such as travel and residential satisfaction. In this regard, various studies showed that a positive perception of accessibility can improve travel and residential satisfaction as well as overall satisfaction with life. While not explicitly studied yet, perceived accessibility may also affect activity satisfaction, especially through activity participation. A theory that could explain this relationship between perceived accessibility and satisfaction is standard utility theory, which posits that consumers prefer having more alternatives available to choose from in order to increase their satisfaction. Freedom of choice is another theoretical mechanisms that could explain this link. As articulated by Sen (1988), freedom of choice has two main values, namely: intrinsic and instrumental. The intrinsic value of freedom of choice posits that 'having freedom to choose from a set of possibilities and by the mere act of choosing, individuals are better-off', whereas the instrumental value means that 'freedom of choice enables individuals and nations to manage their own capabilities in such a way as to achieve a better outcome, and thus, higher well-being' (Alcalde-Unzu et al., 2012, p.210). That said, studies examining the link between perceived accessibility and domain and overall satisfaction often do not control for travel and activity decisions. However, it is likely that these links are mediated by related behavioural factors, such as mode choices and activity participation (path 8).

In turn, activity and travel decisions as well as domain and overall satisfaction may influence perceived accessibility through experiences and learning in three ways, resulting in a reinforcing or downward-spiral feedback loop in an individual's perceived accessibility. Firstly, travel behaviour and activity participation can reshape an individual's needs, desires, or abilities (path 9). Recent research has emphasized the bidirectional relationship between travel attitudes and behaviour; for example, Kroesen et al. (2017) provide evidence that travel behaviour and attitudes mutually influence each other. Secondly, domain and overall satisfaction can influence the individual component of perceived accessibility (path 10). In the context of daily travel, De Vos and Witlox (2017) highlight how satisfaction with trips and daily travel can affect travel attitudes. A final theory is the broaden-and-build theory of positive emotions, which posits that positive emotions experienced during travel or activities could broaden an individual's 'thought-action repertoire' (see Fredrickson, 2001). As a result, these emotions could influence how individuals perceive their level of accessibility as well (path 11).

5. Exploring the links: Methods

In this section, we will discuss the methodology used to empirically quantify the influence of perceived accessibility on well-being through mediating pathways. To do so, we explicitly focus on the direct link between perceived accessibility and overall life satisfaction (path 7) as well as the indirect link through travel behaviour and activity participation as well as domain satisfaction (path 5 and 8). For this, we will discuss the data in Section 5.1, the measures in Section 5.2, and the modelling approach in Section 5.3.

5.1. Data collection

To empirically explore links with between perceived accessibility on the one hand and travel, activity participation, and well-being on the other hand, data from a questionnaire distributed at the end of 2020 among respondents (aged 18 years and older) of the Netherlands Mobility Panel (see Hoogendoorn-Lanser et al., 2015) is used. This survey mainly posed questions on the daily travel patterns, activity participation, and perceived accessibility of respondents. In total, 1252 valid responses were retained.

Table 2 presents an overview of participants' socio-demographic characteristics as well as the distribution of these characteristics among the wider population (Dutch adults aged 18 years and older). The majority of respondents are employed (67 %) and are in possession of a secondary education degree (43 %), while 30.6 % of the respondents have a higher education degree. Women are better represented than men (respectively 52.6 % and 47.4 %), whereas the average age equals 46.7 years. Most respondents live in urban Dutch areas (52.8 %), whereas only 31.3 % of the respondents are classified as rural-living. The sample is generally representative for the population, with a notable exception for income levels. Individuals earning a net personal income between 2000 and 3000 EUR are overrepresented in the sample, whereas individuals earning more than 3000 EUR are underrepresented.

5.2. Measures

Various variables have been included, based on the constructs discussed and presented in Section 3. Descriptive statistics of these measures are provided in Table 3. Perceived accessibility is measured using the Perceived Accessibility Scale (PAC) as proposed by Lättman et al. (2018). This scale measures perceived accessibility through the use of four items, which are formulated as 'Considering how I travel today, it is easy to do my daily activities', 'Considering how I travel today, I am able to live my life as I want to', 'Considering how I travel today, I am able to do all activities I prefer', and 'Considering how I travel today, access to preferred activities is satisfying'. Respondents were asked to rate these statements on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). As for travel mode choice, the frequency of use of car, train, BTM (bus, metro, tram), bike, e-bike, and walking was measured on a seven-point Likert scale ranging from (1) never, (2) less than 1 day per year, (3) 1 to 5 days per year, (4) 6 to 11 days per year, (5) 1 to 3 days per month, (6) 1 to 3 days per week, (7) 4 days or more per week. Fig. 3 provides distribution plots for travel mode use among participants, highlighting a large group of individuals who never use public transport (train and BTM). The distribution of (e-)bike use is highly skewed as well. Trip characteristics are not measured since the majority of studies on perceived accessibility and travel behaviour found an explicit link with travel mode use. With respect to activity participation, the frequency of work-, school-, medical care-, sport-, and grocery shopping-related activities was measured on a seven-point Likert scale ranging from (1) never, (2) less than 1 day per 3 months, (3) 1 to 2 days per 3 months, (4) 1 to 3 days per month, (5) 1 to 3 days per week, and (6) 4 days or more per week. For satisfaction with daily travel and residential location, single statements have been used as well, namely: 'All things considered, I am satisfied with how I can move around' and 'I am satisfied with my current residential location' respectively. Respondents were asked to indicate to what extent they agreed with these statements on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Activity satisfaction has not been included as a measure, while Section 4 highlights the potential role of activity satisfaction as a mediator of the link between perceived accessibility and life satisfaction, since satisfaction with activities has not been measured in the survey. Lastly, life satisfaction was measured using the Satisfaction with Life Scale (SWLS) (Diener et al., 1985). The five statements (see Table 3) have been measured on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Moreover, the following socio-demographic variables have been included in the model to account for possible confounding effects: age (0 = younger than 25 years, 1 = between 25 and 34 years, 2 = between 35 and 44 years, 3 = between 45 and 54 years, 4 = between 55 and 64 years, 5 = 65 years or older), gender (0 = female; 1 = male), non-EU migration background (0 = no; 1 = yes), educational attainment (0 = low (secondary school degree or less); 1 = medium; 2 = high (college or university degree)), employment status (0 = not working; 1 = working), personal net income (0 = less than EUR 1000; 1 = EUR 1001 to EUR 2000; 2 = EUR 2001 to EUR 3000; 3 = more than EUR 3000), household size (number of members in the household), car ownership (0 = no; 1 = yes), bike ownership (0 = no; 1 = yes), car driver's license (0 = no; 1 = yes), and level of urbanity (0 = extremely urban (more than 2500 surrounding addresses per square km2); 1 = very urban (2000 – 2500); 2 = moderately urban (1500 – 2000); 3 = slightly urban (500 – 1000); 4 = not urban (less

Table 2
Participants' background information.

Variable	Categories	Sample	Population
Gender	Male	47.4 %	49.4 %
	Female	52.6 %	50.6 %
Age	Mean	46.7 years	42.4 years
Level of education	Low	26.3 %	30.6 %
	Medium	43.1 %	37.4 %
	High	30.6 %	32.0 %
Employment	Unemployed	30.6 %	29.5 %
	Employed	69.4 %	70.5 %
Net personal income	Less than EUR 1000	18.6 %	19.6 %
	EUR 1001 to EUR 2000	29.2 %	28.8 %
	EUR 2001 to 3000	36.1 %	26.6 %
	More than EUR 3000	16.1 %	25.0 %
Household size	1 person	40.1 %	38.5 %
	2 persons	34.8 %	32.6 %
	3 persons or more	25.1 %	28.9 %
Level of urbanity	Rural	31.3 %	33.9 %
	Intermediate	17.6 %	17.1 %
	Urban	51.1 %	49.0 %

Data source for population distributions: Statistics Netherlands (CBS).

Table 3
Descriptive statistics ($N = 1252$).

Construct	Variables	Mean	SD
Perceived accessibility	Considering how I travel today, it is easy to do my daily activities	6.24	0.95
	Considering how I travel today, I am able to live my life as I want to	6.01	1.13
	Considering how I travel today, I am able to do all activities I prefer	5.82	1.33
	Considering how I travel today, access to preferred activities is satisfying	6.07	0.97
Travel mode use	Car use	5.22	2.21
	Train use	2.62	1.62
	BTM use	2.75	1.70
	Bike use	4.41	2.37
	E-bike use	2.69	2.41
	Walking	6.12	1.49
Activity participation	Work	4.19	2.07
	School	1.63	1.39
	Medical care	2.85	0.95
	Engaging in sports	3.56	1.74
	Grocery shopping	4.86	0.89
	Shopping	2.98	0.94
Travel satisfaction	All things considered, I am satisfied with how I can move around	6.31	0.82
Residential satisfaction	I am satisfied with my current residential location	6.05	1.08
Life satisfaction	In most ways my life is almost ideal	5.24	1.26
	The conditions of my life are excellent	5.54	1.13
	I am satisfied with life	5.63	1.14
	So far I have achieved the most important things in my life	5.23	1.28
	If I could start my life all over again, I wouldn't change anything	4.69	1.54

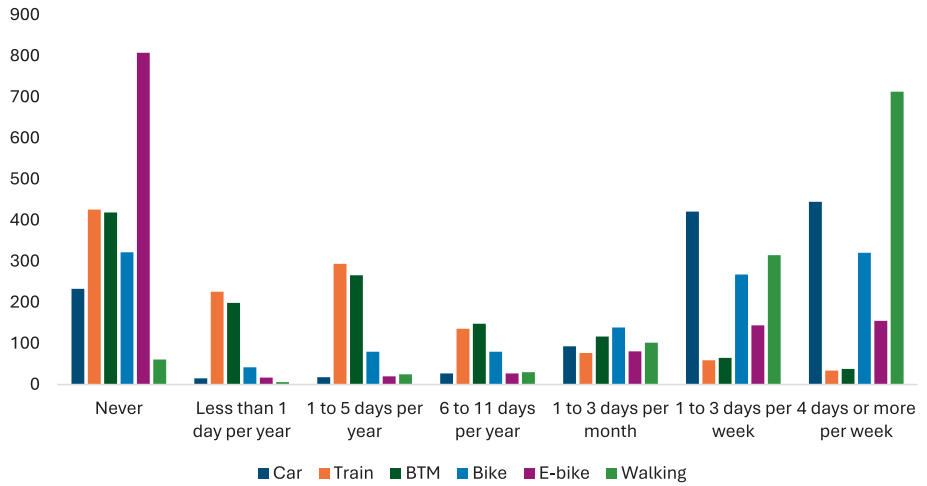

Fig. 3. Distribution of travel mode use.

than 500)). These variables are based on earlier studies concerned with revealing mediating pathways towards life satisfaction (not necessarily using perceived accessibility) (e.g. De Vos, 2019; Mehdizadeh et al., 2025).

5.3. Modelling approach

To estimate the effect of perceived accessibility on its outcomes, we make use of a structural equation modelling approach. Such an approach is commonly used in travel behaviour research to test complex causal structures, including both direct and indirect effects (see Golob, 2003). This is especially useful for the present study since we are interested in both the direct influence of perceived accessibility on well-being (path 7 in Fig. 2) as well as the indirect influence via travel behaviour and activity participation (path 5) and through domain satisfaction (path 8).

To test these paths as depicted in Fig. 2, both a measurement as well as structural model have been used. The measurement model includes a latent variable consisting of the four statements of the PAC scale used to measure perceived accessibility and another latent variable consisting of the five statements of the SWLS scale used to measure satisfaction with life. These latent variables for perceived accessibility and life satisfaction, together with the other (observed) variables, are included in the structural model to estimate the effect of perceived accessibility on its outcomes. All observed indicators (for perceived accessibility, travel behaviour, activity participation, and residential, travel, and life satisfaction) are specified as ordinal variables.

Given that we rely on cross-sectional data, a single direction of causality is assumed. This direction of causality is in line with the conceptual framework offered in Section 4. Perceived accessibility is specified as an exogenous variable, and assumed to influence both activity participation and travel behaviour. Out-of-home activities and travel mode use are operationalised in such a way that they may mediate the effect of perceived accessibility on respectively travel, residential, and life satisfaction. In turn, travel and residential satisfaction may mediate the effect of perceived accessibility, activity participation, and travel behaviour on life satisfaction. The structural equation model estimated for the purpose of the present study is depicted in Fig. 4. Error terms between behavioural outcomes (activity participation and travel behaviour) as well as satisfaction-related outcomes (travel and residential satisfaction) are allowed to correlate. All insignificant direct effects ($p < 0.05$) were fixed to zero using backward elimination, whereas all correlations between error terms (significant and insignificant) are retained. Due to the inclusion of ordinal variables in the empirical model, the model was estimated using the robust WLSMV estimator (see Muthén & Muthén, 2010; Flora & Curran, 2004) using Mplus 8.5 (see https://www.statmodel.com/) and yields a good model fit ($\chi 2 = 814.92$, df = 347, $p = 0.00$, CFI = 0.990, RMSEA = 0.033, SRMR = 0.025).

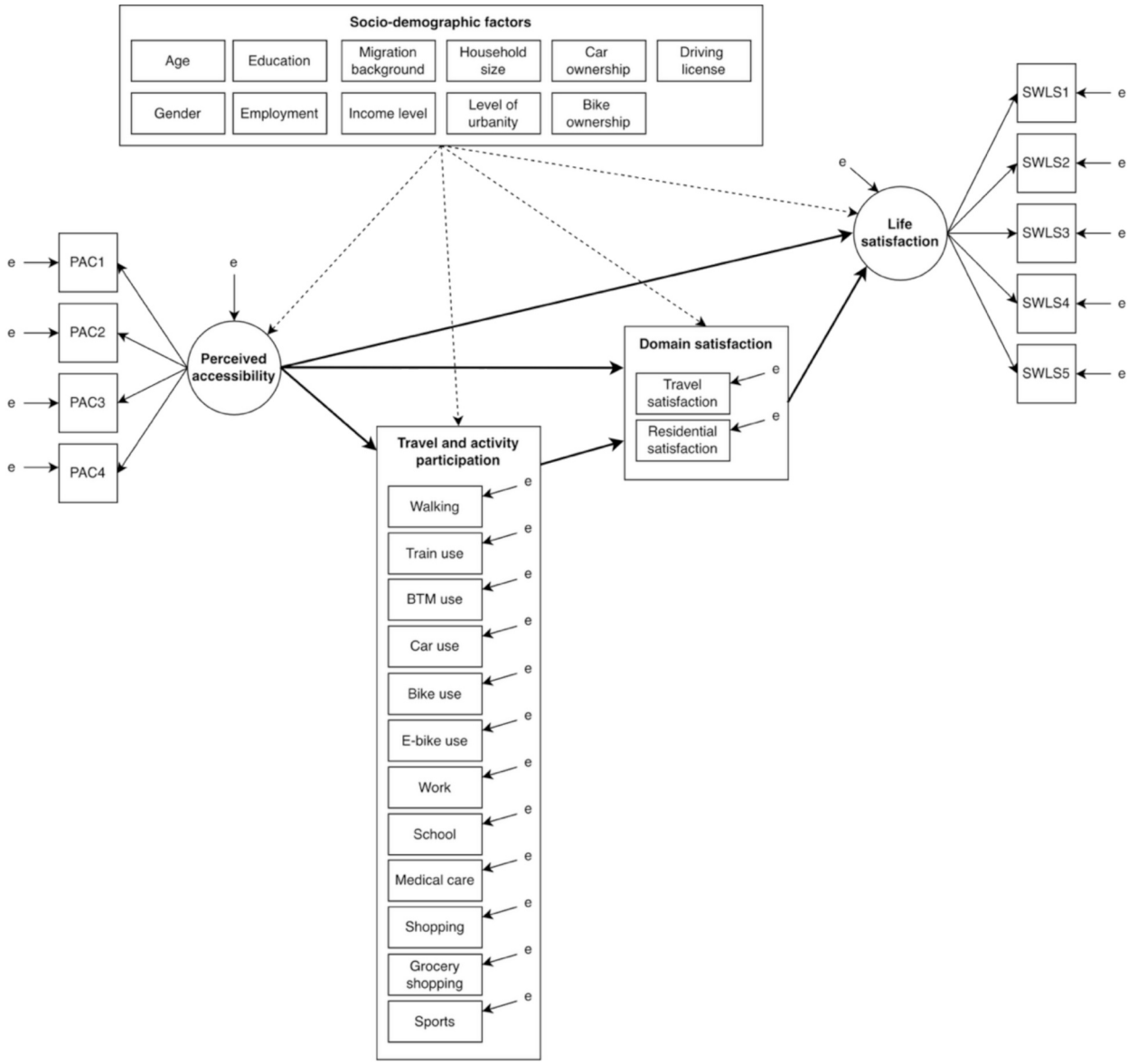

Fig. 4. Schematic overview of the structural equation model.

6. Exploring the links: Results

6.1. Links with travel, activity participation, and well-being

This section discusses the key findings of the structural equation model. Fig. 5 and Table 4 present the (significant) standardised direct estimates, which allows to compare the estimates in terms of their relative importance. First, perceived accessibility significantly affects the behavioural constructs tested in this analysis. More specifically, significant positive links with walking ($\beta = 0.09$), bike use ($\beta = 0.07$), sports ($\beta = 0.09$), and grocery shopping ($\beta = 0.12$) are retained. In other words, a higher (lower) perceived accessibility is associated with more (less) walking and biking as well as activities related to sports and grocery shopping. In addition, perceived accessibility is negatively associated with health-related activities (β = -0.17), indicating that individuals with higher perceived accessibility less often carry out such activities. Interestingly, no significant effects with car, e-bike,and train and BTM use have been found. Hence, overall perceived accessibility does not significantly affect individuals' use of these modes.

Second, perceived accessibility is related to travel and residential satisfaction both directly and indirectly. The direct association with travel satisfaction is highest ($\beta = 0.66$), whilst perceived accessibility is related to individuals' satisfaction with the residential location ($\beta = 0.45$) to a large extent as well. Besides these direct associations, the link between perceived accessibility and satisfaction with daily travel and origin location is partly mediated by travel behaviour and activity participation. With regard to travel mode use, train use is positively associated with residential satisfaction ($\beta = 0.10$). Individuals with a higher train use are on average thus more likely to be more satisfied with their residential location than others. For activity participation, activities related to working have significant relations with travel satisfaction, whereas health-related and grocery shopping activities are predominantly related to the satisfaction with the residential location. More specifically, working has a positively association with travel satisfaction ($\beta = 0.10$), whereas health-related activities such as visiting the doctor's office positively relates to residential satisfaction ($\beta = 0.06$). Notably, individuals who carry out activities such as grocery shopping more often are on average less satisfied with their residential location (β = -0.13).

Third, perceived accessibility is correlated with satisfaction with life both directly and indirectly. A higher (lower) perceived accessibility is associated with higher (lower) life satisfaction ($\beta = 0.27$). Additionally, both behavioural decisions (travel behaviour and activity participation) and domain satisfaction (daily travel, activities, residential location) mediate the link between perceived accessibility and life satisfaction since life satisfaction is directly affected by travel satisfaction ($\beta = 0.17$) and residential satisfaction (β = 0.25). Interestingly, residential satisfaction seems to correlate with life satisfaction to a larger extent than travel satisfaction, indicated by the magnitude of both estimates. Health- and sports-related activities are significantly associated with life satisfaction as

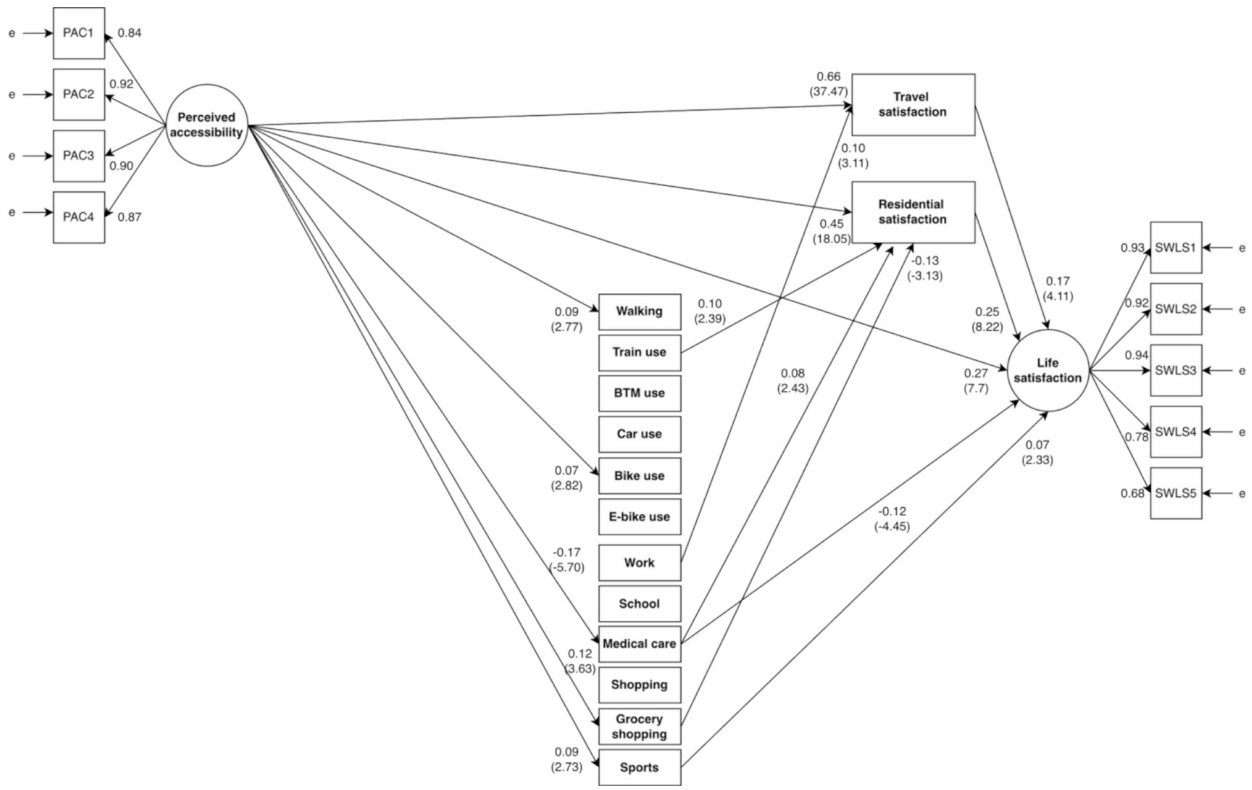

Fig. 5. Path diagram with direct estimates (effects from socio-demographics have been suppressed to enhance readability but are shown in Table 4).

Table 4
Standardised direct effects and correlations (between error terms of behavioural constructs; underlined).

	PA	Work	School	Medical care	Grocery shopping	Shopping	Sports	Car use	Train use	BTM use	Bike use	E-bike use	Walking	RS	TS	LS
Socio-demographics																
Age	–	−0.27	−0.42	–	0.20	–	−0.09	–	–	−0.08	−0.19	0.25	–	0.17	–	0.14
Gender	0.07	0.05	–	−0.12	−0.15	−0.19	–	0.09	−0.07	–	–	–	–	–	–	–
Migration background	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Educational attainment	0.10	–	–	–	0.08	–	0.13	–	0.16	0.17	–	–	–	–	–	–
Employment status	–	0.58	−0.14	–	–	–	–	0.18	0.11	–	–	–	–	–	–	–
Personal net income	–	0.15	–	–	–	–	–	0.11	0.08	–	–	–	–	–	–	0.07
Household size	–	–	0.19	–	−0.20	–	−0.09	–	−0.11	−0.12	–	–	–	–	−0.10	0.18
Bike ownership	0.08	0.06	0.13	−0.08	–	–	0.11	–	0.16	0.08	0.53	−0.29	0.08	−0.14	–	–
Car ownership	0.08	0.15	−0.24	–	–	–	–	0.31	−0.24	−0.22	−0.14	–	–	–	0.10	–
Driver's license	0.12	–	0.17	–	–	–	0.11	0.45	–	–	0.06	–	–	–	–	–
Level of urbanity	−0.07	–	–	–	−0.09	–	–	0.10	−0.14	−0.28	–	–	−0.14	0.11	–	–
Perceived accessibility																
Perceived accessibility (PA)	–	–	–	−0.17	0.012	–	0.09	–	–	–	0.07	–	0.09	0.45	0.66	0.27
Activity participation																
Work	–	–	–	–	–	–	–	–	–	–	–	–	–	–	0.10	–
School	–	−0.04	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Medical care	–	−0.11	−0.01	–	–	–	–	–	–	–	–	–	–	0.08	–	−0.12
Grocery shopping	–	0.03	−0.17	0.10	–	–	–	–	–	–	–	–	–	−0.13	–	–
Shopping	–	0.03	−0.04	0.29	0.31	–	–	–	–	–	–	–	–	–	–	–
Sports	–	0.02	0.20	0.05	0.06	0.18	–	–	–	–	–	–	–	–	–	0.07
Travel mode use																
Car use	–	0.32	−0.19	0.11	0.02	0.08	−0.08	–	–	–	–	–	–	0.10	–	–
Train use	–	0.06	0.14	−0.06	0.19	0.14	0.20	−0.25	–	–	–	–	–	–	–	–
BTM use	–	0.04	0.14	−0.03	0.19	0.17	0.16	−0.23	0.72	–	–	–	–	–	–	–
Bike use	–	−0.05	0.12	−0.07	0.18	0.01	0.21	−0.35	0.18	0.09	–	–	–	–	–	–
E-bike use	–	0.02	0.03	0.00	0.03	0.09	0.11	−0.17	0.13	0.06	−0.27	–	–	–	–	–
Walking	–	0.01	−0.00	−0.07	0.27	0.13	0.20	−0.10	0.33	0.33	0.18	0.09	–	–	–	–
Satisfaction																
Residential satisfaction (RS)	–	–		–	–	–	–	–	–		–	–	–	–	–	0.25
Travel satisfaction (TS)	–	–		–	–	–	–	–	–		–	–	–	–	0.36	0.17

well. Here, sports-related activities contribute positively to life satisfaction ($\beta = 0.07$), whereas health-related activities negatively influence life satisfaction ($\beta = -0.12$).

The combined direct and indirect effect of these constructs should be assessed to draw conclusions about the total effect of constructs on satisfaction with life. Table 5 presents these total effects. First, perceived accessibility and residential satisfaction significantly relates to life satisfaction compared to activity participation and travel mode frequencies. Notably, the direct correlation between perceived accessibility and satisfaction with life is higher ($\beta = 0.27$) than the total association via activity participation and satisfaction, travel behaviour and satisfaction, and residential satisfaction ($\beta = 0.25$). In other words, the influence of perceived accessibility on life satisfaction is primarily direct rather than mediated by other (behaviour- and satisfaction-related) constructs.

6.2. Additional links

Socio-demographics also have significant associations with perceived accessibility, travel, activity participation and well-being (Table 4). Variations in perceived accessibility among individuals are partly explained by gender ($\beta = 0.07$), education attainment ($\beta = 0.10$), bike ownership ($\beta = 0.08$), car ownership ($\beta = 0.08$), and driver's license ($\beta = -0.09$), and level of urbanity ($\beta = -0.07$). In contrast to earlier studies on differences in perceived accessibility among groups of individuals (see Pot et al., 2023; Moleman and Kroesen, 2025), we do not find significant links with age, gender, migration background, employment status, income, and household size. Life satisfaction seems to be higher for older adults, those with a higher income, or large households.

Correlations between the error terms of behavioural constructs also provide interesting results. Working and educational activities are positively correlated with driving, whereas (grocery) shopping is strongly correlated with walking, cycling and public transport. In line with the expectation, sport-related activities correlate with active travel modes (e.g. cycling and walking) to a great extent.

7. Exploring the links: Discussion

The structural equation model results indicate that perceived accessibility is significantly associated with the constructs considered in the analysis. For activity participation, the model findings indicate that perceived accessibility is related to out-of-home activities, while this relationship varies for different types of activities. A positive link has been found between overall perceived accessibility and grocery shopping and sports, whereas the link with health-related activities is estimated to be negative. These findings add to the current body of literature, which either focuses on mode-specific accessibility (in the Dutch context: Mehdizadeh et al., 2025) or on general activity participation levels (in the Dutch context: Pot et al., 2024). Mehdizadeh et al. (2025) concluded that perceived accessibility by car, bike, and public transport was negatively associated with grocery shopping. However, the present analysis shows that individuals' general ease of reaching destinations positively correlates with grocery shopping. Mehdizadeh et al. (2025) also found that perceived walking accessibility positively correlated with sports-related activities, which aligns with the present analysis in which a higher (lower) overall perceived accessibility seems to result in more (less) sports-related activities. Pot et al. (2024) concluded that individuals experiencing lower levels of accessibility still report high levels of activity participation. However, the structural equation modelling findings underscore that individuals experiencing perceived inaccessibility are more likely to report fewer out-of-home activities. While Pot et al. (2024) also studied general levels of perceived accessibility, a notable difference in research designs relates to the operationalisation of activity participation. Whereas this study has analysed various types of activities, Pot et al. (2024) assessed the general level of activity participation, which may have resulted in different outcomes.

With respect to travel behaviour, the structural equation model underscores that overall perceived accessibility is positively linked with walking. This finding aligns with earlier studies on perceived accessibility and walking behaviour. In particular, Hou et al. (2020) also found that higher (lower) perceived accessibility resulted in a higher (lower) number of walking trips in Singapore. Additionally, studies found a positive relationship between perceived walking accessibility and walking behaviour (e.g. Liu et al., 2022; Van der Vlugt et al., 2022; Van der Vlugt et al., 2025), collectively highlighting that walking behaviour is both related to overall perceived

Table 5
Standardised direct, indirect, and total effects on life satisfaction.

	Direct	Indirect	Total
Perceived accessibility	0.27	0.25	0.52
Work	–	0.02	0.02
School	–	–	–
Medical care	−0.12	0.02	−0.10
Grocery shopping	–	−0.03	−0.03
Shopping	–	–	–
Engaging in sports	0.07	–	0.07
Car use	–	–	–
Train use	–	0.02	0.02
BTM use	–	–	–
Bike use	–	–	–
E-bike use	–	–	–
Walking	–	–	–
Travel satisfaction	0.17	–	0.17
Residential satisfaction	0.25	–	0.25

accessibility as well as perceived walking accessibility. We also find a significant link between perceived accessibility and bike use, which aligns with earlier research as well (e.g. Scheepers et al., 2016). Interestingly, links with car and public transport use have not been found, contradicting earlier studies which concluded that overall perceived accessibility negatively correlates with car and public transport use (e.g. Blandin et al., 2024; Friman et al., 2020; Andersson et al., 2023). However, these studies are also contradicted by other findings of studies focussing on mode-specific rather than overall accessibility, concluding that perceived accessibility by car or public transport is positively related to car or public transport use (e.g. Scheepers et al., 2016; Sheng and Zhang, 2022; Watthanaklang et al., 2024; Negm and El-Geneidy, 2025; Mehdizadeh and Kroesen, 2025). Similarly, the present study estimated links with activity participation and travel behavior in a combined fashion. Since we find significant direct effects on activities related to grocery shopping, medical care, and sports, the accessibility of these facilities may be more important for perceived accessibility. In this regard, the opportunity to reach these facilities/destinations by active modes (walking or biking) may play an especially prominent role for perceived accessibility levels. This, however, may be much stronger in the Netherlands compared to other geographical areas.

While the findings highlighted significant links with travel behaviour and activity participation, the strongest correlations have been found between perceived accessibility and domain (travel and residential satisfaction) and overall life satisfaction. In line with several other studies (not necessarily Dutch) on these links (e.g. Mehdizadeh et al., 2025; Lättman et al., 2019; Liu et al., 2022; Sukwadi et al., 2022; Friman and Olsson, 2023; Lim et al., 2020), the model results show that perceived accessibility is positively associated with daily travel, residential, and life satisfaction.

8. Implications, research agenda and concluding remark

8.1. Implications

The most important lesson is that perceived accessibility is a relevant construct to study since the analysis shows that perceived accessibility has significant associations (travel-related) outcomes. More specifically, the structural equation model retained significant links between perceived accessibility and activity participation, travel behaviour, and satisfaction with daily travel, residential location, and life in general. This implies that policymakers may aim to improve travel, activity participation, and well-being through improving individuals' perceived accessibility.

A related lesson is that perceived accessibility has greater associations with satisfaction-related variables than with behavioural variables (e.g. travel behaviour and activity participation). As shown in the path diagram (Fig. 5), the direct association between perceived accessibility and behavioural variables is rather weak, whereas the direction associations with travel and residential satisfaction are strong. This supports the notion that daily travel and activity patterns are relatively inert, whilst a greater (lower) perceived accessibility relates to an even higher (lower) satisfaction. An explanation for this is that knowing that you can reach destinations and/or participate in activities can be more important than actually increased participating in activities. People satisfied with their travel patterns or residential location are, then, more likely to report a higher perceived accessibility and quality of life as well. Conversely, those individuals that are less satisfied will likely report lower levels of accessibility. In other words, (low) perceived accessibility and (low) satisfaction levels may reinforce each other. The direct link between perceived accessibility and life satisfaction has been estimated to be large, indicating that perceived accessibility should be considered more thoroughly when designing policies related to improving subjective well-being, especially in cases where a mismatch with 'calculated' accessibility exists. Policymakers and practitioners could do so by explicitly intervening in such a way that perceived accessibility levels increase. For this, determinants of changes in perceived accessibility may explicitly be targeted, such as vehicle ownership and built environment characteristics. As highlighted in Moleman (2025), becoming in possession of a private vehicle such as a bike or car could significantly uplift one's perceived level of accessibility. The physical environment, especially in terms of the distance to important destinations such as grocery stores and train stations, also played a prominent role in changing perceived accessibility, while to a lesser extent compared to vehicle ownership (Moleman, 2025). Altogether, changes in vehicle ownership and the built environment could alter people's perceived ease of reaching destinations and, in turn, their well-being since an explicit relationship with domain and life satisfaction has been found in the present study.

While impacts on travel and activity decisions have been estimated to be rather low, a final lesson is that relationship between perceived accessibility and satisfaction with life seems to be partly mediated by travel and activity patterns. More specifically, the findings suggest that overall perceived accessibility is related to active travel (walking and/or biking). With increasing emphasis on active mobility and healthy cities recently in both research and urban planning, a related policy direction would be to incentivize active travel patterns through perceived accessibility. A starting point here would be to focus on the drivers of perceived accessibility, i.e. characteristics of the built environment, socio-demographic and −economic factors, and mobility tool ownership.

8.2. Limitations and future research directions

Several limitations of the present study can be identified. A first limitation relates to the frequency of use of different travel modes (car, train, BTM, bike, e-bike, and walking). These indicators were measured on a seven-point Likert scale ranging from (1) never to (7) four days or more per week. While this scale provides ordinal variation across modes, one methodological concern would be that the validity of self-reported frequency may be limited. Individuals often find it difficult to accurately recall or estimate their typical travel frequency, particularly for infrequent modes. The unequal spacing between response categories (e.g., "less than one day per year" versus "1-3 days per week") may also reduce interpretability and comparability of responses across modes.

Another limitation would be the limited mediating pathways analysed in the present study. The literature review showed that

studies have been focussed on travel behaviour, travel satisfaction, activity participation, residential satisfaction, and subjective well-being. However, activity satisfaction has not been tested in the structural equation model. Exploring such additional links may provide a better understanding of the set of outcomes that are the result of perceived accessibility. A second direction for future research would thus be to explore additional links with outcomes of perceived accessibility.

A third limitation of the present study is that a single direction of causality is assumed. Studies evaluated in this paper mainly examined the effect of perceived accessibility on an outcome, however, the effect may also work the other way around (for instance, the influence of travel behaviour on perceived accessibility as showed by Mehdizadeh & Kroesen, 2025). A second avenue for future research could be to find out whether the links between perceived accessibility and its outcomes are unidirectional or bidirectional. The conceptual model proposed in Section 4 may provide inspirations on which links and directions of causality to assess. By employing, for instance, a cross-lagged panel model, the causal effects between two or more constructs can be estimated. A final avenue for future research in this regard would be to explore potential underlying theories and mechanisms explaining the relationships depicted in the conceptual framework as well as others. An important shortcoming of studies included in the literature review is that underlying theories and mechanisms explaining the tested/hypothesised relationships are limitedly explored. While Section 4 proposes a few potential theories explaining how perceived accessibility may relate to travel behaviour, activity participation, and domain and life satisfaction, future studies could explore the underlying mechanisms of these relations in more detail.

A related limitation of this study is that feedback loops, hypothesised in the conceptual framework, have not been assessed as well. In this regard, an avenue for future research would be to assess perceived accessibility over time and to identify which factors cause changes in the perceived level of accessibility. How the outcomes of perceived accessibility (travel, activity participation, well-being) in turn influence people's level of perceived accessibility is an additional research direction. As showed in the literature review, only a few studies have been concerned with examining perceived accessibility in a longitudinal format. The effect of a policy intervention has been studied in most cases. For instance, Andersson et al. (2023) examined whether individual perceptions of the level of accessibility changed after providing individuals with fare free public transport tickets to promote modal shifts. By employing a before-and-after research design, the effect of various other policy interventions on perceived accessibility could be measured as well. Such before-and-after studies should, then, measure perceived accessibility at different moments before as well as after the real-world implementation.

The implications of non-interventional changes (such as changes in built environment characteristics, mobility means and/or travel attitudes) on perceived accessibility may be estimated with such a longitudinal perspective as well. To the best of our knowledge, only Moleman (2025) has applied a longitudinal approach to study changes in perceived accessibility. Rather, most studies on perceived accessibility use cross-sectional data to identify variations in perceived accessibility among different groups. However, to better understand the effect of changes in perceived accessibility on daily travel and activity patterns, it is necessary to identify those determinants of perceived accessibility that do not only cause variations in experienced levels of accessibility but also those that determine perceived accessibility over time.

A data-related limitation is that the present study makes use of data sourced from the Netherlands Mobility Panel. While this panel allows to make use of a representative sample of the Dutch population, a shortcoming is that it has limited generalisability to other geographical contexts. As highlighted in Fig. 3, car and bikes are intensively used within the sample, while this does not necessarily hold in other countries. Similarly, most studies reviewed in this paper focus either on Asia or Europe, while other continents are not or to a limited extent explored. By studying the differences in cultures and (personal and social) norms, and their effect on the subjective evaluation of accessibility (over time), valuable insights can be gained on the subjective evaluation of accessibility levels. In addition, whether the relationships between perceived accessibility and travel as well as activity participation changes across geographical contexts could also be studied.

A final limitation is the use of a specific measurement scale. For this study, we solely relied upon one measurement scale to capture individuals' perceived level of accessibility, namely the commonplace used Perceived Accessibility Scale (Lättman et al., 2016b; Lättman et al., 2018). An important shortcoming of this scale, as also highlighted by Negm et al. (2025), is that satisfaction with life is partly measured by these items as well. Yet, as highlighted in this paper, we feel that life satisfaction is not an aspect of perceived accessibility, but rather a potential outcome of an individual's experienced level of accessibility. A suggestion for future scales would thus be that the items are formulated in such a way that they only focus solely on perceived accessibility and limit the overlap with outcomes of perceived accessibility. In doing so, a robustness check of the present analysis on the impacts of travel, activity participation, and well-being can be carried out.

8.3. Concluding remark

To conclude, this paper has discussed a wide range of links between perceived accessibility and travel mode choice, travel satisfaction, activity participation, satisfaction with the residential location, and well-being. In addition to offering a conceptual model of these links, empirical evidence for this model has been provided as well. In doing so, this paper has shed light on the potential role that perceived accessibility may fulfil in a broader travel behaviour process. An important implication for policy is that policies designed to improve −among others- activity participation and travel behaviour should not solely focus on the socio-demographic characteristics and attitudes. Rather, focussing on the experienced level of accessibility of individuals may suffice as well. Still, further research is needed to explore this topic in much more detail, for which a research agenda has been provided.

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Milan L. Moleman: Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. **Felix J. Pot:** Writing – review & editing, Conceptualization. **Bert van Wee:** Writing – review & editing. **Jonas De Vos:** Writing – review & editing. **Iris Roeleven:** Writing – review & editing, Supervision, Conceptualization. **Nihit Goyal:** Writing – review & editing, Supervision, Conceptualization. **Marije Hamersma:** Writing – review & editing, Supervision, Conceptualization. **Maarten Kroesen:** Writing – review & editing, Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A

Studies included in the systematic literature review and their respective research design in terms of geographical scope, measurement scale, method, and empirical findings are shown in Table A.1.

Table A.1
An overview of the literature on outcomes of perceived accessibility (alphabetical order).

Reference	Study area	Measurement scale *Mode*	Method *Design*	Empirical findings
Al-Rashid et al. (2021)	Lahore, Pakistan	PAC-2016 *Public transport*	PLS-SEM	• PA is positively associated with social inclusion
Alousi-Jones and El-Geneidy (2025)	Canada	Perceived ease of reaching 4 destinations in reasonable time	Logistic regression *Cross-sectional*	• PA impacts frequent PT use
An et al. (2024)	Manchester, UK; Utrecht, the Netherlands; Malmö, Sweden	Perceived ease of reaching destinations and activities within based on ideal travel time, at affordable costs, with a positive travel experience	Causal discovery methodologies *Cross-sectional*	• Overall PA positively relates to social capital and negatively to shared bike use
Andersson et al. (2023)	Stockholm, Sweden	PAC-2018	Mixed ANOVA *Quasi-experimental*	• Use of public transport decreased overall PA • Free public transport did not change overall PA
Blandin et al. (2024)	Santiago de Chile, Chile	Four psychometrics indicators	ICLV and MNL models *Cross-sectional*	• Lower PA by car increases likelihood to use the car • Lower PA by public transport increases likelihood to use public transport
Friman and Olsson (2023)	Sweden	PAC-2018	PLS-SEM *Cross-sectional*	• PA correlated positively with satisfaction with life
Hamersma et al. (2015)	The Netherlands	PA of residential location	SEM *Cross-sectional*	• PA to residential location insignificantly effected perceived highway nuisance • Perceived car commute did negatively affect perceived highway nuisance • Residential satisfaction mediates the effect of perceived highway nuisance on the intention to move
Hou et al. (2020)	Republic of Singapore	Perceptions of connecting spaces, transit hubs, utilitarian facilities, and recreational facilities	Multivariate ordered probit *Cross-sectional*	• PA to recreational facilities positive influences older adults' daily walking trip frequency • Other subjective measures did not reach statistical significance

(*continued on next page*)

Table A.1 (*continued*)

Reference	Study area	Measurement scale *Mode*	Method *Design*	Empirical findings
Hu and Ettema (2023)	Ganyu, China	9 statements on 5-point Likert scale	Ordinal logit *Cross-sectional*	• Mismatch between PA and desired resident
Kim (2024)	Republic of Korea	Perceived accessibility to transport systems, public service facilities, and digital services	PLS-SEM *Cross-sectional*	• PA positively influence life satisfaction and, indirectly, happiness
Lättman et al. (2019)	Stockholm, Helsinki, Oslo, Copenhagen, Bergen	PAC-2018	PLS-SEM *Cross-sectional*	• Overall PA is positively associated with travel and life satisfaction • Travel satisfaction partly mediates the effect of overall PA on life satisfaction
Lim et al. (2020)	Selangor, Malaysia	PAC-2016 *Mass-Rapid Transit*	Hierarchical multiple regressions *Cross-sectional*	• PA correlated positively with life satisfaction
Liu et al. (2021)	Kunming, China	3 statements on 6-point Likert scale	Cross-lagged panel model *Longitudinal*	• PA positively influences transport equity
Liu et al. (2022)	Dalian, China	[shopping and dining areas/classrooms and self-study rooms/many places] are within easy distance on campus	T-tests and SEM *Cross-sectional*	• Overall PA to locations on campus positively relates to walking behaviour (no. of walking trips)
Lukina et al. (2023)	Moscow, Russia	16 attributes measured on a 5-point Likert scale	Contingency tables and Chi-square tests *Cross-sectional*	• Overall PA positively relates to frequence of public transport use
Mehdizadeh and Kroesen (2025)	The Netherlands	PA of neighbourhood by [car/train/bike]	Cross-lagged panel models *Longitudinal*	• PA and travel behaviour influence each other • Travel behaviour impacts PA to a larger extent
Negm and El-Geneidy (2025)	Montreal, Canada	Public transit/walking is suitable to reach desired destinations	Linear regression *Cross-sectional*	• PA by public transport positively correlates with people's weekly public transport mode share • PA by walking positively correlates with people's weekly walking mode share
Nguyen-Phuoc et al. (2025)	Hanoi, Vietnam	3 items on 7-point Likert scale	PLS-SEM *Cross-sectional*	• PA positively correlates with intention to use urban train services
Olfindo (2021)	Yangon City, Myanmar	PA to bus stops	SEM *Cross-sectional*	• PA to bus stops positively correlates with residential satisfaction • PA to bus stops does not influence moving intentions directly; indirect effect through residential satisfaction is significant
Olsson et al. (2021)	Sweden	PAC-2016 *Public transport*	Linear regression *Cross-sectional*	• Public transport use is negatively associated with PA by public transport
Pot et al. (2024)	The Netherlands	PAC-2018	Multinomial logit *Cross-sectional*	• PA is weakly correlated with activity participation • Link becomes negligible with increasing PA • Those with low engagement levels still reported high PA
Scheepers et al. (2016)	The Netherlands	PA of shops, natural spaces, and sports facilities in neighbourhood by car, bicycle, and foot	Logistic regression *Cross-sectional*	• Car use higher for those with high PA by car • Active mode use higher for those with high PA by bicycle or foot
Shao et al. (2022)	Chengdu, China	Single statement on 5-point Likert scale	Propensity score matching and average treatment effect *Quasi-experimental*	• High PA to metro services correlates positively with space–time flexibility
Sukwadi et al. (2022)	Jakarta, Indonesia	PAC-2016 *Mass rapid transit*	SEM *Cross-sectional*	• PA by mass rapid transit (MRT) positively affects general satisfaction with daily travel
Tanimoto and Hanibuchi (2021)	Sendai, Japan	Satisfaction with distance to 6 activity locations	Ordinal logit *Cross-sectional*	• PA positively associated with sense of accessibility
Vafeiadis and Elldér (2024)	Gothenburg, Sweden	16 statements measured on a 5-point Likert scale	Ordinal regressions *Cross-sectional*	• Car use relates to the highest level of PA
Van der Vlugt et al., 2022	Hamburg, Germany	3 statements measured on a 5-point Likert scale	SEM *Cross-sectional*	• Overall PA of living environment positively relates to walking behaviour (no. of walking trips)

(*continued on next page*)

Table A.1 (*continued*)

Reference	Study area	Measurement scale *Mode*	Method *Design*	Empirical findings
Wang et al. (2019)	Nanjing, China	Perceived walking distance of bus or metro within 10–15 min	Mixed-effect logistic regression *Cross-sectional*	• PA of public transport stops (bus or metro) positively impacts participation in physical activity
Watthanaklang et al. (2024)	Nakhon Ratchasima, Thailand	PAC-2016 *Public transport*	SEM *Cross-sectional*	• PA is positively associated with intention to use local PT
Zhang and Hu (2024)	Shenzhen, China	Two statements on the ease of reaching a destination with a specific route	XGBoost algorithm *Cross-sectional*	• PA positively correlates with cycling distance
Zhu et al. (2024)	Nanjing, China	PA to 6 activity locations	T-tests and SEM *Cross-sectional*	• Transport and housing equity are influenced by PA

Data availability

The authors do not have permission to share data.

References

Alousi-Jones, M., El-Geneidy, A., 2025. Examining the influence of personal-time-based accessibility on the frequency of public transit use among older adults across Canada. Transp. Res. Interdiscip. Perspect. 31, 101381.

Alcalde-Unzu, J., Ballester, M.A., Nieto, J., 2012. Freedom of choice: John Stuart Mill and the tree of life. Series 3 (1), 209–226.

Al-Rashid, M.A., Shamsul Harumain, Y.A., Goh, H.C., Ahmad, Z., 2021. Psychosocial factors of public transport users and social inclusion implications among older women in Pakistan. J. Urban Plann. Dev. 147 (4), 04021046.

An, Z., Mullen, C., Guan, X., Ettema, D., Heinen, E., 2024. Shared micromobility, perceived accessibility, and social capital. Transportation 1–36.

Andersson, J., Björklund, G., Warner, H.W., Lättman, K., Adell, E., 2023. The complexity of changes in modal choice: a quasi-experimental study. Transport. Res. F: Traffic Psychol. Behav. 96, 36–47.

Blandin, L., Vecchio, G., Hurtubia, R., Tiznado-Aitken, I., 2024. Car dependency in the urban margins: the influence of perceived accessibility on mode choice. Transp. Res. A Policy Pract. 184, 104098.

Bude, H., Lantermann, E.D., 2006. Soziale exklusion und exklusionsempfinden. KZfSS Kölner Zeitschrift Für Soziologie Und Sozialpsychologie 58 (2), 233–252.

Curl, A., 2018. The importance of understanding perceptions of accessibility when addressing transport equity. J. Transp. Land Use 11 (1), 1147–1162.

De Vos, J., Witlox, F., 2017. Travel satisfaction revisited. on the pivotal role of travel satisfaction in conceptualising a travel behaviour process. Transp. Res. A Policy Pract. 106, 364–373.

De Vos, J., 2019. Analysing the effect of trip satisfaction on satisfaction with the leisure activity at the destination of the trip, in relationship with life satisfaction. Transportation 46 (3), 623–645.

Diener, E.D., Emmons, R.A., Larsen, R.J., Griffin, S., 1985. The satisfaction with life scale. J. Pers. Assess. 49 (1), 71–75.

Flora, D.B., Curran, P.J., 2004. An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. Psychol. Methods 9 (4), 466–491.

Fredrickson, B.L., 2001. The role of positive emotions in positive psychology: the broaden-and-build theory of positive emotions. Am. Psychol. 56 (3), 218–226.

Friman, M., Lättman, K., Olsson, L.E., 2020. Carpoolers' Perceived Accessibility of Carpooling. Sustainability 12 (21), 8976.

Friman, M., Olsson, L.E., 2023. Are we leaving some people behind? Travel autonomy, perceived accessibility, and well-being among people experiencing mental and physical difficulties. Transport. Res. F: Traffic Psychol. Behav. 98, 243–253.

Geurs, K.T., Van Wee, B., 2004. Accessibility evaluation of land-use and transport strategies: review and research directions. J. Transp. Geogr. 12 (2), 127–140.

Golob, T.F., 2003. Structural equation modeling for travel behavior research. Transp. Res. B Methodol. 37 (1), 1–25.

Hamersma, M., Heinen, E., Tillema, T., Arts, J., 2015. Residential moving intentions at highway locations: the trade-off between nuisances and accessibility in the Netherlands. Transp. Res. Part D: Transp. Environ. 35, 130–141.

Hoogendoorn-Lanser, S., Schaap, N., Olde Kalter, M., 2015. The Netherlands Mobility Panel: An innovative design approach for web-based longitudinal travel data collection. Transport. Res. Proc. 11, 311–329.

Hou, Y., Yap, W., Chua, R., Song, S., Yuen, B., 2020. The associations between older adults' daily travel pattern and objective and perceived built environment: a study of three neighbourhoods in Singapore. Transp. Policy 99, 314–328.

Hu, Y., Ettema, D., 2023. Exploring residential dissonance from a household perspective: a gendered examination of resident characteristics in a small chinese city. J. Transp. Geogr. 112, 103706.

Jamei, E., Chan, M., Chau, H.W., Gaisie, E., Lättman, K., 2022. Perceived accessibility and key influencing factors in transportation. Sustainability 14 (17), 10806.

Kim, S., 2024. Effects of perceived accessibility to living infrastructure on positive feelings among older adults. Behavioral Sciences 14 (11), 1025.

Kroesen, M., Handy, S., Chorus, C., 2017. Do attitudes cause behavior or vice versa? an alternative conceptualization of the attitude-behavior relationship in travel behavior modeling. Transp. Res. A Policy Pract. 101, 190–202.

Lättman, K., Friman, M., Olsson, L.E., 2016a. Perceived accessibility of public transport as a potential indicator of social inclusion. Social Inclusion 4 (3), 36–45.

Lättman, K., Olsson, L.E., Friman, M., 2016b. Development and test of the perceived accessibility scale (PAC) in public transport. J. Transp. Geogr. 54, 257–263.

Lättman, K., Olsson, L.E., Friman, M., 2018. A new approach to accessibility–Examining perceived accessibility in contrast to objectively measured accessibility in daily travel. Res. Transp. Econ. 69, 501–511.

Lättman, K., Olsson, L.E., Friman, M., Fujii, S., 2019. Perceived accessibility, satisfaction with daily travel, and life satisfaction among the elderly. Int. J. Environ. Res. Public Health 16 (22), 4498.

Lim, S., Wong, W.C., Wu, Z.X., Tan, C.S., 2020. The impact of perceived accessibility to MRT service and perceived neighborhood safety on quality of life: a study in Malaysia. Asia Pac. Soc. Sci. Rev. 20 (4), 10.

Liu, M., Zhao, S., Li, J., 2022. Associations among perceived built environment, attitudes, walking behavior, and physical and mental state of college students during COVID-19. Travel Behav. Soc. 28, 170–180.

Liu, Q., An, Z., Liu, Y., Ying, W., Zhao, P., 2021. Smartphone-based services, perceived accessibility, and transport inequity during the COVID-19 pandemic: a cross-lagged panel study. Transp. Res. Part D: Transp. Environ. 97, 102941.

Lukina, A.V., Sidorchuk, R.R., Mkhitaryan, S.V., Skorobogatykh, I.I., Musatova, Z.B., 2023. A new combined model for assessing the perceived accessibility of public transport by consumers in the Megapolis. Emerging Science Journal 7 (6), 2239–2259.

Mehdizadeh, M., Kroesen, M., 2025. Does perceived accessibility affect travel behavior or vice versa? Alternative theories testing bidirectional effects and (in) consistency over time. Transp. Res. A Policy Pract. 191, 104318.

Mehdizadeh, M., Kroesen, M., De Vos, J., 2025. Perceived accessibility and life satisfaction: the mediating role of activity participation? Transp. Res. Part D: Transp. Environ. 146, 104848.
Moleman, M.L. (2025). Perceived accessibility revisited: A perspective on change [Master's thesis, Delft University of Technology]. https://resolver.tudelft.nl/uuid:fc64220a-d35b-45aa-b9a0-9d24b51613fe.
Moleman, M.L., Kroesen, M., 2025. Revealing accessibility disparities: a latent class analysis linking objective and subjective accessibility measures. Transportation Research Part a: Policy and Practice 192, 104341.
Morris, J.M., Dumble, P.L., Wigan, M.R., 1979. Accessibility indicators for transport planning. Transportation Research Part a: General 13 (2), 91–109.
Muthén, B., Muthén, L.K., 2010. Mplus User's Guide, 6th ed. Muthén & Muthén, Los Angeles, CA.
Negm, H., El-Geneidy, A., 2025. Subjectivity matters: investigating the relationship between perceived accessibility and travel behaviour. Transportation Research Part a: Policy and Practice 193, 104399.
Negm, H., De Vos, J., Pot, F., El-Geneidy, A., 2025. Perceived accessibility: a literature review. Journal of Transport Geography 125, 104212.
Nguyen-Phuoc, D.Q., Pham, S.T., Nguyen, T.P.T., Su, D.N., Luu, T.T., Oviedo-Trespalacios, O., 2025. Exploring the switch to urban train services: the impact of perceived accessibility and its moderating effects. Transportation Research Part a: Policy and Practice 191, 104320.
Olfindo, R., 2021. Transport accessibility, residential satisfaction, and moving intention in a context of limited travel mode choice. Transportation Research Part a: Policy and Practice 145, 153–166.
Olsson, L.E., Friman, M., Lättman, K., 2021. Accessibility barriers and perceived accessibility: Implications for public transport. Urban Science 5 (3), 63.
Pot, F.J., van Wee, B., Tillema, T., 2021. Perceived accessibility: what it is and why it differs from calculated accessibility measures based on spatial data. Journal of Transport Geography 94, 103090.
Pot, F.J., Koster, S., Tillema, T., 2023. Perceived accessibility in dutch rural areas: Bridging the gap with accessibility based on spatial data. Transport Policy 138, 170–184.
Pot, F.J., Heinen, E., Tillema, T., 2024. Sufficient access? activity participation, perceived accessibility and transport-related social exclusion across spatial contexts. Transportation 52 (4), 1679–1707.
Pot, F.J., 2025. Perceived accessibility and transport equity: does satisfaction imply perceived sufficiency of opportunities? Transportation Research Part a: Policy and Practice 198, 104497.
Scheepers, C.E., Wendel-Vos, G.C.W., Van Kempen, E., De Hollander, E., Wijnen, V., Maas, H.J., Den Hertog, F.R.J., Staatsen, B.A.M., Stipdonk, H.I., Int Panis, L.L.R., Van Wesemael, P.J.V., Schuit, A.J., 2016. Perceived accessibility is an important factor in transport choice—Results from the AVENUE project. Journal of Transport & Health 3 (1), 96–106.
Shao, R., Derudder, B., Yang, Y., 2022. Metro accessibility and space-time flexibility of shopping travel: a propensity score matching analysis. Sustainable Cities and Society 87, 104204.
Sen, A., 1988. Freedom of choice: concept and content. European Economic Review 32 (2–3), 269–294.
Sheng, L., Zhang, L., 2022. Understanding the determinants for predicting citizens' travel mode change from private cars to public transport in China. Front. Psychol. 13, 1007949.
Sukwadi, R., Cory, S., Liang, Y.C., 2022. The study of travel satisfaction in MRT Jakarta during the pandemic of covid-19. Geo Journal of Tourism and Geosites 40 (1), 191–199.
Tanimoto, R., Hanibuchi, T., 2021. Associations between the sense of accessibility, accessibility to specific destinations, and personal factors: a cross-sectional study in Sendai. Japan. Transportation Research Interdisciplinary Perspectives 12, 100491.
Vafeiadis, E., Elldér, E., 2024. Correlates of perceived accessibility across transport modes and trip purposes: Insights from a swedish survey. Transportation Research Part a: Policy and Practice 186, 104147.
Van der Vlugt, A.L., Curl, A., Scheiner, J., 2022. The influence of travel attitudes on perceived walking accessibility and walking behaviour. Travel Behaviour and Society 27, 47–56.
Van der Vlugt, A., Lättman, K., Welsch, J., Prichard, E., Otsuka, N., De Vos, J., 2025. Analysing the determinants of perceived walkability, and its effects on walking. Transportation Research Part A: Policy and Practice 197, 104498.
Wang, Z., Ma, Y., Qin, Z., Ye, Q., Xu, Z., Han, L., Jia, P., Xu, F., 2019. Association between perceived access to public transport stops and physical activity among adults in Nanjing, Mainland China: a cross-sectional study. Journal of Transport & Health 13, 12–18.
Watthanaklang, D., Jomnonkwao, S., Champahom, T., Wisutwattanasak, P., 2024. Exploring accessibility and service quality perceptions on local public transportation in Thailand. Case Studies on Transport Policy 15, 101144.
Zhang, Y., Hu, X., 2024. The nonlinear impact of cycling environment on bicycle distance: a perspective combining objective and perceptual dimensions. Journal of Transport and Land Use 17 (1), 241–267.
Zhu, L., Lucas, K., Hess, M., 2024. Understanding the relationship between perceived accessibility, housing and transport equity of different types of residents: a structural equation modelling approach. Transportation Research Part a: Policy and Practice 190, 104259.