Are Public Spaces Safe Enough to Participate?

Urban Design, Public Behaviour, and Women's Perceptions of Safety and Activity Participation

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A MASTER'S THESIS ON PERCEIVED SAFETY AND ACTIVITY PARTICIPATION OF WOMEN IN AMSTERDAM RESULTING FROM CAR-RESTRICTING POLICIES THROUGH URBAN DESIGN.

Front cover illustration: Bojana Palifrovska, 2024

Preface

It is with sincere pride that I present my master's thesis "*Are Public Spaces Safe Enough to Participate?"* – A qualitative study on the influence of urban design and public behaviour on women's perceptions of safety and accessibility.

This thesis was written as part of the master's programme *Urban & Economic Geography* at *Utrecht University*. In both my previous education and during this Master's program, I have had little to no experience with qualitative research methods. In order to develop the associated academic skills, I chose to conduct a qualitative study for this thesis. During my research, I discovered many new and interesting insights about how women experience public spaces. However, my greatest personal achievement was gaining a glimpse into the resilience of women as they stand up against gender inequalities in the public realm. I also gained many valuable insights into conducting research and critical reflection.

The research process was not always easy, both in terms of content and on a personal level. But I could always count on the help of my thesis supervisor, Dea van Lierop. I would therefore like to thank her for her active involvement and constructive feedback. Thanks in part to her, I succeeded in mastering this new qualitative research method during this challenging yet educational period.

I would also like to thank all the women who were willing to share their honest opinions and personal experiences in support of this research. These experiences are the core of what makes this study so relevant. In addition, I would like to thank my fellow students who helped me with writing and motivation over the past period. Thanks to them, the past six months was a memorable time where lasting friendships were formed and strengthened.

For now, I wish you enjoyable reading, and I hope that this research, even if only slightly, makes you reflect on gender inequalities in public space.

For any questions and/or comments, you can reach me by sending me an email at the following email address: b.krijger2@students.uu.nl

Bram Krijger
Utrecht, 27-06-2025

Abstract

As cities aim to become more sustainable and liveable, car-restricting policies through urban design transformations are increasingly implemented in the urban landscape. However, the influence of these design changes extends beyond just liveability and sustainability. They also influence social dynamics, particularly regarding perceptions of safety and accessibility in public spaces. These changes in social dynamics may disproportionately impact women in historically gendered public spaces. This thesis examines how urban design and behavioural changes in car-restricted zones in Amsterdam influence women's perceived safety and ability to participate in out-of-home activities. Thereby, this study aims to examine how urban redesign influences the gender gap in perceived safety and accessibility in public spaces, whether by reinforcing existing disparities or contributing to more inclusive, equitable public spaces. This influence is examined through the following research question: *"How do urban design changes in car-restricted zones in Amsterdam influence women's perceptions of safety and participation in out-of-home activities, both directly and indirectly through public behaviour, and how is this mediated by age and length of residence?"*

The relationship between urban design, public behaviour, and perceived safety and accessibility is theoretically shaped by competing theories. These theories underscore the impact of urban design elements, the presence of individuals in public spaces, and socially appropriate behaviour on perceived safety and, consequently, on accessibility. This study employs a deductive, qualitative case study approach to assess and compare these contradictory theories and concepts. Semi-structured interviews were conducted with eighteen women living in De Pijp and de Jordaan, two residential neighbourhoods that have undergone significant urban design changes. Afterwards, the empirical findings were used to assess the relevance of existing theories on perceived safety in the case of Amsterdam.

Findings reveal that although participants noticed changes in street design and increased pedestrian activity, these transformations had mixed effects on their perception of safety. While elements such as improved visibility, greenery, and reduced car presence enhanced feelings of comfort, issues such as overcrowding, ambiguous street layouts, and increased tourism sometimes diminished perceived safety. Altogether, the redesign of public spaces has resulted in diminished safety perceptions among women, reinforcing existing gendered safety inequalities. Despite these safety concerns, most women did not significantly reduce their activity participation, suggesting that coping mechanisms, place attachment, and mandatory trip needs play mediating roles.

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1. Introduction

More and more often, cities aim for better liveability and sustainability. However, ensuring that individual feel safe in the city remains a priority for urban planners and policymakers (Rossbach, 2024). Feeling safety is not merely a matter of crime rates but also a subjective experience that depends on how individuals perceive public spaces (Sørensen & Mosslemi, 2009). Public spaces are becoming increasingly more appealing. However, the question remains: do residents, particularly women, feel safe in these public, urban environments?

Recent national and local studies show striking gendered disparities in safety perceptions. In the Netherlands, 44% of women report feeling unsafe in public spaces at some point. While among men, these numbers are 'only' 25% (Meesterberends, 2024; Akkermans, Derksen, Kennis, Kloosterman & Moons, 2024). In Amsterdam, this difference is even bigger: 59% of women feel unsafe in public areas, compared to 28% of men (Van der Beek & Rubingh, 2023). These figures highlight the gendered nature of safety perceptions, which are shaped by both physical design and sociocultural elements.

In response, the City of Amsterdam has launched several initiatives to improve perceived safety among women. The Seksuele Intimidatie en Seksueel Geweld (SISG) program addresses harassment in public space as part of the broader 'Orange the World' campaign (Gemeente Amsterdam, 2023c). Furthermore, Amsterdam is participating in the *Veilige Steden* programme, a national initiative which aims to enhance both the actual and perceived safety of women in public spaces (Veilige Steden, 2020).

Alongside these policies on safety, the municipality of Amsterdam is also actively implementing policies to enhance liveability and sustainability in the city. This involves the introduction of car-restricted zones with corresponding urban designs. Thereby, the municipality tries to reduce car dependency and promote active mobility. In neighbourhoods such as De Pijp and de Jordaan, spaces previously intended for cars are reduced and redesignated for active mobility, with increased space for pedestrians and cyclists (Gemeente Amsterdam, 2013; 2017b; 2021c).

While these policies are primarily intended as mobility and climate interventions, the subsequent urban design changes have broader social implications for, among others, safety and accessibility perceptions. These car-restricting policies and redesigned public spaces result in changes in public behaviour (Lindsey, Tikoudis, & Hassett, 2023). Therefore, urban design, both directly and through behaviour change, influences how people experience and use their environment, shaping their perceptions of comfort and safety in public spaces (Navarrete-Hernandez, Vetro, & Concha, 2021; Szarata, Nosal, Duda-Wiertel, & Franek, 2017).

These behavioural changes can, in some cases, increase social control and reduce crime rates, improving subjective safety (Szarata et al., 2017; Wright & Montezuma, 2004). However, since contemporary public spaces are often dominated by men, behavioural changes in these spaces often reinforce gender inequalities (Anneroth, Ferlander, & Jukkala, 2024). Existing literature consistently highlights that women generally feel less safe and more insecure in public spaces compared to men (Valentine, 1990; Navarrete-Hernandez, Vetro, & Concha, 2021).

Contemporary public spaces often do not account for women's safety needs enough, largely because urban spaces have often been constructed through male perspectives that often overlook gender-specific issues. (Navarrete-Hernandez et al., 2021). Physical design features, such as inadequate street lighting, isolated streets, and poor sightlines, can reinforce gender inequalities in perceived safety (Ceccato & Nalla, 2020). These issues are influenced by sociocultural factors, such as gender norms and societal narratives that position public space as risky for women (Condon, Lieber, & Maillochon, 2007). While behaviour changes in public areas can enhance perceptions of safety, they may simultaneously heighten discomfort or anxiety for women, particularly in the context of environments dominated by men (Wright & Montezuma, 2004).

In addition to the safety concerns, car-restricting policies could also lead to issues in gender inequalities regarding accessibility. Navarrete-Hernandez et al. (2021) state that women face restrictions in transportation options as a result of perceived insecurity. They are more likely than men to remain home because they feel that they don't have safe transportation options. Desolate or overcrowded public spaces are identified as stressful settings for many women, leading them to change their travel patterns to avoid these environments. Therefore, gender inequalities in activity participation can occur (Loukaitou-Sideris, 2009; Fink & Loukaitou-Sideris, 2009).

The influence of urban planning and public behaviour on women's perceived safety is increasingly acknowledged in existing literature. However, there remains uncertainty about which theoretical frameworks best explain gendered safety and accessibility concerns in contemporary urban contexts. Existing theories often present contradictory assumptions and findings about the impact of spatial design and behavioural dynamics, leading to conceptual ambiguity and inconsistent findings (Jacobs, 1961; Whitzman, 2007; Clarke, 2006; Newman, 1972). This theoretical fragmentation highlights a significant research gap: the need to assess the applicability and limitations of existing safety theories in contemporary gendered urban settings. To address this gap, the present study critically examines how various safety theories, such as Shared Space Theory (Clarke, 2006), Defensible Space Theory (Newman, 1971), and Eyes on the Street (Jacobs, 1961), align with the lived experiences of women in redesigned public spaces in Amsterdam. This comparison is especially relevant as public safety and accessibility have become key priorities for urban planners (Gemeente Amsterdam, 2021c; 2023b; 2023c).

To fully understand the potential benefits and drawbacks of urban design transformations for women, it is necessary to comprehensively examine how changes in the urban landscape may influence women's experiences of safety and ability to participate in out-of-home activities.

This study seeks this comprehensive and nuanced understanding by exploring the following research question:

"How do urban design changes in car-restricted zones in Amsterdam influence women's perceptions of safety and participation in out-of-home activities, both directly and indirectly through public behaviour, and how is this mediated by age and length of residence?"

Sub-questions:

How do women living in car-restricted zones in Amsterdam perceive changes in public behaviour and the use of public spaces since the introduction of urban design changes resulting from car-restricting policies?

How do changes in urban design, both directly and through public behaviour change, influence women's perceptions of social- and road safety in car-restricted zones in Amsterdam?

How do changes in urban design, both directly and through public behaviour change, influence women's perceived activity participation in car-restricted zones in Amsterdam?

By answering these research questions, this study contributes to urban and gender studies, since it aims to explain the intersection of urban design and gender inequalities through safety perceptions. By assessing different theories on the impact of urban design on women's perceived safety, this study aims to provide an insight into potential gendered imbalances resulting from sustainable urban planning. Thereby, this study contributes to a more inclusive urban planning approach.

Figure 1 depicts the relationship between car-restricting policies, urban design, perceived public behaviour change, perceived safety, and perceived accessibility that is examined in this study. By explaining the relationship between the elements presented in Figure 1, this study aims to develop a comprehensive understanding of how urban transformations in car-restricted zones influence women's safety and accessibility experiences of public spaces.

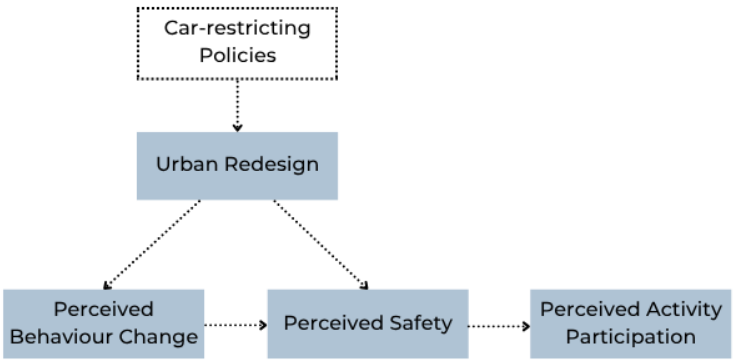

Figure 1: Research framework

2. Theoretical Framework

In this chapter, several theoretical concepts and theories on the influence of urban design and behaviour changes on subjective safety are examined. Accordingly, a theoretical framework is established to serve as the foundation for this study. Thereby, structured and comprehensive answers to the research questions can be obtained.

2.1 GENDERED PERCEPTIONS OF SAFETY IN PUBLIC SPACES

In this study, the concept of perceived safety is examined extensively. Perceived safety is the perception of how safe an individual feels in an environment, regardless of the actual level of risk. It is shaped by a combination of emotional responses, environmental cues, and social conditioning (Loukaitou-Sideris, 2006; Ceccato, 2017). Women in particular generally report significantly lower levels of perceived safety in public and traffic environments compared to men, a pattern linked not only to individual experiences but also to broader societal norms, urban design, and cultural expectations (Cordellieri, Baralla, Ferlazzo, Sgalla, Piccardi, & Giannini, 2016).

Individuals' perceived safety is inherently linked to a state of individual security. According to Kaufmann (1970). Security is a state of continuity, order, and, most importantly, inner harmony and balance (Kaufmann, 1970; Vornanen, Törrönen, & Niemelä, 2009). This sense of security is significantly influenced by external societal and environmental factors. When these external factors create instability, they enhance feelings of insecurity and vulnerability (Bal, Eriksen, & Salemink, 2010). These feelings of insecurity are stimulated in contexts of low social cohesion, lack of trust, and poorly maintained environments (Zani Cicognani and Albanesi, 2001; Ferretti, Pozza, & Coluccia, 2019). In urban settings, features such as dark alleyways, visual obstructions, loitering groups, or erratic traffic patterns contribute to a sense of disorder, increasing psychological discomfort and insecurity (Ferretti, Pozza, & Coluccia, 2019). When an individual's inner harmony and balance are disrupted by such factors, resulting in heightened levels of insecurity, individuals are more likely to experience a heightened perceived unsafety (Kokkonen, Athanasopoulou, Leino-Kilpi, Puukka, & Sakellari, 2023; Lu, Zhang, & Liu, 2018).

2.1.2 Public Spaces as Gendered Spaces

In this study, public spaces refer to open access areas, such as streets, sidewalks, and parks, where daily life, social interaction, and movement occur (Moravcová, Pecenka, Pekna, Moravcova, & Novakova, 2020).

Perceived safety in public spaces is intrinsically linked to the gendered nature of these spaces. The design of public spaces historically reflected male-centric perspectives in the design and use of the spaces, shaping access, behaviour, and control (Spain, 1993; Low, 2023). As a result, women's experiences in public spaces are often constrained by fear of harassment, surveillance, or violence (Vera-Gray & Kelly, 2020).

The men-centric design of public spaces plays an important role in the safety perceptions of women and their use of these spaces. Men-orientated urban spaces often overlook gendered

needs, such as clear sightlines and urban greenery, or comfort-enhancing elements such as benches or informal surveillance (Loukaitou-Sideris, 2014). Furthermore, men's visible exposure in public spaces and dominant use of the space, reflected in loitering. This can reinforce an unspoken dominance of men in public realms in urban environments (Navarrete-Hernandez et al., 2021; Spain, 2014; Low, 2023).

Women's experiences of public spaces are often shaped by safety concerns regarding the fear of gender-based violence (Dubey, Bailey, & Lee, 2025; Polko & Kimic, 2022). They are often more cautious and strategic about where and when they engage with these areas (Dubey, Bailey, & Lee, 2025). According to the vulnerability hypothesis (Baur, 2007), this dominance of men results in behavioural disparities. Women are socialised to anticipate harassment or violence in public spaces. They often oppose precautionary strategies, such as avoiding certain places, avoiding groups of men, or reducing visibility (Dubey, Bailey, & Lee, 2025; Baur, 2007). This results in an exclusionary cycle: women's access to public space becomes conditional, while men's access is assumed and uninterrupted. This confirms the notion of public space as a gendered space, constructed to favour safety and mobility by men (Vera-Gray & Kelly, 2020).

2.1.3 Gender Disparities in Road Safety Perceptions

Beyond social safety, women also experience relatively high levels of insecurity in traffic. In this study, road safety refers to the subjective experience of being safe in traffic, on roads, sidewalks and shared spaces.

Women report relatively low comfort levels in traffic situations compared to men (Kaparias, Michael, Bell, Miri, Chan, and Mount, 2012; Cui, Zhang, Yang, Huang, & Chen, 2023). This safety disparity could result from the fact that women are more likely to respond more intuitively to danger, while men generally evaluate risks analytically and with less emotional sensitivity. In the context of road safety, this means that women generally perceive unusual and chaotic traffic as more dangerous than men (Zhu & Ma, 2024; Peng & Ruosong, 2020).

Kaparias et al. (2012) further explain that women are significantly more likely to feel unsafe in chaotic and ambiguous road conditions. This includes so-called 'shared spaces', street designs with little separations between cars, cyclists, and pedestrians. Although these spaces are intended to create equality through interactions among road users, they often lead to perceptions of uncertainty and discomfort for women (Kaparias et al., 2012; Pyrialakou, Gkartzonikas, Gatlin, & Gkritza, 2020).

Furthermore, cultural socialisation also plays a role in gender disparities in road safety. From a young age, women are taught to be cautious in public spaces, particularly in traffic-dense environments. This conditioning often results in very careful behaviour and potentially avoidance (Valentine, 1989; Cordellieri et al., 2016). These gendered perceptions ultimately influence mobility choices and can lead to the avoidance of certain places or modes of transport (Kujala, 2022).

2.2 THE INFLUENCE OF URBAN DESIGN ON PUBLIC BEHAVIOUR

Car-restricting policies often impact public space design by, for instance, narrowing car lanes, which allows for wider sidewalks and cycling lanes (Vasilev, Pritchard, & Jonsson, 2018; Rye & Hrelja, 2020). To discourage car use, parking spaces in residential areas are replaced with urban greenery, street furniture, and expanded active mobility lanes (Rye & Hrelja, 2020).

Gehl (2010) argues that street design greatly influences public space use; prioritising pedestrians through wider sidewalks, reduced car access, and removed parking spaces makes urban areas more attractive for walking, lingering, and socialising. These interventions lead to a substantial increase in individuals using public spaces and the time spent in these spaces (Gehl, 2010; Gerike et al., 2021).

Hassen and Kaufman (2016) add that a human-centric design approach leads to the fact that public streets turn into destinations rather than just transit routes. This design approach encourages individuals to stay longer in public spaces, thereby it fosters social interaction. However, this is moderated by situational and environmental factors. For example, the relationship is more pronounced in dense residential neighbourhoods than in commercial or entertainment districts (Hassen & Kaufman, 2016). Additionally, Gehl (2011) and Chuang and Chen (2024) note that a pedestrian-centric urban design encourages activities such as outdoor dining and informal gatherings, transforming spaces from transit spaces to spaces of destination. This significantly influences the time spent in public spaces and the way individuals behave in the public realm (Gehl, 1971; Chuang & Chen, 2024; Rhoads et al., 2023). In addition, urban design, influenced by car-restricting policies, also shapes travel behaviour, particularly transportation mode choice. Wider sidewalks and cycling lanes lead to an increase in walking and cycling while reducing car use (Vasilev, Pritchard, & Jonsson, 2018; Blitz, Busch-Geertsema, & Lanzendorf, 2020).

Car-restricting policies influence behaviour not only through urban design but also by direct measures such as car-free streets, speed limits, and higher driving and parking costs. These interventions often lead to a reduction in car travel and a corresponding increase in the use of alternative modes of transportation (Xiao, Sinclair, Saunders, & Panter, 2023; Teo & Odoni, 2012).

However, according to Pokharel, Miller, and Chapple (2023), car-restricting policies do not always produce the intended effects on travel behaviour. Sometimes, they result in policy resistance, where drivers try to find alternative routes or adopt new strategies to maintain their car usage. This can lead to unwanted or antisocial behaviour by car drivers in areas designed for low car usage. This may lead to clutter, overcrowding, and irritations (Pokharel, Miller, and Chapple, 2023).

2.3 THE INFLUENCE OF URBAN DESIGN ON PERCEIVED SAFETY

According to several studies, car-restricting policies through urban design significantly impact perceived safety through visibility and open sightlines, urban greenery, and visible disorder and maintenance (Barker, Warrington Brown, Forman, McClean, & Walker, 2023; Kelling &

Wilson, 1982; Dubey, Bailey, & Lee, 2025; Anciaes & Jones, 2022). The influence of all these elements of urban design is examined in the following paragraph.

2.3.1 Open Sightlines, Visibility, and Perceived Safety

Contemporary literature shows that the perceived safety of women in public spaces is strongly dependent on the visibility of the space. In this study, visibility refers to the degree of openness of a space that influences how easily individuals can oversee the space and to the ability to navigate oneself, to know where one is and where to go and where others are and go (Milanović, 2020; Tara, 2015; Jansson, 2019). Factors that influence the visibility of a space are the design of street networks, the design and placement of view-obstructing elements, the possibility to get an overview of the space, and the visibility of individuals (Uittenbogaard, Ahlskog, & Grönlund, 2018; Jansson, 2019).

Well-visible spaces allow users to easily orient themselves and identify potential risks, thereby reducing perceived unsafety. Designing spaces as open spaces with little obstacles enhances natural surveillance by enabling individuals to oversee their surroundings effectively. Therefore, design elements promoting visibility and open sightlines contribute to increased feelings of safety and security among users (Kaushal, 2024; Chen, Lin, Yao, & Zhou, 2024).

2.3.2 Urban Greenery and Perceived Safety

Another influential element for perceived safety is the presence of eye-visible urban greenery. This study focuses solely on greenery in the streets of residential areas when examining urban greenery. Research by Li, Li, and Zhang (2015) presented a significant correlation between eye-visible greenery and perceived safety in public spaces. Additionally, Nordh, Aamodt, and Nordbø (2024) even conclude that access to greenery in residential areas increases safety perceptions, both direct and indirect. There is a direct correlation between the presence of greenery in a neighbourhood and perceived safety by residents. Additionally, greenery positively influences perceived safety through increased satisfaction of the neighbourhood and increased place attachment (Nordh, Aamodt, & Nordbø, 2024; Zhang, Van Dijk, Tang, & van den Berg, 2015).

Contradictingly, studies also show a negative relationship between urban greenery and perceived safety. The presence of urban greenery may lead to a decrease in visibility since they act as view obstructers. The presence of green spaces on streets and sidewalks in residential areas often results in an increase in enclosure. Dense green spaces can obstruct visibility, thereby reducing feelings of safety (Baran, Tabrizian, Zhai, Smith, & Floyd, 2018; Zhao & Huang, 2021). In conclusion, the presence of greenery in residential urban areas can both lead to an increase and a decrease in perceived safety.

2.3.3 Street Design and Perceived Safety

The third element of urban design that significantly impacts public space users' perceived safety is street layout, particularly the width of sidewalks and bicycle lanes (Von Stülpnagel & Binnig, 2022; Šemrov, Rijavec, & Lipar, 2022). Wider bicycle lanes notably improve cyclists' perceived safety, especially when these lanes are not clearly separated from the street. Šemrov,

Rijavec, and Lipar (2022) argue that increased lane width reduces the frequency and intensity of interactions of cyclists with motorised vehicles, which in turn enhances cyclists' subjective safety. Similarly, Gössling and McRae (2022) indicate that even in the absence of physical barriers or visual differentiation, lane width alone positively correlates with perceived safety. Wider lanes provide cyclists with greater manoeuvring space and reduce stress associated with proximity to motorised traffic (Šemrov, Rijavec, & Lipar, 2022; Gössling & McRae, 2022). Furthermore, according to Schramm and Rakotonirainy (2009), wider lanes generally provide more space for cyclists and motor vehicles to coexist safely. This additional space leads to safer overtaking and reduces close passing incidents, which often lead to accidents and conflicts between cyclists and other road users.

The relationship between street design and safety perception regarding sidewalks is a little more complex. At smaller, low-traffic streets, sidewalk width is a key factor for pedestrian safety and walkability. Wider sidewalks were strongly associated with higher walkability scores, as they allowed for smoother pedestrian movement and reduced conflicts with obstacles or other users. Narrow sidewalks often forced pedestrians into the roadway, especially in high-traffic areas, increasing both perceived and actual safety risks (Lee, Jang, Wang, & Namgung, 2009; Shaaban, 2019). However, a study by Kim, Choi, Choi, Ahn, and Hwang (2024) shows that the relationship between sidewalk width and perceived safety is different for a more traffic-heavy street. While extremely narrow sidewalks negatively impact safety perception due to limited space and increased proximity to vehicular traffic, excessively wide sidewalks in high-traffic areas may also diminish perceived safety (Kim, Choi, Choi, Ahn, & Hwang, 2024). In conclusion, both bicycle lane width and sidewalk width are generally related to perceived safety by public space users.

2.3.4 Broken Windows Theory and Perceived Safety

In addition to the actual spatial design of public spaces, the maintenance of these spaces also plays a crucial role in enhancing perceptions of safety of their users. A study by Rashid, Wahab, Rani, & Ismael (2017) found that poor maintenance indicators, such as litter, graffiti, and inadequate lighting, were strongly associated with feelings of unsafety.

In extension of this, Kelling and Wilson (1982) introduced the 'Broken Windows Theory', which explains how physical deprivation, such as graffiti and trash, may lead to a decrease in perceived safety. When individuals live in an environment that looks neglected, they are more likely to feel unsafe and withdraw from that space, which can lead to a vicious cycle of further decay and increased crime (Kelling & Wilson, 1982; Ortigueira-Sánchez, 2017). Additionally, individuals generally behave more civilly when they navigate clean and orderly areas, while being more likely to engage in antisocial or criminal behaviour when in areas with visible disorders, since they feel less social control (Kelling & Wilson, 1982; Weisburd, Uding, Hinkle, & Kuen, 2024).

Another element of the Broken Windows Theory is the maintenance of public spaces, and its influence on perceived safety. When a space is poorly maintained, this is a cue for potential inattention or abandonment of the space. This, in turn, can lead to an increased perception of danger (Zeng, Dong, Yan, & Lin, 2023). Furthermore, Hur and Nasar (2014) explain that signs

of neglect can increase fear of crime and make individuals feel vulnerable in the space. They explain that neglect can indicate the presence of malicious individuals. Thus, physical deprivation and poor maintenance of public spaces often increase perceived unsafety.

2.4 THE INFLUENCE OF PUBLIC BEHAVIOUR ON PERCEIVED SAFETY

Car-restricting policies do not only influence perceived safety directly through urban design, but also through behaviour changes in the public realm (Nieuwenhuijsen & Khreis, 2016; Szarata, Nosal, Duda-Wiertel, & Franek, 2017). As mentioned before, urban design and car-restricting policies significantly impact individuals' behaviour in public spaces. (Gehl, 2010; Hassen and Kaufman, 2016). This impact of behaviour changes on safety perceptions is examined in the following sections.

2.4.1 The Presence of Cars and Perceived Safety

Before examining the influence of public behaviour on perceived safety. It is important to explain how the reduced presence of cars, resulting from car-restricting policies and changes in urban design, influences the perceived safety of public space users.

Research indicates that environments with a high presence of motorised vehicles can undermine pedestrians' sense of safety, particularly among vulnerable groups. Appleyard (1981) demonstrated that higher traffic volumes in residential areas are associated with reduced social interaction and increased perceptions of danger among residents. More recent studies support these findings, suggesting that streets with heavy or fast-moving traffic contribute to a heightened sense of vulnerability, discourage active transportation such as walking or cycling, and reduce overall neighbourhood cohesion (Hedin, 2021). The visual and auditory presence of cars can contribute to a heightened sense of vulnerability, discourage social interaction, and reduce the overall perceived quality of the urban environment (Appleyard, 1981; Palermo, 2024).

Conversely, reducing car traffic in residential urban environments has been consistently shown to improve individuals' perceived safety in public spaces. The sheer reduction in the number of motorised vehicles lowers the sense of risk among pedestrians and cyclists, as fewer cars translate directly to a perceived decreased likelihood of collisions and unwanted encounters (Llinares, Higuera-Trujillo, Montañana, & Castilla, 2020; Sabi Boun et al., 2024). According to Hans Monderman, perceived safety is enhanced through 'shared spaces' where a uniform street design leads to a more equal interaction between different road users (Clarke, 2006). This concept is further explained in chapter 2.3.2.

2.4.2 Defensible Space Theory vs. Shared Space Theory

According to the Shared Space Theory, removing clear distinctions between infrastructural lanes, such as sidewalks, cycling lanes, and car lanes, can enhance safety perceptions. In these barrier-free environments, users are encouraged to engage more directly with their surroundings. They are forced to adjust their movement through social cues instead of formal traffic controls (Batista & Friedrich, 2022). This design approach, constructed by Hans Monderman, argues that a lack of visual and physical boundaries increases users' alertness and

encourages more cautious, context-aware behaviour. Monderman proposed that when individuals cannot rely on signals or kerbs, they are more likely to make eye contact, reduce their speed, and behave cooperatively, which can contribute to a heightened sense of mutual responsibility and, consequently, a greater perception of safety (Clarke, 2006). Furthermore, a uniform street layout results in a heightened sense of control by cyclists and pedestrians. Additionally, they generally perceive the space as less car-dominated and more equal, fostering perceived safety. (Clarke, 2006; Lee & Kim, 2021).

However, social interaction in shared spaces is not always experienced positively. When users do not correctly interpret each other's intentions, such as pedestrians, cyclists, and drivers manoeuvring through the same undivided space, this can lead to irritation, miscommunication, and conflict, reducing perceived safety (Gkekas, Bigazzi, & Gill, 2020). Furthermore, empirical findings suggest that shared spaces generally cause a higher number of minor accidents and user conflicts than more clearly demarcated spaces. This could lead to increased perceptions of unsafety, as individuals often experience safety as the absence of fear of conflict or accident (Navarrete et al., 2021; Borker, 2025).

In contrast to the Shared Space Theory, Oscar Newman's 'Defensible Space Theory' argues that clearly defined and structured public spaces enhance both objective and subjective safety (Newman, 1972; Newman, 1998; Reynald & Elffers, 2017). According to this theory, crime and disorder can be prevented by increasing the opportunities for residents to control and oversee their environment while reducing environmental features that may attract offenders. Newman posits that defensible space is established through environmental design based on three main components: territoriality, natural surveillance, and image (Newman, 1998; Reynald & Elffers, 2017).

Territoriality refers to the sense of ownership or control over a space. Individuals generally feel more responsible for maintaining order and safety in areas they perceive as theirs, whether these are permanent residential zones or temporarily claimed public spaces (Newman, 1998; Reynald & Elffers, 2017; Donnelly, 2010). This concept is reflected in the way users behave differently in lanes with distinct purposes. For example, when sidewalks, bicycle lanes, and streets are clearly separated and visibly marked, users generally adjust their behaviour accordingly, leading to safer interactions (Mertens et al., 2016). This behavioural adjustment, in turn, enhances the effectiveness of natural surveillance, where individuals feel observed and thus are less likely to engage in unsafe or antisocial behaviour (Mason, Kearns, & Livingston, 2013).

Furthermore, the concept of Defensible Space emphasises the importance of clearly defined spatial boundaries to enhance environmental legibility and perceptual clarity. Spaces with visible separations between spaces with different purposes, through design elements such as fencing, landscaping, pavement textures, or height differences, create a more comprehensible and structured environment. This spatial structuring fosters clarity, making it easier for individuals to interpret their surroundings and determine appropriate behaviour by other public space users (Cozens, Saville, & Hillier, 2005; Cozens & Love, 2015).

In conclusion, urban design and the degree to which different purposive lanes are distinguished or integrated can have varying effects on perceived safety. While the Shared Space Theory highlights the benefits of informal, interaction-driven environments in fostering caution and attentiveness, the Defensible Space Theory emphasises the importance of structured, visually delineated spaces in promoting user responsibility, surveillance, and clarity.

2.4.3 Eyes on the Streets Theory

One of the most influential theories linking public behaviour to perceived safety is Jane Jacobs' (1961) Eyes on the Street theory. Jacobs argues that safety in public spaces depends on the constant, informal observation by others. The presence of active, engaged individuals in public areas creates a form of natural surveillance, which discourages deviant behaviour and reinforces social norms. (Jacobs, 1961; Sueur, Piermattéo, & Pelé, 2023). This is supported by a study by Milias, Sharifi, Noorian, Bozzon, and Psyllidis (2023), who explain that perceived safety is strongly correlated to human activity in public spaces.

Urban design plays a central role in this mechanism. Features such as widened sidewalks, street furniture, greenery, and reduced car dominance encourage people to walk, linger, and interact in public spaces, ultimately making the spaces feel safer (Milias et al., 2023; Rinaldi, Viviani, & Busciantella-Ricci, 2025; Ragheb & Faragallah, 2025). In this sense, urban design shapes safety indirectly by increasing visible human presence.

Complementing the Eyes on the Streets Theory, the Routine Activity Theory (Cohen & Felson, 1979, 2010) introduces a three-part model to explain deviant behaviour and the perception of it: a motivated offender, a suitable target, and the absence of capable guardians. In urban settings, "guardians" often refer to other users of public spaces, whose presence acts as a form of informal control. This mechanism suggests that populated, well-used streets reduce the probability of crime and thereby increase perceived safety (Miro, 2014).

2.4.4 Critical Reflections on the Eyes on the Streets Theory

As aforementioned, the increased presence of others in public spaces can lead to an increased perception of safety. However, according to several studies, the relationship between pedestrian density and perceived safety is more complex (Whitzman, 2007; Tchinda & Kim, 2020; Bartonek, 2023). The increased presence of individuals in public spaces can lead to an increased fear of crime and decreased perceived safety of women. Primarily because they experience an increased probability of the occurrence of an unwanted situation. When public spaces are not designed adequately, a crowded public space can lead to a worsened perceived safety (Whitzman, 2007; Tandogan & Ilhan, 2016). According to Ismawati, Hutahaean, and Fahrudin (2023), women feel more vulnerable in crowded public spaces and public transit because so-called microaggressions and sexual violence are more likely to happen in crowded spaces.

Additionally, in crowded public spaces, perceived density can contribute to deindividuation, a psychological state in which individuals feel less identifiable and thus more anonymous (Lin, 2020). This phenomenon has been linked to an increase in deviant behaviours, such as vandalism and littering, as individuals experience a reduced sense of personal accountability

(Neuts, Nijkamp, & Van Leeuwen, 2012). The 'Social Identity Model of Deindividuation Effects' further supports this by suggesting that anonymity within large groups can lead to greater conformity to group norms, which may include undesirable behaviours (Reicher, Spears, & Postmes, 1995; Spears, 2021). While an increased presence of individuals in public spaces can sometimes enhance perceived safety through natural surveillance, overcrowding and anonymity in crowds can lead to a heightened perceived unsafety among women. Deindividuation effects, the likelihood of microaggression, and the challenge of navigating escape routes all contribute to this perceived unsafety (Loukaitou-Sideris & Fink, 2009; Ceccato, 2017; Reicher, Spears, & Postmes, 1995; Spears, 2021).

The perception of overcrowding in car-restricted areas is enhanced by the influx of tourists in an area, particularly in touristy areas. The distribution of tourists in a touristy area is influenced by street design. While pedestrian-friendly areas attract tourists, wide sidewalks and open urban spaces are important determinants of where tourists will concentrate (Patandianan & Shibusawa, 2020; Hassanshahi, Soltani, Roosta, & Askari, 2023). Furthermore, well-designed street furniture, urban greenery, and adequate street lighting all increase the influx of tourists to a specific area (Patandianan & Shibusawa, 2020; Hassanshahi, Soltani, Roosta, & Askari, 2023). The influx of these tourists can, according to existing literature, both enhance and diminish perceived safety through social control and overcrowding (Milias et al., 2023; Spears, 2021). In addition to general theories on human activity in public spaces and perceived safety, tourists have a unique influence on the perceived safety of residents. An increase in tourist activities can lead to a higher incidence of crime, which can reduce the perception of safety among both residents and visitors (Mawby, Tecău, Constantin, Chițu, & Tescașiu, 2016; Lisowska, 2017). However, other studies find a significant influence of increased tourism and worsened safety perceptions of locals (Mawby, Tecău, Constantin, Chițu, & Tescașiu, 2016; Thyne, Watkins, & Yoshida, 2018).

Another critique on the Eyes on the Streets Theory is the idea that social control in a neighbourhood only positively influences perceived safety when the social control is enhanced through interaction with other residents. According to Su, Spierings, and Hooimeijer (2023), an increase in individuals does not necessarily lead to a better perceived safety through social interactions. The social interactions in public space only increase the perception of safety when they are between fellow residents. The social distancing between residents and tourists results in less desirable interactions between these groups (Su, Spierings, and Hooimeijer, 2023).

2.5 PERCEIVED ACCESSIBILITY AND ACTIVITY PARTICIPATION

In this study, perceived accessibility, also referred to as activity participation, is the extent to which individuals feel restricted or encouraged to engage in out-of-home activities, such as work, education, social visits, and recreation. It is a subjective experience shaped by personal, social, and environmental conditions (Lättman, Friman, & Olsson, 2016; Pot, Heinen, & Tillema, 2024).

Issues regarding perceived accessibility are relevant for groups who often face non-visible and societal barriers in mobility, such as women. Women's ability to participate in economic, educational, and social life is highly dependent on their accessibility. Thus, perceived

accessibility is not only about mobility but also about autonomy and social and economic inclusion (Pot, Heinen, & Tillema, 2024).

Factors like fear of harassment, lack of social trust, or the need to alter behaviour in public spaces can significantly constrain an individual's perceived ability to move freely. For many women, discomfort or insecurity can lead to avoidance, route changes, or restrictions in time or mode of travel. (Curl et al., 2016).

2.5.1 Perceived Accessibility through Perceived Safety and Urban Design

Contemporary literature (Dobbs, 2005; Kalter, Harms, & Jorritsma, 2010; Olivieri & Fageda, 2021) suggests that women generally experience and use public spaces in different ways than men. Despite increasing car use among women, they remain more reliant on active modes of transport, resulting in a greater reliance on perceived accessibility in public spaces (Olivieri & Fageda, 2021). However, both road safety and social safety concerns form a major psychological barrier for women to use public spaces and participate in out-of-home activities (Borker, 2025). Inadequate urban design, such as poorly lit streets, narrow sidewalks, or unprotected crossings, reinforces vulnerability and discourages mobility by women in public spaces (Noor & Iamtrakul, 2023; Borker, 2025). In addition, verbal harassment, unwanted attention, and fear of assault, potentially resulting from a lack of surveillance, contribute to perceptions of unsafety in public spaces (Peters, 2013; Buliung & Laliberté, 2019; Lynch & Atkins, 1988; Loukaitou-Sideris, 2014; Lino & Kanashiro, 2024). As a result, women alter their mobility patterns; taking detours to avoid specific areas or even completely refraining from using public spaces at certain times. Therefore, at a personal level, women may experience restricted access to amenities and social relationships (Vanier & d'Arbois de Jubainville, 2017; Kwan, 1999; Useche, Colomer, Alonso, & Faus, 2024). At the societal level, these mobility limitations reinforce structural gender inequalities, particularly in terms of labour participation and urban inclusion (Keane, 1998; Borker, 2021). In this regard, inadequately designed public spaces and the subsequent behaviour change can create significant obstacles for activity participation due to an increased sense of unsafety (Lättman, Friman, & Olsson, 2016; Lättman, Olsson, & Friman, 2024; Jamei, Chan, Chau, Gaisie, & Lättman, 2022).

Therefore, perceived accessibility refers to whether individuals feel safe while using or moving through public spaces. A street may be technically accessible, yet still be perceived as inaccessible due to fear or unpredictability (Lättman et al., 2016; Jamei et al., 2022). This is especially relevant in urban environments with ambiguous spatial layouts. Shared spaces often intensify feelings of uncertainty and reduce perceived control, particularly for women (Gkekas et al., 2020; Hamilton-Baillie, 2008). In addition to this, the presence of wide, unobstructed sidewalks and well-maintained pedestrian infrastructure all increase the sense of physical accessibility through enhanced perceived safety (Sundling & Jakobsson, 2023; Von Stülpnagel & Binnig, 2022).

2.6 MEDIATING FACTORS: AGE AND LENGTH OF RESIDENCE

Perceived safety in public space is shaped not only by urban design but also by personal and temporal factors. Two important mediators for the influence of urban design on perceived safety and accessibility are age and length of residence. These variables influence how individuals experience their urban environment and therefore their safety and accessibility perceptions (Sharifian, Sol, Zahodne, & Antonucci, 2022; Doran & Burgess, 2011).

Older adults generally experience less social unsafety and distress from negative social interactions than younger individuals due to habituation and accumulated life experience. Research by Sharifian et al. (2022) and Löckenhoff & Carstensen (2004) show that older adults report fewer negative emotional responses to unwanted interactions, largely because selective engagement helps them minimise emotional impact. Similarly, Isaacowitz, Livingstone, and Castro (2017) find that older adults experience fewer negative emotions overall. While this positivity bias can enhance well-being in social contexts, it may also lead to underestimating risk, affecting subjective safety.

Similarly, length of residence is a significant mediator in the relationship between urban design and perceived safety. Longer-term residents typically report high and more stable perceptions of safety (Nasar & Fisher, 1993; Doran & Burgess, 2011). Familiarity with local routines and individuals helps distinguish between genuine danger and unexpected but harmless events. Repeated exposure also fosters habituation, which gradually lowers sensitivity to disorder or threat, even when objective risks remain (Gehr et al., 2020).

This is particularly relevant in the context of women's safety. Research by Valentine (1989) and Lewicka (2011) highlights how women develop routinised coping strategies that allow them to maintain mobility despite experiencing feelings of unsafety. These strategies consist of, for instance, avoiding specific areas at night, walking assertively, or carrying personal alarms. Over time, these strategies become embodied practices that reduce fear and enable participation in public life (Gray, Jackson & Farrall, 2011).

In summary, both age and length of residence mediate how urban environments are experienced regarding perceived safety and accessibility. Older individuals may experience lower feelings of unsafety due to improved emotion regulation, while long-term residents may become habituated to risk through familiarity and adaptation.

2.7 CONCEPTUAL FRAMEWORK

This theoretical framework can be summarised through the conceptual framework presented in figure 2. All lines presented in this model represent important relationships that explain the relationship between urban design and perceived safety and activity participation. The theoretical framework also consists of several theories and concepts that influence or explain the relationships presented in this model. A complete outline of all theories and concepts and their relevance to this study is presented in appendix 1

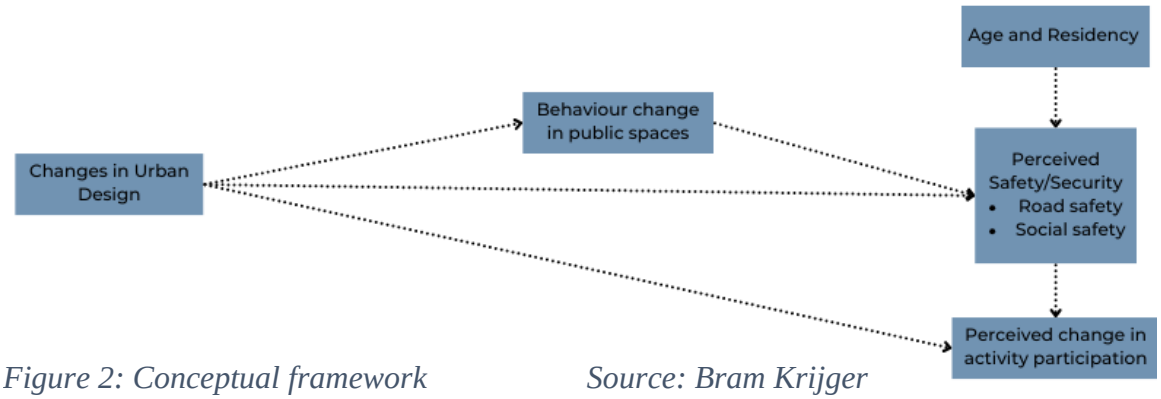

Figure 2: Conceptual framework *Source: Bram Krijger*

3. Methodology

To explore how design and behaviour changes in car-restricted zones in Amsterdam influence women's perceptions of safety and ability to participate in out-of-home activities, this study employs a qualitative research approach. Given the subjective nature of safety perceptions and accessibility experiences, a qualitative method allows for a deeper understanding of how women navigate and experience urban transformations and the subsequent behaviour changes (Bergdahl, 2019).

This chapter outlines the research design, data collection methods, and analytical techniques used to answer the research question. The study makes use of semi-structured interviews with women living in car-restricted neighbourhoods in Amsterdam. The results from the interviews are assessed and compared to contemporary literature and relevant policy documents afterwards in the discussion chapter.

3.1 RESEARCH DESIGN

The research strategy of this study is a 'case study', focusing on two selected neighbourhoods in Amsterdam that have experienced significant urban design changes, resulting from car-restricting policies. For this study, a case study approach is appropriate because it enables a detailed and in-depth examination of specific urban transformations and their impact on residents identifying as women (Bergdahl, 2019). Despite its limited generalisability, the case study approach remains valuable for uncovering gender-related issues within Amsterdam's progressive car-restricting context. By focusing on specific neighbourhoods and lived experiences, this method allows for a deeper understanding of how urban design interventions may differently impact women and highlights context-specific challenges that broader quantitative studies might overlook (Gemeente Amsterdam, 2021c; Bergdahl, 2019). The case study consists of two car-restricted residential neighbourhoods in Amsterdam: De Pijp and Jordaan. More in-depth assessments on the case study areas are presented in chapter 4.

This study adopts a qualitative research approach, as it seeks to explore the subjective experiences and perceptions of women regarding safety and accessibility in car-restricted zones in Amsterdam. Perceptions of safety and accessibility are inherently subjective experiences influenced by both social and environmental factors. A qualitative research approach is applied because it allows for an in-depth exploration of how individuals experience safety and accessibility in their urban environment (Lub & De Leeuw, 2017). Unlike quantitative surveys, which may provide generalisable but surface-level insights, qualitative case studies facilitate a deeper exploration of individual narratives, allowing for a richer and more contextualised understanding of the relationship between car-restricting policies through urban design and gendered experiences in public spaces (Lub & De Leeuw, 2017).

3.2 DATA COLLECTION

3.2.1 Population and Sample

The targeted research population for this study consists of adult women living in the two selected car-restricted zones in Amsterdam who have lived in these areas both before and after

the implementation of car-restricting policies. For De Pijp, this means that the women should live in the neighbourhood for at least six years, while women from de Jordaan should have a length of residence of at least eight years. The study focuses on perceptions and experiences of women over the age of eighteen. Therefore, only women are included in this study. To draw relevant conclusions from this study, women of different ages and with different lengths of residence are selected for this study.

To mitigate the influence of the cofounding factor 'length of residence' on the relationship between urban design and safety perceptions, a control group is constructed with women living in the selected neighbourhoods for less than two years. This control group is a comparative reference point for the influence of length of residence on the relationship between urban design and perceived safety. This allows for a more accurate interpretation of how urban design independently affects perceived safety.

3.2.2 Data Collection Method

The respondents for this study are selected with a purposive sampling method. A purposive sampling method is a non-random sampling technique where researchers select participants based on specific characteristics that align with the study's objectives. This method ensures that the study sample includes individuals who have relevant experiences, knowledge, or traits necessary to provide meaningful insights into the research topic (Campbell et al., 2020). Using this sampling method ensures that participants met the specific criteria of being a woman who has lived in the selected neighbourhoods both prior to and following the implementation of car-restricting policies.

Participants were recruited through local community networks, neighbourhood associations, and action groups, as well as through door-to-door outreach. Flyers containing a link to a brief survey on demographic characteristics were distributed to households across the study area. Based on the survey responses, a diverse sample of eligible participants was purposefully selected. Additionally, a snowball sampling approach is used, where initial respondents were asked to recommend other eligible participants. This strategy ensures a diverse and representative sample of women with varying perspectives on safety and accessibility.

The primary data for this study is collected through semi-structured interviews with women who have lived in the selected case study areas both before and after the implementation of car-restricting policies. This method allows for an in-depth understanding of participants' experiences while maintaining flexibility to explore newly emerging themes (Kallio, Pietilä, Johnson, & Kangasniemi, 2016). The interviews follow a predefined interview guide, which includes open-ended questions addressing several key themes: perceived changes in urban design, perceived changes in public behaviour, perceived changes in both social and road safety, and perceived changes in the ability to participate in out-of-home activities. The full interview script is presented in appendix 2.

This study aims to achieve 'theoretical saturation', a point at which additional interviews do not yield new insights or results. To reach this state of theoretical saturation, a total of eighteen interviews is conducted. Fourteen interviews are conducted with the general research

population: women living in De Pijp and de Jordaan for at least six and eight years, respectively. The four additional interviews are conducted with the control group: women living in De Pijp and de Jordaan for less than 2 years. The number of interviews is equally split between the two selected neighbourhoods.

To uphold all ethical considerations, several measures are implemented. Firstly, all participants are informed about the study's purpose and the use of all data. Additionally, emphasis is based on the participant's voluntary participation and their right to withdraw at any time. To ensure these ethical considerations, written or verbal consent is obtained from the participants before each interview. To ensure the safety and anonymity of the participants, identifiable information was removed from transcripts, and participants were assigned numbers. Additionally, data is securely stored on local storages and is only accessible by the researcher. Lastly, it is significant to acknowledge that issues regarding perceived unsafety have a sensitive nature, where individuals feel anxious talking about (Hoffman, Mair, Hunter, Prince, & Tebes, 2018). In addition to this anxiety, women who experience unsafety or have experienced unsafety in the past may be suspicious towards researchers that identify as man. As a result, they may not feel comfortable sharing their thoughts regarding their subjective safety (Doria et al., 2021). To ensure participants feel comfortable during the interviews, they are encouraged to share experiences at their own comfort level and speed. In addition, introductory questions are asked and superficial conversations are held with the participants to make them feel more at ease.

3.3 DATA ANALYSIS

This study aims to explain the impact of car-restricting policies through urban design on perceived safety and accessibility by assessing several, at times contradicting, theories on safety and activity participation. Accordingly, the data analysis for this study follows a deductive approach. A deductive data-analysis approach enables researchers to examine evidence that supports, contradicts, refines, or expands existing theories, leading to a more nuanced understanding of the phenomena. In addition, it ensures that the obtained findings are theoretically grounded (Bingham, 2023). A deductive analysis approach enables this study to assess several established concepts and theories regarding perceived safety in specific contexts of car-restricted zones in Amsterdam.

This study follows a thematic analysis approach to identify patterns in the obtained data. A thematic analysis approach allows for a structured, in-depth exploration of participants' perceptions, experiences, and feelings (Castleberry & Nolen, 2018). The utilised thematic approach is a top-down theoretical thematic approach. This approach aligns with the deductive analysis approach by enabling the assessment of predefined themes based on the research questions and theoretical framework (Braun & Clark, 2023). The theoretic thematic approach enables researchers to go in-depth into specific, relevant aspects of the data. Thereby, it gives more detailed and relevant results regarding specific themes (Braun & Clark, 2006).

The theoretical thematic approach allows for a critical and focused assessment of the theories and their explanations presented in the theoretical framework (Braun & Clark, 2023). Therefore, this study can systematically evaluate how well safety and accessibility theories align with empirical data and whether some theories on the relationship between urban design,

behaviour, and safety should be reassessed (Braun & Clark, 2023). Furthermore, since perceptions of safety and ability to participate in out-of-home activities are highly subjective and context-dependent, the theoretical thematic approach ensures that the data analysis is grounded by relevant theories, rather than getting lost in overly broad or unrelated themes (Saunders et al., 2023). To systematically analyse the empirical data through a theoretical thematic analysis, this study builds on Fife and Gossner's (2024) step-by-step guideline for thematic analysis. However, for this study, additional steps regarding extracting themes from existing literature and coding empirical data are implemented. Table 1 presents the guiding framework for the conducted theoretical analysis.

Table 1: Guiding framework for theoretical thematic analysis.

Component	Description	Outcome
Developing research questions and selecting theories	Review relevant literature and select theories to guide the research	Research question that clearly connects relevant literature with the studied phenomenon
Operationalising theories	Operationalise relevant theories from literature by creating working hypotheses	Functional version of the guiding theory that includes descriptions of its relevant components and mechanisms
Extracting themes from existing literature	Create specific themes, extracted from existing literature, to guide assessing empirical data	A guiding thematic framework to which the empirical data can be compared.
Purposive sample	Gather purposive samples that allow for a comprehensive examination of the guiding theories	Study sample providing examinable data that can be analysed using the guiding theories
Coding data	Systematically categorise relevant segments of the data by assigning codes that represent key concepts, patterns, or themes related to the research question and theoretical framework	A structured dataset where key patterns, relationships, and thematic connections within the data are identified
Analysing data	Analyse the data using the predefined themes and codes as a guiding framework while remaining receptive to emergent insights arising from an inductive approach	Comprehensive, nuanced understanding of the researched phenomenon
Theorising	Interpret the data and revision and expand the existing theories	Refined theories that include empirically-supported arguments to answer the research question

Table 1: Guiding framework for theoretical thematic analysis. Source: Fife and Gossner's (2024); Bram Krijger.

Following the extraction of relevant themes from the literature, a deductive coding scheme is constructed by means of the identified themes. This coding scheme provides more detailed tools to identify patterns within the empirically obtained data. By using a deductive coding scheme, a systematic and reliable exploration of the data is ensured (Knott, Rao, Summers & Teeger, 2022). A deductive coding scheme is particularly suitable for this study, since it enhances comparability and consistency of the results across contexts (Fereday & Muir-Cochrane, 2006). Since this study consists of two case study areas, a deductive coding scheme is useful. The complete coding scheme is provided in Appendix 3.

Following this analysis, existing literature and theoretical frameworks are reassessed in light of the findings derived from the empirical data. By confirming or challenging prior claims, this study seeks to evaluate the relevance of various theories in explaining women's perceptions of changes in safety and accessibility within the contexts of De Pijp and de Jordaan. Accordingly, a systematic examination is undertaken to identify key elements of urban design and the resulting behavioural changes that shape perceptions of safety and influence the ability to participate in out-of-home activities.

3.4 RESEARCH QUALITY CONSIDERATIONS

In this section, the reliability, internal validity, external validity, and potential limitations are critically examined. By examining these key methodological elements of the study, a deeper understanding is provided of the study's strengths and limitations, improving the overall research quality. Furthermore, this study acknowledges the importance of researcher positionality in qualitative research on sensitive topics such as gender, safety, and accessibility. As a man studying women's experiences, the author recognises potential gendered power dynamics, bias, and the risk of misinterpretation. Steps were taken to mitigate this, including critical reflexivity, transparent communication with participants, use of theory-driven analysis, and inclusion of diverse women. The study also considers intersectionality, aiming for inclusivity while noting limitations in sampling diversity. A complete critical and reflexive assessment of positionality, perspectivism, conflicting interests, and gender dynamics is presented in appendix 4.

3.4.1 Reliability

In qualitative research, reliability refers to the consistency and dependability of the data collection and analysis processes. The goal of this study is not to produce general results. However, it is important that the research process is transparent and well-documented to ensure that others could follow the same steps to find similar outcomes. In this study, reliability was enhanced through the use of a semi-structured interview guide. This ensures consistency across all interviews while remaining open to relevant additional information. All interviews were recorded and transcribed verbatim to ensure the authenticity of participants' responses and to analyse potential discourses. Furthermore, a structured coding scheme was constructed on the basis of the theoretical background. Afterwards, a systematic coding process is followed during data analysis, where all interviews are independently coded twice to improve the intra-coder reliability. The codes from both coding rounds are merged into one coded transcript. Detailed

notes are documented to identify relevant themes and ensure consistency throughout the process.

3.4.2 Internal and External Validity

Internal validity in this study refers to how accurately the results represent the participants' real experiences. In this study, internal validity is achieved by ensuring that the researcher's interpretations align closely with the participants' reports. To ensure this, triangulation was used by comparing empirically obtained results with existing literature and relevant policy documents. Furthermore, the use of direct quotes from participants throughout the results improves the authenticity of the data analysis. Finally, Table 1 presents a detailed guideline for analysing the data to allow for a transparent research process.

Since this study does not aim for generalisability of the results, readers determine whether the findings are useable for them based on the context provided. To ensure external validity, descriptions of the research setting, participants, and context were provided. This includes information about participants' backgrounds and the environmental context. By offering this contextual information, readers can determine whether the results of this study are applicable to their own contexts or environments.

3.4.3 Potential Study Limitations

Although the qualitative case study research design is best suitable for this study since it enables in-depth, contextualised results. This research method brings some potential methodological limitations.

Firstly, the relatively small sample size restricts this study from drawing generalisable conclusions for intersectional groups, primarily since every group is represented by a selected number of participants. To mitigate this, this study aims to extensively explore relevant identities to obtain in-depth insights on the influence of certain identities. The sample population is relatively small and selected through purposive sampling, this may limit the diversity of perspectives that are included. However, this does align with the qualitative aim of this study. An in-depth examination of the subject in the given context is preferred over generalisability. Furthermore, data saturation was achieved, indicating that the main themes of this study are sufficiently explored.

Secondly, the use of self-reported data could result in some biases, such as socially desirable answers. To mitigate this, a confidential and non-judgemental environment was established by first building rapport and trust with participants before asking more in-depth, sensitive questions.

Thirdly, the study represents data regarding the safety perceptions of participants at a specific point in time. However, perceptions of safety are not static; they may shift as residents adjust to urban changes or new urban design. The cross-sectional research design does not reveal how safety perceptions evolve over time, particularly as habituation, behavioural adaptation, or shifting local dynamics take place. However, it does emphasise relevant safety issues for contemporary policies.

Finally, the study is shaped by a theoretical framework grounded in feminist and environmental urbanism perspectives. While these frameworks provide critical depth, they may also direct attention toward specific forms of inequality and overlook alternative explanations that might shape perceived safety. To avoid this, the interview guide was designed to avoid leading questions, allowing participants to define what “safety” and “comfort” meant to them in their own terms. Furthermore, a critical assessment of existing feminist literature on geography was made to remain open to other explanations.

4. Case Study: De Pijp & de Jordaan

In this chapter, the relevance of the aforementioned elements of urban design is examined by linking them with car-restricting policies in Amsterdam. Afterwards, the car-restricting policies and changes in urban design in the case study areas De Pijp and Jordaan are examined. Figure 3 depicts the two case study areas. Important to acknowledge is that De Pijp consists of three smaller neighbourhoods: Oude Pijp, Nieuwe Pijp, and Zuid Pijp, which together form the neighbourhood De Pijp.

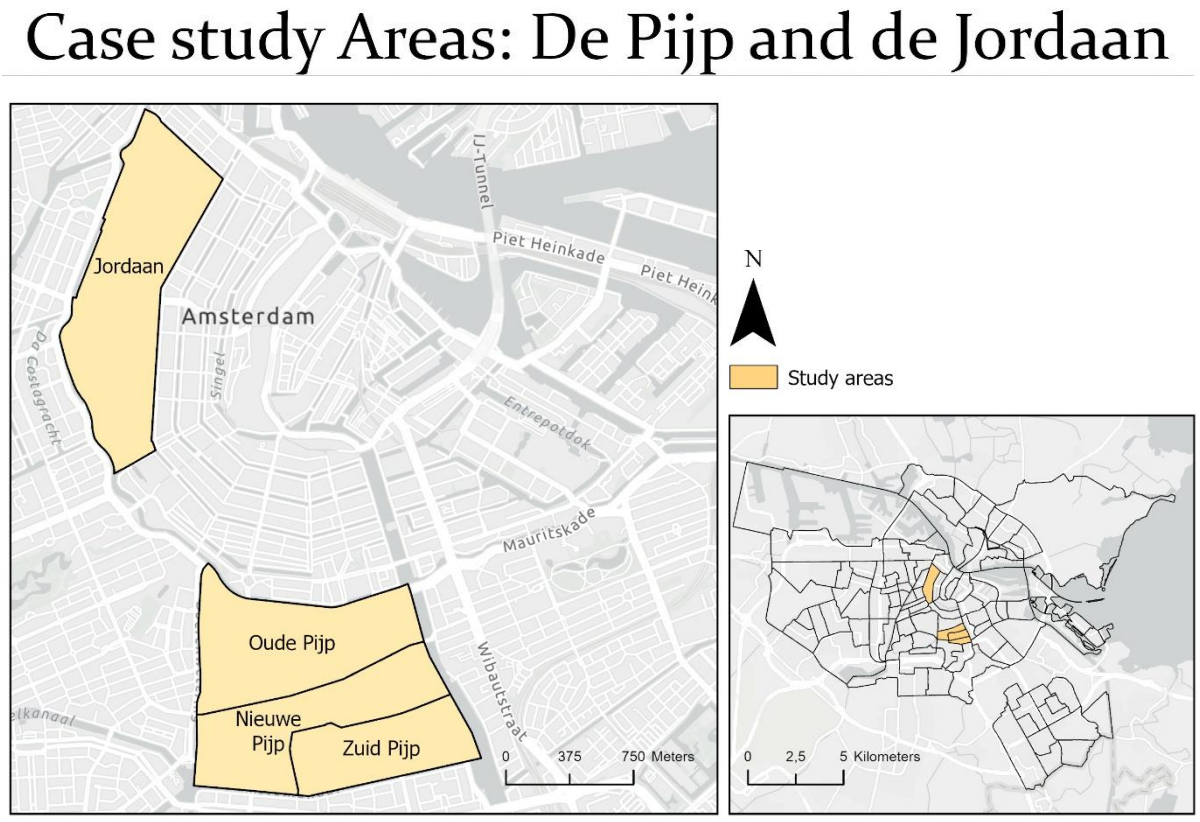

Figure 3: Case Study Areas: De Pijp and de Jordaan. *Source: Esri, 2024*

4.1 URBAN DESIGN TRANSFORMATIONS IN AMSTERDAM

The municipality of Amsterdam has implemented various urban design changes to discourage car use in an effort to enhance sustainability and liveability in the city (Gemeente Amsterdam, 2013; 2017b; 2021b). One of the most significant changes in the urban design of public spaces in Amsterdam is the removal of car-parking spaces. The municipality of Amsterdam removed 1543 parking spaces to free up space for active mobility in 2021 (Gemeente Amsterdam, 2023). Furthermore, many car lanes in residential areas are narrowed (Gemeente Amsterdam, 2021a; 2013; 2021b; 2020a). The vacant public spaces are primarily used for additional greening, increased walking and cycling space, and bicycle parking (Gemeente Amsterdam, 2021a; 2019c). Furthermore, with the reduction of parked cars in residential streets and alleys, the municipality aimed for clearer and more organised street layouts with increased visibility and improved sightlines (Gemeente Amsterdam, 2021b; Gössling & McRae, 2022). In addition,

the newly available space has been utilised to transform Amsterdam's public areas into places for social interaction and relaxation, rather than merely facilitating movement. The municipality aims to achieve this by expanding pedestrian zones and adding street furniture (Gemeente Amsterdam, 2021b). In conclusion, car-restricting policies have significantly impacted the urban design and street layout of public spaces in Amsterdam.

To investigate the relationship between these changes in urban design, the subsequent behaviour changes, and perceived safety, this study examines the influence in two case study areas: De Pijp and Jordaan. The neighbourhoods of De Pijp and De Jordaan were selected as case study areas due to their unique combination of characteristics that make them particularly relevant for this study. Both areas have experienced significant public space transformations as part of the Municipality of Amsterdam's strategy to reduce car dependency and promote active mobility (Gemeente Amsterdam, 2021a; 2021c). In addition, both neighbourhoods are centrally located, densely populated, and influenced by tourists, which leads to a high pressure on the public realm and its users. Furthermore, De Pijp and de Jordaan have undergone both similar (Gemeente Amsterdam, 2021a) and location-specific urban design changes (Gemeente Amsterdam, 2023a; n.d.b) Therefore, several similar urban design changes can be understood in two different contexts while also assessing context-specific urban design transformations.

By examining these two neighbourhoods, this study aims to analyse how design and behavioural transformations in public spaces influence the perception of safety and accessibility among women in De Pijp and de Jordaan.

4.2 NEIGHBOURHOOD PROFILE: DE PIJP

The first neighbourhood that is part of the study area is De Pijp. The neighbourhood De Pijp consists of three smaller neighbourhoods called Oude Pijp, Nieuwe Pijp, and Zuid Pijp. De Pijp is a high-density neighbourhood located southeast of the city centre. Artists, students, and migrant workers used to locate in the neighbourhood. Nowadays, the neighbourhood is known as a high-density, lively neighbourhood (Dekkers, 2023; Gemeente Utrecht, 2022). De Pijp helps provide an insight into the relationship between car-restricting policies and perceived safety and accessibility in lively, dense neighbourhoods (Dekkers, 2023). The neighbourhood De Pijp provides another interesting perspective on the relationship. The neighbourhood is known as a creative neighbourhood. This creativity might influence the way residents view urban life and behaviour in public spaces (AT5, 2020; AmsterdamGuiden, n.d.; Puur Amsterdam, n.d.b).

De Pijp is part of the pedestrian-orientated area of Amsterdam. In reality, this means that several policies have been implemented to reduce car use and encourage active mobility (Gemeente Amsterdam, 2013). To enhance the utilisation of public spaces for active mobility and interactions, the municipality has implemented several changes in urban design. First, the municipality of Amsterdam has redesigned several streets in De Pijp. To discourage car use, several car-parking spaces have been removed in smaller residential streets. The vacant space is used to improve walkability and cyclability in de area, to add bike-parking spaces, and to increase public greenery in the neighbourhood (Gemeente Amsterdam, n.d.b).

Furthermore, the Van Woustraat, one of the main thoroughfares of De Pijp, has undergone a significant transformation, both in design and function. A cut (*knip)* has been placed in the street. The cut is strategically placed near the intersection with the Stadhousderskade. It forces drivers to find alternative routes, reducing the amount of through traffic in the neighbourhood. This has resulted in significant transformations in design. These include the addition of wider sidewalks and bicycle lanes and better public transport options, making the area more conducive to walking and cycling (Gemeente Amsterdam, 2020a; 2021b).

In addition, the Ferdinand Bolstraat, one of the main retail and hospitality hubs, has experienced significant changes in design. To discourage car traffic and stimulate active mobility in the street, spaces for cars and trams have been reduced. The vacant space was used to widen sidewalks and bicycle lanes (AT5, 2021; 2022; Gemeente Amsterdam, 2024a).

In conclusion, the public realm of De Pijp has experienced several changes in urban design. While the municipality has stimulated active mobility on larger streets by changing to a car-discouraging street layout, the most significant changes in urban design are experienced in smaller, residential streets (AT5, 2021). In these alleys, the removal of car-parking spaces has cleared space for additional urban greenery and bicycle-parking spots (Gemeente Amsterdam, 2013; n.d.b).

4.3 NEIGHBOURHOOD PROFILE: DE JORDAAN

The second neighbourhood that features in this study is de Jordaan. Over the past few decades, the Jordaan district has experienced significant gentrification, transforming from a working-class neighbourhood into a trendy area for families (Lammers, 2018). With the arrival of these families, the demand for safety and activity participation has also evolved in the area. Parents with young children have advocated for improved traffic safety and social security (Gemeente Amsterdam, 2019a). The neighbourhood is the mixed-use, yet residential area close to the city centre, characterised by high population density (Gemeente Amsterdam, 2021b). The Municipality of Amsterdam acknowledges that pressure on neighbourhoods such as de Jordaan has increased as a result of car-restriction policies targeting major thoroughfares. This pressure stems primarily from competing demands for limited street space, including car parking, bicycle parking, and shared mobility services (Gemeente Amsterdam, 2021b; 2020a).

To reduce these stains, car-parking spaces have been removed throughout the neighbourhood to create space for bicycle parking. The vacant space is primarily used for additional public greenery and bicycle parking (Gemeente Amsterdam, 2021b; 2024).

In addition to the parking restrictions, the municipality of Amsterdam has constructed a specific policy to reduce car use in the neighbourhood. The so-called ‘Palenplan’ aims to discourage residents and visitors from using the car in the area. Nine bridges that connect the neighbourhood to other streets are blocked by bollards to prevent cars from driving into the area (Gemeente Amsterdam, 2023a). In addition to this, the Marnixstraat, an important thoroughfare at the border of the neighbourhood, is transformed into a one-way street to make space for pedestrians and cyclists. As a result, it has a new physical layout with widened bicycle lanes and a one-way car lane. Therefore, the municipality aims for a clearer, more visible street

focused on safety for active mobility users (Gemeente Amsterdam, 2023a). Important to acknowledge is that another main thoroughfare in de Jordaan remains a car-friendly street to improve the traffic flow in the area (Gemeente Amsterdam, 2023a).

Furthermore, the Elandsgracht, a large, mixed-use street, has undergone a significant redevelopment. The redevelopment is focused on creating a more pedestrian-friendly and liveable urban space. The redesign reduced car traffic by removing parking spaces and improving cycling infrastructure. Wider sidewalks, additional greenery, and new street furniture were introduced to enhance the area's accessibility and encourage social interaction. Traffic calming measures, such as a lower speed limit and adjusted road layout, were implemented to prioritise pedestrians and cyclists over motorised traffic (Hoffschulte, 2014; GroenLinks Amsterdam, 2016). The design of smaller residential streets in the neighbourhood remains relatively untouched, despite the removal of parking spaces (Gemeente Amsterdam, 2021b; 2024).

In conclusion, in contrast to De Pijp, the urban design transformations in de Jordaan are primarily concentrated in larger retail and hospitality streets. Despite the removal of car-parking spaces, smaller residential streets have undergone less noticeable design changes, with only a few exceptions.

5. Results

This chapter outlines the results drawn from the conducted interviews. The results are categorised in six key themes, corresponding to the general themes from the theoretical framework.

5.1 RESPONDENT GROUP

To obtain information about the respondent group of this study, Table 2 contains relevant characteristics of the participants of this study. The study sample includes a total of fourteen participants, with seven participants from De Pijp and seven from de Jordaan. The control group consists of two participants for both De Pijp and de Jordaan.

Table 2: Participant Characteristics

Interview	Neighbourhood of residence	Age (in Years)	Length of residence
P1	de Jordaan	27	14 years
P2	de Jordaan	19	19 years
P3	de Jordaan	79	44 years
P4	De Pijp	28	20 years
P5	De Pijp	25	7 years
P6	de Jordaan	52	25 years
P7	De Pijp	40	16 years
P8	De Pijp	51	30 years
P9	De Pijp	49	27 years
P10	De Pijp	78	49 years
P11	de Jordaan	24	10 years
P12	De Pijp	58	20 years
P13	de Jordaan	33	12 years
P14	de Jordaan	78	35 years
C1	de Jordaan	24	1 year
C2	de Jordaan	19	0.5 years
C3	De Pijp	20	1,5 yaer
C4	De Pijp	25	1 year

Source: Bram Krijger

5.1.1 Age Distribution

As depicted in Table 2, all participants fall under the age qualification of 18 years and above. Therefore, they are all part of the defined study population. In this study, the participants are categorised into three groups. This distinction is made because Sharifian et al. (2022) examine that age is a relevant determinant for safety perception. The total study sample (N=14) consists of 36% (N=5) participants who are classified as ‘young adults’, with an age between 18 and 30 years. In addition, 43% (N=6) of the participants are classified as ‘adults’, with an age between 30 and 65 years. Lastly, 21% (N=3) of the participants are classified as ‘senior adults’, with an age of 65 and over. In comparison to population data, the ‘young adults’ group is slightly

overrepresented, while the ‘adults’ group is slightly underrepresented. However, the ages of the participants are relatively corresponding to the research population.

5.1.2 Length of Residence

Table 2 shows that all participants have lived in their neighbourhood of residence longer than 6 years, except for participants of the control group. This matches the eligibility criteria of living in the neighbourhood both prior to and after the implementation of car-restricting policies. The length of residence is categorised in three categories: ‘short’, for 6 to 15 years, ‘medium’, for 16 to 30 years, and ‘long’, for 31 or more years of residence. In the study sample, 29% (N=4) of the respondent group falls under the category ‘short’, while 42% (N=6) of the respondent group falls under the category ‘medium’. Lastly, 29% (N=4) of the participants are categorised as having a‘long’ length of residence.

5.2 PERCEIVED CHANGES IN PUBLIC BEHAVIOUR

All participants report that they experienced more people in the public realm as a result of car-restricting policies through urban design. According to the majority of the participants, this increase in individuals in public spaces can be explained by two main factors.

Firstly, the substitution of cars for active forms of mobility. Several participants explain how the new urban design increases stimuli to use active modes of transportation, increasing walking and cycling. For instance, one participant describes this as follows:

“Because when you park your car somewhere else, you have to bike there, and then you ride your bike home […]. I think that’s probably the consequence." (P10)

Secondly, several participants explain that they perceived a change in the function of the public spaces. The public spaces, primarily smaller residential streets, have increasingly become a destination rather than solely a space to move through. The participants claim that this change is, though partially, explained through changes in urban design. One participant explains the relationship between the changes in urban design and the function of public spaces as a destination as follows.

“Yes, for instance in the sense that individuals tend to sit outside more often now that the sidewalks have been widened. It’s mostly residents, people who, for instance, place tables or chairs outside.” (P4)

In addition, multiple participants reported that the increased attractiveness of the public spaces, through additional greenery and the reduction of parked cars, stimulates individuals to increasingly use the public realm as a destination.

The intensified use of public spaces was mentioned extensively by participants from both De Pijp and de Jordaan. However, not all participants ascribed the increased crowding in the public realm completely to the changes in urban design. Participants report the overall increase of tourists in Amsterdam as an important determinant for the increase of individuals in public spaces.

Additionally, in De Pijp, participants noted a decrease in the number of cars in the neighbourhood. Participants from de Jordaan often referred to the waterbed phenomenon, where the restriction of cars in some parts of the neighbourhood resulted in an increase in cars in other parts. Furthermore, the increasing purpose of public spaces as destinations was mentioned more frequently by participants from De Pijp than from de Jordaan, referring to design changes in their streets of residence.

5.3 URBAN DESIGN AND PERCIEVED SAFETY

The majority of the participants examine a direct influence of urban design on their perceived safety. Elements influencing safety are urban greenery, visibility, street design, and the level of maintenance and physical deprivation. According to participants from the 'young adult' and 'adult' groups, the degree of visibility is the most influential urban design element for safety perceptions. For 'older adults' participating, the influence of urban design on road- and social safety was generally very small. Additionally, participants with a long length of residence also reported that urban design did not significantly influence their safety perceptions for both road- and social safety.

The majority of the participants who perceive visibility as influencing their perception of safety report that visibility has improved in the new urban design. According to them, the removal of car-parking spaces has resulted in an increased visibility. Parked cars used to block sightlines, disabling participants from clearly overseeing the space. One participant (p7) explains how this improved visibility positively influences her perceived safety. Regarding road safety, she states: *"I actually do feel a bit safer at the moment, because you have a much better overview and you can see a lot more, which allows you to better anticipate what's happening".* In addition, she explains how the improved visibility also increases her perceived social safety: *"If you see someone walking and you spot them from a distance, you can still take another street if you don't want to run into them. […] You're not caught off guard."* Figure 4 and Figure 5 present a visible representation of how the removal of car-parking spaces increases visibility and sightlines, increasing the subjective safety of participants.

Figure 4: Eerste Jacob van Campenstraat (De Pijp) before the removal of car-parking spaces. Source: Google Maps

Figure 5: Eerste Jacob van Campenstraat (De Pijp) after the removal of car-parking spaces. Source: Google Maps

In Figure 4, parked cars block parts of the public space, which are more visible after the removal of parked cars from the streetscape, as depicted in Figure 5.

According to the majority of the participants, urban greenery also significantly influences their safety perceptions. They explain that the additional urban greenery enhanced their social safety perception. The participants framed the increased presence of urban greenery as *"pleasant", "friendly",* and *"peaceful",* resulting in an improvement in perceived social safety.

However, other participants noted that increased density of greenery reduces their sense of social safety. The additional greenery obstructs sightlines and restricts light distribution. One participant mentions the tension between urban greenery and visibility as follows:

"For example, when you go around a corner and there are lots of blooming trees and bushes, it can reduce your visibility of the traffic. […]. Just because you have less visibility. Amsterdam is so busy, you really have to stay alert all the time and be able to see everything around you" (P2).

This quote reflects how urban greenery can reduce perceived road safety because it obstructs the open sightlines, reducing visibility. The blooming trees and dense bushes shown in Figure 6 were added in the vacant spaces after the car-parking removal to improve the liveability and attractiveness. However, this urban greenery reduces the visibility of the street, as depicted in Figures 4, 5, and 6.

Figure 6: Additional urban greenery reducing visibility at the Elandsgracht (de Jordaan). Source: Google Maps

Figure 6 also illustrates the impact of urban greenery on light distribution in public spaces. Although the area is generally exposed to sunlight, the walkway remains entirely shaded by the large trees. One participant explains how this shading leads to a restricted light distribution and dark areas as follows:

"I feel like, even when it's sunny, there's something about the trees and the way the light falls there that always makes it feel a bit grimy and dark." (P1)

The participant later explains that although she enjoys green spaces, the worsened light distribution reduced her sense of social safety. Apart from the aforementioned change in light distribution through additional greenery, participants report that they did not experience a significant change in their perception of safety due to changes in street lighting.

In addition to urban greenery and visibility, street design is an important determinant for perceived safety, mainly concerning the width of bicycle lanes and sidewalks. Several participants mentioned that the widening of active mobility lanes enhanced their sense of safety, since it creates a more spacious environment, contributing to a more comfortable experience when walking or cycling. Others noted that the wider lanes have positively changed their encounters with other road users, further reinforcing their perceived road safety. According to them, this is primarily because *"cars don't speed by so closely anymore"* and *"you don't have to step onto the street just because someone is walking towards you from the other direction".* Therefore, widened sidewalks and bicycle lanes generally improved the road safety perceptions of participants from both De Pijp and de Jordaan.

Changes in urban design have led to a significant perceived decrease in car traffic, particularly in De Pijp. According to the majority of participants, this decrease in cars has directly influenced their sense of both social- and road safety. They reported that reduced car traffic lowered stress levels and made moving through the space feel more comfortable and safe. Two participants managed to assess this by explaining how reduced car traffic leads to less friction and irritation as follows:

"I mean, they drive faster, they get into conflicts with cyclists or […], that can create a kind of friction, which makes you, as a cyclist, not feel completely safe." (P7)

"So if there are a lot of cars passing through and traffic jams form, individuals start to get irritated. And of course, you feel that too when individuals are all stressed out in their cars." (P13)

Several participants also noted a change in the maintenance of public space, affecting their perception of social safety. These changes in maintenance primarily contain changes in the perceived amount of trash. Participants attribute this to the increased visibility of trash since the removal of parked cars. One participant explains that poorly maintained urban greenery and the increasing amount of garbage directly worsen her perceived safety as follows:

"Sometimes I see empty liquor bottles in those green spaces and such. I wouldn't be surprised if you came across drug remnants there as well. [...] you start thinking, 'oh, individuals hang out here, and drink alcohol,' which, in a way, gives you a sense of feeling less safe." (P4)

The relationship between maintenance and perceived safety was only mentioned by participants from De Pijp. Participants from de Jordaan did not mention a noticeable change in maintenance of public spaces. Importantly, no participants reported an increase in antisocial behaviour resulting from the increased physical deprivation.

5.4 UNIFORM OR DIVIDED URBAN SPACES AND PERCEIVED SAFETY

The majority of respondents report that the new street layout is more uniform with a reduction of clear barriers and distinctions between different lanes. According to several participants, this redesign has made the streets feel less clear, organised, and structured. They explain that the previous spatial layout, with clearer separation between spaces, felt safer compared to the new, more blended design. Interestingly, for participants from the older adults and long-term residence categories, the uniform street layout was the only physical design change that diminished their perceived road safety. One participant from the adult group captures the preference for clearly divided lanes and its relationship with road safety perception in the following quote:

"It feels less safe now. The bike lanes used to be elevated, and the road was lower. So as a cyclist, you were more visible […] I also felt safer back then. Cars wouldn't just drive onto the bike lane because they physically couldn't. It meant having to go up a kerb, and they were less likely to do that. So yeah, I found those higher bike lanes much safer." (P9)

The only areas where participants felt the new layout improved safety were those with a clearer, more distinct separation between the street and tram stops. However, these design features are limited to a few locations, while most public spaces have reportedly become more uniform and less well-defined.

However, it's not just the removal of clear distinctions and barriers that contributes to an increased sense of clutter. Some participants noted that the new street design encourages individuals to leave bikes and scooters carelessly scattered around. The disappeared parked cars and the increase in randomly parked bikes and scooters make the public space feel more chaotic and disorganised, making the space less pleasant and safe for these participants.

The changes in street layout do not only influence perceived safety directly, but also through behaviour changes, resulting from the new, uniform street layout. According to the majority of participants, the removal of distinctions and barriers has resulted in more chaotic behaviour by public space users. They report that public space users, especially cyclists and pedestrians, often increasingly behave inconsistently with expected norms regarding road use, creating a less safe environment. Both tourists and residents were observed using designated lanes for purposes other than intended. Participants explain that since the removal of distinctions, road users *"move unpredictably in all directions"*. Two participants clearly explain how these behaviour changes diminish their perceived road safety through the following quotes:

"They walk crisscross through each other, so you constantly have to dodge around. When you're on a bike on the bicycle lane, you have no real assurance that people will respect the fact that you're a cyclist and just walk onto it. That's really frustrating, and it definitely makes things feel less safe." (P13)

"People can't get past each other, so a lot of cyclists and fatbikes just ride straight over the sidewalk. That's partly because it's now really easy to go back and forth between the sidewalk and the street. So, it's pretty annoying when you almost get run off the road like that." (P3)

These quotes illustrate how the new, uniform street design, combined with the increased number of individuals on the streets and the increased number of tourists, contributes to a decrease in perceived road safety.

The neglect of rules regarding the use of different lanes does not only influence the participants perceived road safety, but also their perceived social safety. Several participants explain the more chaotic street use leads to an increase in unpleasant interactions between public space users. They report more irritation and conflicts as a result of the chaotic behaviour. One participant explains this as follows:

When people start wandering more across the streets and sidewalks, it's just natural that individuals get increasingly angry with each other. […] So that definitely makes me feel less safe. (P13)

Other participants noted that road users seem increasingly *"frustrated"* and that public space users *"shout at each other"* more frequently. As a result, they feel that the new, more uniform street design negatively impacts their sense of social safety.

Interestingly, no participants reported experiencing that public space users have become more alert or attentive in traffic as a result of the uniform street design.

In conclusion, participants' reports suggest that the new, more uniform street design not only impacts perceptions of road safety, but also contributes to a diminished sense of social safety. The removal of physical boundaries results in unpredictable and chaotic behavioural expectations, leading to frustration, irritation, and more frequent conflicts among road users. For several participants, this shift results in public spaces that feel less predictable, less respectful, and ultimately less safe.

5.5 PUBLIC BEHAVIOUR AND PERCEIVED SAFETY

As previously mentioned, all participants observed an increase in the number of individuals using public spaces in both De Pijp and de Jordaan. This intensified use of the public realm, resulting from changes in urban design, has impacted participants' perceptions of safety in various ways.

Firstly, some participants from both De Pijp and de Jordaan explained that the increase of individuals in public spaces has resulted in an improved perceived social safety. According to them, a higher number of individuals in public spaces reduces the probability of unwanted interactions through increased social control. However, the relationship between a higher number of individuals on the streets and improved social safety perceptions was only observed by a relatively small proportion of the participants. More participants stated that the presence of individuals in public spaces does not necessarily increase safety perceptions. More than half of the participants emphasise that stronger social ties with those present in the space are a key factor in improving social safety perceptions. The importance of social and community ties is clearly reflected in the following quotes.

"Well, when I think about whether I feel safe in my neighbourhood or not, I find social control really important. In every little street, there are individuals you know and occasionally run into. That really contributes to feeling safe and at home in the neighbourhood." (P2)

"For example, in our street, I actually know quite a few people, and have known them for quite some time. […] individuals know each other and that actively contributes to the sense of safety. […] I'd go check in on them [neighbours] and I kind of assume it works the other way around too." (P8)

Participants explain that the presence of neighbours and close acquaintances in public spaces contributes to a greater sense of social control. While they did not perceive the presence of strangers as enhancing that sense of social control.

Furthermore, several participants perceived that an increased presence of individuals in public spaces diminished their perceptions of safety. The majority of participants report a decline in perceived road safety or social safety as a result of overcrowding. Most participants reported that their sense of safety was negatively affected by the feeling that the increased crowding increased the risk of accidents, both in traffic and through unwanted interactions. These participants explain how the increased crowding has resulted in a more *"chaotic"* environment, where residents have to *"manoeuvre"* through the crowd. The way participants experience overcrowding to diminish social safety is reflected in the following quotes:

"As it gets busier, there's more stress between individuals. So you get more action-reaction situations in traffic […] And that leads to a decline in social safety." (P12)

"You really notice that a lot of individuals are fed up with how busy, how touristy, and how crowded the neighbourhood is becoming. And that just leads to a lot of frustration, even when you're on your bike. It's not unusual to get shouted at." (P2)

Furthermore, several participants indicate that they directly associate the growing number of individuals with a higher likelihood of encountering malicious individuals. As a result, they feel a heightened risk of unwanted interactions, which diminishes their perception of social safety. Additionally, two participants explain that their fear of unwanted interactions stems from herd behaviour and the sense of anonymity that some individuals feel when the streets become more crowded. One participant explains this as follows:

"But here it's so crowded that individuals feel like they can get away with anything, just because there are so many others around. And that just makes it unpleasant. It also definitely makes things feel a lot less safe for me." (P13)

Interestingly, the presence of tourists in public spaces influences the safety perception of the participants in its own way. According to the majority of the participants, the increasing presence of tourists has a negative influence on their perceived road safety. They report that tourists tend to be *"less alert"* and *"unpredictable"* when participating in public spaces. One participant explains how tourists diminish her sense of road safety as follows:

"I'd say that the number of tourists definitely has a negative impact on safety. They're often distracted by other things and don't really know the local traffic rules. They regularly cross the street without looking or things like that." (P1)

Two participants also mention the diminishing of social safety as a result of the increased presence of tourists. They report that tourists are not only unpredictable in traffic, but also in their social behaviour, primarily when they are drunk and start shouting things.

While the mechanisms described above significantly affect participants in the 'young adults' and 'adults' groups, those in the 'senior adults' group reported no change in their perception of safety. The senior adults mention having experienced so many interactions with so many different individuals that they feel less affected by the presence of others in public spaces. Additionally, participants who have lived in the neighbourhood for a 'long' time also feel less influenced by the increased presence of others in public spaces. They report to generally feel

socially safe in their respective neighbourhoods at all times. At the same time, participants from the control group report relatively heavy impacts from the presence of individuals in the public realm, both positive and negative.

In conclusion, the impact of increased public space usage on perceived safety is complex. While more individuals in public spaces can enhance social safety through familiar ties and informal control, they often reduce social safety due to overcrowding and anonymity. Overall, increased public presence tends to diminish perceived safety, though senior adults and long-term residents generally feel less affected by these mechanisms.

5.6 ROAD USER BEHAVIOUR AND PERCEIVED SAFETY

According to several participants, behaviour changes by road users, resulting from car restrictions and urban design changes, also influence their perceived safety.

Almost all participants from de Jordaan reported that they feel less safe as a result of behaviour change by car drivers. They explain that since cars are restricted but not completely banned, car users tend to be less patient and more aggressive in the car-restricted environment. This negatively influences both perceived road safety and social safety. One participant explains how behaviour change by car drivers diminishes her road safety as follows:

"What also makes things feel less safe, is the way those taxis drive, which is really unsafe. There's very little space for cars, but they still go through all those narrow streets. Probably because they make money there and can pick up a lot of individuals. I think they really reduce safety, because they stop in places where they're not allowed, they drive too fast, and there's barely any space left between the bike lane and the sidewalk. So you kind of get cut off." (P11)

This quote reflects the broader concern about unsafe driving behaviour by car users who remain present in de Jordaan and, to a lesser extent, in De Pijp. Participants reported feeling unsafe in traffic due to cars *"cutting corners"* and *"just driving onto sidewalks"*. In de Jordaan, this experienced unsafety extends beyond road safety, as several participants also reported a decline in perceived social safety due to the increasingly aggressive and unpredictable behaviour of car drivers. One participant explains how the urban redesign and car-restricting policies enhance hostile behaviour by car drivers.

"Because more and more streets are being blocked off, individuals are getting increasingly agitated. It's just becoming harder and harder for them to get into the neighbourhood, so they end up sitting in traffic, honking and swearing. So no, it's definitely not becoming any safer." (P6)

Interestingly, taxis are key factors influencing participants' perception of safety. Participants report that the monetary motivations of taxi drivers significantly shape their behaviour. The participants frequently mention disproportionately aggressive conduct of taxi drivers, both in driving and interpersonal interactions. This significantly diminished their sense of social safety.

Participants from both De Pijp and de Jordaan also reported behavioural changes among cyclists. Nearly half of the participants noted that cyclists have become *"less cautious"* and have a bigger "*disregard for the rules*" following the reduction in car traffic.

"Whereas before someone might have looked before crossing diagonally in front of your car, now they don't even do that anymore because they assume you're driving slowly enough. […] I really notice that cyclists often show a disregard for other road users. In many cases, they run red lights, and ride over crosswalks even when someone is crossing. Yes, now that there are fewer cars on the road, their behaviour has actually become even more antisocial." (P8)

This quote reflects how multiple participants perceive behavioural changes among cyclists and pedestrians as negatively impacting their sense of road safety. It is important to note that while many participants link these changes to the decreased number of cars, some participants also believe that this rise in antisocial behaviour is driven by broader cultural and societal shifts.

Participants of all age groups and lengths of residence consistently reported that these shifts in road user behaviour negatively affect their sense of road safety.

In conclusion, urban design changes and car-restricting policies have altered road user behaviour, affecting perceived safety. Although reduced car traffic aimed to improve safety, increased aggression from drivers and reckless behaviour by cyclists and pedestrians have often worsened it.

5.7 CHANGES IN PERCEIVED ACTIVITY PARTICIPATION

The majority of participants reported no significant change in their ability to participate in everyday activities. While many acknowledged experiencing increased concerns regarding safety, they emphasised that these concerns did not prevent them from visiting amenities, meeting acquaintances, or engaging in other routine activities. Several participants attributed this to their long-term residence in the neighbourhood, noting that over time they *"get used to"* navigating through spaces that may feel less safe in. This is supported by the fact that participants in the control group reported slightly more accessibility concerns, particularly when they had just moved into the neighbourhood. However, they did not perceive these concerns to have increased as a result of the urban design changes.

Some participants did report a decline in their ability to participate in everyday activities. However, these limitations were not attributed to safety concerns or infrastructural shortcomings. Instead, participants pointed to overcrowding as restricting their accessibility, as congested routes and blocked pathways create practical obstacles for movement.

In conclusion, the changes in urban design, and the subsequent public behaviour changes, have not influenced the participants ability to participate in out-of-home activities.

6. Discussion

In this chapter, the results are further discussed based on the constructed subquestions. The empirically obtained results are compared to the existing literature from the theoretical framework and, if relevant, to neighbourhood-specific urban design policies.

6.1 PUBLIC BEHAVIOUR CHANGES IN PUBLIC SPACE USAGE

Participants from both case study areas reported a significant increase in public space usage. They, though partially, attributed this to recent urban design interventions that prioritised pedestrians and cyclists, such as wider sidewalks, removal of parking spaces, and added seating. These observations align with theories by Gehl (2010) and Gerike et al. (2021), who argue that increased walkability of a space positively influences to what extent individuals engage with the spaces.

Participants identified two key behavioural shifts as a result of the urban design changes: increased active mobility and the transformation of public spaces into spaces of destination. These findings correspond with literature suggesting that car-restrictive urban design and pedestrian-friendly infrastructure stimulate walking and cycling (Vasilev et al., 2018; Blitz et al., 2020). The findings also reflect Vasilev et al.'s (2018) argument that changes in mode of travel are not the result of personal preferences, but responses to how urban form enables or restricts specific behaviour.

Participants also perceived an increase in individuals staying and gathering in public spaces. This aligns with the findings from Chuang and Chen (2024) and Hassen and Kaufman (2016), who explain that urban design interventions such as sidewalk expansion, removal of car-parking spaces, and added street furniture contribute to individuals using public spaces as spaces of destination. However, this behaviour varied between the two studied neighbourhoods. In De Pijp, where urban design changes primarily occurred in small, residential streets, participants perceived more destination-orientated use. In de Jordaan, the urban design changes were primarily at larger arterial routes, resulting in less pronounced increases of destination-orientated use (Gemeente Amsterdam, n.d.b; Gemeente Amsterdam, 2023a). This reflects Hassen and Kaufman's (2016) arguments that street design is more influential in residential than commercial or arterial streets.

Importantly, participants reported that much of the increased presence in public space could be attributed to tourism. Both De Pijp and de Jordaan are prominent tourist destinations (Hielkema, 2024), and participants linked the increase in human presence in public to rising visitor numbers. Contemporary literature (Gehl 2011; Hassen and Kaufman, 2016) rarely considers the influence of human-centric designs on tourism dynamics. Yet other literature suggests that urban design can shape tourist flows and spatial concentration. Human-centric and green urban design attracts tourists, while pedestrian-friendly street designs influence the distribution of tourists over an area (Patandianan & Shibusawa, 2020; Hassanshahi et al., 2023).

However, the observed increase in public space usage cannot solely be attributed to human-centric urban design. The overall increase in tourism in Amsterdam has resulted in a significant

increase in the number of tourists in De Pijp and de Jordaan, who cluster in specific areas in the city and the neighbourhood (Hospers, 2019; Kuenen et al., 2023; Oskam & Wiegerink, 2020).

In sum, urban design has, though partially, influenced public behaviour in De Pijp and de Jordaan. These behavioural changes include a greater use of public spaces, an increase in active mobility, and the transformation of public spaces into destinations rather than transit routes.

6.2 URBAN DESIGN FEATURES THAT INFLUENCE PERCEIVED SAFETY

This section critically examines the direct influence of urban design and its maintenance on perceived safety.

6.2.1 Visibility and Sightlines: A Consistent Predictor for Safety

Visibility and open sightlines were the most consistently reported predictors of perceived safety. These findings strongly support existing literature that highlights how openness and transparency in urban spaces enhance feelings of control and predictability (Milanović, 2020; Kaushal, 2024). The relationship between visibility and both road and social safety, as reported by participants, reflects Jansson's (2019) argument that physical openness allows users to orient themselves and anticipate social interactions or potential threats.

Interestingly, Navarrete-Hernandez et al. (2021) and Moss et al. (2024) explain that less obstructed sightlines in public spaces stimulate social interactions, fostering community engagement and perceived safety. However, the participants of this study reported the improved sightlines to actually help avoid interactions with others. Loukaitou-Sideris (2006) explains this by arguing that women perceive interactions in public spaces as diminishing safety rather than as enhancing safety. Many women avoid social interactions in public due to prior experiences with uncomfortable or unwanted encounters. Additionally, societal norms and structural warnings frequently caution women about the potential dangers of interacting with strangers in public spaces (Loukaitou-Sideris, 2006).

In this study, improved visibility has improved the participants' safety perceptions, since it enables women to orientate themselves in a space and helps anticipate the behaviour of others.

6.2.2 Urban Greenery: A Double-Edged Sword

This study produced contradictory results regarding the relationship between urban greenery and perceived safety. The majority of participants associated greenery with enhanced feelings of peace, friendliness, and comfort, findings consistent with Zhang et al. (2015) and Nordh et al. (2024). However, some respondents highlighted that urban greenery potentially obstructs sightlines, thereby reducing perceived safety. These concerns reflect critiques raised by Baran et al. (2018) and Zhao and Huang (2021), who explain that dense vegetation can increase enclosure and obstruct sightlines.

Both the results of this study and existing literature suggest that urban greenery may enhance aesthetics but risk obstructing visibility (Baran, Tabrizian, Zhai, Smith, & Floyd, 2018; Zhao

& Huang, 2021). In contrast, lower, well-maintained greenery may balance the psychological benefits of nature exposure with the need for openness (Li et al., 2015).

Despite some nuanced concerns about reduced visibility, additional urban greenery generally contributed to improved safety perceptions among participants.

6.2.3 Street design: More Space, More Comfort

Participants of this study generally reported that widened active mobility lanes contribute to enhanced feelings of safety through improved comfort and reduced stress. This aligns with studies by Von Stülpnagel and Binnig (2022) and Gössling and McRae (2022), which argue that street width directly affects cyclists' and pedestrians' sense of control and perceived vulnerability.

Interestingly, contemporary literature highlights the importance of spacious urban design in enhancing perceived road safety by improving manoeuvrability and decreasing the probability of collisions (Šemrov, Rijavec, & Lipar, 2022; Gössling & McRae, 2022). However, participants of this study reported that widened sidewalks and bicycle lanes primarily improved their social safety perceptions by reducing stress levels associated with overcrowded pathways. This can be explained through literature on overcrowding, stress, and safety perception. Vornanen et al. (2009) and Kokkonen et al. (2023) argue that increased stress levels reduce individuals' sense of stability, increasing their vulnerability to feelings of unsafety. Additionally, Koohsari, Yasunaga, Veitch, Kaczynski, and Oka (2024) demonstrate that overcrowding in public spaces can elevate stress and consequently diminish users' perception of security.

6.2.4 Maintenance of Public Spaces: Assessing the 'Broken Windows Theory'

Participants of this study reported that the maintenance and quality of public spaces significantly impacted their perceived safety. The increased presence of garbage in the public realm and neglect of the added green spaces significantly diminished their safety perceptions. They associated litter and alcohol bottles with antisocial behaviour. This strongly supports the 'Broken Windows Theory', constructed by Kelling and Wilson (1982), which suggests that visible signs of disorder, such as litter, vandalism, or neglect, signal antisocial behaviour and a lack of social control. Interestingly, the Broken Windows Theory suggests that physical disorder encourages further antisocial behaviour. However, this is not reflected by the empirical findings. Participants explained that the signs of neglect themselves negatively impact their perceived safety, but they did not report an increased fear for further antisocial behaviour resulting from the physical deprivation. According to Lewicka (2011) and Molcho (2009), length of residence and the resulting social capital significantly influence the extent to which residents expect physical neglect to affect individuals' behaviour. Increased social capital fosters greater trust in the individuals who use public spaces, reducing the perceived link between physical disorder and antisocial behaviour. Since the participants in this study reported relatively long residence durations, the weak association between physical and social disorder may be explained by their relatively high levels of social capital (Lewicka, 2011; Molcho, 2009).

Thus, the Broken Windows Theory (Kelling & Wilson, 1982) does not fully account for how participants from De Pijp and de Jordaan perceive the impact of physical neglect on their sense of safety. Nevertheless, the direct effect of physical neglect on participants' perceived safety aligns with quantitative findings by Rashid, Wahab, Rani, and Ismael (2017), supporting Hur and Nasar's (2014) conclusion that physical disorder can signal the potential presence of malicious individuals, thereby heightening the fear of unwanted interactions.

6.3 THE REJECTION OF THE SHARED SPACE THEORY

The Shared Space Theory suggests that the removal of physical and visual boundaries fosters attentiveness, eye contact, and mutual respect among users, thereby enhancing safety (Clarke, 2006; Batista & Friedrich, 2022). However, participants of this study consistently challenge this. Instead of increased cooperation, they reported feelings of confusion, unpredictability, and decreased road safety in uniformly designed spaces. This is reflected in cyclists riding onto sidewalks, pedestrians wandering onto bike lanes, and both tourists and locals using the space in ways inconsistent with its intended function. These observations confirm empirical critiques on the Shared Space Theory by Gkekas et al. (2020) and Navarrete et al. (2021), who argue that shared space may work conceptually but often fails in dense, chaotic urban contexts. Participants also reported a decline in social safety, noting increased tension, verbal conflicts, and behavioural irritations. Contrary to the cooperative ideal of Shared Spaces (Clarke, 2006), the lack of structure appeared to facilitate antisocial or unpredictable conduct. In this context, shared space design not only disrupted spatial unambiguity but also weakened behavioural norms.

In contrast, participants consistently expressed a preference for clear spatial demarcations, aligning more closely with Newman's (1972; 1998) Defensible Space Theory. Features such as elevated bike lanes and physically separated sidewalks were reportedly associated with more predictable behaviour, reduced conflict, and a stronger sense of control. This reflects findings from Mertens et al. (2016) and Cozens & Love (2015), who emphasise that spatial legibility and territoriality enhance perceived safety by clarifying expectations and use.

To explain the decline of the Shared Space Theory (Clarke, 2006), context is a key factor. According to Hamilton-Baillie (2008), the success of shared spaces depends on two conditions: low user density and shared behavioural norms. Neither of these conditions apply in De Pijp and de Jordaan, since public spaces in both neighbourhoods are intensively utilised by residents and tourists (AT5, 2023; De Wit, 2024), resulting in a mix of behaviours and value systems. In such heterogeneous and crowded settings, uniform spatial design appears to stimulate conflict rather than reduce it (Hamilton-Baillie, 2008).

6.4 THE LIMITATIONS OF THE 'EYES ON THE STREETS THEORY'

Findings of this study expose both the contemporary relevance and the limitations of Jane Jacobs' (1961) 'Eyes on the Street Theory'. According to Jacobs (1961), human activity in public spaces generates informal surveillance and discourages antisocial behaviour (Jacobs, 1961; Sueur, Piermattéo, & Pelé, 2023). This is partly reflected by the findings of this study, since some respondents report feeling safer in the public spaces in their residential

neighbourhoods because of the increase in the number of individuals on the streets. However, the empirical findings also give critical nuances to the theory. In particular, the results suggest that perceived safety is not linearly or uniformly improved by increased human presence in public spaces.

Participants emphasised that the quality of their relationships with others in public space is a key determinant of whether increased human presence enhances their perceived safety. A heightened sense of social control is only reported when the individuals present were acquaintances, such as neighbours or other recognisable community members. This suggests that safety is not a function of density alone, but of social embeddedness recognition. This aligns with the work of Su, Spierings, and Hooimeijer (2023), who argue that familiarity and community bonds, rather than numerical presence alone, mediate the efficacy of social control in public spaces.

This challenges Jacobs' (1961) assumption that mere public presence contributes equally to informal surveillance. The findings point instead to what feminist urban theorists have argued: that presence without connection and surveillance without community ties can increase rather than mitigate feelings of unsafety, particularly for women (Whitzman, 2007; Loukaitou-Sideris, 2012).

Participants' perceived concerns about overcrowding and the subsequent anonymity reinforce this perspective. Several respondents reported that their perceived safety declined as streets became more congested, especially due to tourism and increased "chaotic" street dynamics. This reflects critiques of the "Eyes on the Street", which note that increased surveillance may foster deindividuation and reduce accountability (Neuts, Nijkamp, & Van Leeuwen, 2012; Spears, 2021). The Social Identity Model of Deindividuation Effects (Reicher, Spears, & Postmes, 1995) offers valuable insight. It suggests that anonymity in crowds may increase conformity to the dominant norms of that group, which in crowded tourist zones may reflect antisocial behaviour.

Senior adults and long-term residents reported a relative immunity to changes in crowd density, often citing a general feeling of familiarity or safety through routine. This supports theories that stress the role of place attachment in shaping perceptions of safety and comfort (Manzo, 2003; Lewicka, 2011). Loukaitou-Sideris (2006) states that individuals often feel safer in known environments, even if these are objectively unsafe. The results are also in line with Korpela's (1989) argument that routine activities in familiar settings foster psychological stability, therefore making long-term residents less vulnerable to changes in safety perceptions.

In the tourist-heavy context of De Pijp and de Jordaan (Hielkema, 2024), the role of *tourists* as a distinctive social group further criticises the Eyes on the Streets Theory (Jacobs, 1961). Tourists were commonly perceived as contributing to feelings of unpredictability, diminished social accountability, and diminished road safety. These findings are supported by Mawby et al. (2016) and Patandianan & Shibusawa (2020). The inability of residents to socially engage or identify with tourists undermines mechanisms of safety that Jacobs (1961) argues to be present in urban environments. Thus, tourist presence functions as a double-edged sword: while

they may increase human activity, they do not necessarily contribute to the kind of surveillance and social control that reduces perceptions of risk (Su et al., 2023).

Another group that specifically influences perceived safety is car drivers. Findings reveal that participants often experience a decline in perceived safety due to increasingly aggressive or impatient behaviour by car drivers in areas with restricted car access. Particularly in de Jordaan, residents reported that drivers, especially taxis, respond to the new urban layout with frustration, leading to unsafe driving and hostile behaviour. Despite the consistency of these reports, current academic literature offers no explanation for this behavioural shift among drivers. While existing studies explore driver aggression broadly, the specific impact of car-restricted environments on driver psychology and behaviour remains understudied.

In conclusion, Jacobs' (1961) idea of "Eyes on the Street" is still a useful starting point for explaining perceived safety through human presence. However, the reality is more complex than the Eyes on the Streets theory proposes. The results of this study generally confirm academically grounded critiques on the theory, such as the mediating role of community ties and safety-diminishing mechanisms that refute the theory.

In conclusion, the changes in urban design of De Pijp and de Jordaan primarily positively impact perceived road and social safety through improved comfort and improved visibility. However, the subsequent behaviour changes were perceived rather negatively. The urban design fosters the presence of individuals in public spaces, enhancing perceived safety for some participants. However, in general, the changes in urban design have resulted in a more chaotic and unpredictable environment. This resulted in diminished social and road safety perceptions among participants, particularly due to conflicts between different user groups and the presence of unfamiliar or disruptive behaviour.

6.5 RETHINKING THE SAFETY–ACCESSIBILITY RELATIONSHIP

In this section, the influence of urban design, and the subsequent behaviour changes, on the ability of women to participate in out-of-home activities is examined, both directly and through safety concerns.

Most participants reported that safety concerns, if present, did not significantly impact their ability or decision to engage in out-of-home activities. Despite describing feelings of discomfort and unsafety in certain public spaces, participants largely maintained their ability to participate in these activities. This challenges claims from existing literature, which positions safety as an important determinant of perceived ability to participate in out-of-home activities (Lättman et al., 2016; Pot et al., 2024). Theories by Curl et al. (2016) and Loukaitou-Sideris (2014) emphasise gendered unsafety as a limiting factor for accessibility to and in urban spaces. However, the stability in accessibility observed in this study indicates that the influence of safety concerns on activity participation may be mediated by other factors.

Several explanations may account for this disconnect between perceived unsafety and unchanged activity participation. First, existing literature often overlooks the role of coping strategies and behavioural adaptation. Koskela (1997) critiques mainstream gendered safety

theories for positioning women as passive victims of the urban environment. Instead, she explains that women actively employ strategies to navigate public spaces. Thereby, they are able to maintain their autonomy and activity participation, despite feeling unsafe.

Furthermore, the relatively unimpacted activity participation can be explained through place attachment (Lewicka, 2011). This suggests that long-term residents develop place attachment, which can create resilience and tolerance towards perceived environmental threats. This generally aligns with the findings of this study. Participants who have lived in their neighbourhoods for several years generally reported confidence in navigating public spaces.

In addition, familiarity with the environment may mediate the relationship between perceived safety and activity participation. Loukaitou-Sideris (2004) explains that residents often feel less affected by safety concerns in familiar environments. The perceived discomfort by participants had potentially become a manageable part of everyday urban life through familiarity and coping mechanisms.

The explanatory power of these mediating factors is supported by this study's findings. Participants in the control group who had lived in the area for less than two years generally reported being disproportionately affected by behavioural and environmental changes regarding perceived accessibility.

Lastly, theories on the influence of safety concerns on activity participation often fail to distinguish mandatory trips from optional trips (Lewicka, 2011; Lättman et al., 2016). This may limit the explanatory power of safety theories for activity participation, as the motivations and constraints for different trips differ significantly (Gehl, 2011). Mandatory trips generally must be undertaken regardless of perceived safety risks and are therefore less influenced by them. In contrast, optional trips are more sensitive to safety-related barriers (Singleton & Wang, 2014; Gehl, 2011).

In conclusion, for participants in this study, the perceived increase in safety concerns did not lead to a decline in their perceived ability to engage in out-of-home activities.

7. Conclusion and Reflection

This study aimed to examine the influence of urban design and the subsequent behaviour changes by others in public spaces on perceived safety and accessibility by women living in De Pijp and de Jordaan. This is explored through the following research question: *"How do urban design changes in car-restricted zones in Amsterdam influence women's perceptions of safety and participation in out-of-home activities, both directly and indirectly through public behaviour, and how is this mediated by age and length of residence?"*

7.1 KEY FINDINGS

Urban design transformations significantly impacted the behaviour of individuals in public spaces. The active mobility-orientated new urban design has resulted in an increase in individuals utilising public spaces, not only as a transitional space, but also as a space of destination. This intensification of the public spaces in De Pijp and de Jordaan has significantly influenced the safety perceptions of women living in these neighbourhoods. The mere increased presence of individuals in the public realm has not resulted in a general improvement of perceived safety among participants, which is contradictory to Jacob's (1961) Eyes on the Streets Theory. Mechanisms such as overcrowding and the increased probability of unwanted interactions turned out to be important factors diminishing safety perceptions among the participants, confirming theories of Whitzman (2007), Lin (2020), and Patandianan and Shibusawa (2020).

While the perceived behaviour changes generally reduced perceived safety among participants, the direct influence of urban design elements, such as urban greenery and visibility, turned out to be positive. However, the more uniform street layout has resulted in a diminishing of perceived safety through chaotic and unpredictable behaviour.

Remarkably, contradicting existing accessibility literature (Borker, 2025; Noor & Iamtrakul, 2023; Peters, 2013), this study concludes that the generally perceived decrease in safety has not resulted in a significant change in perceived ability to participate in out-of-home activities. Participants reported that they do not alter their travel patterns or feel restricted from visiting any amenities or acquaintances.

In conclusion, urban design changes in Amsterdam's car-restricted zones have influenced women's perceived safety both positively and negatively. However, these perceptions have not significantly changed the participants perceived activity participation, potentially due to contextual and personal coping mechanisms. Age and length of residence played a mediating role, with place attachment and habituation being the most influential mediating determinants.

7.2 POLICY RECOMMENDATIONS

To enhance perceived safety for women in car-restricted neighbourhoods, urban design policies in Amsterdam must adopt a gender-sensitive and behaviour-informed approach to sustainability.

Interestingly, the City of Amsterdam has committed to actively involving young women in the development of urban planning policies. The city acknowledges that incorporating the safety perspectives of young women is essential to create a more inclusive urban environment (Hielkema, 2025). According to the new guidelines, visibility, wide active mobility lanes, and well-lit streets are key elements of Amsterdam's new urban design. These measures align with the findings of this study, which suggest that such inclusive design features, such as open sightlines and adequate lighting, can enhance women's perceptions of safety by fostering a more comfortable and secure public space. However, this study suggests that to enhance gender inclusivity in public spaces, pedestrian-friendly street layouts should include clearly separated lanes for different types of use. Such separations help promote predictable and understandable movement patterns, which can contribute to a greater sense of safety and comfort. By integrating this design principle into gender-inclusive urban planning policies, existing gender disparities in safety and accessibility may be further reduced.

Furthermore, stimulating activities in public spaces is crucial for enhancing perceived safety. However, policymakers need to take into account that this only functions when interactions between residents in public space are stimulated rather than a mere increase of individuals. To enhance this local social interaction, designated meeting places should be added, and space for outdoor seating in residential streets should be freed up. In addition, in touristy neighbourhoods such as De Pijp and De Jordaan, managing tourist flows is critical to prevent overcrowding and chaos to protect residents' sense of safety. Thereby, a more resident-orientated public realm instead of a visitor-orientated public realm can be created, which enhances social control and therefore safety perceptions.

7.3 STUDY LIMITATIONS AND IMPLICATIONS FOR FURTHER RESEARCH

While this study offers a detailed exploration of how car-restricting urban design affects women's perceptions of safety and accessibility, it also highlights several areas in which future research can meaningfully extend the discussion.

This study examined safety perceptions of women. However, women do not constitute a homogeneous group, and their experiences of public space are shaped by a multitude of intersecting social identities and contextual factors. Therefore, future research should adopt a more intersectional approach to investigate how overlapping identities, such as race, ethnicity, age, disability, sexual orientation, or migration background, shape experiences of safety and accessibility in public spaces. These factors can mediate how individuals interpret and experience urban public spaces. To achieve this, a mixed-methods approach could be well-suited. While qualitative interviews offer deep insight into how gendered perceptions of safety are experienced, they often rely on small, non-representative samples. By incorporating quantitative tools, such as large-scale surveys broken down by demographic characteristics, researchers can identify patterns of marginalization that might otherwise not be identified.

While Amsterdam serves as a valuable case study because of its progressive urban planning, strong cycling culture, and institutional efforts to improve gender equity in public space, it also represents a highly specific context that may not reflect other cities. Therefore, the findings of this thesis cannot be generalised to other urban environments with different cultural,

infrastructural, or socio-economic conditions. For future research, it is essential to examine how similar urban interventions work out in other types of urban contexts. Particularly those where urban sprawl and car dependency are high. Furthermore, public spaces have different social and cultural meanings, with different gender norms in different cultures. While this study is particularly relevant for public life in Amsterdam, it does not reflect public life in other cultures. Comparative studies, both between and within countries, could explain important differences in how urban design interacts with local cultural expressions.

The influence of urban design and behavioural changes on perceived safety and accessibility diminishes over time because the public space users may get used to it (Lewicka, 2011). However, this study only briefly touches upon these dynamic effects, focusing primarily on cross-sectional data that captures perceptions at a single point in time. Therefore, an examination of the long-lasting influences of the urban design changes on perceived safety is important to examine in future studies. Employing longitudinal methods would provide deeper insights into these long-term influences.

Furthermore, an important finding emerging from this study reveals that behaviour changes by car users in car-restricted zones significantly impact perceived safety among women. However, since there are no theories or concepts generally explaining the relationship, it is not possible to draw generalisable conclusions on how changes in car-driver behaviour influence perceived safety. For further research, a large-scale study, covering different contexts in which car-restricting urban design changes are implemented, could enrich contemporary literature. It would offer a valuable and underexplored dimension to the discourse on equitable and inclusive urban planning. Understanding these behavioural responses is crucial for preventing unintended consequences from sustainable mobility planning.

Lastly, when research on women's experiences of safety is conducted by a man, certain limitations may arise. Even with careful attention to neutrality and sensitivity, gender differences can influence how participants share their experiences and how findings are interpreted. In topics related to perceived safety and activity participation, participants may feel more comfortable and open with a woman studying the topic, which can lead to more honest and detailed responses. A comprehensive examination of the positionality and perspectivism of the researcher is presented in appendix 4. Future research would benefit from being carried out by women, as this may improve participant trust, reduce bias in interpretation, and lead to more accurate and meaningful insights.

7.4 PERSONAL REFLECTION ON THE RESEARCH PROCESS

Despite a relatively smooth research process, the researcher has faced some difficulties, impacting the quality of certain elements of this study.

Interactions with participants revealed some challenges regarding conceptualisation and privacy. Firstly, the distinction between the concepts of 'road safety' and 'social safety' was not always sufficiently clear to participants, which at times impacted their ability to accurately explain their perceptions regarding each type of safety. In future studies, a more clearly defined and operationalised explanation of these terms could result in a more structured analysis of the

data, resulting in more reliable and comparable findings. Secondly, concerns related to participant privacy also emerged. Despite several measures to assure participants that their data is anonymised and confidential, two participants declined to have their interviews audio recorded. Since it is always the participant's right to refuse recording, it is important to prepare a specific scheme to make notes during the interviews. Thereby, a more structured way of taking notes can be secured.

In addition, gathering participants with various sociodemographic characteristics proved to be difficult. To reach potential participants with various sociodemographic characteristics, greater community engagement within the study area is required. Due to time restrictions, this was not possible for this study. However, for future studies, increasing community engagement by the researcher could increase the external validity of the study, with representations of several sociodemographic groups.

Lastly, in the process of transforming public spaces in De Pijp and De Jordaan into more pedestrian-friendly areas, both neighbourhoods underwent extensive construction work, resulting in large construction zones and dug-up streets. Consequently, the new urban design was at times associated with mobility limitations and behavioural constraints caused by the ongoing works. Some participants found it difficult to distinguish their feelings about the new layout from their frustrations with the temporary disruptions, which influenced their overall perception of the redesigned public space.

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Appendix 1: Overview of all Theories and Relationships

Theory / Relationship	Author(s)	Core Idea	Relevance
Gendered Space	*Spain, 1993; Vera-Gray, 2020*	Public space is historically and socially masculinised, creating perceived unsafety by women.	Supports how women behave differently in public spaces.
Vulnerability Hypothesis	*Baur, 2007*	Women avoid spaces or adapt behaviour because they anticipate danger.	Explains how women experience social unsafety in public spaces.
Gendered perceived traffic safety	*Kaparias et al., 2012*	Women experience unsafety in traffic in inadequately designed spaces.	Explains how women experience road unsafety in public spaces.
Urban Design – Public Behaviour	*Gehl, 2010; Hassen & Kaufman, 2016*	Urban design shapes public behaviour by encouraging walking, lingering, and social interaction.	Explains how the design of public spaces influences public behaviour, influencing perceived safety among women.
Visibility – Perceived Safety	*Jansson, 2019; Kaushal, 2024; Moss et al., 2024*	Visibility enhances perceived safety by improving orientation, surveillance, and social interaction.	Explains how sightlines and visibility in urban design influence women's safety perceptions.
Urban Greenery – Perceived Safety	*Nordh et al., 2024; Li, Li, and Zhang, 2015*	Urban greenery enhances comfort and satisfaction but reduces visibility.	Explains the contradiction of the influence of urban design on women's perceived safety.
Street Design – Perceived Safety	*Šemrovet et al., 2022; Gössling and McRae, 2022*	Wider active mobility lanes increase perceived road and social safety.	Explains how street design, such as sidewalk width, influences perceived safety.
Broken Windows Theory	*Wilson & Kelling, 1982*	Physical disorder and poor maintenance lead to feelings of unsafety.	Explains the impact of maintenance and physical disorder on antisocial behaviour and safety perception.
Shared Space Theory	*Monderman, 2003; Clarke, 2006*	Lack of demarcation leads to equality, cooperation, and alertness. This increases perceived safety	Predicts for road structures and perceived safety. Contradicts the Defensible Space Theory.
Defensible Space Theory	*Newman, 1972*	Areas with clear boundaries and visibility feel safer and organised.	Predicts for road structures and perceived safety. Contradicts the Shared Space.
Eyes on the Street Theory	*Jacobs, 1961*	More people and activity increase social control and perceived safety.	Predicts perceived safety in lively public spaces.
Increased unwanted interactions	Whitzman, 2007; *Ismawati et al., 2023*	More people and activity increase the likelihood of unwanted interactions.	Predicts perceived unsafety in lively public spaces. Nuances the Eyes on the Streets Theory.
Deindividuation	*Lin, 2020; Neuts et al., 2012*	More people leads to a sense of anonymity and unaccountability by public space users.	Predicts perceived unsafety in lively public spaces. Nuances the Eyes on the Streets Theory.
Overcrowded public spaces	*Loukaitou-Sideris & Fink, 2009*	More people diminish perceived safety through chaos and discomfort.	Predicts perceived unsafety in lively public spaces. Nuances the Eyes on the Streets Theory.
Community ties	*Su, Spierings, and Hooimeijer, 2023*	Social control is only efficient when the public space users are acquaintances.	Mediates the influence of people in public spaces on social control. Nuances the Eyes on the Streets Theory.
Perceived Safety – Activity Participation	*Borker, 2025; Kwan, 1999*	Activity participation by women is restricted because of safety concerns.	Explains how safety concerns influence perceptions of the ability to participate in out-of-home activities.

Appendix 2: Interview Scripts

Main study sample

Introduction

Hello [Participant], thank you for agreeing to participate in this interview. My name is Bram Krijger, and I'm conducting research on how changes in the built environment, such as the implementation of car-restricted zones, influence women's perceptions of safety and accessibility. Your insights are incredibly valuable for my study, and I greatly appreciate your time. This interview is completely anonym, no names or traceable information will be kept in the transcripts. The information obtained from this interview is confidential and will only be used for this thesis and will not be published. Thank you for filling in the informed consent form. Do I have the permission to voice-record this interview?

The concept of public space is an important concept in this interview, therefore I want to elaborate on the meaning of the concept in this interview. Public spaces are areas that are open and accessible to everyone, such as parks, streets, and plazas, where individuals can gather, interact, and move freely.

Introduction questions

What is your age at the time of recording?

How long have you lived in your neighbourhood of residence?

Questions on behaviour change

I want to start by asking you some questions about your perception of the design changes in the public space in the neighbourhood.

Do you experience any changes in the design of the public spaces in your residential neighbourhood? And what changes in design do you perceive?

Now I want to go through some visible changes in urban design in your neighbourhood to paint a comprehensive picture of the concerned urban design changes.

Do you recognise these changes in layout consciously or unconsciously? Or do you not experience any of these changes?

Now I want to ask you something about your perception of behaviour change by others on the streets in your neighbourhood.

The changes in urban design may have changed the way individuals use this area. Have you noticed any changes number of individuals on the streets?

Have you noticed any changes in the modes of transport individuals use to move through the streets in the neighbourhood?

Have you noticed any other behavioural changes by individuals on the streets as a result of the way the street is designed?

Questions on perceived safety

The next part will contain questions about your perceived safety. Are you okay with sharing your feelings regarding safety with me? I want to emphasise the fact that you can skip questions or stop the interview at any moment. The first question is about road safety.

Introducing the term 'road safety':
Road safety means that everyone on the road, like drivers, cyclists, and pedestrians, stays safe and avoids accidents. It includes things like rules, signs, and better road designs.

The implementation of car-restricting policies has influenced both the physical design of the neighbourhood and the behaviour of individuals in the public space. How has your perception of road safety in the neighbourhood changed as a result of the changes in physical design and behaviour change?

The second question is about social safety.

Introducing the term 'social safety':
Social safety is the feeling of being safe and protected in your community, where individuals respect each other and there is support for those in need. It involves reducing crime and promoting trust among individuals.

How has your perception of social safety in the neighbourhood changed as a result of the aforementioned changes in physical design and behaviour change?

Explaining all elements of urban design and behaviour in public spaces:
Urban design: Lighting, Visibility, Urban Greenery, & Street Design
Behaviour: Social control, territoriality, gender imbalances in public spaces

What changes in the design and behaviour have potentially influenced these changes in your perceived safety?

Questions on perceived accessibility

Lastly, I want to ask you a couple questions about your perceived accessibility and ability to participate in out-of-home activities. This is reflected in the extent to which you feel limited or encouraged to visit places, facilities, or individuals.

How have the new physical design of the neighbourhood and behaviour changes affected your ability to reach certain destinations (e.g., work, school, shops, healthcare, or leisure facilities) in your neighbourhood? And in what ways?

To what extent are these limitations a result of safety concerns?

Do you think these accessibility concerns are different for individuals with differing genders? If so, why? And in what ways?

Closing

I want to thank you for all your valuable answers. I hope you enjoyed the interview.

Do you have any last questions or relevant comments regarding the topic?

Control sample

Introduction

Hello [Participant], thank you for agreeing to participate in this interview. My name is Bram Krijger, and I'm conducting research on how changes in the built environment influence women's perceptions of safety and ability to participate in out-of-home activities. Your insights are incredibly valuable for my study, and I greatly appreciate your time. This interview is completely anonym, no names or traceable information will be kept in the transcripts. The information obtained from this interview is confidential and will only be used for this thesis and will not be published. Thank you for filling in the informed consent form. Do I have the permission to voice-record this interview?

Introduction questions

What is your age at the time of recording?

How long have you lived in your neighbourhood of residence?

Did you live in Amsterdam before moving here?

Questions on perceived safety

Introducing the term 'road safety' and relevant urban design and behaviour elements:

Road safety means that everyone on the road, like drivers, cyclists, and pedestrians, stays safe and avoids accidents. It includes things like rules, signs, and better road designs.

Urban design: Lighting, Visibility, Urban Greenery, & Street Design
Behaviour: Social control, territoriality, gender imbalances in public spaces

To what extent do you ever feel unsafe regarding road safety when navigating the streets or parks in your neighbourhood because of the way the streets are designed?

To what extent do you think this perception of road safety changes over time?

Introducing the term 'social safety':
Social safety is the feeling of being safe regarding the interactions with others in public spaces and to what extent you feel vulnerable to the impact of others in public spaces.

To what extent do you ever feel unsafe regarding social safety when navigating the streets or parks in your neighbourhood because of the way the streets are designed?

To what extent do you think this perception of social safety changes over time?

Questions on perceived accessibility

Lastly, I want to ask you a couple questions about your perceived accessibility. Accessibility is a complex concept. In this study 'perceived accessibility' means the extent to which you feel limited to visit places or facilities.

Do you ever feel restricted or encouraged in your ability to participate in out-of-home activities as a result of the aforementioned urban design or behaviour by others?

To what extent do you think this perception of accessibility changes over time?

Closing

I want to thank you for all your valuable answers. I hope you enjoyed the interview.

Do you have any last questions or relevant comments regarding the topic?

Appendix 3: Informed Consent Forms

Informed Consent Form

Research Study Title:

The influence of car-restricting policies on women's perceived safety and accessibility in Amsterdam.

Researcher:
Bram Krijger
Student number: 6933653
Email address: b.krijger2@students.uu.nl
Supervisor: Dea van Lierop
Employer: Utrecht University | Master's program 'Urban & Economic Geography'

Purpose of the Study:

The purpose of this study is to explore how the implementation of car-restricted in Amsterdam has influenced women's perceptions of safety and accessibility in public spaces in these zones. The goal is to understand how these changes in the urban design and behaviour in car-restricted zones affect women's behaviour, sense of safety, and perception of accessibility.

Study Procedures:

If you agree to participate, you will be asked to participate in a one-on-one interview where you will be asked questions about your experiences and perceptions regarding car-restricted public spaces in your neighbourhood. Topics regarding safety and accessibility will be addressed in the interview. The interview will last approximately 30 to 45 minutes, and all questions will be related to the topic of the research.

Voluntary Participation:

Your participation in this study is completely voluntary. You may choose to skip any questions or stop the interview at any time.

Confidentiality:

All information you provide will be kept confidential. Your responses will be used solely for academic purposes and will not be shared with anyone outside of the researcher and his supervisor. Any identifiable information will be removed or altered to ensure anonymity in the final report. All interview recordings will be securely stored and deleted after the research is completed.

Potential Risks and Benefits:

There are no anticipated risks associated with participating in this study. However, discussing personal experiences might raise emotions or discomfort. If you feel uncomfortable at any time, you are free to withdraw. The potential benefit is contributing to a better understanding of how changes in urban planning affect women's safety and accessibility in public spaces.

Right to Withdraw:

You have the right to withdraw from the interview at any time during the interview, without any consequences. If you wish to withdraw, simply inform the researcher. Withdrawing from the entire study is possible up to one week after the interview is conducted.

Contact Information:

If you have any questions or concerns about this study, please feel free to contact me at b.krijger2@students.uu.nl. If you have any questions regarding your rights as a participant or concerns about the study, you may contact me at all times.

Consent to Participate:

By signing below, you indicate that you have read and understood the information provided above, that you are voluntarily participating in this study, and that you give your consent to be interviewed for this research.

Participant's Name: _____

Participant's Signature: _____

Date: _____

Researcher's Signature: _____

Date: _____

Informed Consent Formulier

Titel van het onderzoek:
De invloed van autobeperkende beleidsmaatregelen op de ervaren veiligheid en toegankelijkheid van vrouwen in Amsterdam.

Onderzoeker:
Bram Krijger
Studentnummer: 6933653
E-mailadres: b.krijger2@students.uu.nl

Begeleider:
Dea van Lierop

Werkgever:
Universiteit Utrecht | Masterprogramma 'Urban & Economic Geography'

Doel van het onderzoek

Dit onderzoek heeft als doel te verkennen hoe de invoering van autobeperkte en autovrije zones in Amsterdam invloed heeft op de perceptie van veiligheid en toegankelijkheid van vrouwen in deze gebieden. Het doel is om beter te begrijpen hoe veranderingen in de gebouwde omgeving en gedrag in autobeperkte zones het gedrag, veiligheidsgevoel en de toegankelijkheidsperceptie van vrouwen beïnvloeden.

Onderzoeksprocedures

Indien u instemt met participatie aan het onderzoek, wordt u gevraagd om deel te nemen aan een één-op-één interview. Tijdens het interview worden vragen gesteld over uw ervaringen en percepties met betrekking tot autobeperkte openbare ruimtes in uw buurt. Onderwerpen zoals veiligheid en toegankelijkheid komen aan bod. Het interview duurt ongeveer 25 tot 30 minuten, en alle vragen zullen betrekking hebben op het onderwerp van het onderzoek.

Vrijwillige deelname

Uw deelname aan dit onderzoek is volledig vrijwillig. U kunt op elk moment beslissen om een vraag over te slaan of te stoppen met het interview.

Vertrouwelijkheid

Alle informatie die u verstrekt, wordt vertrouwelijk behandeld. Uw antwoorden worden uitsluitend gebruikt voor academische doeleinden en zullen niet worden gedeeld met anderen dan de onderzoeker en zijn begeleider. Alle identificeerbare gegevens worden verwijderd of aangepast om anonimiteit te waarborgen in het eindrapport. Interviewopnames worden veilig opgeslagen en na afronding van het onderzoek verwijderd.

Mogelijke risico's en voordelen

Er worden geen risico's verwacht bij deelname aan dit onderzoek. Wel kan het bespreken van persoonlijke ervaringen emoties oproepen of als ongemakkelijk worden ervaren. Mocht u zich op enig moment ongemakkelijk voelen, dan bent u vrij om te stoppen met het interview. Een mogelijk voordeel is dat u bijdraagt aan een beter begrip van hoe stedelijke planning de veiligheid en toegankelijkheid van vrouwen in openbare ruimten beïnvloedt.

Recht op terugtrekking

U heeft te allen tijde het recht om uw deelname aan het interview te beëindigen, zonder gevolgen. Als u zich wilt terugtrekken, kunt u dit eenvoudig aan de onderzoeker laten weten. Terugtrekken uit het volledige onderzoek is mogelijk tot uiterlijk één week na het afnemen van het interview.

Contactgegevens

Als u vragen of opmerkingen heeft over dit onderzoek, neem dan gerust contact op via **b.krijger2@students.uu.nl**. Mocht u vragen hebben over uw rechten als deelnemer of andere zorgen over het onderzoek, dan kunt u eveneens contact opnemen.

Toestemming voor deelname

Door ondertekening van dit formulier geeft u aan dat u de bovenstaande informatie heeft gelezen en begrepen, dat u vrijwillig deelneemt aan dit onderzoek, en dat u toestemming geeft om geïnterviewd te worden voor dit onderzoek.

Naam deelnemer: _____

Handtekening deelnemer: _____
Datum: _____

Handtekening onderzoeker: _____
Datum: _____

Appendix 4: Coding Scheme

Theme / Subquestion	Code
Public behaviour change	Change in frequency or intensity of use
	Change in mode of transportation
	Change in moment of use of public space
Determinants for changes in perceived safety in public spaces	Urban greenery
	Street lighting
	Visibility & Open sightlines
	Street design
	Increase in physical deprivation
	Decrease in physical deprivation
	Presence of natural surveillance (Eyes on the Street)
	Increased crowding
	Overcrowding
	Increased likelihood of unwanted interactions
	Deindividuation
	Community ties
	Influence of tourism and presence of tourists
	Territoriality
	Lack of territoriality leading to irritation or conflict
	Improved spatial legibility (Defensible space)
	Reduced spatial legibility
	Increased vigilance
	Change in driver behaviour
	Fewer cars
	Other
Changes in perceived accessibility in PS	Improved perceived accessibility
	No change in perceived accessibility
	Diminished perceived accessibility

Appendix 5: Positionality and Conflicting Interests

Positionality and conflicting interests are essential in qualitative research, especially in studies addressing sensitive topics such as safety and accessibility. Acknowledging how the researcher's background and biases may influence data collection and analysis promotes transparency and credibility. Reflecting on positionality ensures the research remains objective, while addressing conflicts of interest enhances the study's validity.

Gender Imbalances

Feminist geography issues, especially issues regarding gender inequalities, are loaded subjects, full of historical and cultural oppression. To acknowledge and respect the sensitivity of issues regarding safety and accessibility for women, a comprehensive and critical reflection on the researcher's positionality is necessary.

As a male researcher investigating the experiences of women regarding safety and accessibility in car-restricted zones, it is important to recognise the potential influence of gender on the research approach. The focus on the perceptions of women presents a challenge, as male researchers do not directly experience the safety and mobility restrictions that women may face. Additionally, perceived unsafety by women is regularly caused or reinforced by men (Schoberleitner, 2022). Therefore, women may experience anxiety or a lack of comfortability explaining their perceived safety and accessibility to male researchers (Hoffman, Mair, Hunter, Prince, & Tebes, 2018). The researcher is aware of the male biases and gendered imbalances regarding interviews with participants. To ensure that the participants feel safe to share their story, the researcher explains his awareness to the participants. Moreover, he emphasises that the participants are never required to answer any questions they are not willing to answer.

In addition to the dominant position that men hold in the public sphere and the potential gender disparities in social interactions, there is also a significant gender imbalance in academia (Bosco, Verney, Bermúdez, & Tonarelli, 2024). The researcher is aware of the gender gap in academia. He is also aware that this may cause resistance by women. The researcher shows his awareness around the issue and acknowledges the issues of male dominance in academia to participants to ensure they feel comfortable.

Positionality and Perspectivism

The researcher does not have disproportionate emotional attachment to the studied subject, ensuring a relatively objective approach to the studied topic (Khatwani & Pahnwar, 2019). However, the researcher does have background information regarding the topic, which may negatively influence the objectivity of this research. To mitigate this, critical reflexivity was employed throughout the entire research process, and conscious efforts were made to acknowledge and minimise personal biases during data collection, analysis, and interpretation."

Since the researcher identifies as a man, his personal experiences with safety and ability to participate in out-of-home activities may differ from those of the women participating in this study. This discrepancy poses a potential risk of misinterpretation when analysing the data. To mitigate this issue, the researcher engaged in extensive discussions with women to gain deeper

insights into perceptions of safety and accessibility. Additionally, the analysis was conducted through a theoretical lens, minimising subjective bias. To further ensure the accuracy of interpretations, a comprehensive and in-depth review of existing literature on women's perceptions of safety and accessibility and gender differences in spatial experiences was executed prior to the study. The 'outsider' position that the researcher has regarding the research topic and the participants might increase the possibility of misinterpreting the literature and empirical data.

However, being an outsider in this study provides a critical advantage by allowing for a relatively objective perspective on the research topic. Without personal experiences shaping perceptions of safety and accessibility in car-restricted zones, there is a reduced risk of preconceived notions influencing data interpretation. This detachment enables an analytical approach, focusing on theoretical frameworks and empirical findings rather than personal assumptions (Dwyer & Buckle, 2009).

To not exclude potential participants from participating in the study, the potential sample population consists of both Dutch- and English-speaking women living in De Pijp and de Jordaan. Therefore, the interviews can be conducted in both Dutch and English. Consequently, a more inclusive potential sample population is ensured. Furthermore, conducting interviews in the participants' native language to capture the depth and subtleties of their experience (Birbili, 2000).

This research acknowledges that women's experiences of safety and accessibility are shaped by intersecting factors such as race, class, age, and disability. While the study focuses on women in car-restricted neighbourhoods, it recognises that their perceptions may differ based on their individual backgrounds and social positions (Christoffersen & Emejulu, 2023). Efforts were made to include participants with diverse demographic characteristics to capture a broad range of experiences. However, limitations in sampling may result in certain perspectives being underrepresented (Crenshaw, 2013).