Pre-Print[a]: Women's safety perception before and after the reconstruction of an urban area: A mixed method research

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Abstract

This study addresses the heightened fear of crime experienced by women, which often leads to the adoption of self-protective behaviors that can negatively impact their quality of life. Focusing on a hot-spot in the city of Donostia-San Sebastián undergoing redesign, the research is conducted in two phases: pre-intervention and post-intervention. Utilizing a mixed-methods approach, the study employs systematic observation using the SUE tool, surveys, and Safety Walks to gather data. Findings indicate a high prevalence and frequency of fear of crime among female participants, with a significant reduction in fear observed post-intervention. Consistent with the Crime Prevention through Environmental Design (CPTED) framework, factors such as physical design, area activity, and user profiles are identified as key determinants of women's insecurity. Notable improvements in both the physical and social characteristics of the urban environment are evident between the two phases. The consistency of results across the three methodological tools reinforces the validity and reliability of the findings, highlighting the potential of mixed methodologies. Overall, the study suggests that urban redesign effectively reduces fear of crime among women, offering insights for urban planning and policy-making to create safer, more inclusive public spaces.

Keywords: safety perception, fear of crime, women, CPTED, urban transformation

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[a] This is a pre-print that has not been peer-reviewed.

Introduction

The perception of security varies significantly across different locations and times, influenced by spatial and temporal factors. This variability is evident in how individuals report their feelings of safety. Research consistently shows that women experience a higher perception of unsafety compared to men, highlighting a critical gender disparity in the perception of security (De Welde, 2003; Fox, et al., 2009; Glas, et al., 2019; May, et al., 2010;). Consequently, women often feel compelled to restrict and modify their mobility based on specific times and locations (Tandogan & Ilhan, 2016; Trawalte et al., 2022), adopting self-protective measures. These actions can lead to increased psychological distress and a reduced quality of life (Lorenc et al., 2013; Paül i Agustí, et al., 2022; Pearson & Breetzke, 2014).

One could argue that women report more perceived unsafety than men because women participate reporter over all more disorder. For example, it has been observed that women perceive greater incivility (Johansson & Haandrikman, 2023) concerns more in public spaces (Gaub, et al., 2021), report empty streets, or inadequate lighting (Painter, 1996). This suggests some spaces are suitable for women, while others are not, and that self-protective behaviors, such as avoidance or the need of walking in companionship, are therefore necessary.

The heightened sense of unsafety among women not only reflects a significant gender inequity but also has profound effects on their daily lives and overall well-being. The need for women to constantly navigate their environment with caution can lead to stress, limiting their opportunities and participation in various social, economic, and recreational activities. Furthermore, understanding these gendered perceptions of security can inform urban planning and policy-making, aiming to create safer and more inclusive public spaces. By addressing the factors that contribute to perception of unsafety, such as inadequate lighting and public incivility, we can foster environments where all individuals, regardless of gender, feel safe and secure.

This study focuses on the *ad-hoc* evaluation of the transformation of an urban space in the city of Donostia-San Sebastián. Specifically, it examines the change in access from a central neighborhood to a more peripheral one, divided by train tracks. Prior to the change, people had to cross the tracks through an underground tunnel. Subsequently, the state railway infrastructure administration (ADIF) constructed a footbridge for pedestrians to cross from one neighborhood to the other (see Image 1). The tunnel area had been considered by pedestrians as a critical or risky point, frequently reported as such on the city's citizen participation portal[b].

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[b] See the map of the city council

The transformation of the space provides a unique opportunity to assess the perceived safety of women who use this space. The general objective of this study is to describe the perception of unsafety of women, and its association with the build and social environment, before and after the transformation of an urban area that was categorized as risky point. As a secondary objective, we explore the feasibility of systematic observation tools (or audits) to capture the urban and social elements that women report as reasons for their perception of unsafety. Therefore, we posit our research questions as follow:

RQ1: What are the differences in the perception of unsafety and associated behaviors among women in a risky area of the city before and after the transformation?

RQ2: To what extent are urban design and social variables associated with women's perception of safety before and after the reconstruction?

RQ3: How do systematic observation tools capture urban design and social characteristics that women identify as elements that increase their unsafety perception?

We must make it clear that this is a descriptive study. Due to methodological limitations (mostly described in the limitations section), the results cannot be interpreted in terms of causal inference and are not generalizable. Therefore, p-values and effect sizes are merely indicative. Despite the potential limitations on the methodology, this study contributes to understanding the perception of unsafety among women in urban environments by examining the transformation of an urban space using mixed method design. By focusing on the change from an underground tunnel to a pedestrian footbridge, the study assesses women's perceived safety before and after the reconstruction. The study also evaluates the effectiveness of systematic observation tools in capturing the urban and social elements contributing to women's fear. These insights can inform urban planning and policy-making, aiming to create safer, more inclusive public spaces.

Literature background

Women's Security Perception in the urban space

Fear of crime is an umbrella term used to encompass a range of concepts related to the perception of crime, both at the individual and social levels (for a more in-depth discussion, see Gerber et al. 2010; Pohl & Buil-Gil, 2023). In this study, we focus on the individual perspective and, more specifically, on the perception of (in)security.

The relationship between the perception of security and the immediate environment (both urban and social design) is well-documented and has been evidenced repeatedly (Chataway & Hart, 2019; Kronkvist & Engström, 2020; Skarlatidou, et al., 2023). Among other factors, physical and social disorder have been shown to increase perceptions of unsafety (Hodgkinson & Lunney, 2021; Lee, Boateng, Kim, & Maher, 2022; Winter, Johnson, & Obara,

2021). This is logical when considering that socially and physically disordered places can indicate a lack of attention from public authorities and the community (Jackson, 2004).

Focusing on the specific case of women, who are the study population in this research, various perspectives explain their higher reported concern for safety. These concerns stem from multiple sources, including the information women receive during their formative years about the risks present in public spaces (Morrell, 1998; Pryor, et al., 2023). Additionally, the perception of unsafety often reflects the fear of becoming a victim of sexual crimes (Ferraro, Kenneth F., 1996; Mellgren & Anna-Karin Ivert, 2019)

Evidence from Europe shows that certain physical and social characteristics of spaces, such as poor lighting, areas allowing concealment or entrapment, poor maintenance, signs of disorder like drug use, perceptions of criminal activity, and weak social cohesion, predict women's fear of crime (Blobaum & Hunecke, 2005; Grohe, 2011; Johansson & Haandrikman, 2023; Koskela & Pain, 2000). These characteristics lead women to categorize spaces as "appropriate" or "inappropriate," creating areas with bad reputations (Koskela & Pain, 2000). Labelling certain public spaces and times as "dangerous" results in continuous surveillance and restricted use, affecting women's mobility and health. Recent studies show women engage in more self-protective behaviors than men, such as avoiding specific public spaces, especially at night, and modifying their clothing (Pain, 1997; Tandogan & Ilhan, 2016; Woolnough, 2009). In summary, fear of crime can condition women's social relationship with space, limiting their mobility and free use of urban areas (Ceccato & Loukaitou-Sideris, 2022).

Context Dependency

Unsafety perceptions are not constant; they vary across different times and places and are significantly influenced by the physical and social characteristics of the surrounding environment. Surveys alone are insufficient to capture this complexity, making it essential to employ alternative approaches. The Crime Prevention Through Environmental Design (CPTED) perspective offers researchers a framework to develop tools that partially address this complexity, such as audits to assess the built and social landscape (Ceccato, 2019; Cozens, Paul, Babb, & Stefani, 2022). The CPTED framework proposes that appropriate design can reduce crime and enhance perceptions of (un)safety. It is based on seven principles: territoriality, surveillance, image management, access control, activity support, target hardening, and geographical juxtaposition (Cozens, et al., 2005).

Despite the well-known limitations of those tools and methods, such as observer bias (Hoeben, et al., 2018) or the cross-sectional nature of the method (Cozens et al., 2022), these limitations are not insurmountable. These tools can be effective as first step to capture environmental indicators that could explain contextual variation of perceived unsafety. In combination with other data sources or methods, such as secondary spatial data, or semi-

structured interviews, as shown in previous research (Ceccato, 2019), those tools can be informative, not only for scholars but also for practitioners.

Method

Study setting

The study focuses on San Sebastian, a city with a population of approximately 187,849, of which 53% are women (INE, 2022). Despite its growth, San Sebastian boasts the lowest crime rate [c] in the Basque Country among municipalities with more than 50,000 inhabitants.

The study's setting is a risky point[d] regarding the perception of security based on citizens' reports. Specifically, it involves a pedestrian-only underground passageway that connects the city center with a neighborhood. This passageway is located at the underground access to the main bus station, with the main train station situated above it (see Image 1). The passageway was planned to be closed (pre-transformation), with pedestrian traffic redirected to an elevated footbridge (post-transformation) that spans the railway tracks from one neighborhood to the other.

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[c] See Basque Police data for 2021-2022
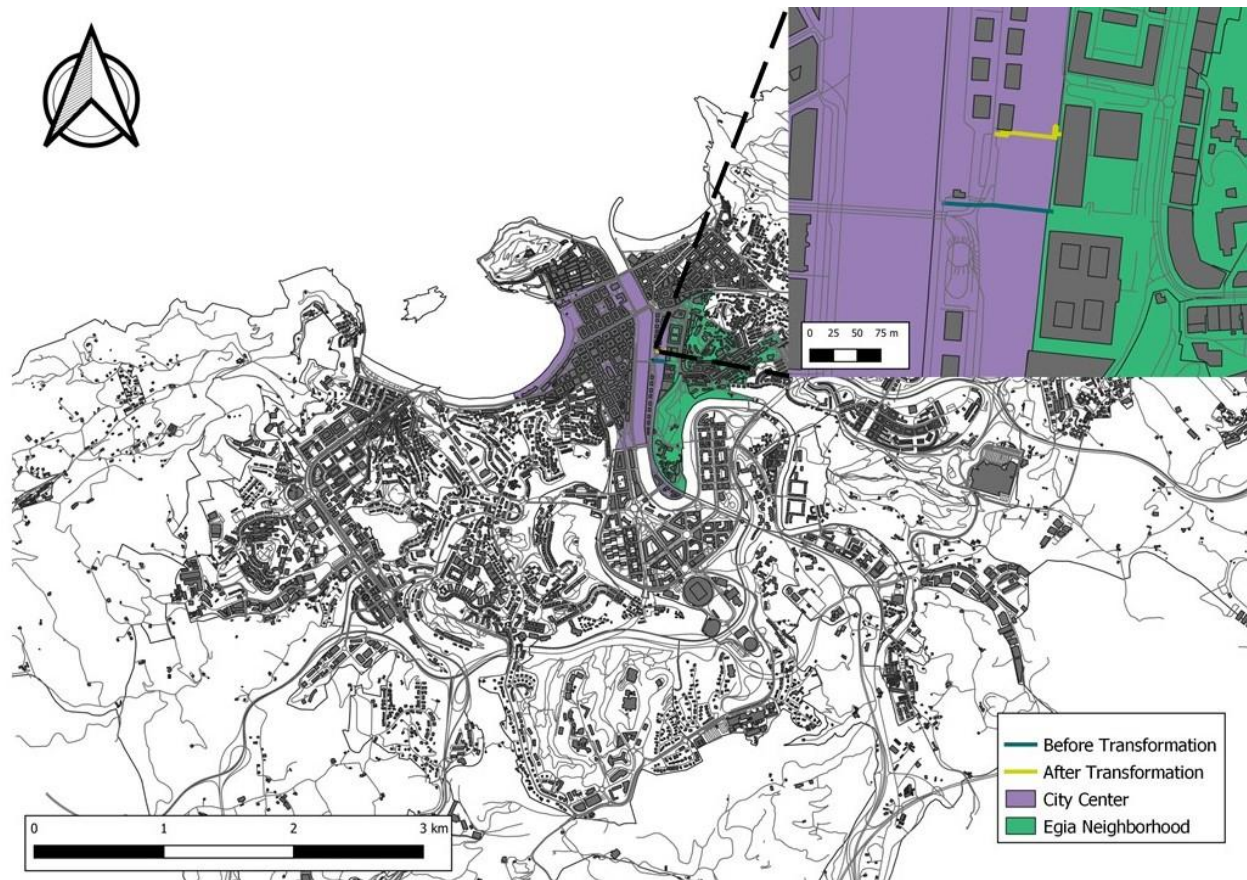[d] See the map of the city council

Image 1. Area of the study.

Design, Instruments and Sample

To address the research questions, we employed a mixed-methods design, combining quantitative and qualitative methods. For research questions RQ1 and RQ2, we used ad-hoc surveys within the CPTED framework, as well as a safety walk (for more details, see the qualitative section below). To answer RQ3 (and RQ2), we utilized an audit-type tool for systematic observation, developed based on similar existing tools (Iqbal, & Ceccato, 2016; San Juan, Vozmediano, & Martín, 2019).

The entire procedure in both stages obtained a favorable report from the Ethics Committee for Research Involving Human Subjects (CEISH) of the UPV/EHU.

Quantitative measures

To capture women's perceptions of security and the associated environmental variables (RQ1 and RQ2), we designed an *ad hoc* survey (see S1 in supplementary materials). This survey was administered to women who were using the study setting. The items collected information on their perceptions of crime, personal use of the setting, and their views on the built environment and social landscape (see supplementary material).

To measure the built environment and social characteristic of both stages (before and after) according to the CPTED principles we used the SUE tool (Safe Urban Environment, Vozmediano, et al., 2024; see S2). A tool designed to assess the aspects that may increase the unsafety or safety perception. It consists of 58 items divided in 8 categories: Criminogenic Design (15 items), Ethnic heterogeneity (6 items), Maintenance (4 items), Miscellaneous (4 items), Physical disorder (7 items), Proactivity (9 items), Security elements (7 items) and Physical disorder (6 items). All items were measured on a scale of 0 to 3 except for Social Disorder, which was analyzed by the presence or absence of the characteristics. We divided the setting of study into three subareas (see Image 2): the middle point of the passageway or footbridge (see in Image 2 the marked zone 2) and the two areas around the entrances (see in Image 2 the marked zones 1 & 3) of the passageway and footbridge. Then two independents observers during the day and at night evaluated the setting. We calculated Cohen's Kappa (1960) as the inter-rater reliability coefficient for each scale. The Kappa values ranged from .727 to 1, indicating a high level of inter-observer agreement. Disagreements between observers were addressed in team meetings, with a third member of the research team mediating when necessary.

Qualitative methodology

To obtain a more comprehensive understanding of women's perceptions of unsafety (see the review of Cozens, 2022) we complemented the quantitative data with a qualitative measure. Specifically, we conducted Safety Walks (see S3), also known as safety audits, which is a participatory approach involving community members to identify urban issues.

Following previous practices (Mitra & Bardhan, 2017), we conducted two safety walks (one before and one after the transformation) with different women in the study area. The activity involves walking through various parts of the study area and asking open-ended questions about perceived security, built environment variables, and social activities and groups. The conversations were recorded for later transcription and thematic analysis by two members of the research team independently. This approach aimed to identify physical and social characteristics that were not captured by the survey or systematic observation. To assess researcher agreement when coding the themes, we calculated Cohen's Kappa, which ranged from .45 to .88. Disagreements were addressed in team meetings.

Sample
Survey

The survey sample was based on a convenience sample of women walking around the study setting (Image 2), with surveys conducted until the predetermined number was reached. The sample consisted of 100 women (50 in each stage). The number of participants was decided based on time and budget constraints. All participants were over 18 years old. Before the transformation, the largest age group was women aged 26-45 (50%), while after the

transformation, the largest group was women aged 46-65 (46%). In both stages, the least represented group was women aged 18-25 (26% before, 8% after). All participants were city residents, with most living in peripheral neighborhoods (51%) and a smaller percentage from central neighborhoods (22%).

Regarding the use of the area, most women used it almost daily (40%) or once or twice a week (30%), predominantly during the day (60%), and the rest used the setting both day and night (40%). No women in our sample used the area exclusively at night. Additionally, a large group of women used the setting both alone and accompanied (47%), followed by those who usually used it alone (42%), and to a lesser extent, those who used it only when accompanied (11%).

Safety Walk

A total of 10 women (5 in each stage) participated in the study, recruited through the snowball sampling method. The number of participants was decided based on time and budget limitations. All participants were over 18 years old and residents of the city. Previous research suggests using small samples to ensure that all participants can easily participate, stay together during the activity, and have their voices heard (Aurat Foundation, 2020; Jagory, 2012; Lambrick & Travers, 2008; SDD, 2013). These activities benefit from a manageable and intimate group, facilitating more specific and meaningful dialogues.

Image 2. Map of the area of study divided by subareas.

Data analysis

First, we conducted univariate analyses for the socio-demographic variables, those related to the perception of unsafety and those related to the participants' use of the space under study. Second, we conducted bivariate analyses between the two stages. We use the chi-square (χ^2) test and report the Phi coefficient (Φ) or Cramer's V as the effect size of the difference between before and after the transformation. Third, to analyze the systematic observation data, we calculated the mean punctuation for all the three subareas for each stage. Table S4 in the supplementary material shows the range of punctuations for each scale and the rescaling value from 0-100. We then obtained the relative change[e] considering the rescale punctuation (0-100) to compare the before and after built environment and social activity characteristics of the settings. We also use some visualizations to show the relative changes. Finally, we conducted a thematic analysis to analyze the Safety Walk.

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[e] $C = \dfrac{Rescaled\ After\ value - Rescaled\ Before\ value}{Rescaled\ Before\ value} * 100$

Results

Results of the surveys on women's perception of unsafety

The characteristics of women's perceptions of unsafety are summarized in Table 1. The majority of women in our sample (61%) reported perceiving unsafety at some moment in the area under study. However, the proportion of reported unsafety was higher in the setting before the transformation (63.9%) than in the setting after the transformation to after (36.1%), (Φ = .33; 95 % CI [0.11 – 0.54]).

We also compared the frequency of the perception of unsafety and the perception of unsafety per type of crime between the women who reported unsafety perception (see Table 1). However, none of the comparisons seems to have an effect size different from zero.

Table 1. Survey Results on Unsafety perception before and after Comparisons

Item		Before n (%)	After n (%)	χ^2	Df	p-value	Φ/V	95 % CI
Unsafety Perception				10.76	1	.001	.33	[0.11, 0.54]
	No	11 (28.2%)	28 (71.8%)					
	Yes	39 (63.9%)	22 (36.1%)					
Frequency of Unsafety				8.481	3	.030	.30	[0.00, 0.55]
	Never	11 (28.2%)	28 (71.8%)					
	Very Rarely	7 (58.3%)	5 (41.7%)					
	Sometimes in the Last Month	22 (64.7%)	12 (35.3%)					
	Every Week	2 (28.6%)	5 (71.4%)					
	Practically Daily	8 (100 %)	0 (0%)					
Unsafety Perception Per Type of Crime								
Robbery				0.196	1	.658	0	[0.00, 0.32]
	No	9 (56.2%)	7 (43.8%)					
	Yes	30 (66.7%)	15 (33.3%)					
Physical Aggression				2.406	1	.121	.19	[0.00, 0.47]
	No	19 (54.3%)	16 (45.7%)					
	Yes	20 (76.9%)	6 (23.1%)					
Sexual Aggression				0.012	1	.910	0	[0.00, 0.26]
	No	14 (60.9%)	9 (39.1%)					
	Yes	25 (65.8%)	13 (34.2%)					
Harassment				0.224	1	.636	0	[0.00, 0.32]
	No	21 (60.0%)	14 (40.0%)					
	Yes	18 (69.2%)	8 (30.8%)					

We asked the women that reported to perceive unsafety (n = 61) the potential reasons (Tables 2 and 3) of their perception. When considering the CPTED themes for those reasons (Table 2), the majority pointed to the *activity in the area* (n = 49), the *design* (n = 55), and the *type of people* (n = 47). However, only the *activity in the area* and the *type of people* in the area shown differences between the setting before and after the transformation. Specifically, more women cited the *activity in the area* as a reason for their unsafety in the setting before the transformation compared to after (Φ = .47; 95 % CI [0.20 – 0.73]). The other CPTED themes –*type of people, commercial activity, unstructured activities* (95 % CI contained 0)*, design, lack of police, maintenance or public transport access*– did not show statistically significant differences.

Table 2. *Results of the Surveys. Reasons for the unsafety (based on the CPTED approach) among stages.*

Item		Before n (%)	After n (%)	χ^2	p-value	Φ	95 % CI
Activity in The Area				12.035	< .001	.47	[0.20, 0.73]
	No	2 (16.7%)	10 (83.3%)				
	Yes	37 (75.5%)	12 (24.5%)				
Commercial Activity				2.375	.091	.19	[0.00, 0.47]
	No	23 (56.1%)	18 (43.9%)				
	Yes	16 (80.0%)	4 (20.0%)				
Unstructured Activities				4.262	.020	.28	[0.00, 0.55]
	No	30 (57.7%)	22 (42.3%)				
	Yes	9 (100.0%)	0 (0.0%)				
Design				0.353	.404	.03	[0.00, 0.36]
	No	5 (83.3%)	1 (16.7%)				
	Yes	34 (61.8%)	21 (38.2%)				
Lack of Police				0	1	-	
	No	38 (63.3%)	22 (36.7%)				
	Yes	1 (100.0%)	0 (0.0%)				
Maintenance				0.889	.262	.11	[0.00, 0.40]
	No	35 (67.3%)	17 (32.7%)				
	Yes	4 (44.4%)	5 (55.6%)				
Public Transport				0.087	.645	0	[0.00, 0.33]
	No	35 (62.5%)	21 (37.5%)				
	Yes	4 (80 %)	1 (20 %)				
Type of People				7.965	.003	.38	[0.08, 0.64]
	No	4 (28.6%)	10 (71.4%)				
	Yes	35 (74.5%)	12 (25.5%)				

Women who reported to perceive unsafety were asked about previous victimization experiences. Few of those (n = 6) had been victims of a crime recently, mostly robbery (n = 3). Likewise, some of the women (n = 13) knew of someone who was recently the victim of a crime. Again, mostly

robbery (n = 8) followed by sexual aggression (n = 4). However, we did not find any the differences between the settings before and after the transformation (see Table 3).

Self-protective behaviors

In terms of self-protective behaviors, it was found that of the women who reported having felt insecure at some point (n = 61), 41% (n = 25) reported having performed self-protective behaviors. These women reported engaging in protective behaviors (e.g. calling someone by telephone). If we look at the differences between setting (before and after), we observe that there is a decrease in the number of women who reported engaging in self-protective behaviors (Before: 25%; After: 16%). Although the differences between stages were not statistically significant in any case.

When looking at avoidance behaviors, of the total number of participants who reported perceiving unsafety, 66% (n = 40) reported engaging in avoidance behavior. However, the differences between stages were not statistically significant in any case.

Results of the Safety Walks conducted with women.

We will now present the most notable findings from the thematic analysis of the Safety Walk. For a more detailed description, refer to Table 4, which includes themes, examples, and the number of women's comments corresponding to each theme.

Consistent with the survey results, all women who participated in the Safety Walk reported feeling insecure at some point in the area during both stages. Overall, the area under study was perceived as unpleasant. This perception was particularly strong at night, when the lack of social activity and insufficient lighting heightened the sense of unsafety.

When asked about the factors influencing their perception of unsafety, *urban design* was the most frequently mentioned reason. Before the transformation, all women indicated that the urban design contributed to their feelings of unsafety (see Table 4). This percentage decreased in some areas after the transformation, dropping from 100% to 67% in zones 1 and 3.

In relation to urban design, most women expressed concerns about unsafety due to insufficient *lighting* in zones 1 and 3, both before and after the transformation. However, only half of the women mentioned concerns about lighting in zone 3 after the transformation. Notably, none of the women reported a lack of lighting in the walkway areas (zones 2) before or after the transformation (see images 3 and 4 for example of the settings).

Table 3. Survey Results of Victimization Experiences (Previous and Vicarious) Before and After Comparisons

| Items		Before n (%)	After n (%)	χ^2	*Df*	*p-Value*	Φ	95 % CI
Prev. Victimization				4.375	1	.019	.30	[0.00, 0.56]
	No	38 (69.1%)	17 (30.9%)					
	Yes	1 (16.7 %)	5 (83.3%)					
Prev. Victimization Robbery				2.96	1	.045	.27	[0.00, 0.54]
	No	38 (66.7%)	19 (33.3%)					
	Yes	0 (0%)	3 (100%)					
Prev. Victimization Physical Aggression				0	1	1	0	[0.00, 0.32]
	No	38 (63.3%)	22 (36.7%)					
	Yes	1 (100%)	0 (0.%)					
Prev. Victimization Sexual Aggression				0.078	1	.367	.11	[0.00, 0.40]
	No	38 (64.4%)	21 (35.6%)					
	Yes	0 (0.%)	1 (100%)					
Prev. Victimization Harassment				0.078	1	. 367	.11	[0.00, 0.40]
	No	38 (64.4%)	21 (35.6%)					
	Yes	0 (0%)	1 (100.%)					
Vicarious Victimization				6.159	1	.008	.34	[0.00, 0.60]
	No	35 (72.9%)	13 (27.1%)					
	Yes	4 (30.8%)	9 (69.2%)					
Vicarious Victimization Robbery				1.627	1	.124	.17	[0.00, 0.45]
	No	36 (67.9%)	17 (32.1%)					
	Yes	3 (37.5%)	5 (62.5%)					
Vicarious Victimization Physical Aggression				4.737	1	.0295	-	-
	No	39 (63.9%)	22 (36.1%)					
	Yes	0 (0%)	0 (0%)					
Vicarious Victimization Sexual Aggression				4.911	1	.014	.33	[0.00, 0.59]
	No	39 (68.4%)	18 (31.6%)					
	Yes	0 (0%)	4 (6.6%)					
Vicarious Victimization Harassment				0	1	1	0	[0.00, 0.32]
	No	38 (63.3%)	22 (36.7%)					
	Yes	1 (100%)	0 (0%)					
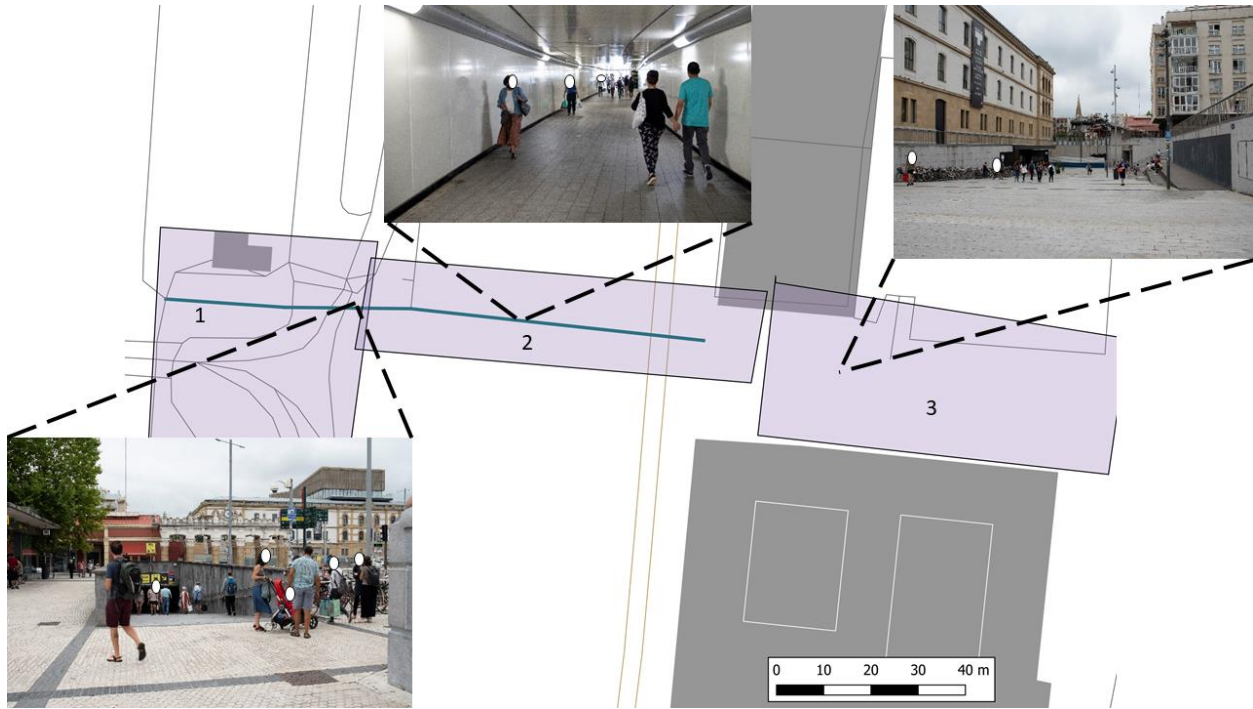
Image 3. Setting before the transformation divided in three subzones.

The lack of *commercial activity* was also identified as a reason for perception of unsafety in zones 1 and 2, both before and after the transformation, but not in zone 3. Regarding the *type of people* in the area, fewer women reported this as an issue in zone 3 after the transformation. Similarly, fewer women reported issues with security features, such as the lack of *CCTVs* (e.g., in zone 1, 40% before and 0% after) and *police presence* (e.g., in zone 3, 60% before and 0% after). On the other hand, there was a noted decline in the *maintenance of the area*, consistent with the survey findings.
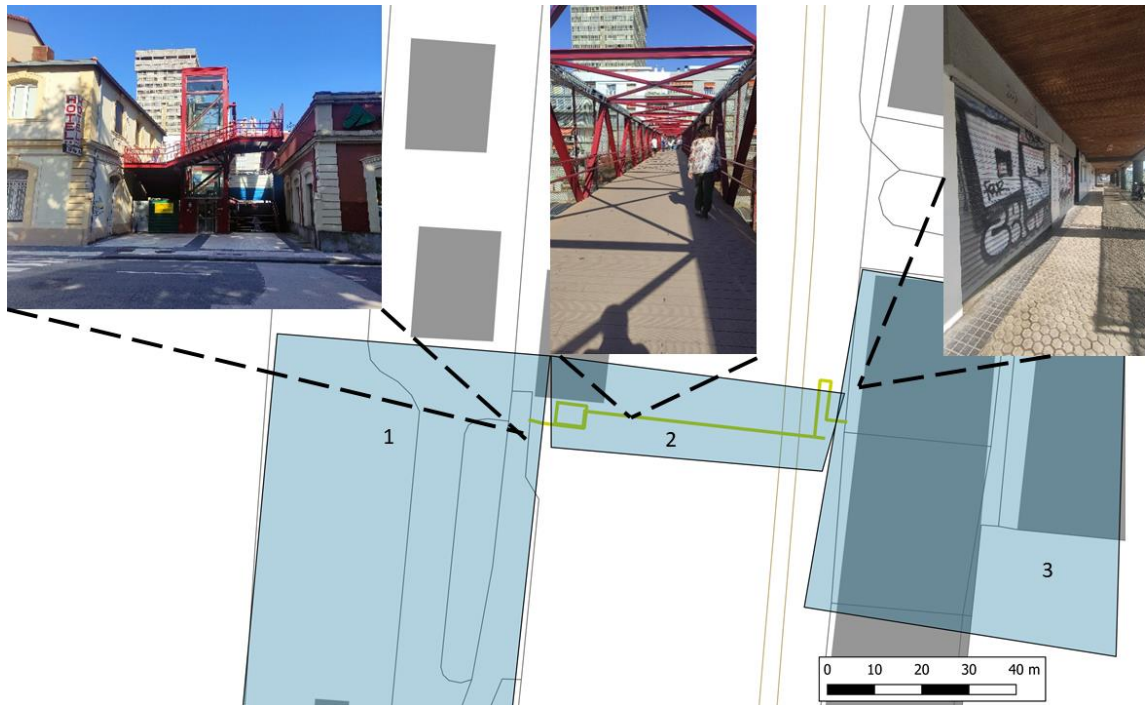
Image 4. Setting after the transformation divided in three subzones.

There was significant concern at all stages regarding the criminogenic characteristics of the entire area. Specifically, all participants noted a *lack of visibility*, which hindered the ability of others to witness if something were to happen to anyone. Concerning the possibilities for *offenders to escape*, all participants agreed (both before and after the transformation) that the design provided escape opportunities for potential offenders.

Regarding escape options for potential victims, the proportion of women who identified potential escape routes in zones 2 and 3 (both before and after the transformation) was low. Only in zone 1 did women report the existence of more escape options for potential victims (before: all participants; after: four women).

In terms of the temporal use of the area, most participants in both settings (except in zone 3 before and after the transformation) indicated they would use the area during the day but not at night.

Finally, in terms of *self-protective behaviors*, all participants in both settings stated they would consider a self-protective measure. The number of women who agreed to consider *self-defense* measures increased in zones 1 and 2 after the transformation. Regarding *altruistic fear*, or concern for the safety of someone they knew, all women in zone 1 expressed concern. In zone 2, more women were concerned after the transformation, whereas in zone 3, only three women before and two women after the transformation expressed concern.

Table 4. Safety Walk results. Before and After Comparison.

Theme	Description Of Category	Example	Zones					
			1 Before	1 After	2 Before	2 After	3 Before	3 After
Altruistic Fear	Altruistic fear, if the participant would feel insecure if someone close to her were to use that area.	"I always tell my sister when she leaves [name of the a place for dancing] to take a taxi, to go with someone else or to get a bike from the City Council. In other words, just so that this doesn't happen". (Zone 2 -After)	100% (5)	100% (6)	60% (3)	100% (6)	60% (3)	40% (2)
Calling for Help*	Perception that there is not enough chance that, should you need help, you will get it quickly or nearby.	"I mean, you have to go a long way to ask for help, it's like a long way to go. It's not like I go to the corner and I'm already free...". (Zone 2 -After)	100% (5)	100% (6)	40% (2)	100% (6)	100% (5)	100% (5)
CCTV	Perception of the lack of CCTV in the area and the need for improvement.	I don't know if there is or not, but there should be and if there is, some more." (Zone 2 -After)	40% (2)	0% (0)	100% (5)	0% (0)	60% (3)	50% (3)
Commercial Activity	Perceived lack of commercial activity and need for Improvement	"Yes, and there are no shop windows, in other words, there is nothing." (Zone 2 -After)	100% (5)	100% (6)	100% (5)	100% (6)	60% (3)	50% (3)
Day-time Use*	Participants would use the area during daylight hours.	"Daytime yes, night-time no." (Zone 2 -After)	100% (5)	100% (6)	100% (5)	100% (6)	40% (2)	80% (4)
Escape For Aggressor*	Perception that there are enough options for the offender to get away	"You get in there and you don't know if it goes to the right, to the left..." (Zone 3-Before).	100% (5)	100% (6)	100% (5)	100% (6)	100% (5)	100% (5)

Category	Description	Quote						
Escape For Victim*	Perception that there are enough options for the victim to get away	"And with the stairs you start to run, and you fall down". (Zone 2 -After)	100% (5)	67% (4)	20% (1)	0% (0)	60% (3)	0% (0)
Hiding Places for the Aggressor*	Perception that there are enough options for an aggressor to hide unseen	"in the arcades, on the columns, in the doorways..." (Zone 3-Before).	100% (5)	100% (6)	100% (5)	83% (5)	100% (5)	100% (5)
Lighting	Women's perception of poor lighting in the area.	"You can meet people... you can bump into someone and "oops, I haven't seen them before". The less light you have, the more scares you can get" (Zone 2 -After)	100% (5)	100% (6)	0% (0)	0% (0)	100% (5)	50% (3)
Unsafety at Certain Times*	Perception that it is a space that can create unsafety for participants at certain times.	"Yes, especially at night". (Zone 2 -After)	100% (5)	100% (6)	100% (5)	100% (6)	100% (5)	100% (5)
Maintenance	Perception of poor maintenance of the area (floors and pavements, buildings, vegetation, etc.).	"For me there are a lot of places (…) I don't know if they are abandoned. (…), it is poorly maintained, in bad condition and that psychologically gives unsafety." (Zone 3 - After)	0% (0)	50% (3)	0% (0)	33% (2)	60% (3)	100% (6)
Night Use*	Participants would not use the area during night-time hours.	"I don't use it at night around here... I walk around." (Zone 2 - After)	100% (5)	100% (6)	100% (5)	67% (4)	100% (5)	100% (5)
Police Presence	Perception of a lack of police presence in the area and the need for more of them.	"I've never seen a cop here..." (Zone 2 - After)	80% (4)	50% (3)	40% (2)	50% (3)	60% (3)	0% (0)
Self-Protection Measures*	Participants' perceptions of whether the area is a place where they might need a self-protection tool. Such as whistles, defence sprays, etc.	"Keys in your hand for sure. I think I would activate all of them here, I mean..." (Zone 3 - After)	60% (3)	17% (1)	80% (4)	100% (6)	40% (3)	40% (2)

Self-Protective Behaviour*	Participants' perception of whether the area is a place that can lead you to do some kind of self-protective behaviour. For example, avoiding this area, running past it...	"I always avoid the passageway at night and if you can't avoid it, you have to go with your mobile phone (…)"	100% (5)	100% (6)	100% (5)	100% (6)	100% (5)	100% (5)
Territoriality (Signage)	Perception of poor signage in the area by the participants,	"I don't see the name of any street". (Zone 2 - After)	20% (2)	0% (0)	0% (0)	100% (6)	0% (0)	0% (0)
Type of People	The type of people frequenting the area as a reason for participants' perception of unsafety	"and there are a lot of people that you see that don't give you confidence, that you say well let's see... they can be whatever, but they don't give me confidence" (Zone 3 - Before).	60% (3)	50% (3)	40% (2)	67% (4)	80% (4)	17% (1)
Urban Design	The design of the space as a reason for the perception of unsafety felt by the women (overpasses, underpasses, position of vegetation, etc.).	"Yes, a very narrow and not very open place where... you don't see who's coming, who's coming behind you..." (Zone 3 - After)	100% (5)	67% (4)	100% (5)	67% (4)	100% (5)	100% (6)
Visibility Around*	Perception that there is no good visibility of the surroundings to let you know who is around you or if anything is going on.	"In fact...I couldn't identify anyone." (Zone 2 - Before)	100% (5)	100% (6)	0% (0)	100% (6)	100% (5)	100% (5)
Visibility Of A Third Person*	Perception that there is no good visibility of your location that a third party can see you if you are well	"They can't see me, I'm on a porch, what are they going to see me, they won't even hear me, I mean, apart from today with the windows that are there..." (Zone 3 - Before).	100% (5)	83% (5)	100% (5)	100% (6)	100% (5)	100% (5)

Built and Social Environment

Figure 1 show the sum of scores rescaled on each physical and social characteristic considered in the SUE tool (Vozmediano, et al., 2024) in before and after transformation of the setting.

An improvement can be observed in the following aspects: *proactivity in that area* (relative change of -2.03 %), *social disorder* (relative change of -63.65 %) and, the *security elements* (relative change of 52.37 %).

On the contrary, there is a worsening in some aspects such as, in *physical disorder* (with relative change of 50%), and *maintenance* (relative change of -43.33%). As well as, a slightly worsening of the *criminogenic* characteristics (relative change of -1.59%).
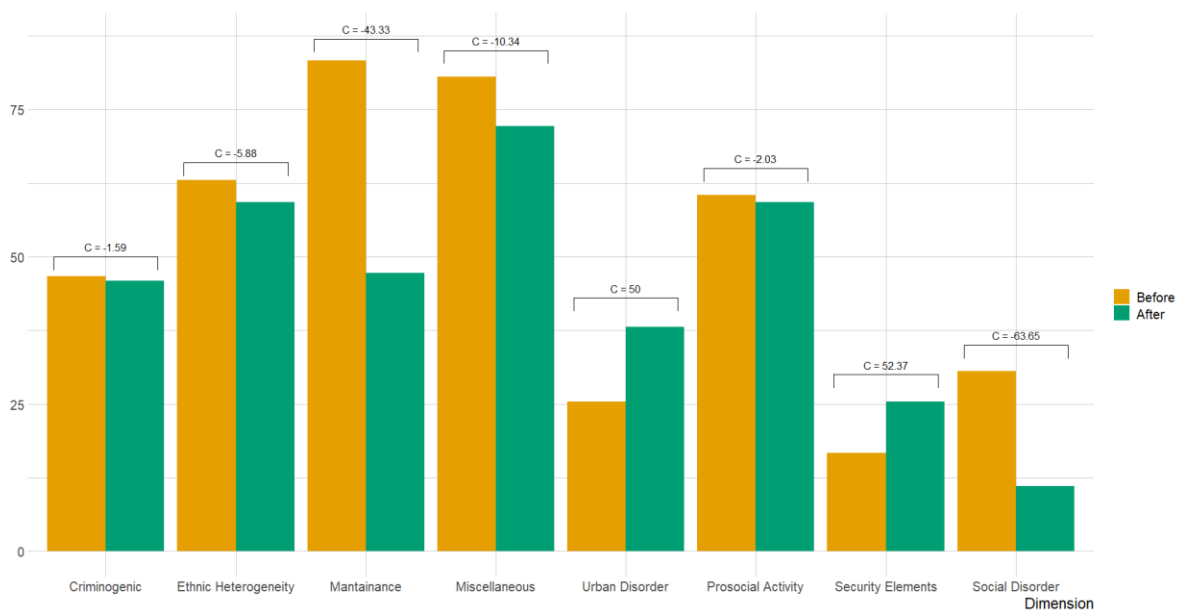

Figure 1. Sum of the Scores of SUE tool and Relative Change Before and After the Urban Transformation.

Discussion

In this study, we examined whether there were differences in the perception of insecurity and associated behaviors among women before and after the reconstruction of an urban area considered risky (RQ1). Our bivariate analysis results indicate a significant difference between the women surveyed in the tunnel (before reconstruction) and those on the walkway (after reconstruction). These findings align with research on urban design, visibility, social disorder, the locality of underground stations, and their association with crime (Ceccato et al. 2013) and the perception of safety (Ceccato et al. 2024).

We also explored the extent to which urban and social design are related to the perception of insecurity (RQ2). Closing an underground space and creating an elevated area with

better visibility, as done at the Donosita-San Sebastián train and bus station, can partially explain the change in women's perception of safety. The perception of greater insecurity in spaces with less visibility, more social disorder, or lack of security features is well documented in CPTED (Crime Prevention Through Environmental Design) research (Ceccato et al., 2024). Our systematic observation measures also support these findings. Although survey and qualitative measures did not show significant differences when women were asked, the area's activity, which improved compared to the pre-transformation phase, was the only CPTED measure showing a difference. A plausible explanation is that the change from the tunnel to the bridge is only about 89 meters. Specifically, the tunnel's exit or entrance to the plaza (zone 3), where groups of friends or people from a nearby public center spent time, contrasts with the bridge area. While the immediate bridge area may not have much activity, a nearby residential zone with various shops and cafes is typically bustling, contributing to a perception of informal surveillance and a safer environment.

This study also investigated whether systematic observation tools based on CPTED criteria, such as the SUE, captured the urban design and social environment elements that women perceived as contributing to insecurity. Generally, the answer is affirmative. While many CPTED criteria differences are similar in both scenarios, some systematically observed criteria in our study reflect what women reported in surveys and Safety Walks, consistent with other empirical studies (see Cozens, 2022). For example, improvements in security elements, area activity, and social disorder, along with deteriorations in maintenance, physical disorder, and criminogenic features of the space, were noted. This concordance could be because the systematic observation was conducted by women, as it is well-documented that women generally perceive and report social and physical disorder more than men (Johansson & Haandrikman, 2023). Future research using systematic observation should consider the observers' individual characteristics and the design of observation measurements to minimize biases (Hoeben et al., 2018).

Finally, regarding individual variables such as protective behaviors and previous victimization, the results showed no differences between the two locations. While most women used protective measures, consistent with existing evidence, these behaviors did not change before or after the space transformation. This could be explained by the fact that such behaviors are deeply ingrained in women, and changing certain urban environment elements is unlikely to alter these possibly crystallized habits (Woolnough, 2009).

Limitations

Although many have been mentioned through the different sections of the manuscript, the present study is not free limitations that need to be considered when interpreting the results. Firstly, an important limitation would be the sample size, especially when carrying out the surveys

and the Safety Walk. In the surveys we obtained a sample of 100 women participants and in the Safety Walk, 11. Considering that there are 99060 women living in the city of Donostia-San Sebastian, the sample of the present study is not representative and, therefore, the results cannot be generalized. Furthermore, by carrying out the study in a residential neighborhood with people who walk through it, we need to point the selection bias introduced into the sample, given that not all ages, ethnicities, socio-economic status, etc. may be represented.

Another issue to be considered is that both during the surveys and during the Safety Walk (and especially during the Safety Walk) questions were asked about perceptions of unsafety. As mentioned above, for the scientific community itself, it is a phenomenon that is difficult to conceptualize, with different interpretations, measurements, etc. It is conceivable that this may be the case with participants when they are asked how they feel about their safety and when they are asked about other aspects of safety. In other words, we can find a bias in the participants' interpretation of the questions. And, in relation to this problem, there may be a response bias, particularly in activities such as the Safety Walk, where women, together and in person, engage in discussions for a period of time and may respond in a socially accepted way without reflecting their true perceptions.

Finally, regarding the measurement of the physical and social environment, it is worth mentioning that some limitation in the results can be found due to observer bias or even confirmation bias. As Cozens (2022) explains, CPTED audits are essentially subjective and therefore the results may be associated with the values and opinions of the auditors. It should also be borne in mind that such tools present results from a specific time and date and are therefore a snapshot of what is happening in that place.

Implications for Future Research and Practice

While sample size is undoubtedly limited in terms of generalization, we should consider that samples were composed of women that were using the researched area, therefore being potential representatives of a smaller group: female users of the specific urban area. Size of the population of female users could not be estimated for this study but could be a significant way forward for future studies.

The strength of the contribution lies mainly in the proposed method that allows deeply studying perceptions and behaviors of women, and design and use characteristics urban areas. And it is noteworthy that any improvement aimed for the most vulnerable groups will benefit all citizens. This proposal could be applied prior to the modification of urban areas, in order to establish priorities by the public, and also for assessing the impact of a particular change, as we did. Therefore, we propose a potentially helpful way of evaluating safety at the micro level, particularly interesting for local councils.

By using and combining the three methodological approaches, the present study has been able to identify which specific characteristics of the urban environment are associated women's

perception of security. In this way, with the data obtained, it is possible to make a series of suggestions for the improvement of this space, through the design of specific interventions for this area that can be subsequently evaluated. It should also be noted that this type of study allows the community to be involved in decision-making regarding the safety of their city. In this way, it is possible to think that the community may become more responsible for its spaces, which could lead to an improvement of the area by non-invasive methods and more by the neighborhood's own natural surveillance and would do so through active and cooperative participation with other institutions.

References

Blobaum, A., & Hunecke, M. (2005). Perceived danger in urban public space. *Environment and Behavior, 37*(4), 465-486. doi:10.1177/0013916504269643

Burt, M. R., & Estep, R. E. (1981). Apprehension and fear: Learning a sense of sexual vulnerability. *Sex Roles, 7*(5), 511-522. doi:10.1007/BF00288628

Ceccato, V. (2019). Fieldwork protocol as a safety inventory tool in public places. *Criminal Justice Studies, 32* doi:10.1080/09589236.2019.1601367

Ceccato, V. & Loukaitou-Sideris, A. (2022). Fear of Sexual Harassment and Its Impact on Safety Perceptions in Transit Environments: A Global Perspective. *Violence Against Women, 28*(1), 26-48. https://doi.org/10.1177/1077801221992874

Ceccato, V., Sundling, C. & Gliori, G. (2024). What makes a railway station safe and for whom? The impact of transit environments on passengers' victimisation and safety perceptions. European Transport Research Review, 16, 21. https://doi.org/10.1186/s12544-024-00641-5

Ceccato, V., Uittenbogaard, A. & Bamzar, R. (2013). Security in Stockholm's underground stations: The importance of environmental attributes and context. Security Journal 26, 33–59. https://doi.org/10.1057/sj.2011.32

Chataway, M. L., & Hart, T. C. (2019). A social-psychological process of "fear of crime" for men and women: Revisiting gender differences from a new perspective. *Victims & Offenders, 14*(2), 143-164. doi:10.1080/15564886.2018.1552221

Chataway, M. L., Hart, T. C., Coomber, R., & Bond, C. (2017). The geography of crime fear: A pilot study exploring event-based perceptions of risk using mobile technology. *Applied Geography, 86*, 300-307. doi:10.1016/j.apgeog.2017.06.010

Chiricos, T., Eschholz, S., & Gertz, M. (1997). Crime, news and fear of crime: Toward an identification of audience effects. *Social Problems, 44*(3), 342-357. doi:10.2307/3097181

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, 20, 37–46. https://doi.org/10.1177/001316446002000104

Cops, D., & Pleysier, S. (2011). 'DOING GENDER' IN FEAR OF CRIME: The impact of gender identity on reported levels of fear of crime in adolescents and young adults. *The British Journal of Criminology, 51*(1), 58-74. Retrieved from http://www.jstor.org/stable/23640337

Cozens, P. M., Saville, G., & Hillier, D. (2005). Crime prevention through environmental design (CPTED): A review and modern bibliography. *Property Management, 23*(5), 328-+. doi:10.1108/02637470510631483

Cozens, P., Babb, C., & Stefani, D. (2022). Exploring and developing crime prevention through environmental design (CPTED) audits: An iterative process. *Crime Prevention and Community Safety, 25*, 1-19. doi:10.1057/s41300-022-00170-0

De Welde, K. (2003). White women beware!: Whiteness, fear of crime, and self-defense. *Race, Gender & Class, 10*(4), 75-91. Retrieved from http://www.jstor.org/stable/41675102

Ferraro, K. F., & LaGrange, R. (1987). The measurement of fear of crime. *Sociological Inquiry, 57*(1), 70-101. doi:10.1111/j.1475-682X.1987.tb01181.x

Ferraro, K. F. (1996). Women's fear of victimization: Shadow of sexual assault? *Social Forces, 75*(2), 667-690. doi:10.2307/2580418

Fox, K. A., Nobles, M. R., & Piquero, A. R. (2009). Gender, crime victimization and fear of crime. *Security Journal, 22*(1), 24-39. doi:10.1057/sj.2008.13

Garofalo, J. (1979). Victimization and the fear of crime. *Journal of Research in Crime and Delinquency, 16*(1), 80-97. doi:10.1177/002242787901600107

Gaub, J. E., Wallace, D., & Mary, E. H. (2021). The neighborhood according to women: Understanding gendered disorder perceptions. *Crime & Delinquency, 67*(6-7), 891-915. doi:10.1177/0011128720968491

Gerber, M., Hirtenlehner, H., & Jackson, J. (2010). Insecurities about crime in Germany, Austria and Switzerland: A review of research findings. *European Journal of Criminology, 7*(2), 141-157. Doi: 10.1177/1477370809356871

Glas, I., Engbersen, G., & Snel, E. (2019). Going spatial: Applying egohoods to fear of crime research. *British Journal of Criminology, 59*(6), 1411-1431. doi:10.1093/bjc/azz003

Gray, E., Grasso, M., Farrall, S., Jennings, W., & Hay, C. (2019). Political socialization, worry about crime and antisocial behaviour: An analysis of age, period and cohort effects. *British Journal of Criminology, 59*(2), 435-460. doi:10.1093/bjc/azy024

Gray, E., & Jackson, J. (2008). Reassessing the fear of crime. *European Journal of Criminology, 5* doi:10.1177/1477370808090834

Gray, E., Jackson, J., & Farrall, S. (2008). Reassessing the fear of crime. *European Journal of Criminology, 5*(3), 363-380. doi:10.1177/1477370808090834

Grohe, B. (2011). Measuring residents' perceptions of defensible space compared to incidence of crime. *Risk Management, 13*(1), 43-61. Retrieved from http://www.jstor.org/stable/41289356

Hale, C. (1996). Fear of crime: A review of the literature. *International Review of Victimology, 4*(2), 79-150. doi:10.1177/026975809600400201

Hart, T. C., Chataway, M., & Mellberg, J. (2022). Measuring fear of crime during the past 25 years: A systematic quantitative literature review. *Journal of Criminal Justice, 82*, 101988. doi:10.1016/j.jcrimjus.2022.101988

Henson, B., & Reyns, B. W. (2015). The only thing we have to fear is fear itself…and crime: The current state of the fear of crime literature and where it should go next. *Sociology Compass, 9*(2), 91-103. doi:10.1111/soc4.12240

Hirtenlehner, H., Farrall, S., & Eva Groß. (2023). Are women of all age groups equally affected by the shadow of sexual assault? evidence from germany. *European Journal of Criminology, 20*(3), 834-855. doi:10.1177/14773708231156330

Hodgkinson, T., & Lunney, K. (2021). Across the wide prairie: Exploring fear of crime in a small canadian municipality. *Journal of Criminology, 54*(2), 109-125. doi:10.1177/0004865821999082

Hoeben, E. M., Steenbeek, W., & Pauwels, L. J. R. (2018). Measuring disorder: Observer bias in systematic social observations at streets and neighborhoods. *Journal of Quantitative Criminology, 34*(1), 221-249. doi:10.1007/s10940-016-9333-6

INE. (2022). Cifras oficiales de población de los municipios españoles en aplicación de la ley de bases del régimen local.

Iqbal, A., & Ceccato, V. (2016). Is CPTED useful to guide the inventory of safety in parks? A study case in stockholm, sweden. *International Criminal Justice Review, 26*(2), 150-168. doi:10.1177/1057567716639353

Jackson, J. (2004). Experience and expression - social and cultural significance in the fear of crime. *British Journal of Criminology, 44*(6), 946-966. doi:10.1093/bjc/azh048

Jackson, J. (2005). Validating new measures of the fear of crime. *International Journal of Social Research Methodology, 8*(4), 297-315. doi:10.1080/13645570500299165

Johansson, S., & Haandrikman, K. (2023). Gendered fear of crime in the urban context: A comparative multilevel study of women's and men's fear of crime. *Journal of Urban Affairs, 45*(7), 1238-1264. doi:10.1080/07352166.2021.1923372

Koskela, H., & Pain, R. (2000). Revisiting fear and place: Women's fear of attack and the built environment. *Geoforum, 31*(2), 269-280. doi:10.1016/S0016-7185(99)00033-0

Kronkvist, K., & Alexander Engström. (2020). Feasibility of gathering momentary and daily assessments of fear of crime using a smartphone application (STUNDA): Methodological considerations and findings from a study among swedish university students. *Methodological Innovations, 13*(3), 2059799120980306. doi:10.1177/2059799120980306

Lee, H. D., Boateng, F. D., Kim, D., & Maher, C. (2022). Residential stability and fear of crime: Examining the impact of homeownership and length of residence on citizens' fear of crime. *Social Science Quarterly, 103*(1), 141-154. doi:10.1111/ssqu.13108

Lorenc, T., Clayton, S., Neary, D., Whitehead, M., Petticrew, M., Thomson, H., . . . Renton, A. (2012). Crime, fear of crime, environment, and mental health and wellbeing: Mapping review of theories and causal pathways. *Health & Place, 18*(4), 757-765. doi:10.1016/j.healthplace.2012.04.001

Lorenc, T., Petticrew, M., Whitehead, M., Neary, D., Clayton, S., Wright, K., . . . Renton, A. (2013). Fear of crime and the environment: Systematic review of UK qualitative evidence. *Bmc Public Health, 13*, 496. doi:10.1186/1471-2458-13-496

Maruthaveeran, S., & van den Bosch, C. C. K. (2014). A socio-ecological exploration of fear of crime in urban green spaces - A systematic review. *Urban Forestry & Urban Greening, 13*(1), 1-18. doi:10.1016/j.ufug.2013.11.006

May, D., Rader, N., & Goodrum, S. (2010). A gendered assessment of the ''Threat of victimization'': Examining gender differences in fear of crime, perceived risk, avoidance, and defensive behaviors. *Criminal Justice Review, 35*, 159-182. doi:10.1177/0734016809349166

Mellgren, C., & Anna-Karin Ivert. (2019). Is women's fear of crime fear of sexual assault? A test of the shadow of sexual assault hypothesis in a sample of swedish university students. *Violence Against Women, 25*(5), 511-527. doi:10.1177/1077801218793226

Mitra, P., & Bardhan, S. (2017). Tracing the importance of safety audit in making inclusive cities: A step towards smart cities. *Procedia Environmental Sciences, 37*, 420-428. doi:10.1016/j.proenv.2017.03.011

Morrell, H. (1998). Seguridad de las mujeres en la ciudad. In C. Booth, J. Darke & S. Yeandle (Eds.), (). Madrid: Narcea S.A.

Pain, R. H. (1997). Social geographies of women's fear of crime. *Transactions of the Institute of British Geographers, 22*(2), 231-244.

Painter, K. (1996). The influence of street lighting improvements on crime, fear and pedestrian street use, after dark. *Landscape and Urban Planning, 35*(2), 193-201. doi:10.1016/0169-2046(96)00311-8

Paül i Agustí, D., Guilera, T., & Guerrero Lladós, M. (2022). Gender differences between the emotions experienced and those identified in an urban space, based on heart rate variability. *Cities, 131*, 104000. doi:10.1016/j.cities.2022.104000

Pearson, A. L., & Breetzke, G. D. (2014). The association between the fear of crime, and mental and physical wellbeing in new zealand. *Social Indicators Research, 119*(1), 281-294. doi:10.1007/s11205-013-0489-2

Pohl, S. & Buil-Gil, D. (2023). The Drop in Worry about Crime and Its Gender Gap: Trends in England and Wales from 1998 to 2019/2020. *CrimRxiv*. Doi: 10.21428/cb6ab371.8d50382d

Pryor, D. W. W., Hughes, M. R. R., & Langdon, J. J. J. (2023). Agents of socialization, anxiety, college women, and fear of rape. *Violence Against Women,* doi:10.1177/10778012231172703

San Juan, C., Vozmediano, L., & Martín, N. (2019). Valoración de escenarios de agresiones sexuales en contextos urbanos: In-EAS, una propuesta de herramienta de análisis espacial. *Behavior & Law Journal, 5*(1), 18-30. doi:10.47442/blj.v5.i1.65

Skarlatidou, A., Ludwig, L., Solymosi, R., & Bradford, B. (2023). Understanding knife crime and trust in police with young people in east london. *Crime & Delinquency, 69*(5), 943-970. doi:10.1177/00111287211029873

Solymosi, R., & Bowers, K. (2018). The role of innovative data collection methods in advancing criminological understanding. (pp. 210-237)

Solymosi, R., Bowers, K., & Fujiyama, T. (2015). Mapping fear of crime as a context-dependent everyday experience that varies in space and time. *Legal and Criminological Psychology, 20*(2), 193-211. doi:10.1111/lcrp.12076

Solymosi, R., Buil-Gil, D., Vozmediano, L., & Guedes, I. S. (2021). Towards a place-based measure of fear of crime: A systematic review of app-based and crowdsourcing approaches. *Environment and Behavior, 53*(9), 1013-1044. doi:10.1177/0013916520947114

Stanko, E. A. (1995). Women, crime, and fear. *The Annals of the American Academy of Political and Social Science, 539*, 46-58. Retrieved from http://www.jstor.org/stable/1048395

Tandogan, O., & Ilhan, B. S. (2016). *Fear of crime in public spaces: From the view of women living in cities* doi:https://doi.org/10.1016/j.proeng.2016.08.795

Vozmediano, L., Subiza-Pérez, M., San Juan, C., & Trinidad, A. (2024, July 10). Comparing Safety Perceptions and Active Mobility in Two Urban Settings: A Case Study. OSF Preprints, https://doi.org/10.31219/osf.io/m2zyc

Vozmediano, L., Vergara, A. I., & San Juan Guillén, C. (2008). Problemas de medición del miedo al delito: algunas respuestas teóricas y técnicas. *Revista electrónica de ciencia penal y criminología,* (10) Retrieved from http://dialnet.unirioja.es/servlet/oaiart?codigo=2747635

Winter, S. C., Johnson, L., & Obara, L. M. (2021). Neighborhood cohesion, perceptions of disorder, and the geography of women's fear of crime in informal settlements in nairobi, kenya. *American Journal of Community Psychology, 68*(3-4), 385-401. doi:10.1002/ajcp.12519

Woolnough, A. (2009). Fear of crime on campus: Gender differences in use of self-protective behaviours at an urban university. *Security Journal, 22*, 40-55. doi:10.1057/sj.2008.11