

SHAPING SAFETY PERCEPTION

An analysis of the relationship between physical and social neighbourhood factors on the perception of safety: Differences between men and women

by

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Ethical statement

This study was approved by the Ethical Review Board of the Faculty of Social and Behavioural Sciences of Utrecht University. The approval concerns ethical aspects, as well as data management and privacy issues. The approval is filed under number 24-1693.

Abstract

Perceived safety within neighbourhoods plays a critical role in shaping individuals' well-being, quality of life, and daily activities. This thesis examines whether the perceived safety of neighbourhoods is influenced by both perceived physical neighbourhood aspects (such as the absence of litter, graffiti, and deteriorated buildings) and perceived neighbourhood social cohesion (including the sense of trust and belonging among neighbours), and whether these influences vary between men and women.

Physical neighbourhood order can signal community engagement, upheld norms, and social control, affecting neighbourhood safety perception. Similarly, higher perceived social cohesion can enhance neighbourhood safety perceptions through expected social control measures. It is hypothesized that both higher perceived physical neighbourhood order and higher perceived social cohesion are associated with increased perceived neighbourhood safety, with stronger effects expected for women due to gender role socialisation.

This study analyses data from the Utrecht Resident Survey of 2023, with a sample of 6200 residents. The results indicate that both higher perceived physical neighbourhood order and, to a somewhat lesser extent, perceived neighbourhood social cohesion predict greater perceptions of neighbourhood safety. Importantly, these were found to be stronger for women than for men. To enhance neighbourhood safety among residents, it is recommended to adopt gender-sensitive safety policies, prioritize physical improvements such as cleanliness and maintenance, foster community cohesion, and enhance communication strategies to better inform residents.

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1 Introduction

Perceived safety of a neighbourhood captures how safe people feel in their neighbourhood, rather than how safe it actually is. This subjective evaluation of safety is not simply a matter of crime statistics or security measures but reflects the complex interplay of social, environmental, and psychological factors. Perceived safety within neighbourhoods significantly influences individuals' well-being, quality of life, and their daily behaviours. Therefore, it provides a more complete understanding of residents' feelings by reflecting their subjective evaluations of their environment (Putrik et al., 2019).

Research indicates the critical importance of perceived safety, as it is linked to various aspects of physical and mental health. Individuals who perceive their neighbourhoods as unsafe are more likely to experience poorer mental health (Roberts et al., 2010; Stafford et al., 2007; Booth et al., 2012) and poorer physical health (Putrik et al., 2019; Chandola, 2001), indicating a significant impact on overall well-being. In addition to its direct impact on health outcomes, perceived safety also influences individuals' behaviours and lifestyle choices. Feelings of unsafety can lead to avoidance behaviours such as restricting mobility outside the residence (Loukaitou-Sideris & Eck, 2007). This restriction on mobility can potentially impede physical activity (Loukaitou-Sideris & Eck, 2007) and social engagement (Stafford et al., 2007), exacerbating the negative health effects associated with perceived safety.

Due to the substantial impacts of the perception of safety, this perception has long been a priority for key stakeholders in the field of security policy. Recognizing its importance, influential figures such as politicians, municipalities, and police have dedicated substantial efforts to addressing this issue. But for these efforts to be effective, it is important to understand how the complex concept of perceived safety is shaped.

While objective measures such as crime rates offer valuable statistical insights into the prevalence of criminal activities, they may not fully capture individuals' subjective experiences of safety. Actual threats of crime account only for a small part of people's perception of safety. Instead, behaviours that are not defined as criminal but are still perceived as threatening seem to play a significant role in safety perceptions (Lewis & Salem, 1986). Moreover, perceptions of safety vary greatly depending on the location (CBS, 2024), implying that contextual factors of the neighbourhood can have a significant influence on perceived neighbourhood safety.

The concept of a neighbourhood encompasses both physical and social dimensions. Physically, it refers to the geographical area where residents live, while socially, it reflects the

communal norms and interpersonal connections within that area (Jenks & Dempsey, 2007). In the field of urban sociology, it was recognized that the neighbourhood in which an individual lives can significantly influence their behaviour. In response to these insights, researchers formulated new theoretical constructs that delved deeper into how physical and social factors within neighbourhoods are connected to crime-related phenomena.

First, physical neighbourhood aspects, such as graffiti, litter, or broken windows, can signal a lack of community engagement, upheld norms, and social control (Wilson & Kelling, 1982a; Skogan, 2011). Therefore, these physical signs may influence how residents perceive their neighbourhood's safety.

Secondly, neighbourhoods with high social cohesion are better equipped to address safety concerns collectively (Sampson et al., 1997). When residents perceive higher social cohesion, they expect more prevalent social control measures, which can influence their perception of safety (Kleinhans & Bolt, 2010).

Besides these variances across neighbourhoods, perceived safety also varies within neighbourhoods. Research consistently shows that women report feeling less safe than men in their neighbourhoods, despite being less likely to be victims of crime in public spaces (Johansson & Haandrikman, 2021, CBS, 2022). This disparity underscores the importance of investigating factors that influence neighbourhood safety perceptions and highlights the need to examine these factors separately for men and women. Women are often socialised to be more attuned to both physical neighbourhood order and neighbourhood social cohesion (Franklin & Franklin, 2009; Rader & Haynes, 2011). Consequently, these factors may have a different influence on women's perceptions of safety compared to men. While existing research has examined how physical neighbourhood order and neighbourhood social cohesion affect perceptions of neighbourhood safety, this study therefore extends this scope by considering differences between men and women. The aim of this study is to investigate to what extent the perceived physical neighbourhood order and perceived neighbourhood social cohesion affect perceived neighbourhood safety, and if this differs for men and women.

Previous research has critiqued that efforts to improve safety perception often stall at the level of intentions and goals without translating into effective implementation (Spithoven, 2014). By delving into the complex dynamics of perceived safety, this research seeks to provide valuable insights for policymakers, urban planners, and community stakeholders to foster neighbourhoods with heightened perceived safety.

Furthermore, much existing research in this field has been conducted in the United States (Lorenc et al., 2012), thus, the Dutch context offers a unique perspective. Despite a decline in crime rates, perceptions of safety have not significantly improved in the Netherlands (CBS, 2024). This suggests that factors beyond crime rates influence safety perceptions. By examining the Dutch context, this study seeks to provide insights that enhance the generalizability of findings.

To conduct an answer to these questions, this thesis analysed data from the Dutch city Utrecht, a prominent urban centre in the Netherlands. Studying an urban context aligns with the characteristics examined in much prior research on perceived safety, thereby providing a relevant basis for my study. The data utilized came from the Utrecht Resident Survey of 2023, focusing on residents of Utrecht aged 18 and above. This survey, conducted biennially by the municipality of Utrecht, reaches out to approximately 30,000 residents of Utrecht. From this outreach, about 6,800 respondents actively participated by completing the questionnaire. This dataset offers a unique opportunity to delve into the specific Utrecht context, providing relevant and actionable insights for policymakers and stakeholders in Utrecht, while also contributing to the broader understanding of perceived safety in urban environments.

2 Theoretical framework

Since the 1970s, scholars have started exploring subjective safety perceptions beyond objective crime rates. Researchers recognised that safety cannot be solely predicted by crime statistics but is instead a multifaceted construct shaped by various contextual factors. In my exploration of this complicated web of factors, I propose that physical order and social cohesion of a neighbourhood are influential aspects in the level of safety one perceives, and that this influence is different for men and women. In the subsequent section of this thesis, I will delve deeper into the mechanisms through which the physical neighbourhood order and neighbourhood social cohesion shape an individual's perceptions of safety in their neighbourhood, and how this is different for men and women.

Perceived physical neighbourhood order

Physical cues of deterioration in the neighbourhood, such as litter, graffiti, or vandalism, have been found to function as implicit indicators of areas perceived as unsafe (Skogan, 2011; Pitner et al., 2012; Taylor, 1994). These physical cues represent a lack of physical order in the neighbourhood. Research indicates that an increase in physical disorder leads to higher perceptions of crime and overall disorder among residents (Taylor, 1994).

This concept is rooted in the 'Broken Windows Theory', introduced by Wilson and Kelling in 1982. This theory significantly impacted public discourse by proposing that the physical aspects of a neighbourhood can shape the prevalence of deviant behaviour and residents' perceptions of safety within their environment. It posits that minor physical disorder, such as broken windows, creates an environment that encourages further crime and disorder (Wilson & Kelling, 1982a).

Physical disorder signals a lack of enforcement and adherence to community norms, leading residents to perceive a decline in the level of social control in the neighbourhood (Wilson & Kelling, 1982a; Skogan, 2011). This perceived decline in social control may evoke feelings of threat among residents, as it lowers the perceived risk for potential offenders, making the idea of committing a crime seem less costly (Kotabe, 2014). These feelings of threat and the perceived lack of social control may result in people experiencing an environment as less safe (Pitner et al., 2012). Consequently, when people perceive cues of physical disorder in their environment, their perception of safety diminishes, regardless of the actual crime rates or risks of victimization (Skogan, 2011).

Additionally, the Routine Activities Theory offers complementary insights. According to routine activities theory, for a crime to occur, three elements must converge: motivated offenders, suitable targets, and the absence of capable guardianship (Cohen & Felson, 1979). Although this theory primarily focuses on factors that lead to crime, evidence indicates that spaces where these three elements are less likely to converge are also perceived as safer (Branas et al., 2018). This theory suggests that environments with more physical disorder are perceived as less safe because this suggests that community norms are not being enforced (Branas et al., 2018). Residents may perceive fewer capable guardians in such environments (Nasar & Fisher, 1993; Jiang et al., 2018), fostering a belief among residents that motivated offenders view these areas as low-risk opportunities for criminal activity (Kotabe, 2014). Even without an increase in actual crime, the mere perception of more motivated offenders can diminish residents' sense of safety (Pitner et al., 2012). Additionally, residents' perceived safety may decline due to their belief that there are fewer capable guardians in the neighbourhood (Hollis et al., 2013).

The integration of these perspectives shows that the Broken Windows Theory highlights how physical disorder signals a perceived breakdown in social control, impacting safety perceptions. The Routine Activities Theory links physical disorder to safety through its implications for perceived crime opportunity. Together, these theories indicate that physical disorder cues in neighbourhoods play a crucial role in shaping residents' perceptions of neighbourhood safety.

Previous research has found that physical neighbourhood order has a positive impact on residents' perception of safety (Austin et al., 2002). Specifically, researchers have consistently shown that neighbourhood physical disorder, such as litter, graffiti, and deteriorating buildings, influence safety perceptions (Austin et al., 2002; Skogan & Maxfield, 1981, Zeng et al., 2022).

Based on these insights, I propose the following hypothesis:

H1: The higher one perceives the level of physical neighbourhood order, the safer one feels in it.

Social neighbourhood cohesion

In addressing safety perceptions in the neighbourhood, Sampson et al. (1997), argue that the relationship between physical factors and safety is weaker than often assumed. Sampson et al. (1997) suggest that the perception of safety is strongly dependent on the social context of a neighbourhood. Therefore, they advocate for a more comprehensive approach to safety, which not only examines the physical characteristics of a neighbourhood but also the social context.

Recognizing the importance of the social context in shaping safety perceptions, it is relevant to turn to the Collective Efficacy Theory. This theory suggests that not the physical aspects of a neighbourhood, but rather the social aspects of a neighbourhood influence the perceptions of safety within the neighbourhood (Sampson et al. 1997). The Collective Efficacy theory emphasizes the importance of social cohesion and proactive community action in shaping neighbourhood safety (Sampson et al. 1997).

The concept of social cohesion was first introduced by sociologist Durkheim (1897), who defined it as the interdependence between the members of a society. He attributed social cohesion to the absence of latent social conflict and the presence of strong social bonds. Building upon this foundation, Chan et al. (2006) provided a redefined and operational definition of social cohesion. Their paper defines social cohesion as the state of relations among members of society, characterized by a set of attitudes and norms, including trust, a sense of belonging and the willingness to participate and help, along with behavioural expressions (Chan et al., 2006). Social cohesion is closely linked to social capital. This study employs the term ‘social cohesion’ for its specific emphasis on the neighbourhood context, whereas social capital primarily concerns individual assets (Wan et al., 2021).

Collective Efficacy is defined by Sampson et al. (1997) as social cohesion among neighbours combined with their willingness to intervene on behalf of the common good. This involves expectations about the capacity to collectively generate solutions to local problems that occur in the neighbourhood (Bandura 1997). This capacity refers to the ability of a neighbourhood to apply social control to prevent crime and address safety concerns collectively (Bandura 1997). Theories suggest that social cohesion takes precedence over informal social control, as residents are only willing to take action if they know the person addressed, feel supported by other residents or have confidence that other residents would also intervene in a similar situation (Kleinhans & Bolt, 2010). Consequently, in neighbourhoods with high social cohesion, informal social control mechanisms are more prevalent and effective.

When effective social control is in place, residents are more likely to perceive their neighbourhood as safer, knowing that they can rely on their neighbours to address nuisances and undesirable matters (Kleinhans & Bolt, 2010). Thus, the perception of greater social cohesion fosters a greater sense of informal social control, which makes a neighbourhood more susceptible to feelings of safety (Sampson et al., 1997). Therefore, the perception of greater social cohesion positively affects the perception of safety.

Furthermore, that perceived social cohesion positively influences safety perceptions, does not necessarily imply that residents have a close-knit relation. Instead, it is more about whether neighbours expect that they can rely on each other for help when needed. The perception of social cohesion is sufficient for a positive effect on safety perceptions (Lee & Earnest, 2003).

Previous research has already found that stronger social cohesion in a neighbourhood is associated with lower perceptions of unsafety. Sociaal en Cultureel Planbureau (De Hart et al., 2002) found that in seven Dutch neighbourhoods, higher levels of social cohesion enhanced residents' perceptions of safety. This same result was found by other studies, based on residents in bigger Dutch cities (Boers et al., 2008; Maas-de Waal & Wittebrood, 2002; Elffers & De Jong, 2004). Research by Kleinhans and Bolt (2010) focused on six 'deprived neighbourhoods' in Amsterdam, Rotterdam, and Dordrecht. Results showed that lack of social cohesion is a significant predictor of feelings of unsafety (Kleinhans & Bolt, 2010).

With these insights in mind, I have conducted the following hypothesis:

H2: The higher one perceives the level of neighbourhood social cohesion, the safer one feels in it.

Gender differences

In the literature on perceived safety, one of the most consistent findings is the lower level of safety reported by women compared to men (Fisher & May, 2009; Skogan & Maxfield, 1981). Interestingly, this occurs despite women being less likely to become victims of crime (Johansson & Haandrikman, 2021). To analyse which mechanisms are at play here, we see gender as a social structure rather than an individual characteristic. This perspective allows us to better analyse how gender is embedded into our society and how it affects the perceived safety of men and women (Risman, 2004). In addition, understanding gender as a social structure helps us explore how it intersects with perceptions of the physical neighbourhood order and social cohesion to shape perceived safety.

Gender differences in the effect of perceived physical neighbourhood order

The difference in safety perception between men and women has been linked to differences in gender role socialisation (Franklin & Franklin, 2009). Gender role socialisation refers to the process by which individuals internalize norms and expectations related to their gender from various sources, such as parents, peers, and the media (Franklin & Franklin, 2009). Subsequently, individuals behave in accordance with these internalized norms. For instance,

parents often set different standards for their sons and daughters regarding freedom and independence. Male children are typically encouraged to explore their environment with little concern for potential dangers, which fosters a willingness to face risky situations (Goody, 2000). In contrast, female children are often more protected and sheltered, which instils a heightened sense of caution about the environment (Goody, 2000).

In this context, the lower level of perceived safety observed in women stems from internalized messages, which reinforce the belief that women are vulnerable, lack self-defence skills, and have heightened susceptibility to certain crimes (Franklin & Franklin, 2009; Rader & Haynes, 2011). Men internalize a contrasting message, being encouraged to embrace fearlessness (Rader & Haynes, 2011). Thus, because of this socialisation, women are more sensitive to physical neighbourhood cues that signal disorder and potential danger, such as graffiti and litter.

This gender role socialisation also integrates with the routine activity theory. It is argued that individuals base their vulnerability on the degree to which they feel like a suitable target (Cohen & Felson, 1979). Women, having been socialised to see themselves as more vulnerable, are more likely to see themselves as suitable targets of crime (Snedker, 2011). This heightened perception of vulnerability makes them more attuned to physical neighbourhood cues that signal the presence of potential threats or the lack of protection (Snedker, 2011). According to the socialisation theory, men have not internalised this same level of vulnerability (Rader & Haynes, 2011). Therefore, they may be less attuned to environmental cues signalling disorder compared to women.

Furthermore, an additional explanation for the lower levels of perceived safety among women is the heightened fear of crimes with a sexual component, which disproportionately affects women (CBS, 2024). The 'shadow of sexual assault' thesis posits that fear of such crimes amplifies women's overall fear of crime (Ferraro, 1996). Despite statistics indicating that women are less likely to be victims of crimes in public spaces compared to men since sexual crimes predominantly occur in private settings (CBS, 2024), the socialization process still leads women to feel more unsafe in public spaces.

Research by O'Brien (2005) has found that the disparity in perceived safety among men and women is particularly pronounced when the environment is neglected or deteriorating. Women have also been found to feel safer in areas that signal physical order (O'Brien, 2005; Ho et al., 2005). Due to the distinct perspective on physical neighbourhood order, women may experience stronger feelings of unsafety when they perceive less physical neighbourhood order.

This suggests that perceived physical neighbourhood order has a more pronounced impact on women's safety perceptions than on men's.

Considering these insights, I have constructed the following hypothesis:

H3: The effect of perceived physical neighbourhood order on safety perceptions is stronger for women than for men.

Gender differences in the effect of perceived neighbourhood social cohesion

Socialisation of gender may also impact the effect of social cohesion on safety perception differently for men and women. According to the socialisation theory, women are taught through societal norms to value relational and interdependent aspects of their identities, which are integral to their sense of self-worth and security (Koss et al., 1994). This socialisation process teaches women that their well-being is closely tied to their connections and relationships with others (Koss et al., 1994). Therefore, women are expected to derive greater benefits from social cohesion, feeling safer when they are part of cohesive communities.

In contrast, men are socialised to prioritize self-reliance and independence as components of their masculine identity (Walklate, 1997). Findings suggest that men tend to adopt identities characterized by fearlessness and toughness (Day, 2001). This socialisation minimizes the importance of relying on social networks for protection and support (De Jesus et al., 2010). Consequently, men's perceptions of safety are less influenced by the presence of social cohesion.

Furthermore, explanations of the gender effect in safety perceptions, are often linked to physical vulnerability. Common explanations for women's lowered feelings of safety highlight physical limitations that hinder their self-defence (Killias & Clerici, 2000). This, in turn, translates to their socialisation into more dependent roles (Bennett & Flavin, 1994).

Given these differences, social cohesion in the neighbourhood, which is characterised by strong relations, trust, and a sense of belonging, may play a more critical role in shaping women's perceptions of safety. Women, who are socialized to value interdependence, are likely to feel more secure in environments where they perceive high levels of social cohesion. This enhanced feeling of safety from social cohesion is less pronounced in men, whose socialisation emphasizes independence and self-reliance.

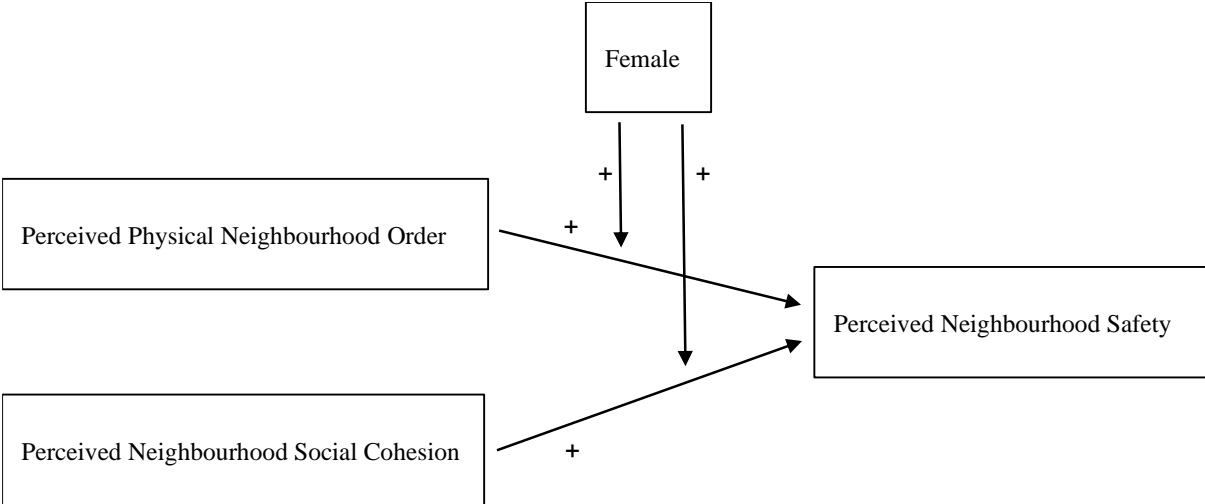
Research by De Jesus et al. (2010) and Loan and Walker (2017) found that women’s perception of neighbourhood safety is more strongly influenced by social cohesion in the neighbourhood.

Based on these insights, I have formulated the following hypothesis:

H4: The effect of neighbourhood social cohesion on neighbourhood safety perceptions is stronger for women than for men.

Following the different hypotheses and research considerations, figure 1 shows a visualisation of the conceptual framework.

Figure 1
Visualisation of the four hypotheses



3 Data & methods

The analyses in this study are based on data from the Utrecht Resident Survey of 2023. This is a survey conducted every two years by the Department of Research & Advice of the municipality of Utrecht. This survey has been held for over twenty years to measure the perceptions of Utrecht residents. It contains questions regarding safety, public space, environment, housing, municipal services, participation, and culture. The survey reached out to 27,198 randomly selected residents of Utrecht aged 18 years and older through email, inviting them to participate online. The response rate for the email outreach was 24 percent. Additionally, the survey utilized social media platforms to further engage potential respondents. To ensure that the survey is representative of the adult population of Utrecht, there was a weight factor employed. This approach accounts for differences in inclusion probability based on gender, age, migration background, and neighbourhood. The weighting ensures that the distribution of respondents in the sample matches the distribution of residents in Utrecht. The total number of respondents in the survey is $N = 8025$.

Variables

Perceived neighbourhood safety (dependent variable)

The dependent variable ‘perceived neighbourhood safety’ is measured by asking respondents the following question: ‘Do you ever feel unsafe in your own neighbourhood?’. Respondents could answer this question with: ‘yes’, ‘no’ or ‘I don’t know/no opinion’. For the purpose of this analysis, this variable was reversed and recoded into a binary variable ‘neighbourhood safety’, where 1 = ‘Safe’ and 0 = ‘Unsafe’.

Perceived Physical Neighbourhood Order (independent variable)

Regarding the moderating variable in this study, ‘perceived physical neighbourhood order’ five questions have been incorporated. Respondents could answer these questions with: ‘often’, ‘sometimes’, ‘(almost) never’ or ‘don’t know/no opinion’. The first question is: ‘How often are you bothered by litter or trash on the street in your neighbourhood? The second question is: ‘How often are you bothered by dog poop in your neighbourhood?’. The third question is: ‘How often are you bothered by defacement of walls and buildings in your neighbourhood?’. The fourth question is: ‘How often are you bothered by in vandalism in your neighbourhood?’. The fifth question is: ‘How often are you bothered by obstacles on the sidewalk (uneven tiles, parked bicycles) in your neighbourhood?’

The four items were combined into the scale variable 'physical neighbourhood order', which has an acceptable internal consistency ($\alpha = .710$). To ensure comparability across variables and allow for further analysis, the scale was standardized by converting the scores to z-scores.

Perceived neighbourhood social cohesion (independent variable)

The independent variable 'perceived neighbourhood social cohesion' is measured by asking respondents: 'What do you think of the following statements about your neighbourhood?', then five questions were asked about contacts with people in the neighbourhood: 'The people in this neighbourhood do not know each other very well', 'The people in this neighbourhood deal with each other in a pleasant way', 'The people in this neighbourhood deal with each other a lot', 'I live in a cosy ('gezellige') neighbourhood', 'I feel comfortable with the people who live in this neighbourhood'. These questions have the same answering categories ranging from 1 to 6: (1) strongly agree, (2) agree, (3) neutral, (4) disagree, (5) strongly disagree, (6) don't know/no opinion. Respondents who answered (6) don't know/no opinion were set to be missing values and were excluded from this study.

For most of these statements, a response of one indicated a highly cohesive neighbourhood, except for the statement: 'The people in this neighbourhood do not know each other very well.' To ensure consistency in measurement across the analysis, the response categories for all statements, except for the statement 'The people in this neighbourhood do not know each other very well', were reversed. Consequently, a lower score now represents lower social cohesion. The five items were combined into a scale variable named 'social cohesion', which has an acceptable internal consistency ($\alpha = .829$). To ensure comparability across variables and allow for further analysis, the scale was standardized by converting the scores to z-scores.

Gender (moderator)

The moderator variable 'gender' is measured by asking respondents: 'I am...' to which respondents could answer with 'a female', 'a male', 'neither male nor female' and 'I prefer not to say'. From this variable, the variable 'Female' was computed in which 1 = 'Female' and 0 = 'Male'. Respondents who selected 'neither male nor female' or 'I prefer not to say' were excluded from the analysis. This exclusion affected 163 respondents, comprising approximately 2% of the total sample size.

Control variables

Differences in age and ethnicity could influence the relationship between perceived physical neighbourhood order and perceived neighbourhood safety. These variables will therefore be controlled for in the analysis.

First, in literature, *age* is often associated with the perception of safety. The ‘environmental docility hypothesis’ suggests that older adults may be more susceptible to adverse environmental conditions (Lawton, 1990; Wahl et al., 2012), and therefore, age could influence the relation between perceived physical neighbourhood order and perceived neighbourhood safety. However, research has shown contradicting results for this effect. For instance, Köber et al. (2020) found a weakening effect of neighbourhoods’ effects on feelings of safety with age. Thus, age might impact the relations to perceived neighbourhood safety, highlighting the importance of controlling for age in this study. In this study, age is measured by asking respondents: ‘What is your age?’ to which respondents could answer ‘18-22’, ‘23-27’, ‘28-32’, ‘33-37’, ‘38-42’, ‘43-47’, ‘48-52’, ‘53-57’, ‘58-62’, ‘63-67’, and ‘67+’. For the purpose of analysis, these age ranges are recoded to their midpoints. This means that each age range is represented by a single value, which is the midpoint of that range. Specifically, the age range ‘18-22’ is recoded to 20, ‘23-27’ is recoded to 25, and so forth. For the range ‘67+’, the midpoint is approximated as 70. This recoding allows for an easier interpretation of age within the analysis.

Second, *ethnicity* has been found to be associated with the perception of safety. One explanation for this association is provided by the ‘social vulnerability hypothesis’. This hypothesis suggests that individuals from socially vulnerable groups are more likely to perceive themselves as potential victims. Ethnic minorities tend to experience higher levels of social vulnerability (Allik & Kearns, 2016). Therefore, in this study, I will also control for ethnicity. Ethnicity was measured by asking respondents: ‘In which country were you born?’ to which respondents could answer ‘Netherlands’, ‘Morocco’, ‘Turkey’, ‘Suriname, Antilles, Aruba’, ‘other Western’, ‘other non-Western’, and ‘I prefer not to say’. For analysis, this variable was converted into a dichotomous variable where ‘Netherlands’ was classified as ‘no migration background,’ and all other responses were classified as ‘migration background.’

Exclusion criteria

Respondents who did not answer, answered 'no answer', 'don't know/no opinion', or 'I prefer not to say' to the questions of the independent variable, dependent variable, mediator, or control variables, were set to be missing values and were excluded from this study. Using listwise deletion, the dataset originally consisting of 8025 respondents was reduced to 6200 respondents.

Analytical strategy

To assess my hypotheses and give an answer to the research question, a binary logistic regression was performed with IBM SPSS version 29. By this analysis, logistic regression is a model to predict categorical outcomes from predictor variables (Field, 2017). In essence, this method predicts in which of two categories an individual is likely to belong to, based on their score on the predictor variables (Field, 2017).

For this research, four binary logistic regression models were executed. The first model analysed the effect of the perceived physical neighbourhood order on the probability of perceiving the neighbourhood as safe. The second model investigated the effect of perceived neighbourhood social cohesion on the probability of neighbourhood safety perception. The third model investigates the contribution of both variables, while controlling for the other. For this, I will use a logistic regression model with both the perceived physical neighbourhood order and perceived neighbourhood social cohesion as independent variables. At last, an interaction term between each independent variable (perceived physical neighbourhood order and perceived social cohesion) and gender is included in a logistic regression model. The models adjusted for the control variables age and migration background.

Assumptions

Logistic regression relies on several assumptions, these include considerations regarding the sample size, multicollinearity among predictors, and the presence of outliers (Pallant, 2010)

The sample size for this analysis was 6200, which is sufficient for the number of predictors included in the model. Descriptive statistics were run on each predictor, confirming that there were no categories with limited cases. Multicollinearity was evaluated using the variance inflation factor (VIF) and Pearson correlation matrix. The VIF value of both variables was 1.056, falling into the acceptable range ($VIF < 1$ or > 3), indicating no strong

multicollinearity (Pallant, 2010). The Pearson pairwise correlation coefficients were all below 0.3, also indicating no strong multicollinearity (Pallant, 2010). Outliers were assessed visually and statistically, revealing no significant outliers. Outliers were assessed by inspecting the residuals. There were no standardized residuals greater than 3.3 or less than -3.3, indicating the absence of significant outliers in the data (Pallant, 2010).

To ensure robustness, the linearity assumption was also evaluated. The relationship between the logit transformation of the dependent variable and the independent variables was tested on linearity using the Box-Tidwell method (Field, 2017). Interaction terms showed non-significant results for perceived physical neighbourhood order ($p=.134$) and perceived social cohesion ($p=.779$). Therefore, the linearity assumption was met. None of the assumptions were violated, therefore a logistic regression analysis was conducted.

The goodness of fit of the model was confirmed by the Grouped Hosmer-Lemeshow test, suggesting a suitable fit to the observed data ($p=.907$, 95% confidence interval).

Table 1 presents the descriptive statistics of all variables included in the logistic regression analysis on perceived neighbourhood safety. A total of 6200 respondents were included in the analyses.

Regarding perceived neighbourhood safety (abbreviated as 'Safety' in Table 1), respondents reported a relatively high level of perceived neighbourhood safety, with a mean score of 0.67 on a scale from 0 to 1. This indicates that 67% of the respondents perceive their neighbourhood as safe.

The variable perceived physical neighbourhood order (abbreviated as 'Physical Neighbourhood Order Z' in Table 1), standardized as a z-score, ranged from -2.58 to 1.51. This indicates that the values of perceived physical neighbourhood order in the sample ranged from 2.58 standard deviations below the mean to 1.51 standard deviations above the mean.

The variable perceived neighbourhood social cohesion (abbreviated as 'Social Cohesion Z' in Table 1), also standardised as a z-score, ranged from -2.40 to 2.25. This indicates that the values of perceived neighbourhood social cohesion in the sample ranged from 2.40 standard deviations below the mean to 2.25 standard deviations above the mean.

In terms of demographic characteristics, approximately half (51%) of the respondents were female. The average age of respondents was 41.82 years on a scale ranging from 20 to 70 years, with a standard deviation of 15,17, indicating variability in ages within the sample. Age

ranges provided by participants were converted to midpoints for the analysis. With regards to migration background, 34% of respondents reported having a migration background.

Table 1

Descriptive statistics

	Min	Max	Mean	S.D.
Safety	0	1	.67	
Physical Neighbourhood Order (z-score)	-2.58	1.51	0	1
Social Cohesion (z-score)	-3.31	2.25	0	1
Female	0	1	.51	
Age	20	70	41.82	15.17
Migration Background	0	1	.34	

Note. N = 6127. S.D. = Standard deviation. Source: Utrecht Resident Survey Municipality Utrecht 2023.

4 Results

Table 2 presents four logistic regression analyses examining the impact of several factors on the probability of neighbourhood safety perception. The alpha level was set at 0.05 to test whether a significant relation can be found. The analysis included five independent variables (physical neighbourhood order, social cohesion, age and migration background) and two interaction terms (female and physical neighbourhood order, and female and social cohesion).

Table 2

Logistic Regression Predicting Likelihood Perceived Neighbourhood Safety

	Model 1	Model 2	Model 3	Model 4
	B	B	B	B
Physical Neighbourhood Order (z-score)	2.346*** (.033)		2.143*** (.035)	2.412*** (.052)
Social Cohesion (z-score)		1.936*** (.031)	1.705*** (.033)	1.899*** (.051)
Female	.485*** (.060)	.456*** (.059)	.405*** (.062)	.419*** (.065)
Age	1.026*** (.002)	1.012*** (.002)	1.024*** (.002)	1.024*** (.002)
Migration background	1.259*** (.064)	1.318*** (.062)	1.300*** (.066)	1.302*** (.066)
Female*Physical neighbourhood Order Z				.816** (.066)
Female*Social Cohesion Z				.828** (.066)
Constant	1.074 (.099)	1.861*** (.095)	1.217 (.101)	1.294 (.103)
Cox & Snell R ²	.153	.112	.192	.194
Nagelkerke R ²	.212	.155	.267	.271

Note. Coefficients are odds ratios. Standard error in parentheses. N = 6200. SE = Standard error. Source: Utrecht Resident Survey Municipality Utrecht 2023.

* p <.05

** p <.01

*** p <.001

Model 1 evaluated the initial relation between the (IV) perceived physical neighbourhood order and the (DV) perceived neighbourhood safety, when accounted for control variables. The model shows that perceived physical neighbourhood order was a significant predictor of perceived neighbourhood safety ($B = 2.346$, $SE = .033$, $p < .001$). For each standard deviation increase in physical neighbourhood order, the odds of perceiving the neighbourhood as safe increased by a factor of 2.346. The model was statistically significant ($\chi^2(4, N = 6200) = 1012.79$, $p < .001$), indicating that the model was able to differentiate between respondents who perceive their neighbourhood as safe and those who do not. Model 1 explained between 15.3% (Cox & Snell R^2) and 21.2% (Nagelkerke R^2) of the variance in perceived neighbourhood safety. These findings are consistent with my first hypothesis: the higher one perceives the level of physical neighbourhood order, the safer one feels in it.

Model 2 assessed the initial relationship between social cohesion (IV) and perceived neighbourhood safety (DV), when accounted for control variables. The results indicate that perceived neighbourhood social cohesion was a significant predictor of perceived neighbourhood safety ($B = 1.936$, $SE = .031$, $p < .001$), indicating that each standard deviation increase in perceived neighbourhood social cohesion increased the odds of perceiving the neighbourhood as safe by a factor of 1.936. Model 2 was statistically significant, ($\chi^2(4, N = 6200) = 724.244$, $p < .001$), indicating that the model was able to differentiate between respondents who perceive their neighbourhood as safe and those who do not. Model 2 explained between 11.2% (Cox & Snell R^2) and 15.5% (Nagelkerke R^2) of the variance in safety feelings. These results are consistent with my second hypothesis: the higher one perceives the level of neighbourhood social cohesion, the safer one feels in it.

Model 3 included both perceived physical neighbourhood order and perceived neighbourhood social cohesion, alongside the control variables. Perceived physical neighbourhood order ($B = 2.143$, $SE = .035$, $p < .001$) and perceived neighbourhood social cohesion ($B = 1.705$, $SE = .033$, $p < .001$) were both found to be significant predictors of perceived neighbourhood safety. Specifically, for each standard deviation increase in perceived physical neighbourhood order, the odds of perceiving the neighbourhood as safe increase by a factor of 2.143. For each standard deviation increase in perceived neighbourhood social cohesion, the odds of perceiving the neighbourhood as safe increase by a factor of 1.705.

Additionally, model 3 shows that being female ($B = .405$, $SE = .062$, $p < .001$) is a significant predictor of perceived neighbourhood safety. More specifically, being female decreases the odds of perceiving the neighbourhood as safe by 59,5 percent.¹

The results indicate that Model 3 was statistically significant ($\chi^2 (8, N = 6200) = 1303.135$, $p < .001$). This model explained between 19.2% (Cox & Snell R^2) and 26.7% (Nagelkerke R^2) of the variance in safety feelings.

All the variables were found to make a unique and statistically significant contribution to the model. However, given that the predictor variables were measured on a comparable scale, perceived physical neighbourhood order emerged as the strongest predictor with an odds ratio of 2.143, surpassing perceived neighbourhood social cohesion, which has an odds ratio of 1.705. This indicates that an increase in perceived physical neighbourhood order has a greater positive impact on the odds of perceiving the neighbourhood as safe compared to an increase in perceived neighbourhood social cohesion.

Additionally, being female was found to be a significant predictor of neighbourhood safety perception ($B = .405$, $SE = .062$, $p > .001$). Specifically, being female decreases the odds of perceiving the neighbourhood as safe by 59.5 percent, controlling for other variables.¹

Model 4 introduced interaction terms between gender (female) and the two main predictors (perceived physical neighbourhood order and perceived neighbourhood social cohesion). The interaction term between female gender and perceived physical neighbourhood order was statistically significant ($B = .816$, $SE = .066$, $p < .001$), indicating that the effect of perceived physical neighbourhood order on perceived neighbourhood safety differs between genders. Specifically, as perceived physical neighbourhood order increases, the negative impact of being female on the perception of neighbourhood safety diminishes. These results support the third hypothesis: the effect of the physical neighbourhood environment on safety perceptions is stronger for women than for men.

Similarly, the interaction term between female gender and perceived physical neighbourhood order was also significant ($B = .828$, $SE = .066$, $p < .001$), suggesting that the effect of perceived social cohesion on perceived neighbourhood safety also varies by gender. As perceived neighbourhood social cohesion increases, the negative impact of being female on the perception of neighbourhood safety diminishes. These results support the fourth

¹ Calculations of percentage from odds ratio: $(.405 - 1) * 100\% = -59,5\%$.

hypothesis: the effect of neighbourhood social cohesion on safety perceptions is stronger for women than for men.

Furthermore, the odds ratios of the interaction terms between gender (female) and perceived physical neighbourhood order ($B = .816$, $SE = .066$, $p < .001$) and social cohesion ($B = .828$, $SE = .066$, $p < .001$) are comparable. This similarity in odds ratios indicates that gender moderates the relationship between perceived neighbourhood safety and the two predictor variables (perceived physical neighbourhood order and perceived neighbourhood social cohesion) to a similar extent in magnitude.

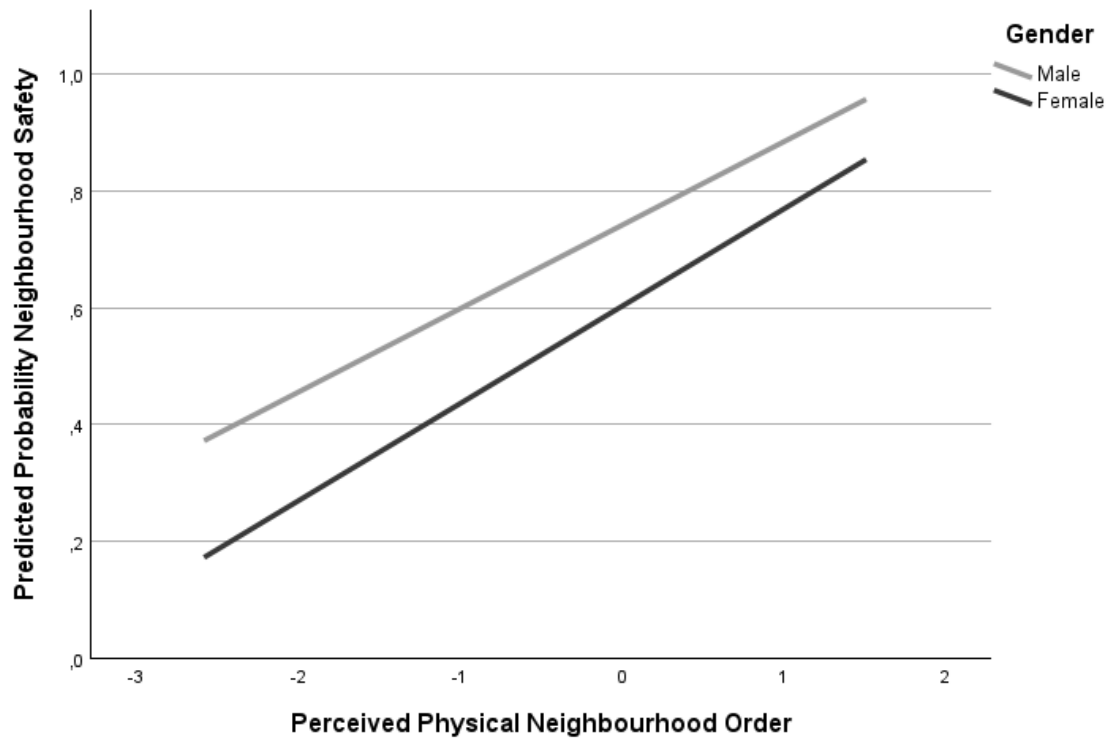
The results show that Model 4 was statistically significant, ($\chi^2(7, N = 6200) = 1322.668$, $p < .001$), indicating that the interaction terms contributed to the model. This model explained between 19.4% (Cox & Snell R^2) and 27.1% (Nagelkerke R^2) of the variance in safety feelings.

For an overview of the results, Figures 2 and 3 show the predicted probability of perceiving the neighbourhood as safe by perceived physical neighbourhood order and perceived social cohesion, respectively, stratified by gender.

Figure 2 displays the predicted probability of perceiving the neighbourhood as safe (y-axis, labelled as 'Predicted probability neighbourhood safety') against perceived physical neighbourhood order (x-axis), differed by gender (male and female). Higher values on the y-axis indicate a greater likelihood of perceiving the neighbourhood as safe, while higher values on the x-axis indicate a higher perception of physical neighbourhood order. Figure 2 shows that as perceived physical order improves, the predicted probability of perceiving the neighbourhood as safe increases for both genders. This aligns with my first hypothesis: the higher one perceives the level of physical neighbourhood order, the safer one feels in it. Moreover, this increase in probability is more pronounced for females, indicated by the steeper line. This supports my third hypothesis: the effect of the physical neighbourhood environment on safety perceptions is bigger for women than for men.

Figure 2

Predicted probability of perceived neighbourhood safety by perceived physical neighbourhood order, considering the interaction with gender

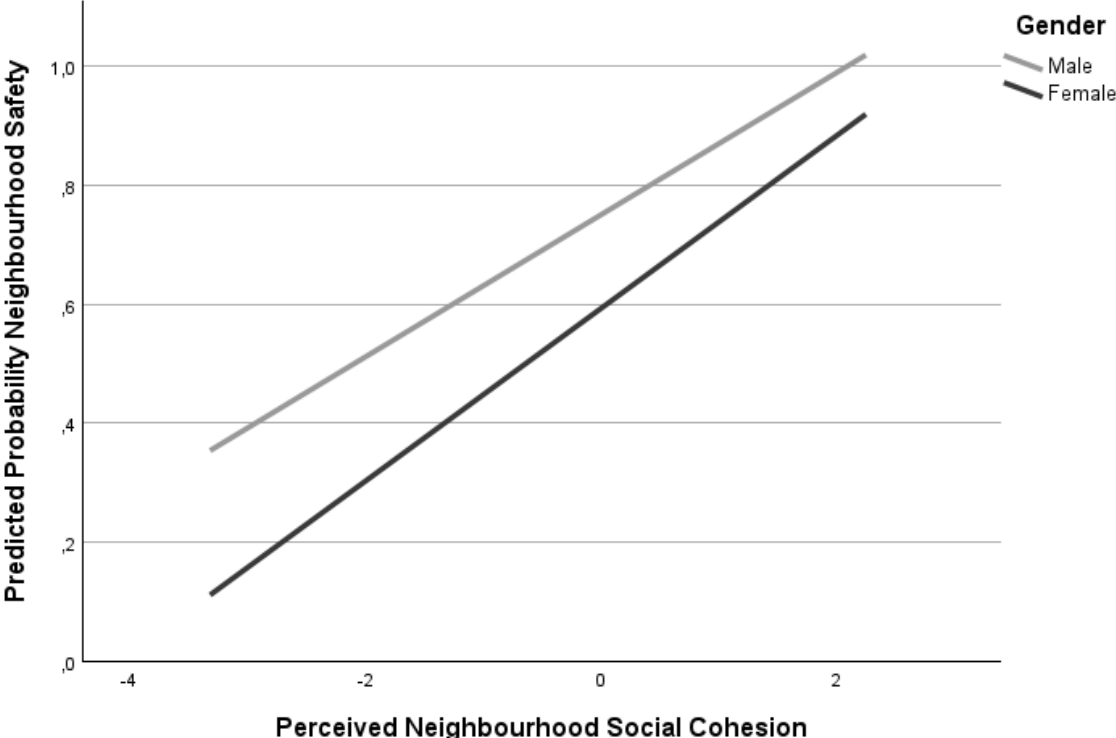


Note. N = 6200. Predicted probabilities based on Model 4 in Table 2. Source: Utrecht Resident Survey Municipality Utrecht 2023.

Figure 3 shows the predicted probability of perceiving the neighbourhood as safe (y-axis, labelled as ‘Predicted probability neighbourhood safety’) against perceived social cohesion (x-axis), stratified by gender. Higher values on the y-axis indicate a greater likelihood of perceiving the neighbourhood as safe, while higher values on the x-axis indicate a higher perception of neighbourhood social cohesion. Figure 3 shows that as perceived social cohesion improves, the predicted probability of perceiving the neighbourhood as safe increases for both genders. This aligns with my second hypothesis: the higher one perceives the level of neighbourhood social cohesion, the safer one feels in it. Furthermore, this increase in probability is more pronounced for females, indicated by the steeper line. This supports my fourth hypothesis: the effect of neighbourhood social cohesion on safety perceptions is bigger for women than for men.

Figure 3

Predicted probability of perceived neighbourhood safety by perceived social cohesion, considering the interaction with gender



Note. N = 6200. Predicted probabilities based on Model 4 in Table 2. Source: Utrecht Resident Survey Municipality Utrecht 2023.

5 Conclusion and discussion

The aim of this study was to investigate whether the perceived safety of neighbourhoods is influenced by both perceived physical neighbourhood order and neighbourhood social cohesion and whether this relation is different for men and women.

The results show that the positive effects of perceived physical neighbourhood order and perceived neighbourhood social cohesion on the likelihood of perceiving the neighbourhood as safe, are more pronounced for women than for men. These results align with earlier findings that indicate that women's safety perceptions are more affected by physical order (O'Brien, 2005; Ho et al., 2005). This can be attributed to societal expectations and norms that shape women's attitudes and behaviours, leading them to be more cautious than men (Franklin & Franklin, 2009). Consequently, women are more likely to perceive themselves as suitable targets of crime, making them more attuned to physical order (Snedker, 2011).

Our results also support earlier findings that show that the effect of social cohesion on safety perception is stronger for women than for men (De Jesus et al., 2010, Logan & Walker, 2017). Women, socialised to value relational and interdependent aspects of their identities, derive greater benefits from social cohesion and feel safer in cohesive communities (Koss et al., 1994). In contrast, men socialized to prioritize self-reliance, are less influenced by social cohesion in their perceptions of safety (Day, 2001).

Furthermore, the effect of gender on how perceived physical neighbourhood order and perceived neighbourhood social cohesion predict neighbourhood safety is similar. This suggests that gender plays a comparable role in how these factors influence safety perceptions.

Additionally, the study found that women are more likely to perceive their neighbourhood as unsafe compared to men. This result aligns with previous studies which found that women consistently report lower levels of safety (Fisher & May, 2009; Skogan & Maxfield, 1981).

Moreover, the study identified perceived physical neighbourhood order as a strong significant predictor of perceived neighbourhood safety. This suggests that the presence of physical signs of order, as well as the absence of signs of disorder such as litter, deterioration, and vandalism, can significantly enhance perceived neighbourhood safety. These results are consistent with earlier findings (Austin et al., 2002), and can be explained by the idea that

physical order signals active social control and concern, which can increase resident's perception of safety (Skogan, 2011; Pitner et al., 2012; Taylor, 1994).

Similarly, perceived neighbourhood social cohesion was found to be a positive significant predictor of perceived neighbourhood safety. This suggests that when residents perceive a level of trust, a sense of belonging, and willingness to help among neighbours, they are more likely to perceive their neighbourhood as safe. These findings are consistent with earlier (Boers et al., 2008; Maas-de Waal & Wittebrood, 2002; Elffers & De Jong, 2004, De Hart et al., 2002), and can be attributed to the idea that social cohesion fosters a greater sense of informal social control, which makes residents feel safer (Sampson et al., 1997).

Furthermore, the results suggest that the impact of perceived physical neighbourhood order on safety perceptions is stronger than that of perceived neighbourhood social cohesion. This finding underscores the importance of addressing physical signs of disorder to improve perceptions of safety within neighbourhoods.

Limitations and strengths

Although great care was taken to conduct this research, this study is not without limitations. First, perceived neighbourhood safety was measured by asking respondents if they ever felt unsafe in their own neighbourhood. This binary measure, where respondents could answer 'yes' or 'no', simplifies the complex nature of safety perceptions. Perceptions of safety can vary widely in intensity, from mild unease to severe anxiety. A binary measure does not capture these nuances and may oversimplify the respondent's actual feelings. Therefore, future research could measure perceived neighbourhood safety on a scale with more answering options.

Additionally, the question to residents focuses on feelings of unsafety rather than safety. However, focusing on feelings of safety aligns more with the theoretical frameworks used to explain the influence of neighbourhood order and neighbourhood social cohesion. These frameworks emphasize the importance of factors such as social bonds, perceived social control, and maintaining order, in the shaping of safety perception. Therefore, future research could enhance its approach by directly asking respondents about their feelings of safety rather than feelings of unsafety.

The study relies on self-reported data from the Utrecht Resident Survey, which can be subject to biases such as social desirability bias, recall bias, or misinterpretation of questions

by respondents (Morling & Carr, 2022). Self-reported measures of perceived physical neighbourhood order, perceived neighbourhood social cohesion, and perceived neighbourhood safety may not accurately reflect objective conditions. While perceptions shape human behaviour and experiences, they may not always accurately reflect objective reality. To address this limitation, future research could incorporate both subjective and objective measures.

Furthermore, the survey is conducted by the municipality of Utrecht, which might influence the responses. This could introduce response bias, as it is not an independent organisation. The affiliation with the municipality might also result in non-response bias if certain groups distrust government surveys.

For the measurement of perceived physical neighbourhood order and perceived neighbourhood social cohesion, multiple items of different scales were combined into one construct. While these scales have acceptable internal consistency, they may still not fully encapsulate the multi-dimensional nature of these concepts.

To enhance the assessment of the perceived physical neighbourhood environment, incorporating questions about residents' satisfaction with neighbourhood lighting would be beneficial. Lighting is acknowledged as a crucial factor influencing both physical neighbourhood order and residents' perceptions of safety (Rahm et al., 2020).

For perceived neighbourhood social cohesion, it would be valuable to include questions that assess residents' beliefs about trust among neighbours. Trust is recognized as a significant component of social cohesion (Chan et al., 2006), and it would be interesting to take it into account in future research.

Besides these limitations, there are also strengths of this research that should be highlighted. First, the comprehensive data collection with a large, weighted sample size of 6,200 respondents from the Utrecht Resident Survey enhances the generalizability of the findings. Additionally, the study provides valuable gender-specific insights, showing that women are more affected by both physical order and social cohesion, which is crucial for developing gender-sensitive safety policies. Lastly, the validation of all expected hypotheses offers strong support for the theoretical framework, reinforcing the importance of both physical and social neighbourhood factors in influencing perceptions of safety.

6 Policy advice

Building upon the insights gained from this study, this thesis aims to offer tailored policy recommendations to the municipality of Utrecht. Despite the acknowledged limitations of this study, it is noteworthy that all expected hypotheses were confirmed. These validated hypotheses provide a foundation for the policy recommendations.

One key finding is that the positive effects of both perceived physical neighbourhood order and perceived neighbourhood social cohesion on perceived neighbourhood safety were more pronounced for women compared to men. Additionally, the study found that women are more likely to perceive their neighbourhood as unsafe compared to men. It is important to address these disparities in safety perceptions between men and women to create more equitable and safer neighbourhood experiences for all residents.

Therefore, I firstly advise the municipality of Utrecht to incorporate a gender-sensitive approach into their safety policies. For example, the municipal council of Utrecht sets safety objectives through the safety agenda, this current plan does not account for gender differences. Future plans should integrate a gender-specific consideration to address these disparities effectively. This aligns with the current policy of the coalition agreement which prioritizes ‘unequal investment to create equal opportunities’ ensuring that resources are allocated to those who need them the most. Given that women are a more vulnerable group in terms of safety perception, there should be increased investment in initiatives aimed at enhancing their perceived safety.

Furthermore, the results show that perceived physical neighbourhood order, characterized by the absence of litter, defaced buildings, and vandalism, positively contribute to the perceived safety of residents. This was found to be a stronger predictor of perceived neighbourhood safety than perceived neighbourhood social cohesion. Therefore, the municipality should prioritize maintaining and improving physical order in neighbourhoods, focusing on areas where these issues are most prevalent. This can include increased maintenance of public spaces, increased cleaning services, and prompt repair of vandalized or deteriorated property. For instance, the ‘regional’ strategy, where each cleaner is responsible for a specific area, has been found effective in maintaining clean streets (Rangoni & Jager, 2017). Additionally, community clean-up events, where residents come together to clean their

neighbourhood, can enhance this strategy by fostering a sense of ownership and responsibility among the community members (Rangoni & Jager, 2017).

Perceived neighbourhood social cohesion, fostered through community ties and social interactions, also positively contributes to safety perception within neighbourhoods, although to a lesser extent than perceived physical neighbourhood order. Therefore, after prioritizing the improvement of the perceived physical neighbourhood order, the municipality should arrange efforts to strengthen social cohesion, especially in areas where it is perceived to be lacking. This can include supporting local groups that promote community engagement and develop and maintain public spaces for residents to interact (Movisie, 2022). Moreover, community clean-up events can simultaneously enhance both neighbourhood cleanliness and social cohesion among neighbours (Rangoni & Jager, 2017).

This extra focus on areas where these issues are most prevalent also aligns with the idea of ‘unequal investment to create equal opportunities’. The residents of neighbourhoods with lower physical order and lower social cohesion will be given more resources to improve the safety perceptions in these neighbourhoods.

It is important not only to implement these actions but to also ensure that residents are informed about them and know how to access support (Movisie, 2024). In vulnerable neighbourhoods in Utrecht, where numerous initiatives exist, residents may not always be aware of available resources. Therefore, it is crucial to enhance effective communication strategies. The municipality should establish clear and accessible channels of communication that ensure residents are well-informed about ongoing initiatives, support services, and community resources (Movisie, 2024). Given the heightened impact of perceived physical neighbourhood order and social cohesion on women, special efforts should be undertaken to engage and inform women about these initiatives.

In sum, these recommendations aim to enhance safety perceptions in neighbourhoods and promote equitable safety experiences for residents. By addressing gender disparities, improving physical neighbourhood conditions, fostering social cohesion, and implementing effective communication strategies, these initiatives strive to create neighbourhoods that foster a sense of safety among residents.

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