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Reducing the safety gap between gender groups with better station and urban design

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Abstract

Women and gender non-conforming individuals (GNC) often feel less safe at and around public transport (PT) stations, compared to men. While the significant influence of built environment (BE) on perceived safety is agreed upon, its interaction with gender remains underexplored. Using a tailor-made survey data (N=3,101) from East Denmark, we investigate BE features effective at addressing women & GNC's safety concerns at the home and activity travel environments. Linear regression models reveal that lighting, cleanliness and wayfinding benefit all travellers at both ends, while activating isolated areas around stations especially benefits women & GNC. Shops and urban life have positive effects on perceived safety for the whole sample at the home end, and transparent facades contribute at the activity end.

Introduction

Women are frequent users of public transport (PT), and they often conduct more complex trips by chaining several purposes (D'Agostino et al. 2024). Simultaneously, they report lower levels of perceived safety (i.e. higher levels of fear of crime and anxiety) while using public transport, along with LGBTQI+[1] or gender non-conforming individuals (GNC) (Ceccato, Sundling & Gliori 2024, Ceccato, Gliori & Sundling 2024, Lubitow et al. 2017, 2020, Sundling & Ceccato 2022). The negative consequences of feeling unsafe include perceiving waiting times as longer (Fan et al. 2016), having to take precautions while travelling (Ceccato, Gliori & Sundling 2024, Sundling & Ceccato 2022), changing routes or even cancelling trips (D'Agostino et al. 2024, Stark & Meschik 2018, Sundling & Ceccato 2022). Failing to address this issue creates a significant equity problem, as individuals with safety concerns face social exclusion and being forced out of public transport.

Over the past decades, researchers have investigated features shaping travellers' perceived safety in PT. Among individual characteristics, gender inevitably has the strongest effect, while age and frequency of PT

[1] LGBTQI+ is an umbrella term for lesbian, gay, bisexual, transsexual, queer, intersex individuals, and other identities not covered in the acronym.

use can also play a role (Sundling & Ceccato 2022). The built environment (BE) also plays a considerable role, as most travellers find stations and their surroundings more fearful than the vehicle (Ceccato, Gliori & Sundling 2024, Crime Concern 2004, FIA Foundation 2016). Recent reviews (Ceccato et al. 2022, Sundling & Ceccato 2022) highlight the negative effects of e.g. tunnels, parking lots, and entrapments, as well as the positive effects of e.g. good lighting, cafés and shops, and being visible to other travellers.

Both gender and BE have strong impacts on travellers' perceived safety levels - but what about their interaction? Basu et al. (2021) and Coppola & Silvestri (2021), for example, demonstrated that women experience the positive and negative impacts of BE stronger than men. Especially entrapments and poor visibility (Börjesson 2012), lack of human activity and anti-social behaviour Yavuz & Welch (2010) have significant effects on women's perceived safety levels. Ceccato, Gliori & Sundling's (2024) recent analysis intersecting gender and sexual orientation to explain perceived safety also shows significant effects of restaurants and cafés, tunnels, and poor lighting at stations, although it is not possible to draw conclusions on gender- or orientation-specific effects. Although designing BE according to the needs of gender groups in vulnerable positions could benefit most users, our knowledge on the gender and BE interaction remains limited.

This paper reveals which BE features influence different gender groups' perceived safety at and around stations. We further contribute with a holistic perspective, following the traveller door-to-door and investigating the barriers they might encounter at the home and activity ends of their train trips, recognising that individuals are likely less familiar with their activity environment. Using data from a tailor-made online survey (N=3,101) covering over 200 train stations in East Denmark, we estimate linear regression models explaining the perceived safety levels at the home and activity travel environments. Our analysis includes a detailed list of BE features at stations and their urban surroundings, as reported by the survey respondents, and their interactions with gender, enabling us to test whether certain features are more effective at addressing women & GNC's safety concerns.

This paper is organised as follows. Section 2 presents our survey design and statistical analysis method. Section 3 describes our survey data, and it presents and discusses the statistical analysis results. Section 4 concludes the paper with our key findings and plans for future work. In the remainder of the paper, we use the term *travel environments* to address stations and their urban surroundings, and *Gender non-conforming individuals (GNC)* to refer to individuals who have reported their gender as non-binary, or "other" in our survey.

Data and Method

Survey design and data preparation

We designed an online survey in Danish targeting individuals over 18 years old, and comprising 35-40 questions under three parts. The first part collects information on travellers' frequency of using various travel modes and measures how important they think certain features of stations and their urban surroundings are on a bipolar scale (-2: not at all important, 2: very important). The second part measures travellers' perceived safety at and around the home and activity ends of their latest train trip with the following formulation: "How safe would you feel at/around this station if you walked alone at night?" on a 5-point Likert scale (1: very unsafe, 5: very safe). In this part, travellers also select which BE features (e.g. closed facades, trees, human activity) were present and describe the atmosphere (e.g. lighting, maintenance, cleanliness) at and around their stations at both trip ends. The third part gathers travellers' socio-demographic characteristics such as age, gender, income and education levels.

We collected data between June 2022-December 2023. After data cleaning, our final sample had 3,101 observations. Within this sample, women & GNC have a slightly higher share (53.4%) than men and nearly half of the respondents are over 60 years old (49.1%). The sample also has a high education and income

level on average. Nearly one-third of the respondents use public transport 3 times a week or more (34.8%). Appendix 1 describes the sample in detail.

Supplementary data

To describe the socio-economic features around stations, we gathered yearly neighbourhood income per capita data within a 500 m buffer around stations from the Danish National Transport Model (NTM) (Rich & Hansen 2016). The average neighbourhood income per capita around a station is 215,500 DKK/year (≈28,000 EUR/year), ranging from 146,800 DKK/year (≈19,500 EUR/year) to 334,400 DKK/year (≈45,000 EUR/year).

To describe the land use around stations, we gathered data on i) the residential population within a 500 m buffer around stations and ii) the daytime population reflecting the number of individuals within the same buffer during working hours, from the Danish National Transport Model (NTM) (Rich & Hansen 2016) and Danish Road Directorate (Vejdirektoratet), respectively. Using these data, we created nine land use categories by intersecting the residential and daytime population density quantiles (Table 1). The most common land use type is "Very dense urban, mixed use" (19.6%) at the home end, and "Urban commercial" (40.1%) at the activity end. Appendix 2 visualises the land use of each station.

Table 1 Land use categories resulting from the intersection of residential and daytime population quantiles

		Daytime population quantiles		
Residential population quantiles		**0-25 & 25-50**	**50-75**	**75-100**
	0-25 & 25-50	Low density rural	Suburban commercial	Urban commercial
	50-75	Suburban residential	Suburban mixed use	Urban mixed use, mostly commercial
	75-100	Urban residential	Urban mixed use	Very dense urban, mixed use

Statistical analysis

Principal component analysis (PCA)

Our preliminary analysis of the variables describing travellers' perceived safety levels, and lighting and cleanliness conditions at and around stations showed strong correlations between variables. Estimating 3separate models for perceived safety at and around the station would therefore likely produce similar results due to the strong correlation between these variables. Including lighting and cleanliness conditions of stations and their urban surroundings separately could cause multicollinearity issues in the regression analyses.

Therefore, we created latent variables (LV) combining the measures of stations and their urban surroundings by implementing principal component analysis with Varimax rotation (PCA). Table 2 presents the resulting six latent variables along with their respective indicators, loadings and the variance explained by the LV. The Spearman-Brown coefficient of each LV suggests acceptable internal consistency, and each LV explains more than 80% of the variance of its indicators.

Multiple linear regression

We then estimated multiple linear regression models explaining the latent perceived safety variable at home and activity ends for the full sample (N=3,101).

Our full models comprised variables related to i) the **individual cahracteristics** (age, gender, frequency of PT use), ii) **urban surroundings** (e.g. presence of isolated areas and closed facades around stations, trees, large parking lots, tunnels), iii) **atmosphere** (lighting, cleanliness), iv) **ease of movement** (wayfinding, crowdedness) and v) **neighbourhood characteristics** (yearly average income per capita).

To test whether certain BE features are more effective at addressing women & GNC's safety concerns, we added **interactions** between gender and features of urban surroundings, atmosphere, ease of movement and neighbourhood characteristics.

Lastly, we **controlled** for the land use type, station types and railway lines to account for other geographical differences not captured by the BE features, and for the survey samples to account for temporal differences across the waves. For each trip end, we first estimated a full model. Later, we performed stepwise elimination with forward and backwards selection on these two full models.

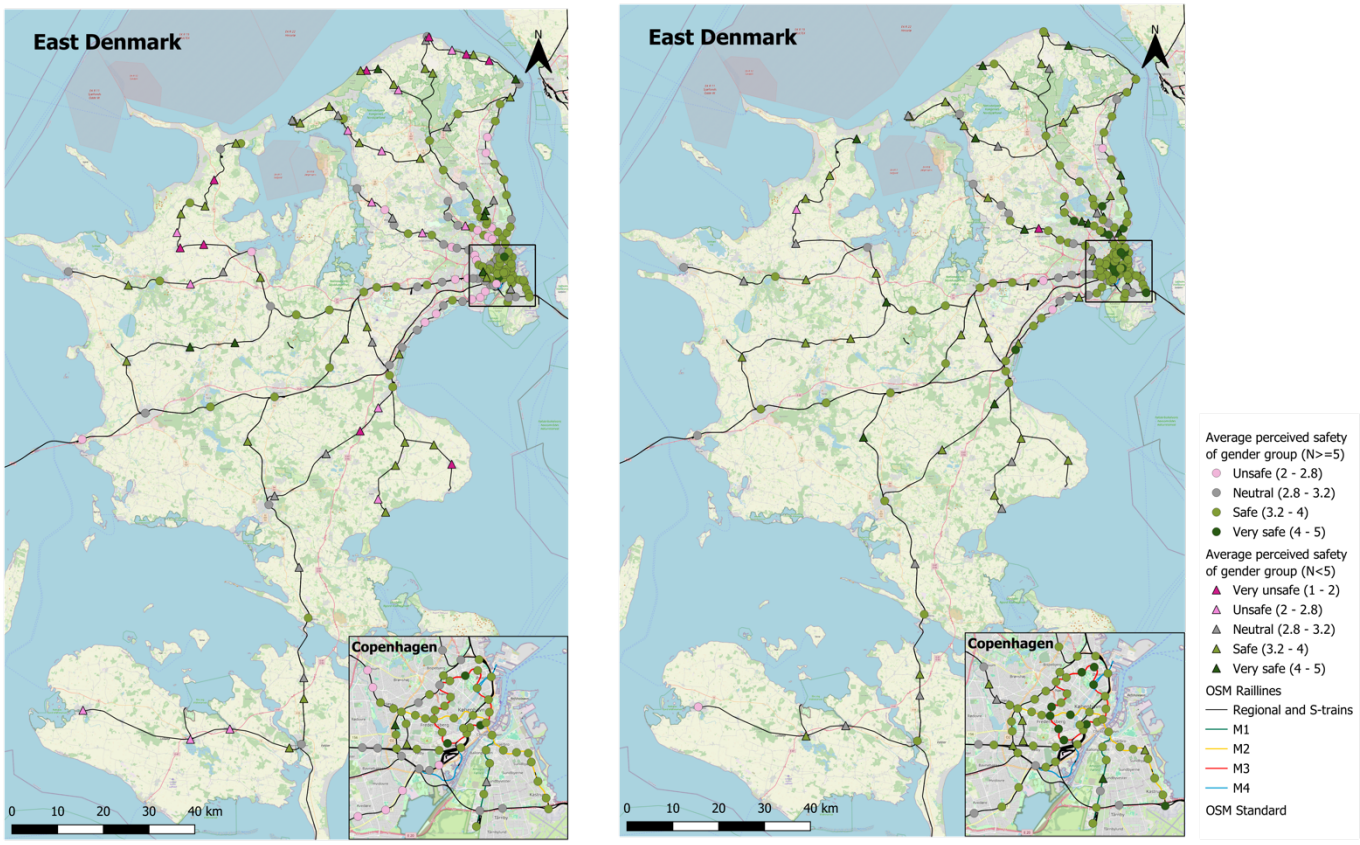
Table 2 Results of the six principal component analyses with Varimax rotation

Latent variable (TRIP END) [Internal consistency]	Indicators	Loading	Variance explained
Lighting at travel environment (HOME) [0.79]	Lighting at station (HOME)	0.91	83%
	Lighting around station (HOME)	0.91	
Lighting at travel environment (ACTIVITY) [0.77]	Lighting at station (ACTIVITY)	0.9	82%
	Lighting around station (ACTIVITY)	0.9	
Cleanliness at travel environment (HOME) [0.82]	Cleanliness at station (HOME)	0.92	85%
	Cleanliness around station (HOME)	0.92	
Cleanliness at travel environment (ACTIVITY) [0.84]	Cleanliness at station (ACTIVITY)	0.93	86%
	Cleanliness around station (ACTIVITY)	0.93	
Perceived safety at travel environment (HOME) [0.92]	Perceived safety at station (HOME)	0.96	93%
	Perceived safety around station (HOME)	0.96	
Perceived safety at travel environment (ACTIVITY) [0.92]	Perceived safety at station (ACTIVITY)	0.96	93%
	Perceived safety around station (ACTIVITY)	0.96	

Results

We collected data for 233 unique train stations in East Denmark, out of which 192 stations had observations from both gender groups. Figure 1 describes the average perceived safety levels of, respectively, women & GNC (1a), and men (1b) at these stations. At approximately 75% of the stations shown in Figure 1, women & GNC feel less safe than men. Stations in the centre of Copenhagen are perceived to be safe by both gender groups, whereas most travel environments along the suburban railway lines are perceived to be unsafe by women & GNC. Some of the local train stations serving rural areas are also unsafe for women & GNC on average.

Calculating the average of all observations within each sample, we found that women & GNC's perceived safety levels range between 3.26-3.29 depending on the trip end (average: 3.28 out of 5), whereas men's perceived safety levels range between 3.59-3.65 (average: 3.62 out of 5).



(a) Women & GNC (b) Men

Figure 1: Average of perceived safety in travel environments in East Denmark

Figure 2 illustrates the importance each gender group assigns to features which we hypothesise to affect perceived safety, revealing some differences between them at first glance. Mann-Whitney U tests show significant gender differences for the importance of most features ($p < 0.05$), except "trees and greenery around the station," which is nearly significant ($p = 0.08$).

Lighting at night and avoiding isolated areas are the most important features, although women & GNC assign greater importance to both. Interestingly, the results for the possibility of avoiding tunnels are contrasting, as men in our sample find this unimportant. While women & GNC value the presence of open facades and human activity, shops around the station were not important for either group, despite serving a similar function in travel environments. Later, we introduce these features, along with others, to our linear regression analyses to test their significance for perceived safety.

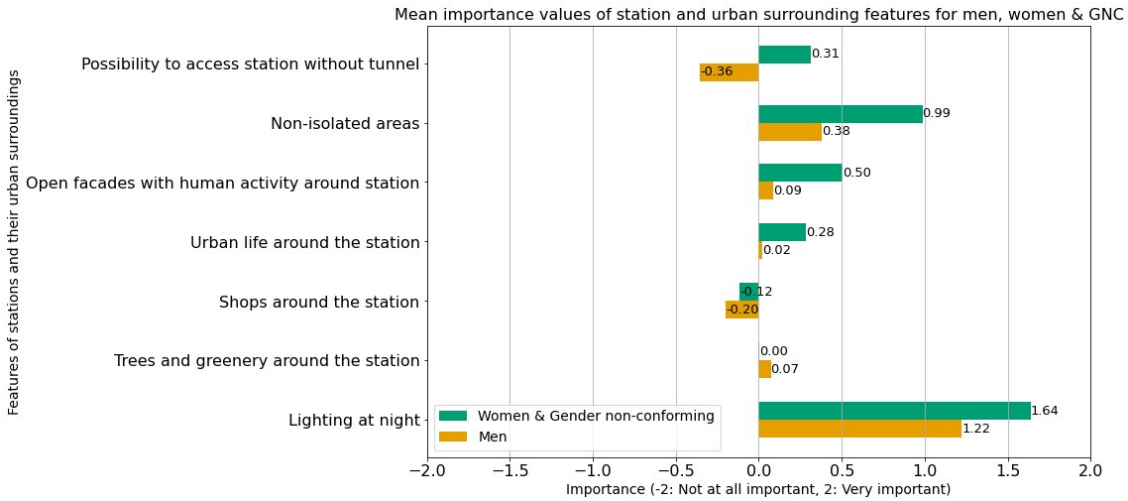


Figure 2: Average importance of features describing stations and their urban surroundings for each gender group

Table 3 presents the results of two stepwise linear regression models explaining individuals' perceived safety levels at the home and activity ends of their trip.

Among **individual characteristics,** models 1 and 2 confirm the significant differences between women & GNC and men at both trip ends. There are only slight differences between age groups. Furthermore, at the home end, frequent PT users have a significantly higher perceived safety level.

Characteristics of **urban surroundings** also influence travellers' perceived safety levels, although there are differences between the trip ends. At the home end, shops, urban life and trees and greenery significantly increase both men and women & GNC's perceived safety. Closed facades and isolated areas have almost significant and negative effects for the entire sample as well. At the activity end, however, the negative effects of closed facades and isolated areas are significant and especially the latter is quite strong. These features might be gaining more importance at the activity end where we assume the travellers to be less familiar with their surroundings.

Atmosphere at and around stations is also quite important. Specifically, improving the lighting and cleanliness conditions significantly enhances travellers' perceived safety at both trip ends. Creating **ease of movement** at stations with better wayfinding and less overcrowding also has positive effects for travellers.

Models 1 and 2 also demonstrate that travellers residing in **high income neighbourhoods** have higher perceived safety levels, and this finding resonates with previous research (e.g. Ingvardson & Nielsen, 2021; Strandbygaard et al., 2020). This could be the result of affluent areas having other aspects that make the BE more attractive, in addition to the variables we control for. It might also imply lower crime levels, or an overall better reputation of the neighbourhood among residents.

The **interaction** variables show whether certain built environment features are especially beneficial or harmful for women & GNC's perceptions. At the home end, we see that the presence of isolated areas has additional negative effects for women & GNC. Large parking lots and tunnels are also almost significantly reducing this group's perceived safety levels and therefore should be designed with care. At the activity end, improving the lighting conditions can have some benefits for women & GNC. Furthermore, avoiding overcrowding has a slightly less positive effect for this gender group than it does for men.

Among **control variables**, models 1 and 2 show, for example, that metro stations are perceived to be significantly safer than other station types. Køge Bugt and Roskilde lines have some stations which reduce perceived safety levels at both trip ends.

Table 3 Results of the stepwise linear regression models explaining individuals' perceived safety levels at both trip ends (Dependent variable: Latent variable of perceived safety)

		Home-end			Activity-end		
Category	**Variable**	**Estimate**	**P-value**	**Sig.**	**Estimate**	**P-value**	**Sig.**
-	Intercept	-1.263	0	***	-0.985	0	***
Individual characteristics	Gender: Men	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Gender: women & gender non-conforming	-0.211	0	***	-0.29	0	***
	Age: 18-29 year-olds	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Age: 30-39 year-olds	Ref.	Ref.	Ref.	0.115	0.043	*
	Age: 40-49 year-olds	0.073	0.092		Ref.	Ref.	Ref.
	Age: 50-59 year-olds	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Age: 60-69 year-olds	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Age: 70+ year-olds	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Frequent PT user	0.095	0.003	**			
Urban surroundings	Shops around the station	0.105	0.002	**	0.063	0.059	
	Urban life around the station	0.112	0.001	***			
	Large parking lots around the station	0.015	0.753				
	Closed facades around the station	-0.071	0.063		-0.141	0.001	***
	Isolated areas around the station	-0.102	0.076		-0.305	0	***
	Trees around the station	0.169	0	***			
	Access via tunnel	0.062	0.228				
Atmosphere	Lighting at travel environment	0.284	0	***	0.202	0	***
	Cleanliness at travel environment	0.09	0	***	0.15	0	***
Ease of movement	Wayfinding at station	0.16	0	***	0.138	0	***
	Station not overcrowded	0.098	0.002	**	0.17	0.001	***
Neighbourhood characteristics	Neighbourhood income per capita (1000 DKK/year)	0.003	0	***	0.002	0.008	**
Interactions	Women & GNC x Shops around the station						
	Women & GNC x Urban life around the station						
	Women & GNC x Large parking lots around the station	-0.104	0.112				
	Women & GNC x Closed facades around the station						
	Women & GNC x Isolated areas around the station	-0.254	0	***			
	Women & GNC x Trees around the station						
	Women & GNC x Access via tunnel	-0.108	0.123				
	Women & GNC x Lighting at travel environment				0.056	0.077	

	Women & GNC x Cleanliness at travel environment						
	Women & GNC x Wayfinding at station						
	Women & GNC x Station not overcrowded				-0.109	0.116	
	Women & GNC x Neighbourhood income per capita (1000 DKK/year)						
Control	Land use: Low density rural	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Land use: Suburban commercial	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Land use: Urban commercial	Ref.	Ref.	Ref.	0.256	0	***
	Land use: Suburban residential	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Land use: Suburban mixed use	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Land use: Urban mixed use, mostly commercial	0.077	0.156		0.204	0.002	**
	Land use: Urban residential	-0.218	0.002	**	Ref.	Ref.	Ref.
	Land use: Urban mixed use, mostly residential	-0.128	0.007	**	0.108	0.113	
	Land use: Very dense urban, mixed use	-0.063	0.159		0.185	0.001	***
	Station type: Metro	0.093	0.042	*	0.131	0.001	***
	Station type: Local train	-0.086	0.06		0.118	0.021	*
	Station type: Regional / Intercity	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Rail line: Central lines	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Rail line: Køge Bugt line	-0.198	0.002	**	-0.175	0.023	*
	Rail line: Roskilde line	-0.101	0.042	*	-0.127	0.037	*
	Rail line: Farum line	-0.149	0.044	*	Ref.	Ref.	Ref.
	Rail line: Frederikssunds line	-0.197	0	***	Ref.	Ref.	Ref.
	Rail line: Hillerød line	-0.161	0.009	**	Ref.	Ref.	Ref.
	Rail line: Helsingør line	-0.269	0	***	Ref.	Ref.	Ref.
	Survey sample: 1	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Survey sample: 2	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
	Survey sample: 3	Ref.	Ref.	Ref.	-0.123	0.018	*

Conclusion and future work

This study investigated which BE and atmosphere features of travel environments significantly influence travellers' perceived safety levels, finding notable differences in women & GNC's experiences compared to men, as well as the features shaping these experiences at home and activity ends.

Most travellers are likely to benefit from enhanced lighting, cleanliness and wayfinding conditions in travel environments, regardless of their gender. The presence of shops, urban life, trees and greenery have additional benefits for both gender groups at the home end. Closed facades and isolated areas gain additional importance in areas unfamiliar to travellers.

To reduce the safety gap between gender groups, avoiding isolated areas and improving lighting conditions should be prioritised, and more attention should be paid to the design of parking lots and tunnels. While implementing such gender-sensitive design measures are likely to be more effective at addressing women & GNC's safety concerns, we can also expect additional benefits for other existing and potential travellers by improving the attractiveness of stations and their urban surroundings. As our findings so far suggest improvements at stations and their urban surroundings, a group of stakeholders involved in the design and maintenance of these spaces should collaborate in achieving these improvements.

Our future work will investigate whether the ridership level at stations is also linked to perceived safety. Furthermore, we will attempt to explain why certain rail lines such as Køge Bugt are especially less safe for travellers by including additional BE or socio-demographic features in our analysis.

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References

Basu, N., Haque, M. M., King, M., Kamruzzaman, M. & Oviedo-Trespalacios, O. (2021), 'The unequal gender effects of the suburban built environment on perceptions of security', *Journal of Transport & Health* 23, 101243.
URL: *https://www.sciencedirect.com/science/article/pii/S2214140521002735*

Börjesson, M. (2012), 'Valuing perceived insecurity associated with use of and access to public transport', *Transport Policy* 22, 1–10.
URL: *https://www.sciencedirect.com/science/article/pii/S0967070X12000704*

Ceccato, V., Gaudelet, N. & Graf, G. (2022), 'Crime and safety in transit environments: a systematic review of the English and the French literature, 1970–2020', *Public Transport* 14(1), 105–153. URL: *https://link.springer.com/10.1007/s12469-021-00265-1*

Ceccato, V., Gliori, G. & Sundling, C. (2024), 'LGBTQI+ safety perceptions in transit environments', *Journal of Urban Mobility* 6, 100087.
URL: *https://www.sciencedirect.com/science/article/pii/S2667091724000177*

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(1), 21.
URL: *https://doi.org/10.1186/s12544-024-00641-5*

Coppola, P. & Silvestri, F. (2021), 'Gender Inequality in Safety and Security Perceptions in Railway Stations', *Sustainability* 13(7), 4007. Number: 7 Publisher: Multidisciplinary Digital Publishing Institute. URL: *https://www.mdpi.com/2071-1050/13/7/4007*

Crime Concern (2004), People's Perceptions of Personal Security and Their Concerns About Crime on Public Transport: Research Findings, Technical report, Department for Transport.

D'Agostino, C., Piva, E., Pucci, P. & Rossi, C. (2024), 'A systematic literature review on women's daily mobility in the Global North', *Transport Reviews* 44(5), 1016–1044. Publisher: Routledge _eprint: https://doi.org/10.1080/01441647.2024.2350613.

URL: *https://doi.org/10.1080/01441647.2024.2350613*

Fan, Y., Guthrie, A. & Levinson, D. (2016), 'Waiting time perceptions at transit stops and stations: Effects of basic amenities, gender, and security', *Transportation Research Part A: Policy and Practice* 88, 251–264. URL: *http://dx.doi.org/10.1016/j.tra.2016.04.012*

FIA Foundation (2016), Safe and sound: International research on women's personal safety on public transport, Technical report.
URL: *https://www.fiafoundation.org/media/20if5xh4/safe-and-sound-report.pdf*

Ingvardson, J. B. & Nielsen, O. A. (2021), 'The influence of vicinity to stations, station characteristics and perceived safety on public transport mode choice: a case study from Copenhagen', *Public Transport* pp. 1–22.
URL: *https://doi.org/10.1007/s12469-021-00285-x*

Lubitow, A., Abelson, M. J. & Carpenter, E. (2020), 'Transforming mobility justice: Gendered harassment and violence on transit', *Journal of Transport Geography* 82, 102601.
URL: *https://www.sciencedirect.com/science/article/pii/S0966692319302960*

Lubitow, A., Carathers, J., Kelly, M. & Abelson, M. (2017), 'Transmobilities: mobility, harassment, and violence experienced by transgender and gender nonconforming public transit riders in Portland, Oregon', *A Journal of Feminist Geography* 24(10), 1398–1418. Publisher: Routledge.
URL: *https://www.tandfonline.com/doi/abs/10.1080/0966369X.2017.1382451*

Rich, J. & Hansen, C. O. (2016), 'The Danish National Passenger Model – model specification and results', *European Journal of Transport and Infrastructure Research* 16(4). Number: 4.
URL: *https://journals.open.tudelft.nl/ejtir/article/view/3159*

Stark, J. & Meschik, M. (2018), 'Women's everyday mobility: Frightening situations and their impacts on travel behaviour', *Transportation Research Part F: Traffic Psychology and Behaviour* 54, 311–323. URL: *https://www.sciencedirect.com/science/article/pii/S1369847817301043*

Strandbygaard, S. K., Jones, A. K. S., Jensen, L. M., Nielsen, O. A. & Grönlund, B. (2020), 'Fear follows form: A study of the relationship between neighborhood type, income and fear of crime at train stations', *Journal of Transport and Land Use* 13(1), 585–603. Publisher: University of Minnesota.

Sundling, C. & Ceccato, V. (2022), 'The impact of rail-based stations on passengers' safety perceptions. A systematic review of international evidence', *Transportation Research Part F: Traffic Psychology and Behaviour* 86, 99–120.

Yavuz, N. & Welch, E. W. (2010), 'Addressing fear of crime in public space: gender differences in reaction to safety measures in train transit', *Urban Studies (Edinburgh, Scotland)* 47(12), 2491–2515.

Appendix

Appendix 1

Table 4 describes the socio-demographic characteristics of the full sample, women & GNC, and men. It also describes a sub-sample of the Danish National Travel Survey which is representative for East Denmark.

Table 4 Socio-demographic characteristics and public transport use frequency of the full sample, women & GNC, and men in comparison to a representative sample from the Danish National Travel Survey

Category	Full sample	Women & GNC	Men	Danish NTS sample

Gender Men	46.6%	-	-	49.3%
Women	52.9%	-	-	50.7%
Nonbinary	0.3%	-	-	-
Other	0.2%	-	-	-
Age 18-29	7.8%	8.2%	7.4%	19.6%
30-39	8.4%	8.7%	8.2%	16.1%
40-49	13.9%	14.0%	13.8%	16.4%
50-59	20.7%	21.8%	19.4%	16.9%
60-69	24.9%	23.9%	26.1%	13.2%
70-79	20.3%	19.6%	21.2%	12.5%
>80	3.9%	3.8%	3.9%	5.3%
Individual income (DKK/year) 0-99.999 DKK	3.3%	3.6%	3.0%	4.3%
100.000-199.999 DKK	7.8%	8.2%	7.5%	9.2%
200.000-299.999 DKK	13.9%	15.3%	12.2%	9.0%
300.000-399.999 DKK	16.9%	18.9%	14.6%	11.1%
400.000-499.999 DKK	16.8%	17.1%	16.5%	10.1%
More than 500.000 DKK	27.9%	19.8%	37.2%	14.4%
Prefer not to disclose	13.4%	17.1%	9.1%	42.0%
Education level Primary school	3.6%	3.1%	4.1%	10.9%
High school	5.8%	5.7%	5.8%	11.4%
Vocational	13.0%	10.6%	15.6%	20.7%
Short-term higher education (1.5-2 years)	7.0%	7.1%	6.9%	5.9%
Medium-tem higher education (2-5 years)	37.1%	42.6%	30.8%	28.7%
Long-term higher education (5+ years)	33.6%	30.9%	36.7%	20.5%
Other	-	-	-	2.0%
Frequency of public transport use Less than once a month	21.0%	19.7%	22.5%	-
1-8 times a month	44.2%	43.2%	45.3%	-
3 times a week or more	34.8%	37.1%	32.2%	-
Total	3101	1655	1446	28734

Appendix 2

Figure 3 illustrates the land use types within the 500 m station buffer area.

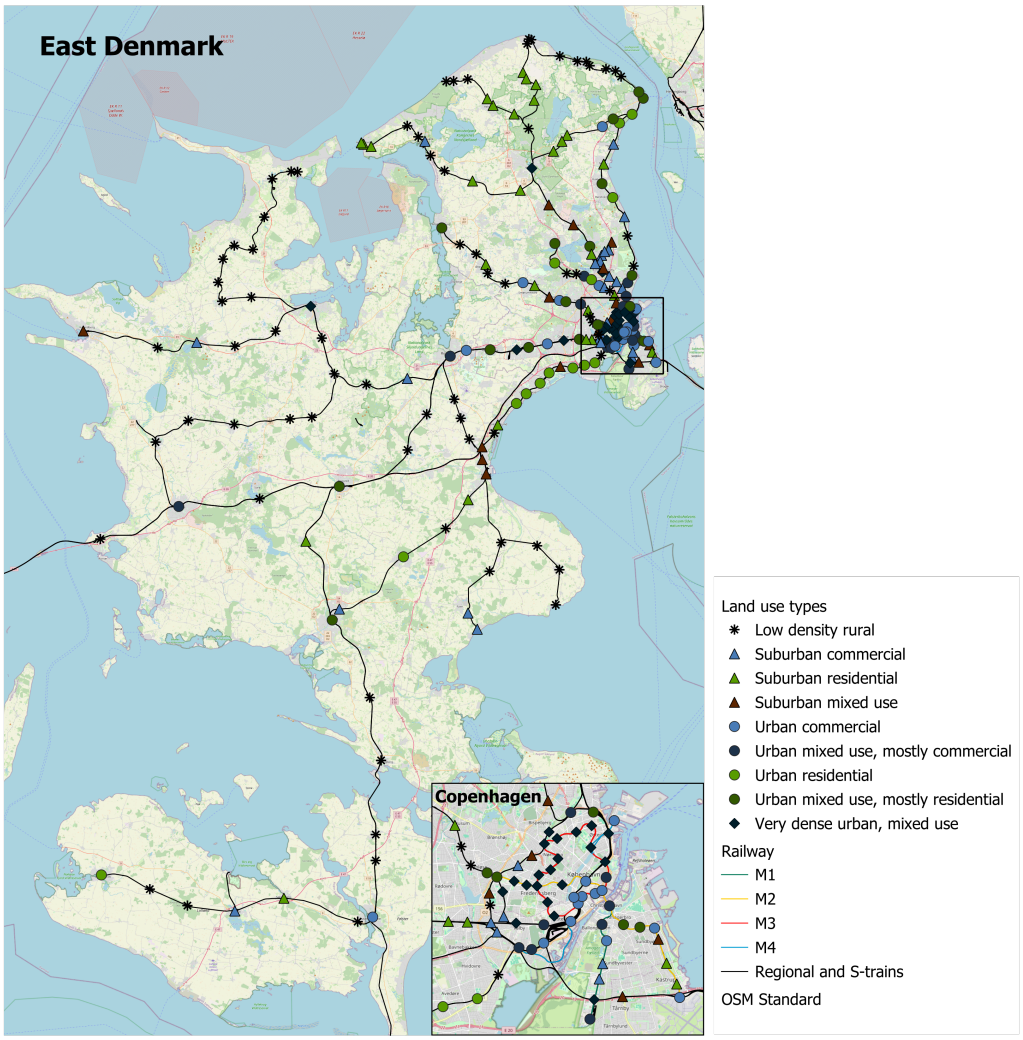

Figure 3: Land use around 192 train stations in East Denmark