WALKABILITY APP

Participatory Walkability Study at Public Transport Catchments

Belgrade, Serbia

April 2024

WALKABILITY

WALK21 LEADING THE WALKING MOVEMENT

ALSTOM

PLACE MAKING W BALKANS

УНИВЕРЗИТЕТ У БЕОГРАДУ ШУМАРСКИ ФАКУЛТЕТ

UNIVERSITY OF BELGRADE

Authors

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Reference

Vukmirovic, M., Cañas, C., Walker, J., Bijelivuk, I., Djurdjev, I., Nesic, J., Tanaskovic, J., Babovic, K., Kuveljic, M., Dzaferi, M., Petrusic, M., Kesic, N., Lazic, P., Filipovic, S. and Popovic, V. (2024). Walkability study around public transport stations in Belgrade, Serbia.

Acknowledgments

The team are grateful to Dr Milena Vukmirovic and her helpful team at the University of Belgrade. Walk21 wishes to acknowledge the dedication of Biljana Filipovic and Radica Vučković, for their expert support and guidance on behalf of the Serbian government during the pan-European partnership.

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Executive Summary

In line with the publication of the policy paper "Integrating Walking and Public Transport" (https://walk21.com/wp-content/uploads/2024/04/Walk21-Intg-Walking-and-PT-Final.pdf), Walk21 in collaboration with the University of Belgrade conducted a walkability study in Belgrade, Serbia, in March 2024. The main aim of the project was to better understand which elements and characteristics of the public space influenced walking experiences (both in a positive and negative way) around public transport stops and stations in Belgrade. This information can assist policy making to prioritise interventions that create safe, comfortable, and enjoyable walking environment to access public transport on foot.

At the beginning of the project, Walk21 delivered a two-hour online training session to the university students of Urban Design on the use of the Walkability App as a survey tool to conduct walking interviews. With the use of the Walkability App, twelve trained surveyors interviewed 693 participants who shared 785 experiences related to 2,663 environmental determinants, in March 2024. The data collection was distributed across eight different study areas in Belgrade, focused on public transport catchment areas.

Participants were asked to share positive experiences, concerns and negative experiences while walking around public transport catchment areas. Overall, the share of positive experiences in Belgrade was high, with 39.1% of all observations. However, participants mostly shared concerns, with 41.8%. While negative experiences were low in the global computation, with 19.1%. Although almost 40% of all experiences were positive, the combination of concerns and negative experiences resulted in more than half of all experiences (60.9%). This shows that Belgrade has some pedestrian-friendly areas around public transport stations related to positive pedestrian experiences that can be considered as good examples of how to cater for walking safe, accessibility and comfort to public transport. However, there are also other areas related to concerns and negative experiences that require attention and improvement, as they do not cater for walking safety, accessibility, and comfort.

Once participants shared their experiences, they were asked to identify the environmental determinants that influenced them, from some predefined categories included in the Walkability App. Overall, the five most relevant environmental determinants in Belgrade related to positive experiences were 'Sufficient space and path quality' and 'Secure' (6.4% each), 'Lighting, seating or (5.1%), 'Designed for people' (4.3%), 'Safe crossings' and 'presence of footpath' (3.6% each). However, the most common determinants related to concerns and negative experiences were 'Dirty, noisy or poor air quality' (8.3%), 'Insufficient trees or visual interest' (7.6%), 'Unsafe crossing' (6.1%), 'Traffic speed' (5.4%) and 'Driver behaviour' (5.3%).

The study focused on eight different public transport catchment areas in Belgrade. The share of different pedestrian experiences varied amongst study areas, showing a relevant variability in walkability across Belgrade. Four study areas presented more positive experiences and can be considered places with good walkability (Republic Square, Old Central Railway Station, Usce Shopping Centre, and Railway Station Belgrade Centar), whereas three study areas presented more concerns (Zeleni Venac Station, Slavia Square, and New Belgrade Train Station), and one study area presented more negative experiences (Mostar Tram Stop), which can be considered areas with poor walkability.

The most relevant environmental determinants related to different experiences also varied amongst study areas. This highlights the need to conduct specific walkability interventions in each study area. As an example, participants praised different elements and characteristics of each study area as the most relevant for positive experiences, mainly 'Secure' (Republic Square, Zeleni Venac, Slavia Square,

Mostar Tram, Belgrade Centar). However, other areas were perceived as positive for other reasons, such as 'Greenery' (Old Central Station), ´Lighting, seating or ramps' (Usce). Similarly, the areas with more concerns or negative experiences not always presented the same issues. While some areas need to improve 'Traffic speed' (Republic Square and Usce), others also need to pay attention to 'No trees or visual interest' (Old Station and Zeleni Venac) or 'Poor environmental quality' (Slavia Square, New Belgrade and Mostar).

Finally, participants were asked to share their age, gender, and ability to walk and interact with the environment. This offered relevant insights on how different pedestrians might have different experiences of the same place based on their specific needs and concerns. By gender, the study did not show any relevant differences on walking experiences between men and women related to all the determinants considered. Although overall, men tended to share slightly more positive experiences (44.2%) than women (35.1%) and fewer negative experiences (14.5%) than women (22.6%). In the case of pedestrian age, older people tended to share more negative experiences, specially related to presence of footpath and protection from weather.

1. Methodology and approach

1.1. Data collection tool: Walkability App

The tool proposed to conduct the walkability assessment is the Walkability App, developed by Walk21, which can be freely downloaded and used on any Android and iOS mobile device. This tool allows information to be collected using four main types of data, considered as key information for in-depth and pedestrian-centred walkability assessments. A brief description of each type of data is described below:

1. **Pedestrian profile**: Information on the participants in the assessment, including their age, gender, and ability.

2. **Walk context**: Information on the walks taken by participants, including walk purpose, choice, group size and familiarity with the place.

3. **Pedestrian experience:** Information on the pedestrian satisfaction with the experienced public space, also known as perceived walkability of the place. Participants can rate their perceived walkability by identifying "positive experiences", "concerns" and "negative experiences".

4. **Environmental determinants:** Information on the elements and characteristics of the public space that influence pedestrians' experiences. Participants can describe the public space by using a set of predefined categories on the Walkability App. There are 12 categories linked to positive experiences and 12 for negative experiences and concerns. Refer to Figure X. (The Walkability App also allows inclusion of open text to further describe elements and characteristics of the public space that might not be represented in the predefined categories).

Figure 1. Predefined categories for environmental determinants in the Walkability.App.

1.2. Trained surveyors for walking interviews

The fieldwork was conducted by trained surveyors who had the app installed on their mobile phones. Data collection was conducted through walking interviews by using the Walkability App as a survey tool. After a two-hour online training session, surveyors learnt how to engage with volunteered participants in the street and ask them about their pedestrian profile, walk context, walking experience and environmental determinants. Surveyors also learnt how to transcribe the participants responses into the predefined variables, categories, and text fields within the Walkability App to input all necessary data for the project. A step-by-step tutorial for the walking interviews can be found in *Appendix 1 and 2*.

Trained surveyors team from the Department of Urban Design: Irena Bijelivuk, Ivana Djurdjev, Jelena Nesic, Jovana Tanaskovic, Kristina Babovic, Magdalena Kuveljic, Marina Dzaferi, Mina Petrusic, Nevena Kesic, Petra Lazic, Sonja Filipovic, and Veljko Popovic. Coordinated and led by Dr Milena Vukmirovic, Associate Professor at University of Belgrade Faculty of Forestry, Department of Landscape architecture.

1.3. Sampling and other considerations about the interviews

The study collected between 80 and 140 walking experiences by study area to compare results amongst them. It combined a volunteered response sampling with a purposive sampling method. On the one hand, the volunteered response sampling relied on people at the study areas who were willing to take part. On the other hand, surveyors conducted purposive sampling to gain knowledge about less frequent pedestrian profiles. In view of this, surveyors were encouraged to actively approach children and older participants, as well as people with reduced mobility, to include them in the sample as much as possible. They were also encouraged to evenly engage both women and men in the interviews. This approach aimed at better understand how the walkable environment is perceived by all types of participants, based on their specific needs and concerns. These sampling methods are often used in exploratory and qualitative research with the aim to develop an initial understanding of the population under study.

Interviews had an average duration of 3 minutes per participant and a successful engagement rate between 30% and 50% amongst study areas.

1.4. Timeframe and location for data collection

Data collection was conducted during two weeks between the 28th of February and the 12th of March 2024, in eight study areas across Belgrade, Serbia. The study areas included public transport stops and stations. Iin order to understand how pedestrians interact with different walking environment in Belgrade, the study areas included places in pedestrianised squares in Central Belgrade (Republic Square and Old Central Railway Station), public transport traffic hubs in Central Belgrade (Slavia Square and Zeleni Venac Station), new developed areas in New Belgrade (Usce Shopping Centre and New Belgarde), and traffic-oriented developments at Outer Belgrade (Mostar Tram Station and Railway Station Belgrade Centar).

Area	Public Trasport catchment	Coordinates
Central Belgrade (Pedestrianised)	Republic Square	44.81627962575689, 20.460208094693513
	Old Central Railway Stastion	44.80831204952211, 20.45638166048404
Central Belgrade (Public traffic hubs)	Zeleni Venac Station	44.814092817275345, 20.45740896543697
	Slavia Square	44.80250992445143, 20.466293255920064
New Belgrade	Usce Shopping Centre	44.814616, 20.434269
	New Belgrade Train Station	44.806878, 20.418034
Outer Belgrade	Mostar Tram Stop	44.798736356489925, 20.4489179975956
	Railway Station Belgrade Centar	44.79331105979351, 20.452829959273362

Figure 2. Location of study areas.

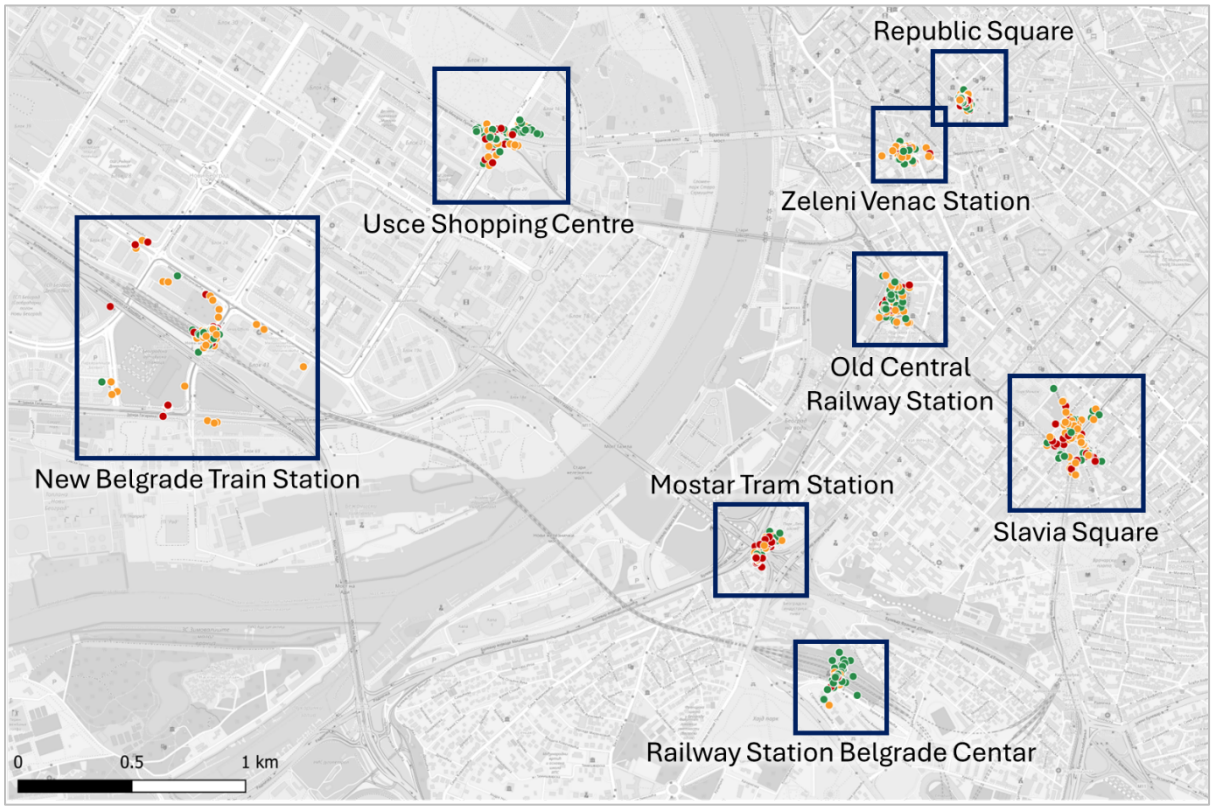


Figure 3. Map with location of study areas.

2. Data analysis and findings in Belgrade

Thirteen university students from Urban Design at the University of Belgrade (Department of Landscape Architecture and Horticulture, Faculty or Forestry) were trained in the use of the Walkability App as a survey tool to interview 693 participants in ten different study areas in Belgrade, Serbia, for two weeks (28/02/2024 – 14/03/2024). As a result, participants shared 785 walking experiences related to 2,663 environmental determinants observed in the public space.

Figure 4. Summary of data collected.

2.1. Pedestrian profiles and walk contexts in Belgrade

From the 693 pedestrians interviewed, 56.7% were women and 42.9% men. Regarding their age, 1.7% were children (<12 years old), 22.5% teenagers (12-17 years old), 63.3 adults (18-65 years old) and 12.4 elders (>65 years old). Finally, based on their ability to walk and interact with the environment, 94.9% were able, 1.7% assisted and 3.3% impaired.

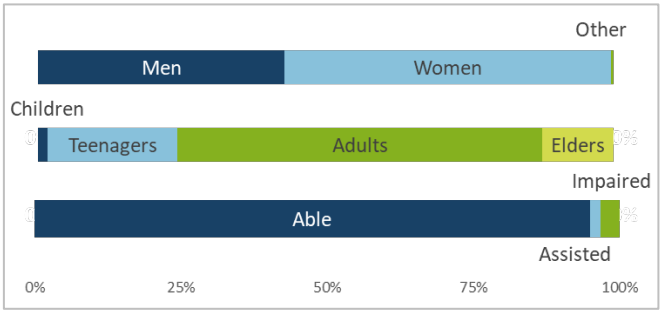


Figure 5. Pedestrian profile from participants.

From the 693 walks recorded in the surveys, 70.1% were related to transport (commuting on foot) and 29.9% were associated with recreational activities. Regarding the decision to walk, 53.5% pedestrians walked out of necessity and 46.5% by choice. Also, 68.1% of participants were walking alone, 24.4% in a group and 7.5% with a dependent. Finally, 69.7% of participants were locals and familiar with the place, while 30.3% were visitors.

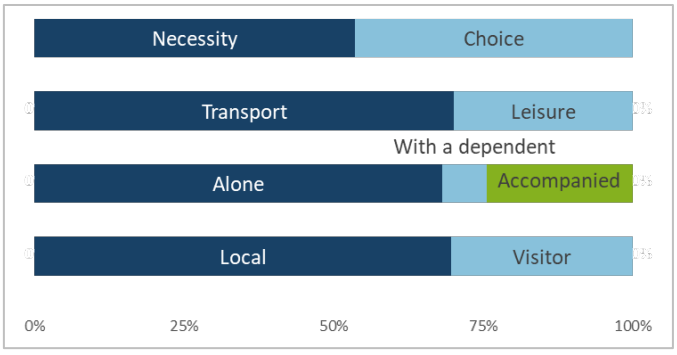


Figure 6. Walk context from participants.

2.2. Walking experiences and environmental determinants in Belgrade

In Belgrade, most of the walking experiences were concerns (41.8%), related to 'Insufficient trees or visual interest' (5.5.%), `Dirty, noisy or poor air quality' (5.2%) and 'Unsafe crossings' (3.8%). Followed by positive experiences (39.1%) related to 'Security' (6.4%), 'Lighting, seating or ramps' (5.1%) and 'Designed for people' (4.3%). And finally, negative experiences (19.1%), related to 'Dirty, noisy or poor air quality' (3.1%), 'Unsafe crossing' (2.3%) and 'Designed for traffic' (2.2%).

Experience	N	%
Positive	307	39.1
Concern	328	41.8
Negative	150	19.1
Total	785	100

Figure 7. Experiences in Belgrade.

Summary of walking experiences and related environmental determinants in Belgrade

Figure 8. Most relevant determinants by type of experience in Belgrade.

Environmental determinants

The 785 walking experiences collected through interviews were linked to 2,663 observations on the environmental determinants included in the Walkability App as predefined categories.

Environmental determinants related to positive experiences

The most frequent and relevant determinants related to positive experiences were 'Sufficient space and path quality' and 'Personal security' with 172 and 170 observations respectively (6.4% each), followed by 'Lighting, seating or ramps' with 135 observations (5.1%) and 'Designed for people' with 115 observations (4.3%). The top-5 list also included 'Safe crossings' and 'presence of footpath' with 96 and 95 observations respectively (3.6%).

Environmental determinants related to negative experiences and concerns

For negative experiences and concerns, 'Dirty, noisy or poor air quality' was the most frequent determinant with 222 observations (8.3%), of which 139 were related to concerns (5.2%) and 83 to negative experiences (3.1%). The second most frequent negative determinant was 'Insufficient trees or visual interest' with 202 observations (7.6%), of which 147 were related to concerns (5.5%) and 55 to negative experiences (2.1%). The third most frequent determinant was 'Unsafe crossing' with 160 observations (6.1%), of which 100 were related to concerns (3.8%) and 60 to negative experiences (2.3%). The fourth most frequent determinant was 'Traffic speed' with 144 observations (5.4%), of which 94 observations were related to concerns (3.5%) and 50 to negative experiences (1.9%). Finally, this top-five list ends with 'Driver behaviour' with 139 observations (5.3%), of which 84 were related to concerns (3.2%) and 55 to negative experiences (2.1%).

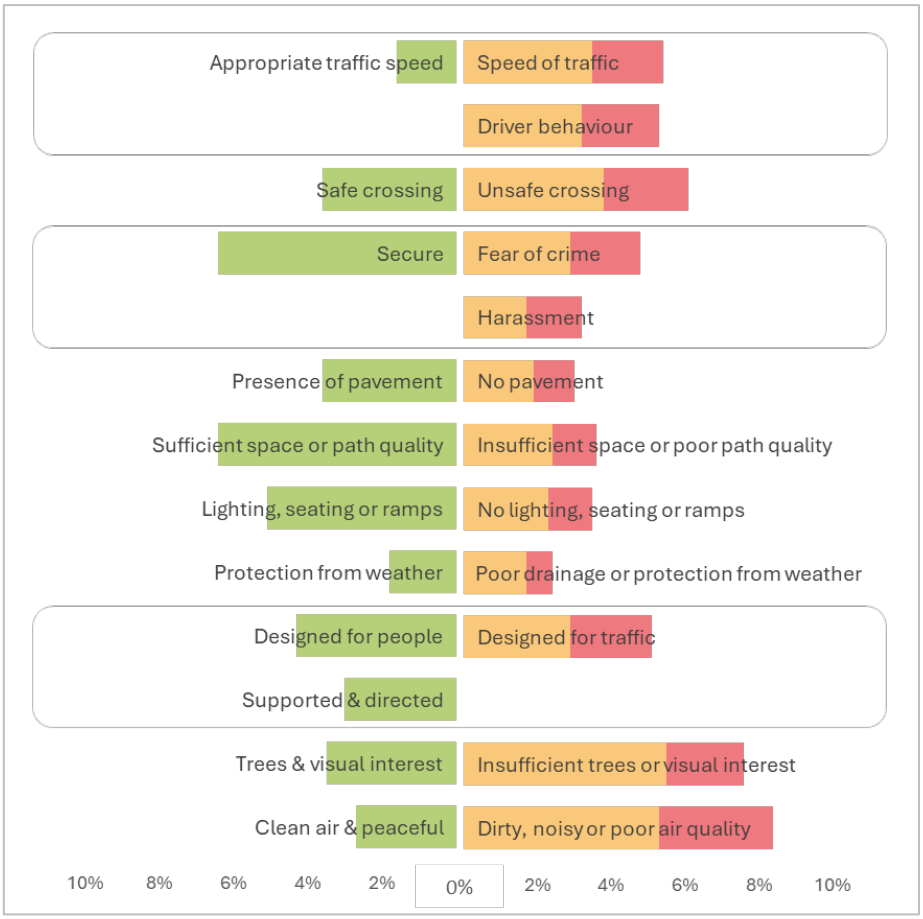


Figure 9. Opposing experiences and determinants in Belgrade.

Summary of observation on environmental determinants linked to walking experience in Belgrade.

Experience	Environmental determinants	N	%
Positive	Secure	170	6.4
	Lighting, seating or ramps	135	5.1
	Designed for people	115	4.3
	Safe crossing	96	3.6
	The path	95	3.6
	Sufficient space	94	3.5
	Trees & visual interest	92	3.5
	Supported & directed	80	3
	Path quality	78	2.9
	Clean air & peaceful	73	2.7
	Protection from weather	47	1.8
	Appropriate speed	42	1.6
Concern	Insufficient trees or visual interest	147	5.5
	Dirty, noisy or poor air quality	139	5.2
	Unsafe crossing	100	3.8
	Speed of traffic	94	3.5
	Driver behaviour	84	3.2
	Designed for traffic not people	78	2.9
	Fear of crime	76	2.9
	Insufficient space or poor path quality	63	2.4

	No lighting, seating or ramps	60	2.3
	No path	50	1.9
	Harassment	45	1.7
	Poor drainage or protection from weather	45	1.7
Negative	Dirty, noisy or poor air quality	83	3.1
	Unsafe crossing	60	2.3
	Designed for traffic not people	58	2.2
	Driver behaviour	55	2.1
	Insufficient trees or visual interest	55	2.1
	Fear of crime	50	1.9
	Speed of traffic	50	1.9
	Harassment	40	1.5
	No lighting, seating or ramps	33	1.2
	Insufficient space or poor path quality	32	1.2
	No path	30	1.1
	Poor drainage or protection from weather	19	0.7
	TOTAL	2663	100

Figure 10. Summary of observations in Belgrade.

3. Data analysis and findings in each study area

From the eight study areas considered in Belgrade, four had more positive experiences (Railway Station Belgrade Centar, Republic Square, Usce Shopping Centre and Old Central Railway Station), three had more concerns (Zeleni Venac Station, New Belgrade Train Station and Savina Square) and one had more negative experiences (Mostar Tram Station).

		Positive	Concerns	Negative	Total
1	Republic Square	69	60	17	146
2	Old Central Railway Station	42	28	12	82
3	Zeleni Venac Station	14	60	20	94
4	Slavia Square	22	45	22	89
5	Usce Shopping Centre	43	36	18	97
6	New Belgrade Train Station	26	56	24	106
7	Mostar Tram Station	20	28	34	82
8	Railway Station Belgrade Centar	71	15	3	89
	TOTAL	307	328	150	785

Figure 11. Different experiences by study area.

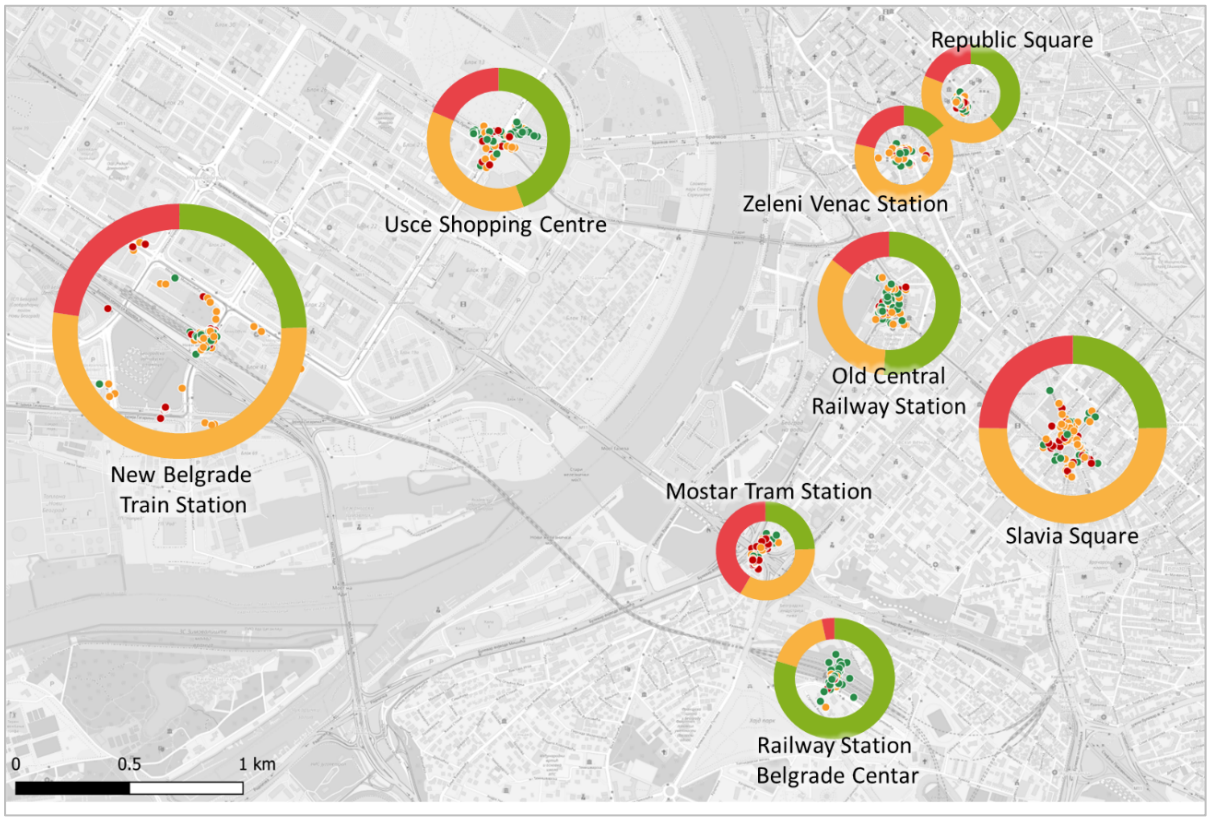
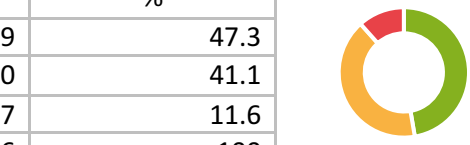


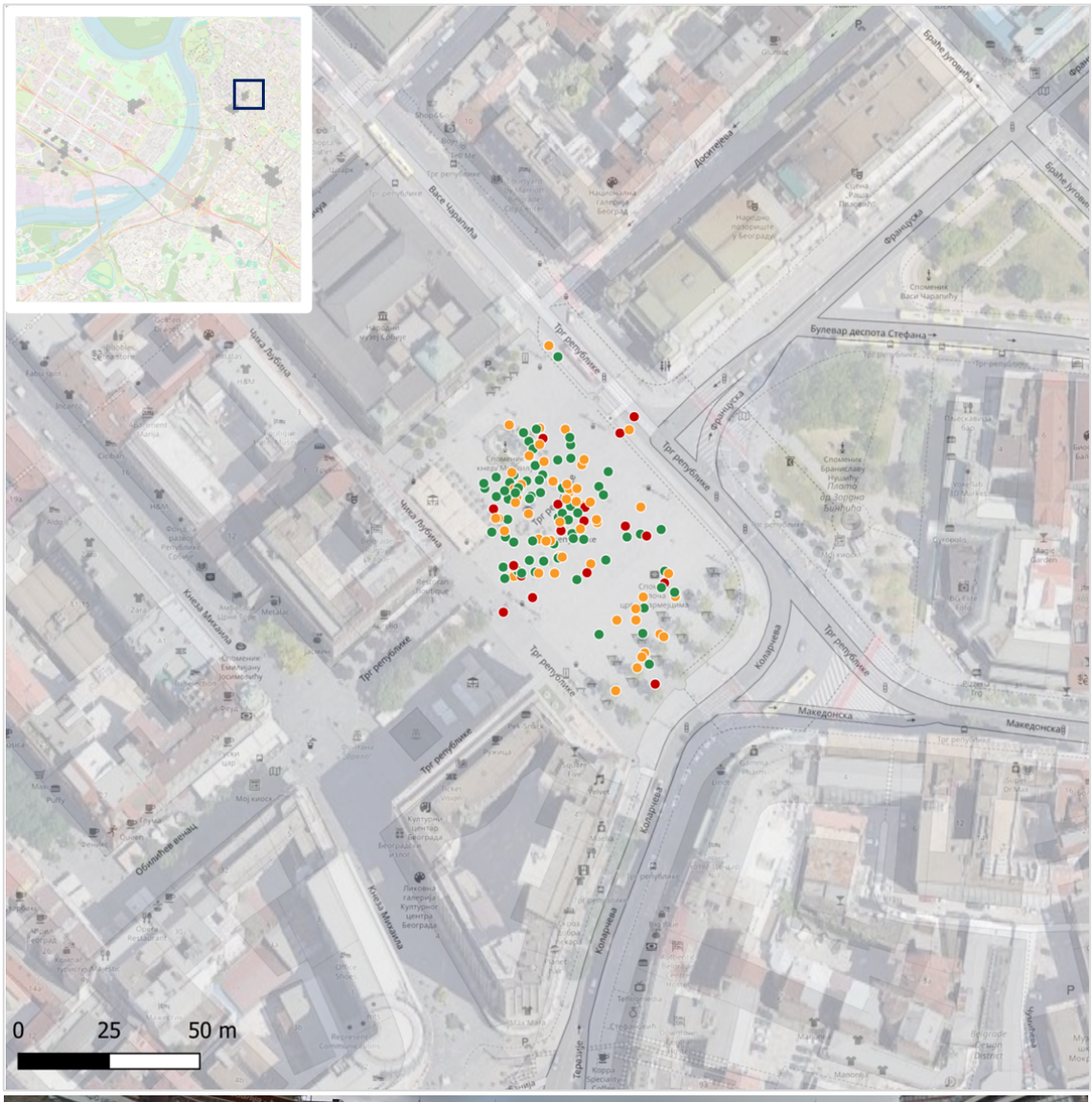
Figure 12. Map with different experiences by study area.

3.1. Republic Square

At Republic Square, most walking experiences were positive (47.3%) related to 'Secure' (9%), `Clean air and peaceful' (8%) and 'Lighting, seating or ramps`(5.8%). Followed by concerns (41.1%) related to 'Insufficient trees or visual interest' (7.6%), 'No lighting, seating or ramps' (6%) and 'Speed of traffic' (4.9%) . Finally, negative experiences (11.6%), related to 'Speed of traffic' (2.4%), 'Designed for traffic' (2.2%) and 'Driver behaviour' (1.9%).

Experience	N	%
Positive	69	47.3
Concern	60	41.1
Negative	17	11.6
Total	146	100





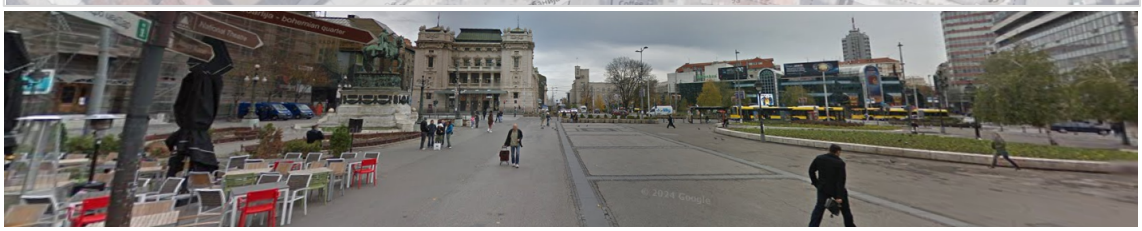


Figure 13. Observations at Republic Square.

Summary of walking experiences and related environmental determinants at Republic Square.

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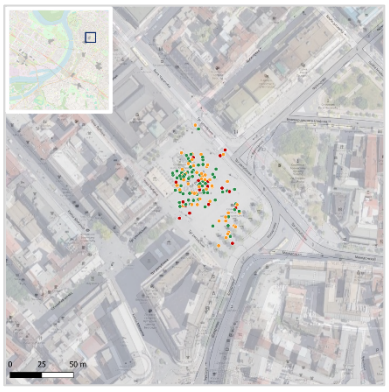
<tr><td>  </td><td> 
Positive experience
Concern
Negative experience

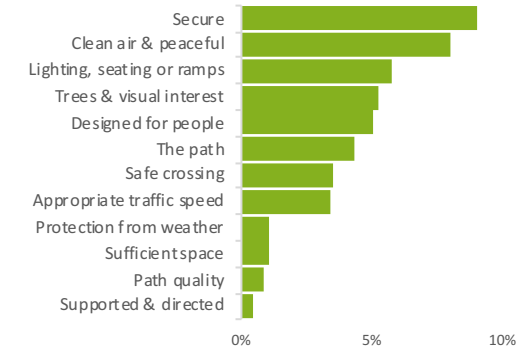
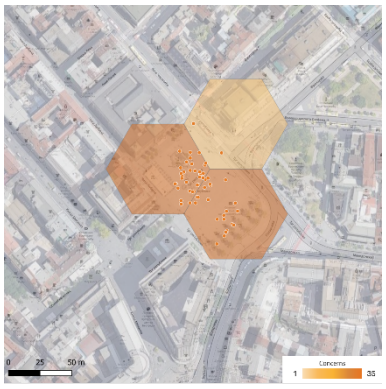
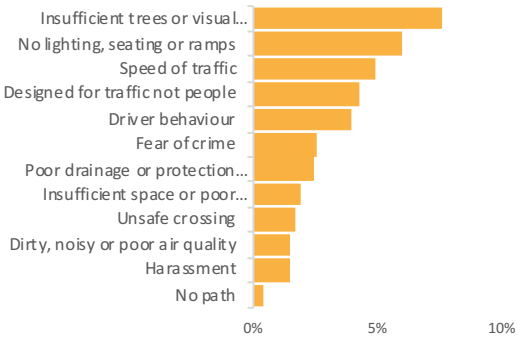
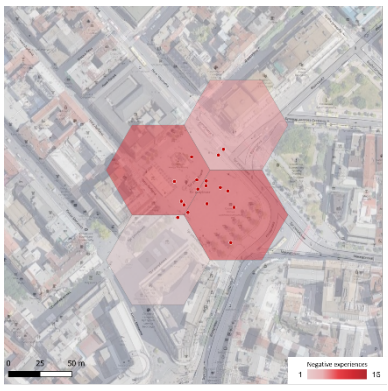
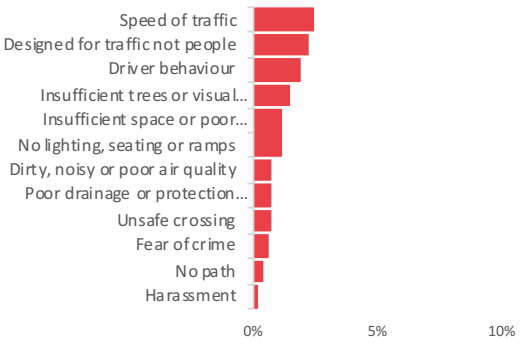
102 Participants
148 Experiences
536 Environmental determinants
Data collection period: 13/03/2024 – 14/03/2024
Location: 44.816279, 20.460208</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>  </td><td>  </td></tr>
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Figure 14. Most relevant determinants by type of experience at Republic Square.

Relationships between opposing environmental determinants and different walking experiences at Republic Square

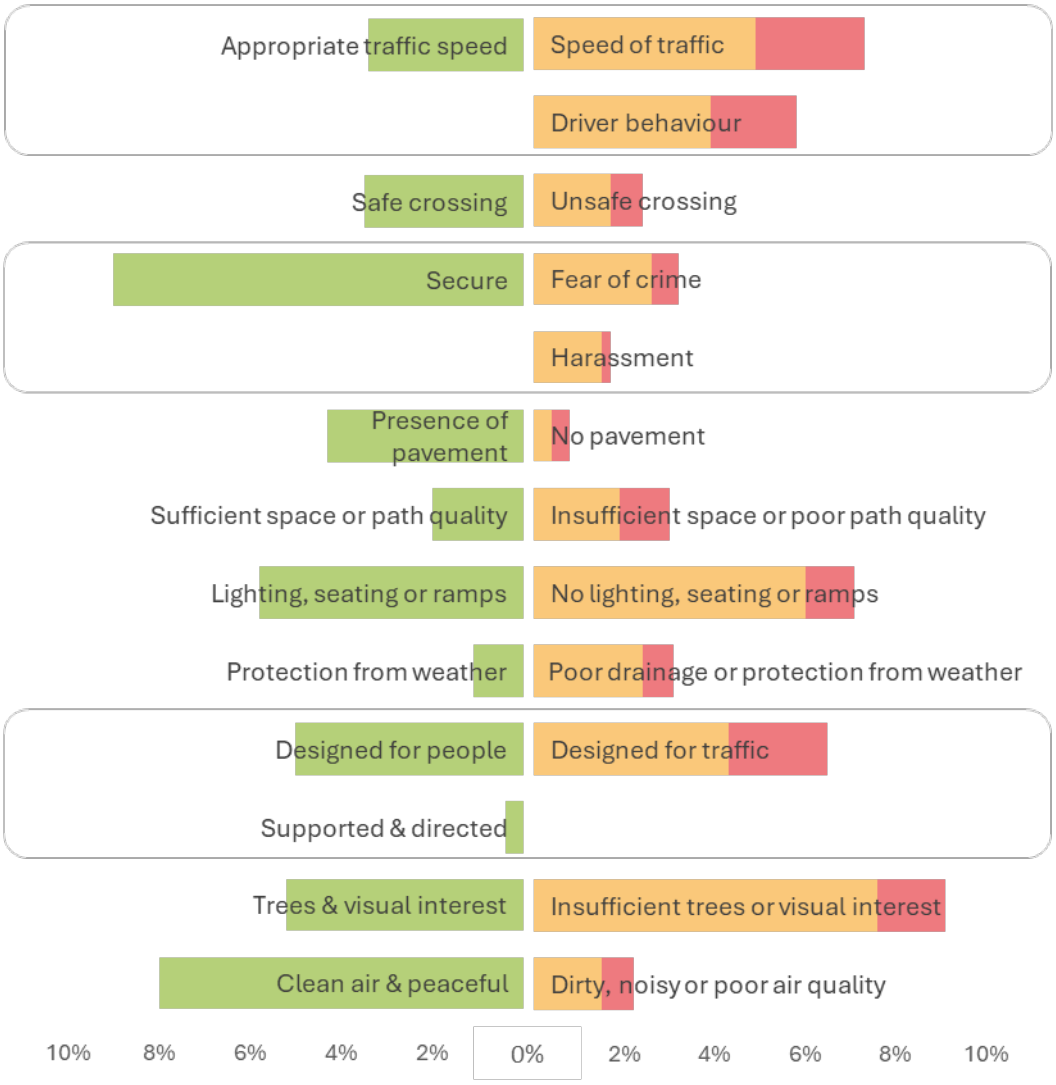

Figure 15. Opposing experiences and determinants in Republic Square.

Observations on each environmental determinant by type of experience at Republic Square.

Experiences	Environmental determinants	N	%
Positive	Secure	48	9
	Clean air & peaceful	43	8
	Lighting, seating or ramps	31	5.8
	Trees & visual interest	28	5.2
	Designed for people	27	5
	The path	23	4.3
	Safe crossing	19	3.5
	Appropriate speed	18	3.4
	Protection from weather	6	1.1
	Sufficient space	6	1.1
	Path quality	5	0.9
	Supported & directed	2	0.4
Concerns	Insufficient trees or visual interest	41	7.6
	No lighting, seating or ramps	32	6
	Speed of traffic	26	4.9
	Designed for traffic not people	23	4.3
	Driver behaviour	21	3.9
	Fear of crime	14	2.6
	Poor drainage or protection from weather	13	2.4
	Insufficient space or poor path quality	10	1.9
	Unsafe crossing	9	1.7
	Dirty, noisy or poor air quality	8	1.5
	Harassment	8	1.5
	No path	2	0.4
Negative	Speed of traffic	13	2.4
	Designed for traffic not people	12	2.2
	Driver behaviour	10	1.9
	Insufficient trees or visual interest	8	1.5
	Insufficient space or poor path quality	6	1.1
	No lighting, seating or ramps	6	1.1
	Dirty, noisy or poor air quality	4	0.7
	Poor drainage or protection from weather	4	0.7
	Unsafe crossing	4	0.7
	Fear of crime	3	0.6
	No path	2	0.4
	Harassment	1	0.2
	TOTAL	536	100

Figure 16. Summary of observations at Republic Square.

3.2. Old Central Railway Station

At the Old Central Railway Station, most walking experiences were positive (51.2%) related to 'Trees and visual interest' (12%), `Safe crossings' (10.2%) and 'Designed for people` (6.8%). Followed by concerns (34.1%) related to 'Insufficient trees or visual interest' (4.9%), 'Dirty, noisy or poor air quality' (4.5%) and 'Fear of crime' (3%). Finally, negative experiences (14.6%), related to 'Insufficient trees or visual interest' (3%), 'Dirty, noisy or poor air quality' (2.6%) and 'Fear of crime' (2.3%).

Experience	N	%
Positive	42	51.2
Concern	28	34.1
Negative	12	14.6
Total	82	100

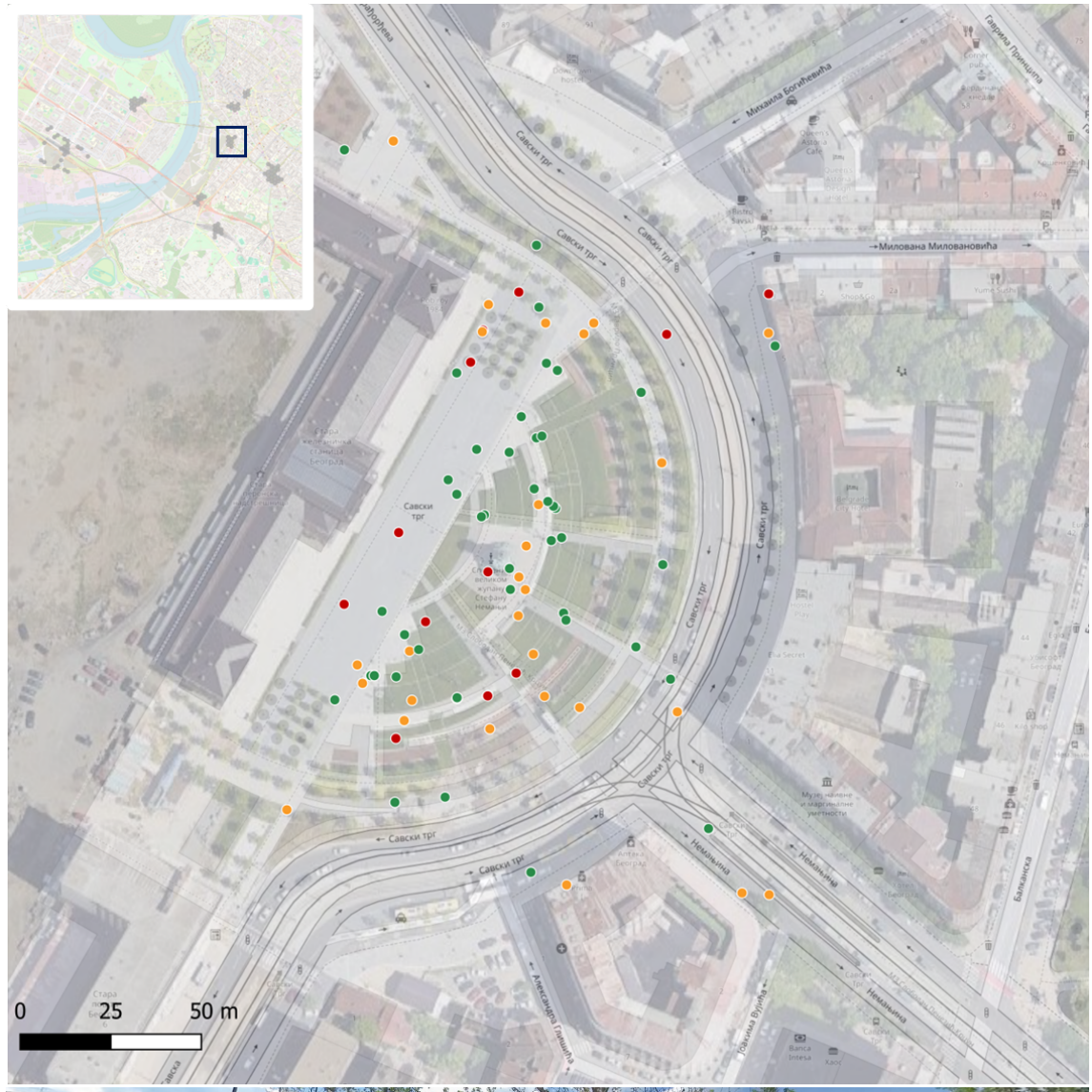

Figure 17. Observations at Old Central Railway Station.

Summary of walking experiences and related environmental determinants at Old Central Railway Sation

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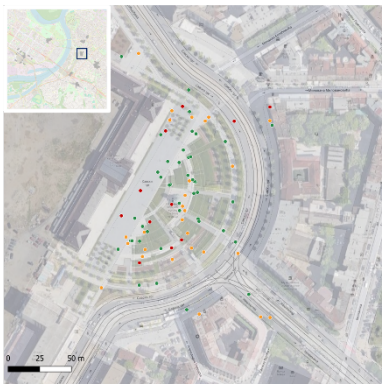
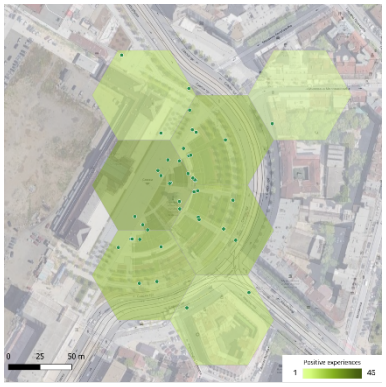
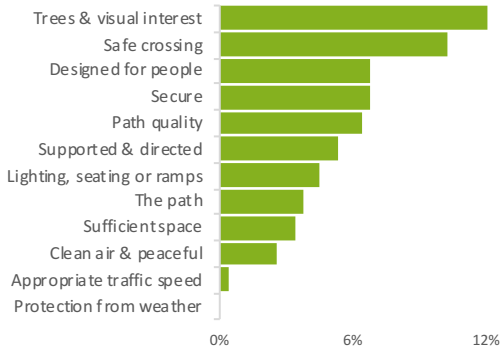
<tr><td>  </td><td> 

72 Participants
82 Experiences
266 Environmental determinants
Data collection period: 06/03/2024 – 12/03/2024
Location: 44.808312, 20.456381</td></tr>
<tr><td>  </td><td> 
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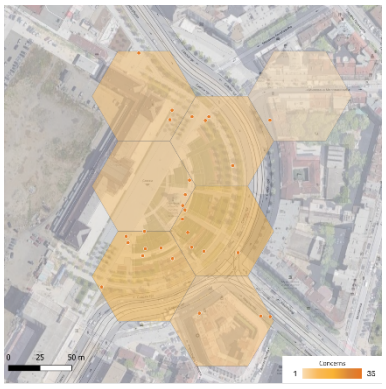
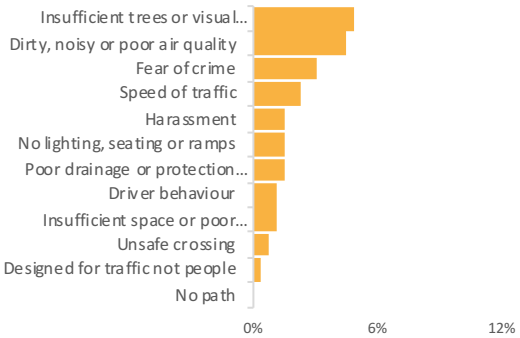
<tr><td>  </td><td> 
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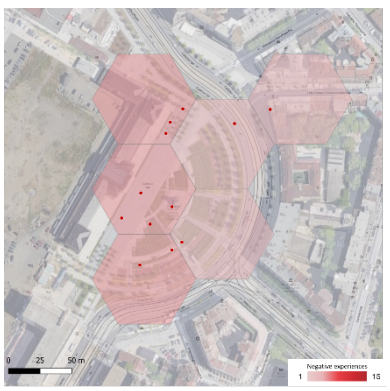
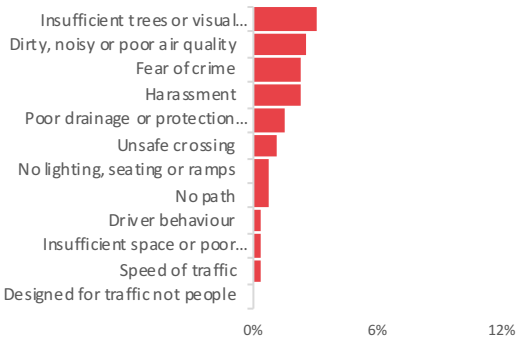
<tr><td>  </td><td> 
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Figure 18. Most relevant determinants by type of experience at Old Central Railway Sation.

Relationships between opposing environmental determinants and different walking experiences at Old Central Railway Sation.

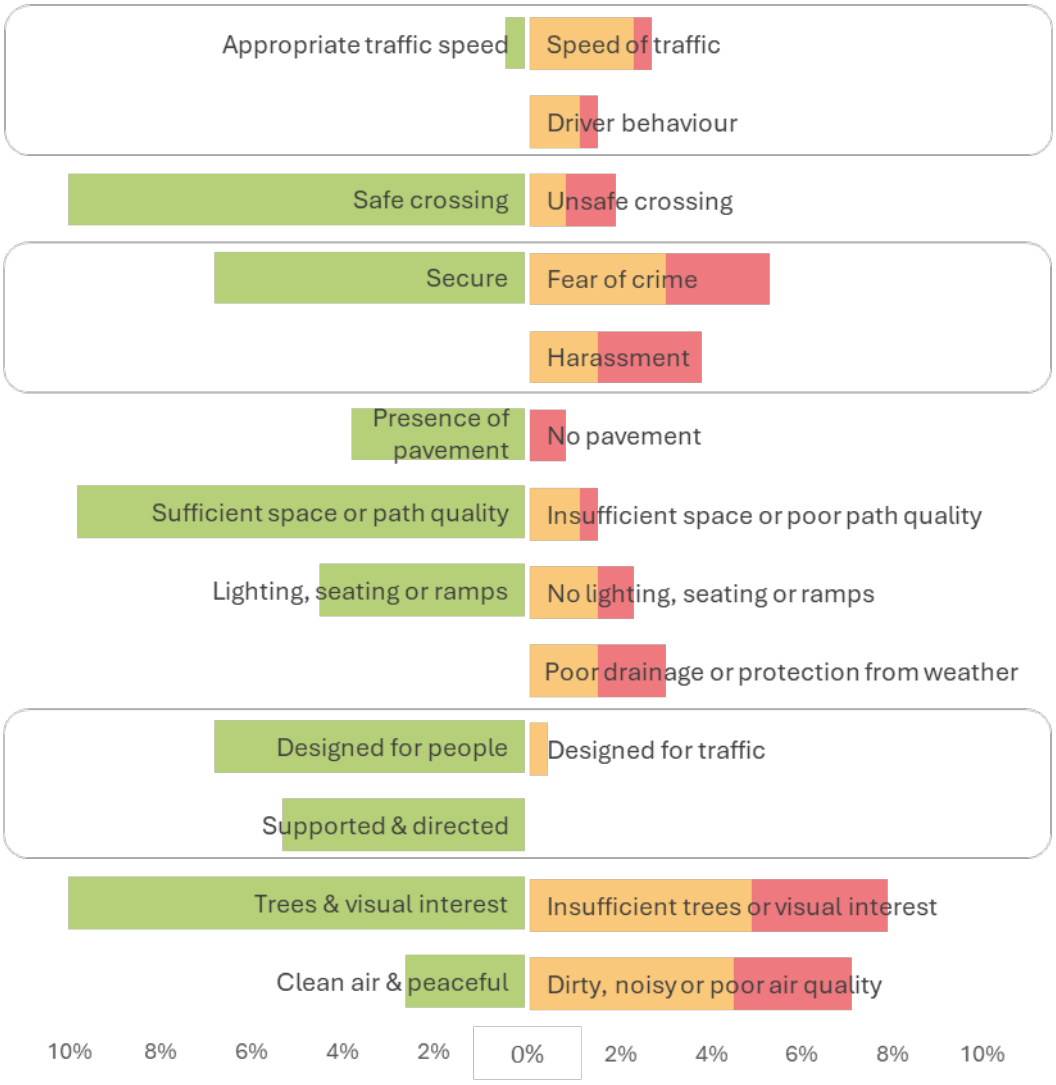

Figure 19. Opposing experiences and determinants at Old Central Railway Sation.

Observations on each environmental determinant by type of experience at Old Central Railway Sation.

Experiences	Environmental determinants	N	%
Positive	Trees & visual interest	32	12
	Safe crossing	27	10.2
	Designed for people	18	6.8
	Secure	18	6.8
	Path quality	17	6.4
	Supported & directed	14	5.3
	Lighting, seating or ramps	12	4.5
	The path	10	3.8
	Sufficient space	9	3.4
	Clean air & peaceful	7	2.6
	Appropriate speed	1	0.4
	Protection from weather	0	0
Concerns	Insufficient trees or visual interest	13	4.9
	Dirty, noisy or poor air quality	12	4.5
	Fear of crime	8	3
	Speed of traffic	6	2.3
	Harassment	4	1.5
	No lighting, seating or ramps	4	1.5
	Poor drainage or protection from weather	4	1.5
	Driver behaviour	3	1.1
	Insufficient space or poor path quality	3	1.1
	Unsafe crossing	2	0.8
	Designed for traffic not people	1	0.4
	No path	0	0
Negative	Insufficient trees or visual interest	8	3
	Dirty, noisy or poor air quality	7	2.6
	Fear of crime	6	2.3
	Harassment	6	2.3
	Poor drainage or protection from weather	4	1.5
	Unsafe crossing	3	1.1
	No lighting, seating or ramps	2	0.8
	No path	2	0.8
	Driver behaviour	1	0.4
	Insufficient space or poor path quality	1	0.4
	Speed of traffic	1	0.4
	Designed for traffic not people	0	0
	TOTAL	266	100

Figure 20. Summary of observations at Old Central Railway Sation.

3.3. Zeleni Venac Station

At Zeleni Venac Station, most walking experiences were concerns (63.8%) related to 'No path' (10.5%), `Insufficient trees or visual interest' (9%) and 'Insufficient space or poor path quality` (8.3%). Followed by negative experiences (21.3%) related to 'Insufficient trees or visual interest' (3.7%), 'Fear of crime' (3.4%) and 'No path' 3.4(%). Finally, positive experiences (14.9%), related to Secure '' (1.9%), 'Supported and directed' (1.5%) and 'Sufficient space' (1.2%).

Experience	N	%
Positive	14	14.9
Concern	60	63.8
Negative	20	21.3
Total	94	100

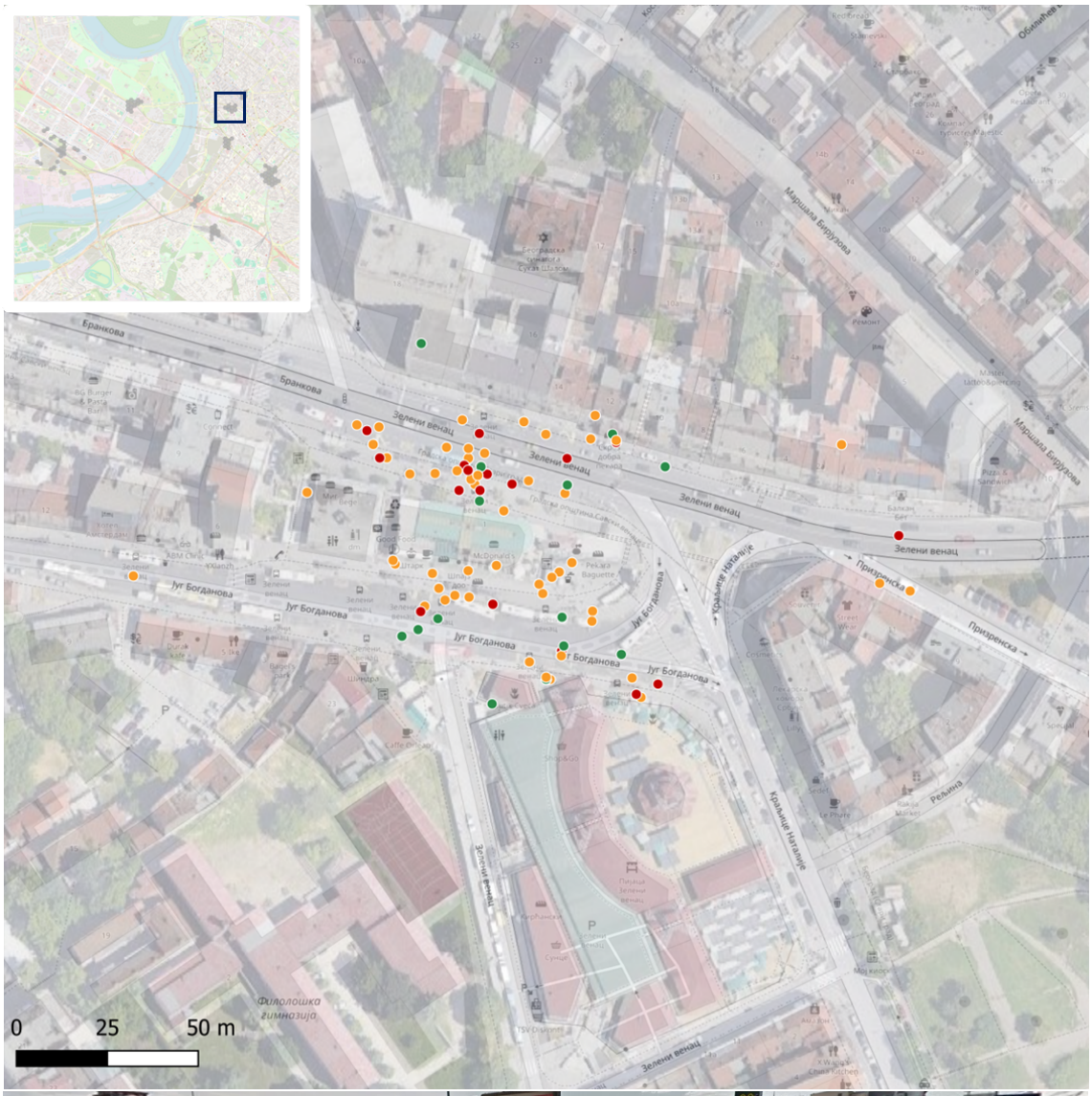

Figure 21. Observations at Zeleni Venac Station.

Summary of walking experiences and related environmental determinants at Zeleni Venac Station.

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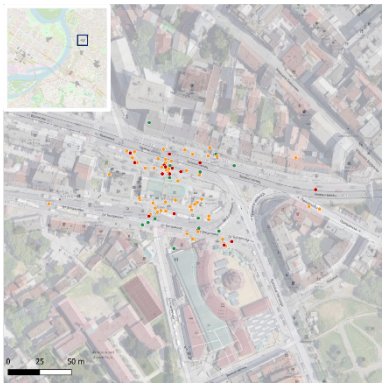
<tr><th colspan="2">Zeleni Venac Station</th></tr>
<tr><td>  </td><td> 
● Positive experience
● Concern
● Negative experience

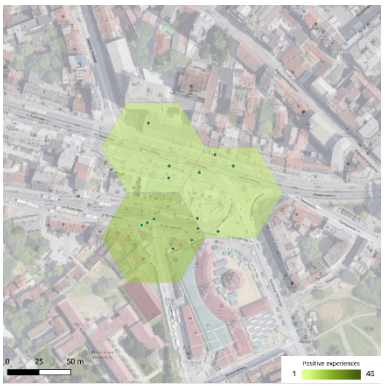
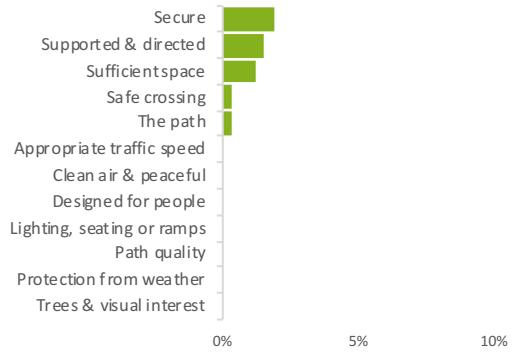
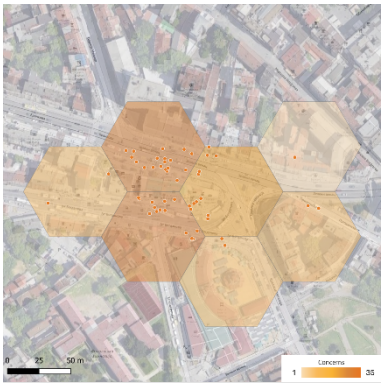
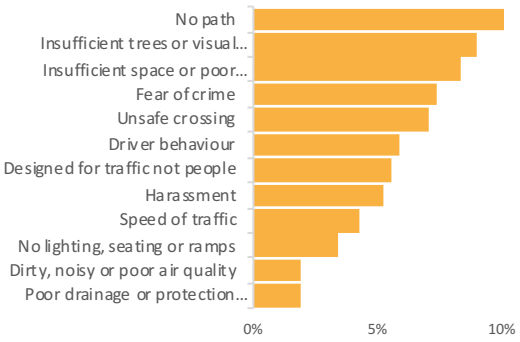
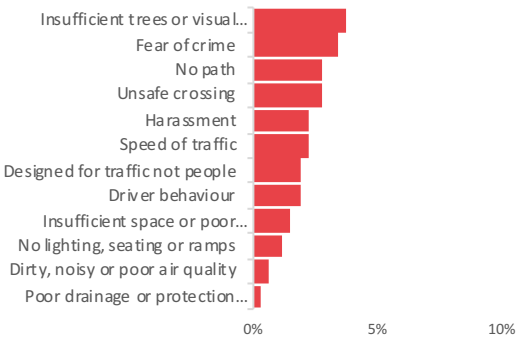
66 Participants
95 Experiences
324 Environmental determinants
Data collection period: 06/03/2024 – 14/03/2024
Location: 44.814092, 20.457408</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>  </td><td>  </td></tr>
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Figure 22. Most relevant determinants by type of experience at Zeleni Venac Station

Relationships between opposing environmental determinants and different walking experiences at Zeleni Venac Station.

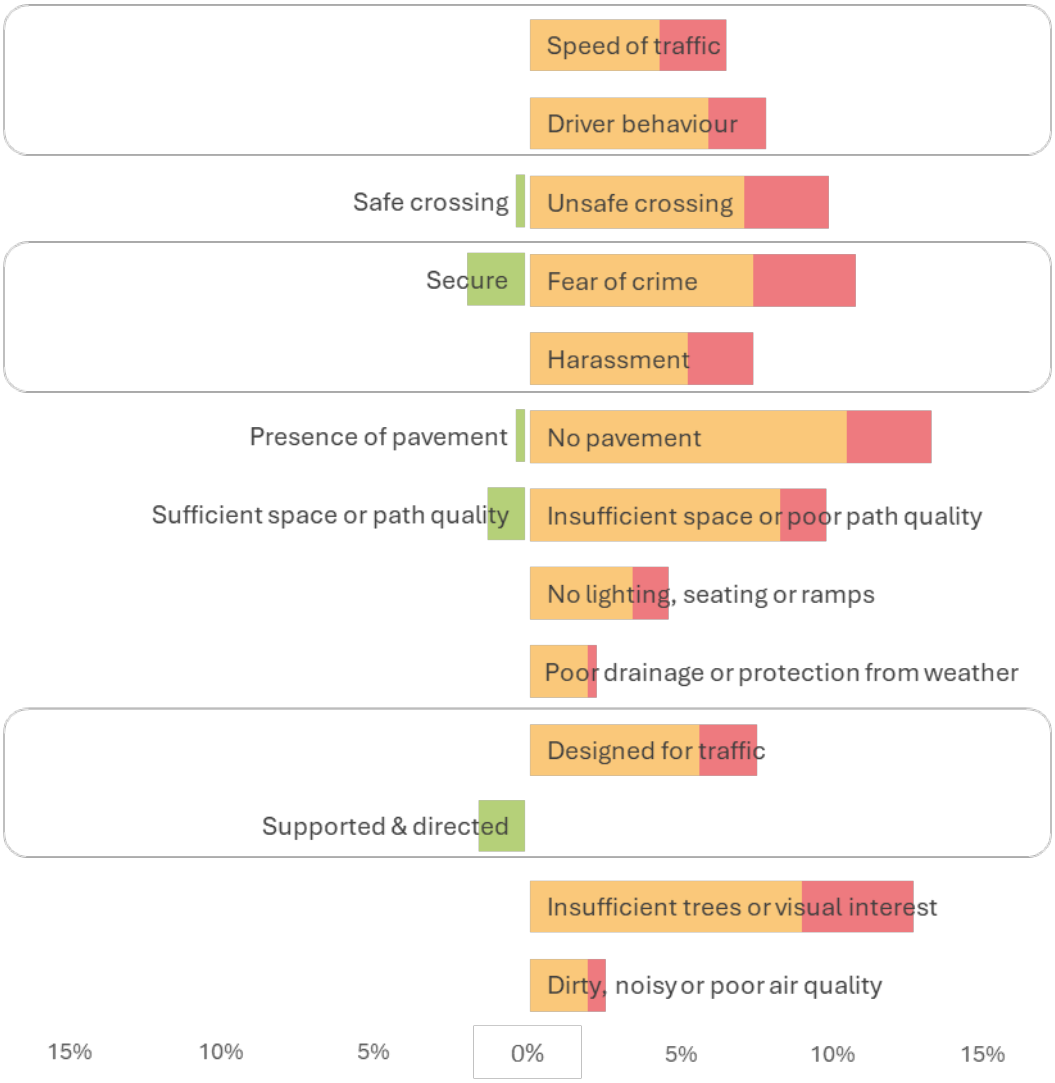


Figure 23. Opposing experiences and determinants at Zeleni Venac Station.

Observations on each environmental determinant by type of experience at Zeleni Venac Station.

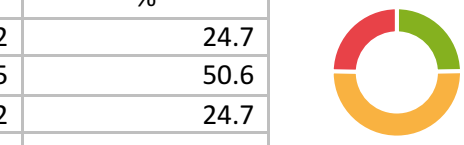
Experiences	Environmental determinants	N	%
Positive	Secure	6	1.9
	Supported & directed	5	1.5
	Sufficient space	4	1.2
	Safe crossing	1	0.3
	The path	1	0.3
	Appropriate speed	0	0
	Clean air & peaceful	0	0
	Designed for people	0	0
	Lighting, seating or ramps	0	0
	Path quality	0	0
	Protection from weather	0	0
	Trees & visual interest	0	0
Concerns	No path	34	10.5
	Insufficient trees or visual interest	29	9
	Insufficient space or poor path quality	27	8.3
	Fear of crime	24	7.4
	Unsafe crossing	23	7.1
	Driver behaviour	19	5.9
	Designed for traffic not people	18	5.6
	Harassment	17	5.2
	Speed of traffic	14	4.3
	No lighting, seating or ramps	11	3.4
	Dirty, noisy or poor air quality	6	1.9
	Poor drainage or protection from weather	6	1.9
Negative	Insufficient trees or visual interest	12	3.7
	Fear of crime	11	3.4
	No path	9	2.8
	Unsafe crossing	9	2.8
	Harassment	7	2.2
	Speed of traffic	7	2.2
	Designed for traffic not people	6	1.9
	Driver behaviour	6	1.9
	Insufficient space or poor path quality	5	1.5
	No lighting, seating or ramps	4	1.2
	Dirty, noisy or poor air quality	2	0.6
	Poor drainage or protection from weather	1	0.3
	TOTAL	324	100

Figure 24. Summary of observations at Zeleni Venac Station.

3.4. Slavia Square

At Slavia Square, most walking experiences were concerns (%50.6) related to 'Dirty, noisy or poor air quality' (12.2%), `Unsafe crossings' (8.4%) and 'Insufficient trees or visual interest` (7.1%). Followed by positive experiences (24.7%) related to 'Secure' (5.1%), 'Safe crossing' (3.5%) and 'Presence of footpath' (3.5%). And finally, negative experiences (24.7%), related to 'Dirty, noisy or poor air quality' (5.5%), 'Insufficient trees or visual interest' (5.5%) and 'Unsafe crossing' (5.5%).

Experience	N	%
Positive	22	24.7
Concern	45	50.6
Negative	22	24.7
Total	89	100



Positive experience
Concern
Negative experience

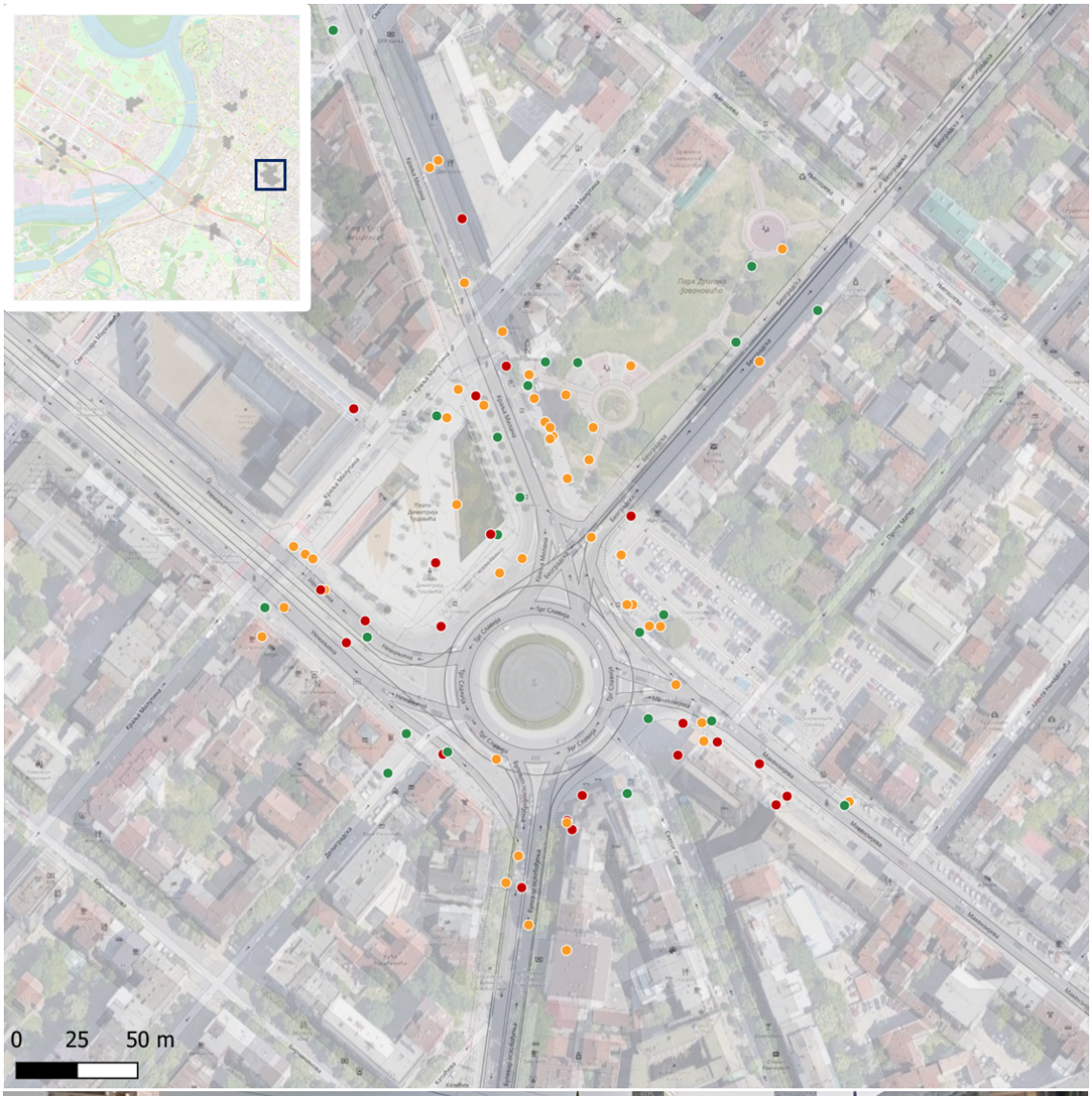


Figure 25. Observations at Slavia Square

Summary of walking experiences and related environmental determinants at Slavia Square.

<table>
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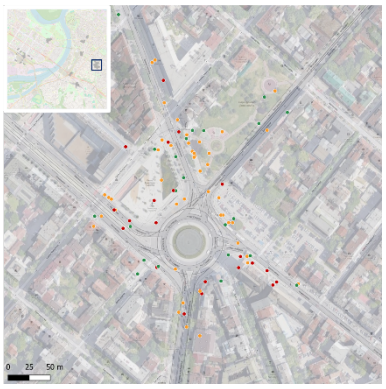
<tr><td>  </td><td> 
Positive experience
Concern
Negative experience

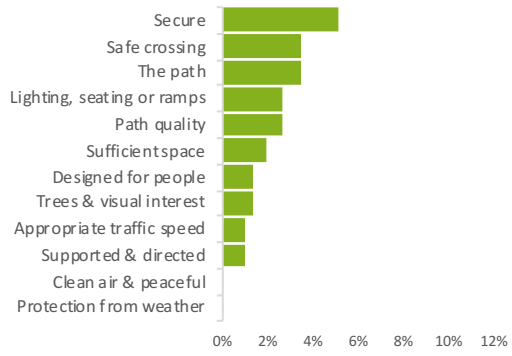
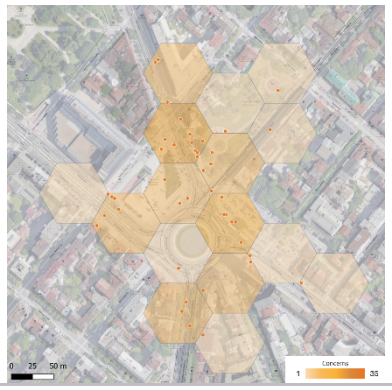
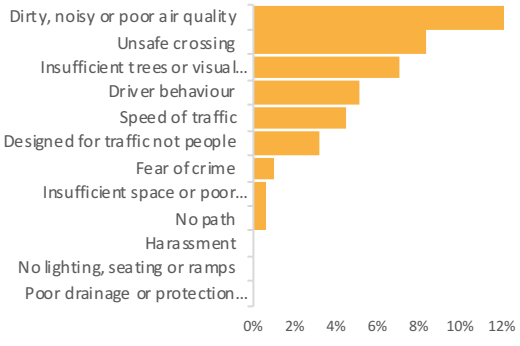
88 Participants
89 Experiences
311 Environmental determinants
Data collection period: 28/02/2024 – 04/03/2024
Location: 44.802509, 20.466293</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>  </td><td>  </td></tr>
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Figure 26. Most relevant determinants by type of experience at Slavia Square.

Relationships between opposing environmental determinants and different walking experiences at Slavia Square.

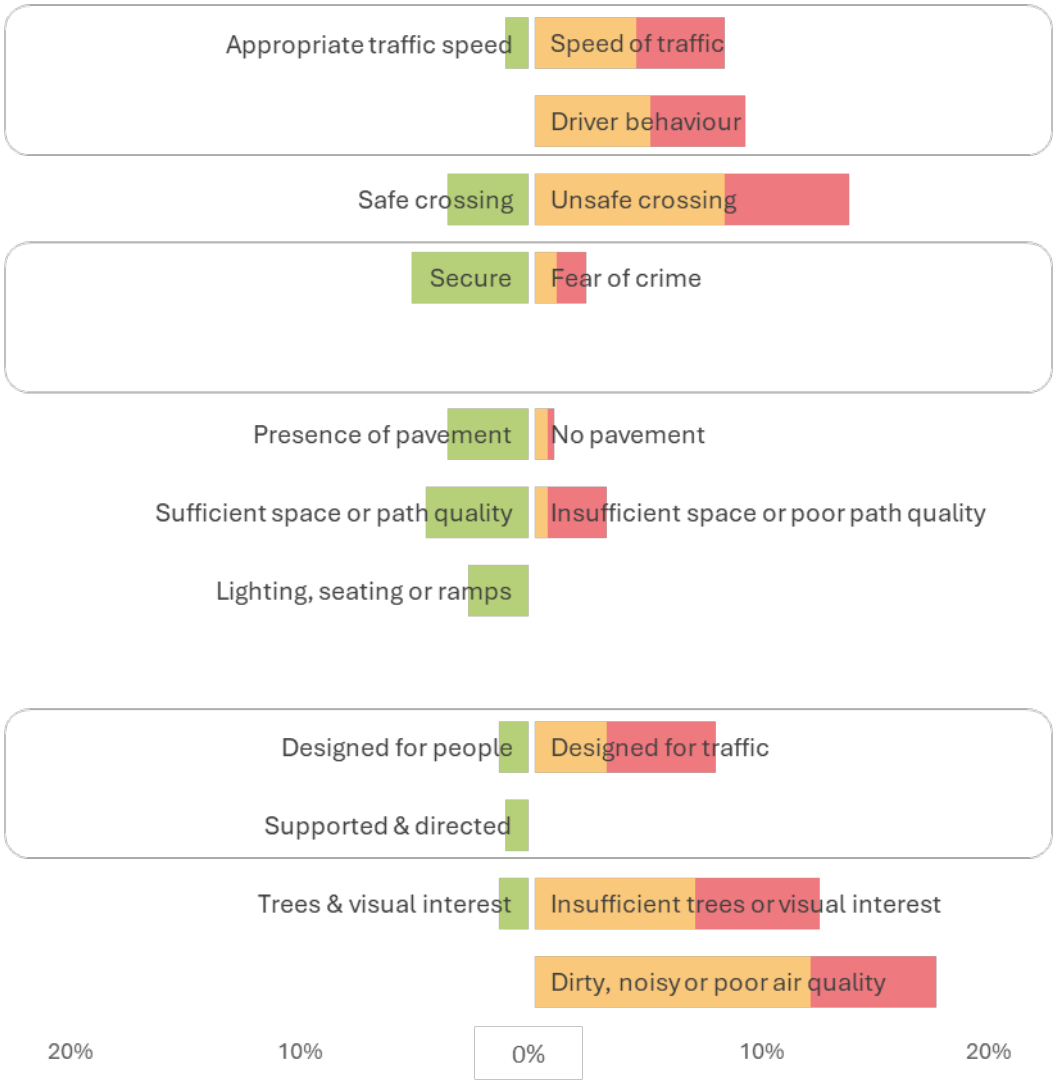

Figure 27. Opposing experiences and determinants at Slavia Square.

Observations on each environmental determinant by type of experience at Slavia Square.

Experiences	Environmental determinants	N	%
Positive	Secure	16	5.1
	Safe crossing	11	3.5
	The path	11	3.5
	Lighting, seating or ramps	8	2.6
	Path quality	8	2.6
	Sufficient space	6	1.9
	Designed for people	4	1.3
	Trees & visual interest	4	1.3
	Appropriate speed	3	1
	Supported & directed	3	1
	Clean air & peaceful	0	0
	Protection from weather	0	0
Concerns	Dirty, noisy or poor air quality	38	12.2
	Unsafe crossing	26	8.4
	Insufficient trees or visual interest	22	7.1
	Driver behaviour	16	5.1
	Speed of traffic	14	4.5
	Designed for traffic not people	10	3.2
	Fear of crime	3	1
	Insufficient space or poor path quality	2	0.6
	No path	2	0.6
	Harassment	0	0
	No lighting, seating or ramps	0	0
	Poor drainage or protection from weather	0	0
Negative	Dirty, noisy or poor air quality	17	5.5
	Insufficient trees or visual interest	17	5.5
	Unsafe crossing	17	5.5
	Designed for traffic not people	15	4.8
	Driver behaviour	13	4.2
	Speed of traffic	12	3.9
	Insufficient space or poor path quality	8	2.6
	Fear of crime	4	1.3
	No path	1	0.3
	Harassment	0	0
	No lighting, seating or ramps	0	0
	Poor drainage or protection from weather	0	0
	TOTAL	311	100

Figure 28. Summary of observations at Slavia Square.

3.5. Usce Shopping Centre

At Usce Shopping Centre, most walking experiences were positive (44.3%) related to 'Lighting, seating or ramps' (9.3%), `Trees or visual interest' (7.1%) and 'Designed for people` (5.9%). Followed by concerns (37.1%) related to 'Dirty, noisy or poor air quality' (6.5%), 'Speed of traffic' (6.2%) and 'Poor protection from weather' (5%). Finally, negative experiences (18.6%) related to 'Speed of traffic' (3.4%), 'Fear of crime' (3.1%) and 'Driver behaviour' (2.8%).

Experience	N	%
Positive	43	44.3
Concern	36	37.1
Negative	18	18.6
Total	97	100

Positive experience
Concern
Negative experience

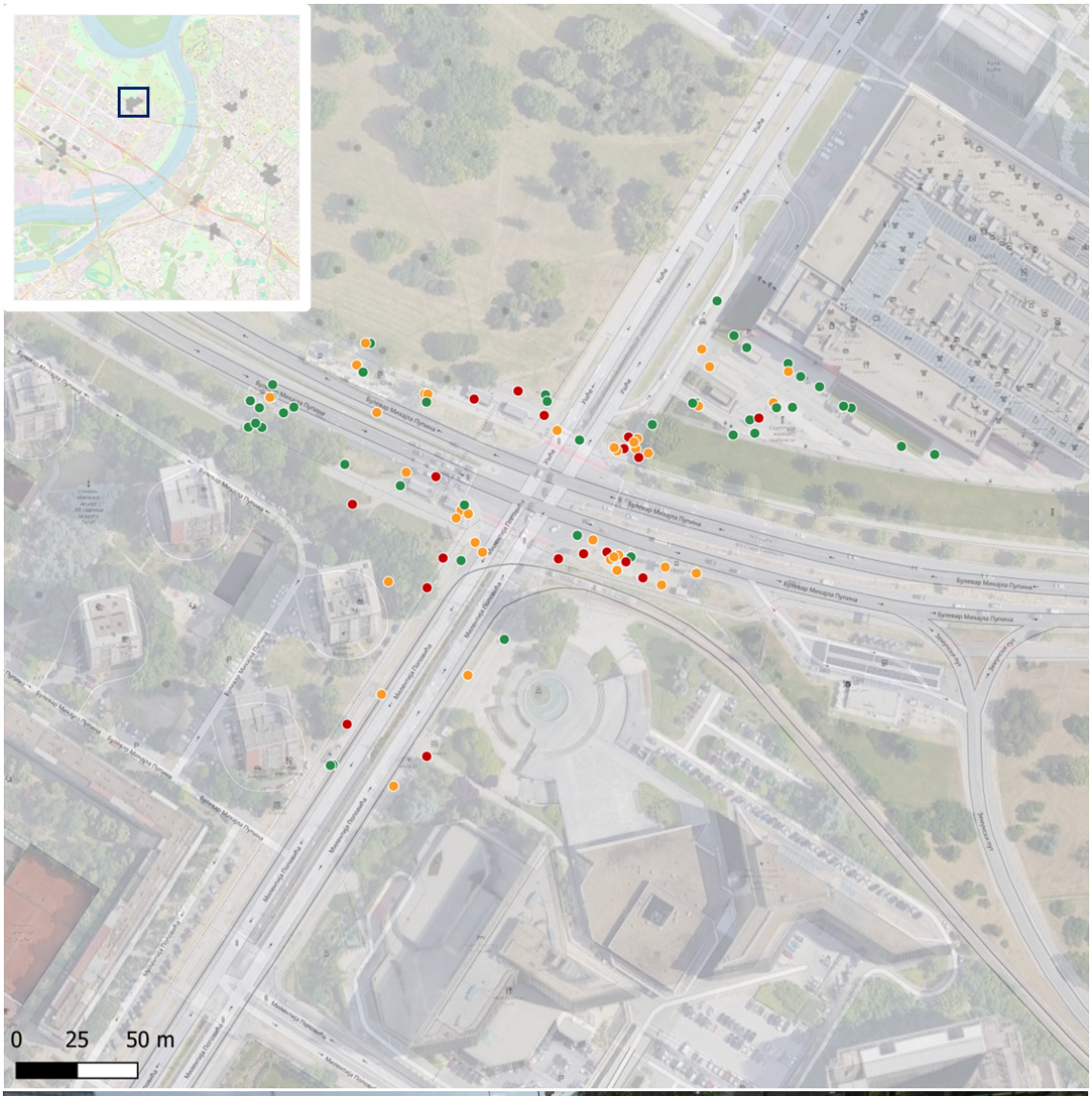

Figure 29. Observations at Usce Shopping Centre.

Summary of walking experiences and related environmental determinants at Usce Shopping Centre.

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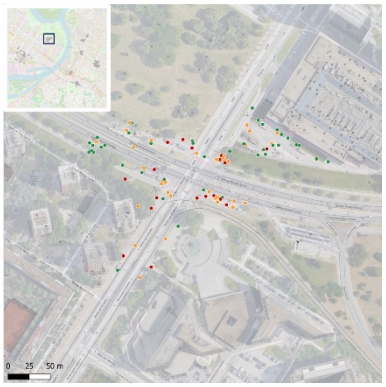
<tr><td>  </td><td> 
Positive experience
Concern
Negative experience

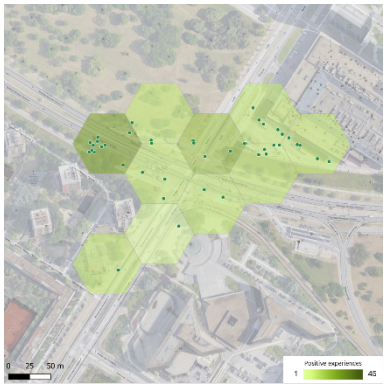
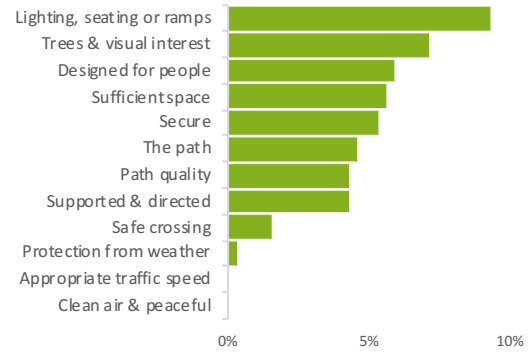
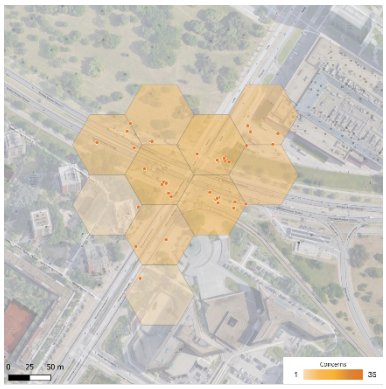
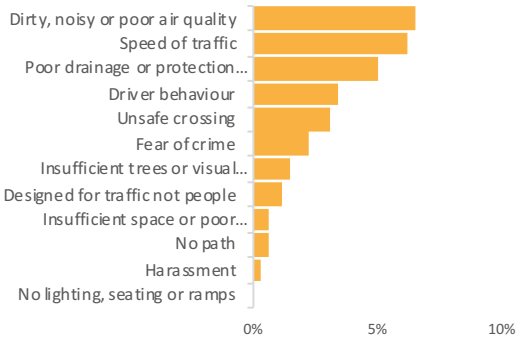
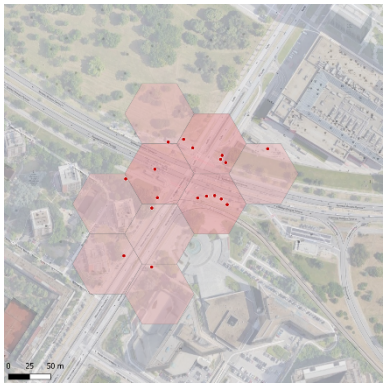
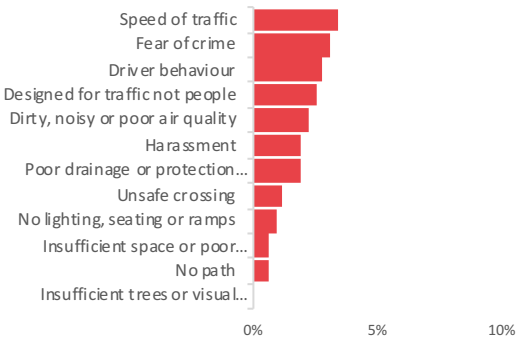
97 Participants
97 Experiences
323 Environmental determinants
Data collection period: 06/03/2024 – 12/03/2024
Location: 44.814616, 20.434269</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>  </td><td>  </td></tr>
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Figure 30. Most relevant determinants by type of experience at Usce Shopping Centre.

Relationships between opposing environmental determinants and different walking experiences at Usce Shopping Centre.

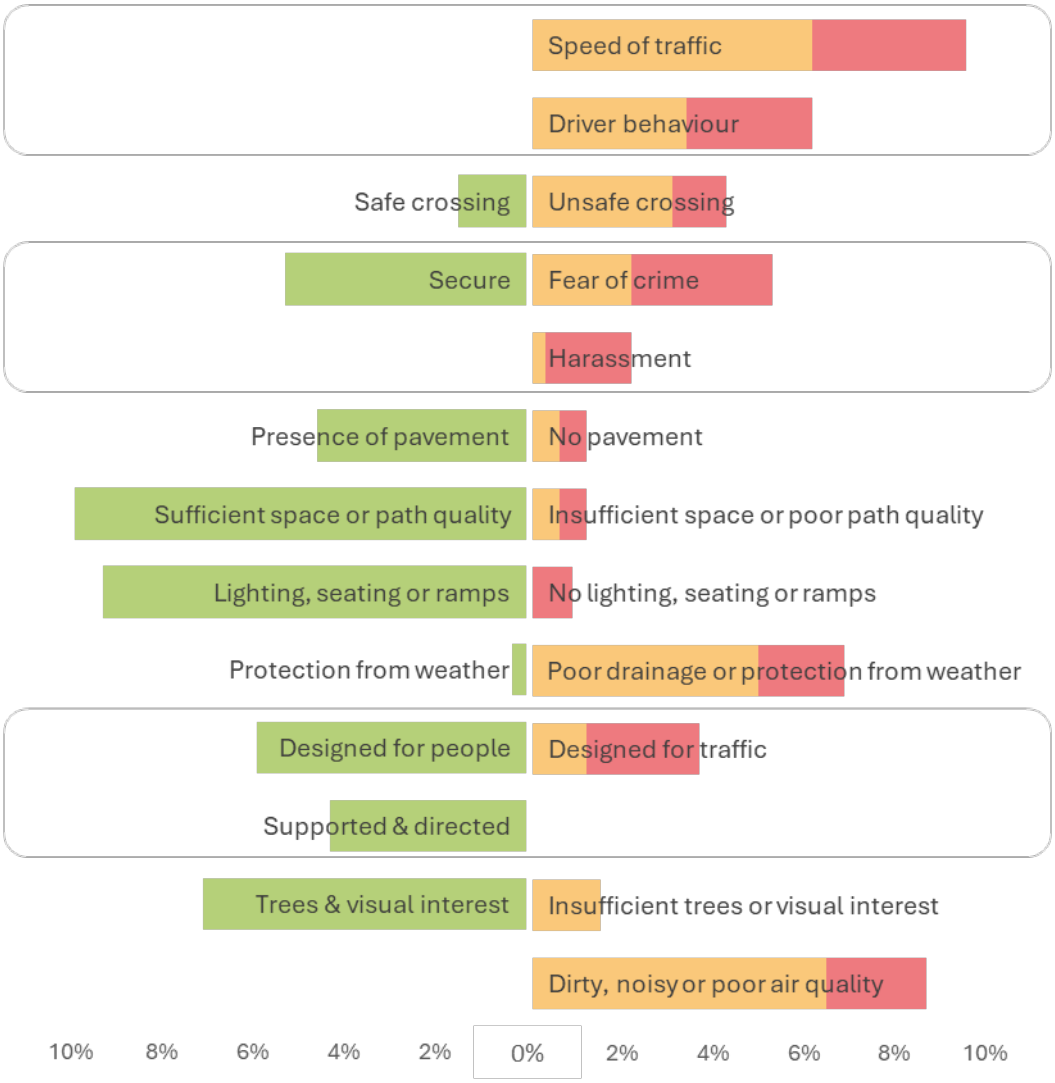


Figure 31. Opposing experiences and determinants at Usce Shopping Centre.

Observations on each environmental determinant by type of experience at Usce Shopping Centre.

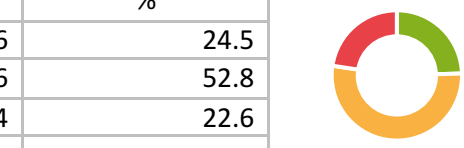
Experiences	Environmental determinants	N	%
Positive	Lighting, seating or ramps	30	9.3
	Trees & visual interest	23	7.1
	Designed for people	19	5.9
	Sufficient space	18	5.6
	Secure	17	5.3
	The path	15	4.6
	Path quality	14	4.3
	Supported & directed	14	4.3
	Safe crossing	5	1.5
	Protection from weather	1	0.3
	Appropriate speed	0	0
	Clean air & peaceful	0	0
Concerns	Dirty, noisy or poor air quality	21	6.5
	Speed of traffic	20	6.2
	Poor drainage or protection from weather	16	5
	Driver behaviour	11	3.4
	Unsafe crossing	10	3.1
	Fear of crime	7	2.2
	Insufficient trees or visual interest	5	1.5
	Designed for traffic not people	4	1.2
	Insufficient space or poor path quality	2	0.6
	No path	2	0.6
	Harassment	1	0.3
	No lighting, seating or ramps	0	0
Negative	Speed of traffic	11	3.4
	Fear of crime	10	3.1
	Driver behaviour	9	2.8
	Designed for traffic not people	8	2.5
	Dirty, noisy or poor air quality	7	2.2
	Harassment	6	1.9
	Poor drainage or protection from weather	6	1.9
	Unsafe crossing	4	1.2
	No lighting, seating or ramps	3	0.9
	Insufficient space or poor path quality	2	0.6
	No path	2	0.6
	Insufficient trees or visual interest	0	0
	TOTAL	323	100

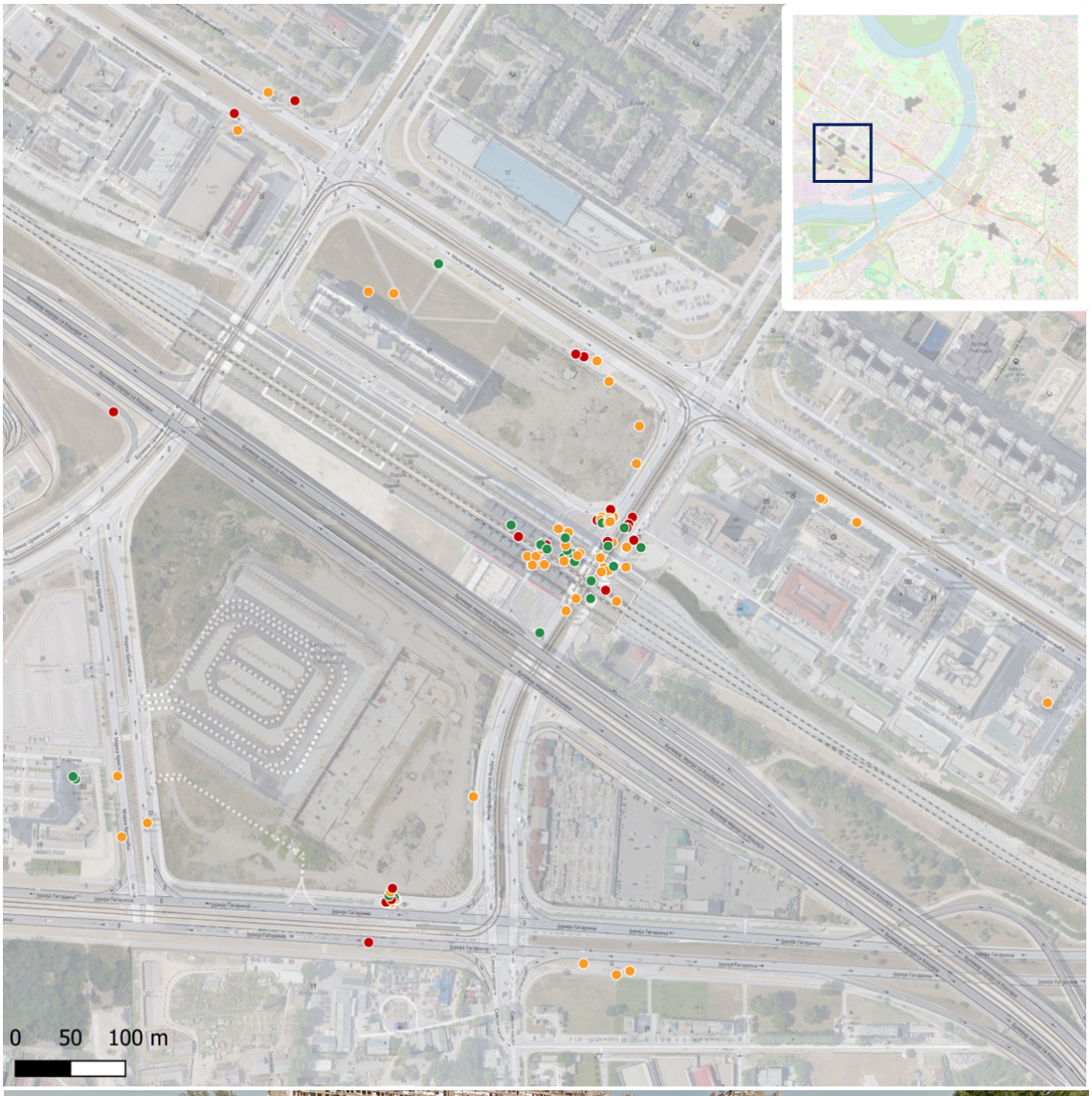
Figure 32. Summary of observations at Usce Shopping Centre.

3.6. New Belgrade Train Station

At New Belgrade Train Station, most walking experiences were concerns (52.8%) related to 'Dirty, noisy or poor air quality' (11.3%), `Insufficient trees or visual interest' (10.1%) and 'Designed for traffic` (5.2%). Followed by positive experiences (24.5%) related to 'Supported and directed' (4.4%), 'Lighting, seating or ramps' (4%) and 'Designed for people' (3.6%). Finally, negative experiences (22.6%), related to 'Dirty, or poor air quality' (6.9%), 'Insufficient trees or visual interest' (2.4%) and 'Designed for traffic' (1.6%).

Experience	N	%
Positive	26	24.5
Concern	56	52.8
Negative	24	22.6
Total	106	100





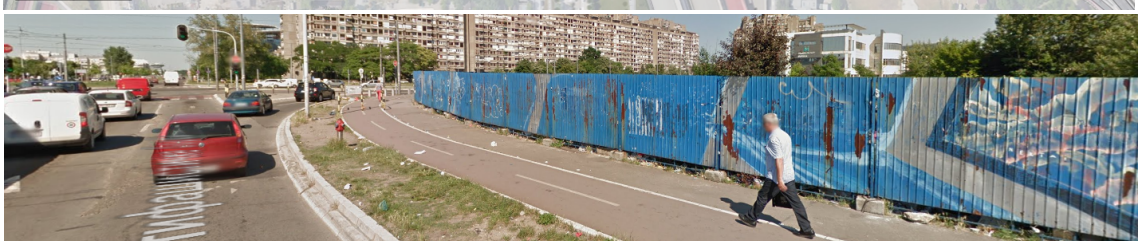
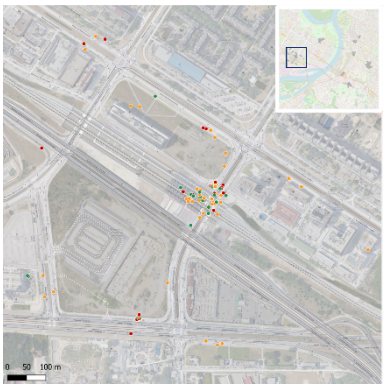
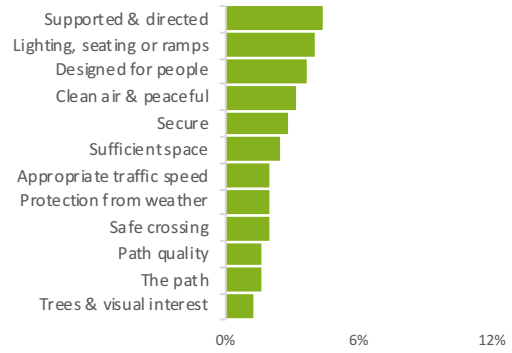
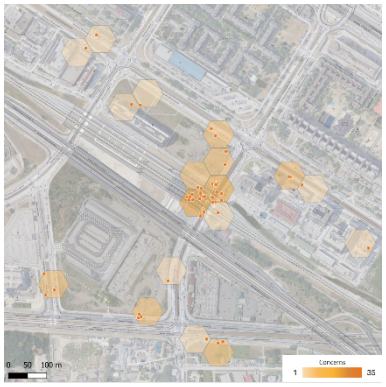
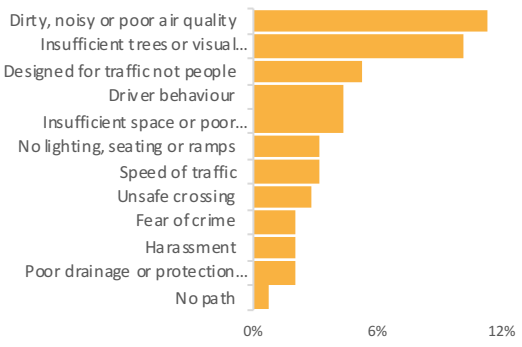


Figure 33. Observations at New Belgrade Train Station.

Summary of walking experiences and related environmental determinants at New Belgrade Train Station.

<table>
<tr><th colspan="2">New Belgrade Train Station</th></tr>
<tr><td>  </td><td> 
● Positive experience
● Concern
● Negative experience

98 Participants
106 Experiences
248 Environmental determinants
Data collection period: 06/03/2024 – 11/03/2024
Location: 44.806878, 20.418034</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>  </td><td>  </td></tr>
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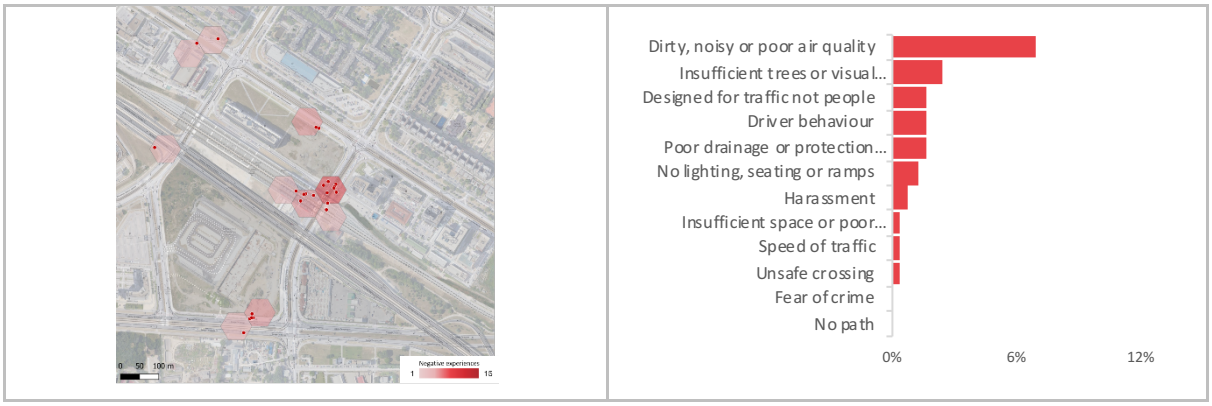


Figure 34. Most relevant determinants by type of experience at New Belgrade Train Station.

Relationships between opposing environmental determinants and different walking experiences at New Belgrade Train Station.

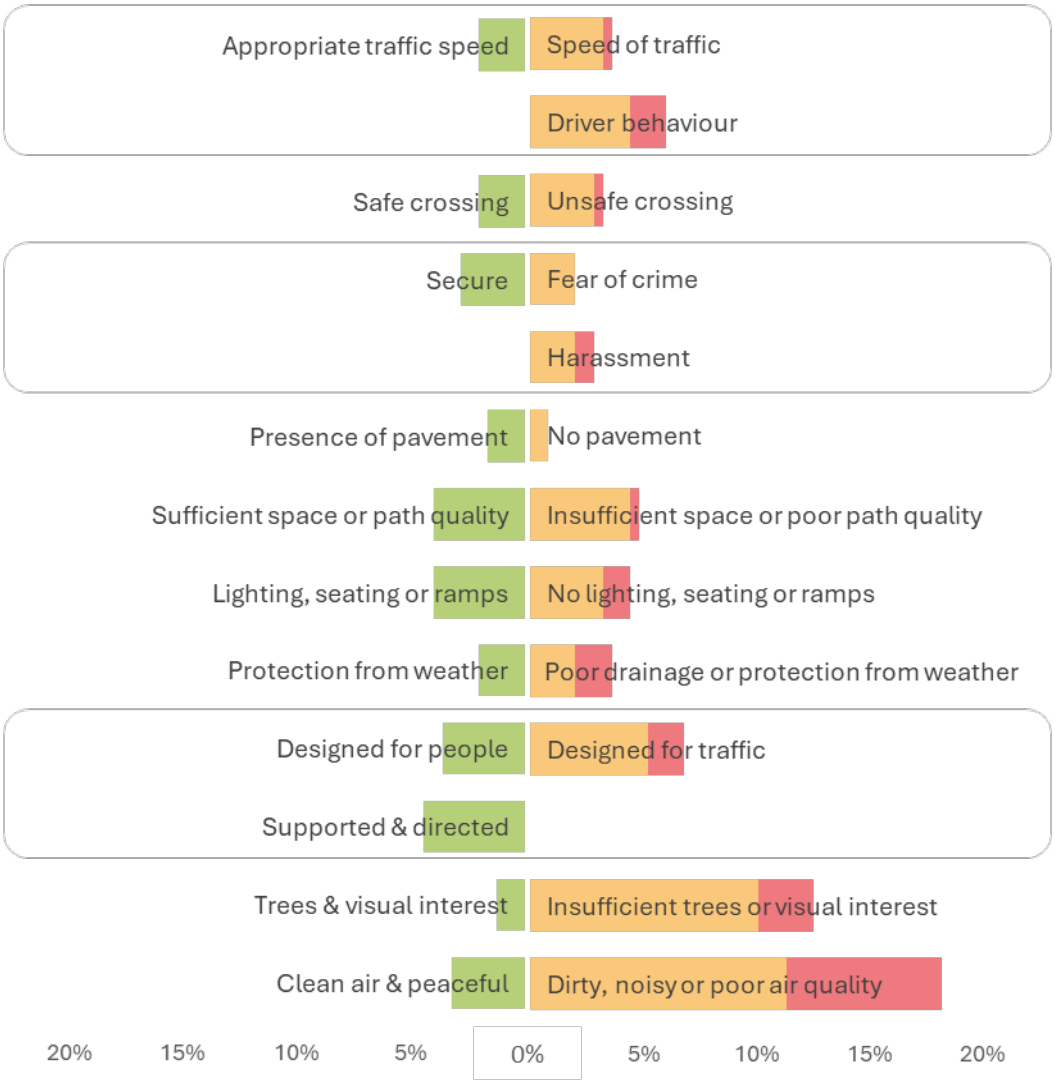


Figure 35. Opposing experiences and determinants at New Belgrade Train Station.

Observations on each environmental determinant by type of experience at New Belgrade Train Station.

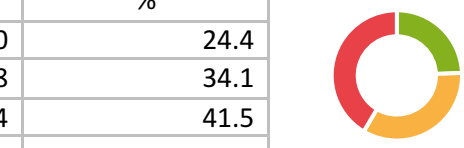
Experiences	Environmental determinants	N	%
Positive	Supported & directed	11	4.4
	Lighting, seating or ramps	10	4
	Designed for people	9	3.6
	Clean air & peaceful	8	3.2
	Secure	7	2.8
	Sufficient space	6	2.4
	Appropriate speed	5	2
	Protection from weather	5	2
	Safe crossing	5	2
	Path quality	4	1.6
	The path	4	1.6
	Trees & visual interest	3	1.2
Concerns	Dirty, noisy or poor air quality	28	11.3
	Insufficient trees or visual interest	25	10.1
	Designed for traffic not people	13	5.2
	Driver behaviour	11	4.4
	Insufficient space or poor path quality	11	4.4
	No lighting, seating or ramps	8	3.2
	Speed of traffic	8	3.2
	Unsafe crossing	7	2.8
	Fear of crime	5	2
	Harassment	5	2
	Poor drainage or protection from weather	5	2
	No path	2	0.8
Negative	Dirty, noisy or poor air quality	17	6.9
	Insufficient trees or visual interest	6	2.4
	Designed for traffic not people	4	1.6
	Driver behaviour	4	1.6
	Poor drainage or protection from weather	4	1.6
	No lighting, seating or ramps	3	1.2
	Harassment	2	0.8
	Insufficient space or poor path quality	1	0.4
	Speed of traffic	1	0.4
	Unsafe crossing	1	0.4
	Fear of crime	0	0
	No path	0	0
	TOTAL	248	100

Figure 36. Summary of observations at New Belgrade Train Station.

3.7. Mostar Tram Station

At Mostar Tram Stop, most walking experiences were negative (41.5%), related to 'Dirty, noisy or poor air quality' (10.5%), `Unsafe crossing' (7.2%) and 'Harassment` (6.5%). Followed by concerns (34.1%) related to 'Dirty, noisy or poor air quality' (9%), 'Unsafe crossing' (6.9%) and 'Designed for traffic' (3.2%). Finally, positive experiences (24.4%), related to 'Secure' (3.2%), 'Presence of path' (2.9%) and 'Designed for people' (1.8%).

Experience	N	%
Positive	20	24.4
Concern	28	34.1
Negative	34	41.5
Total	82	100



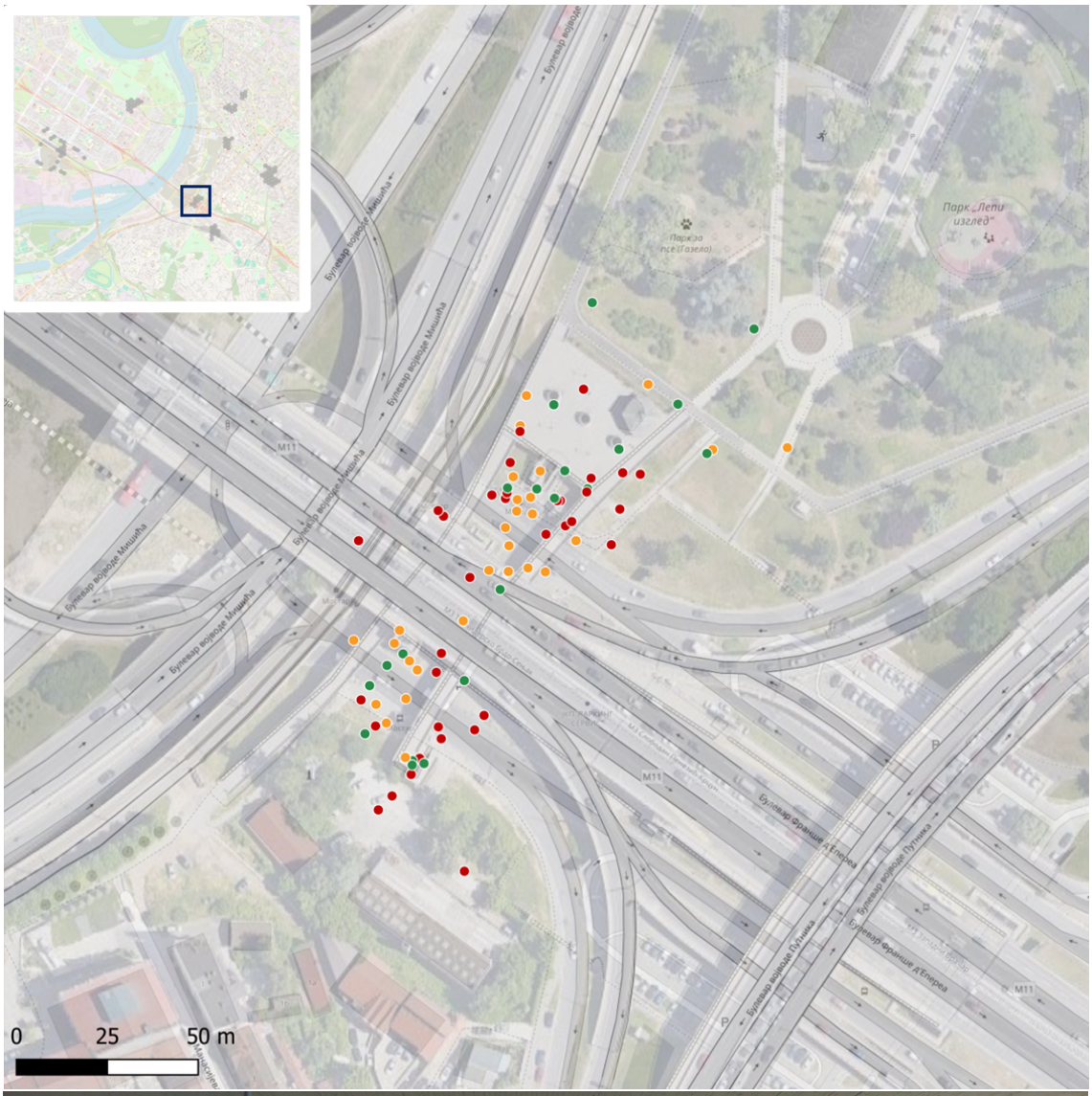


Figure 37. Observations at Mostar Tram Station.

Summary of walking experiences and related environmental determinants at Mostar Tram Station.

<table>
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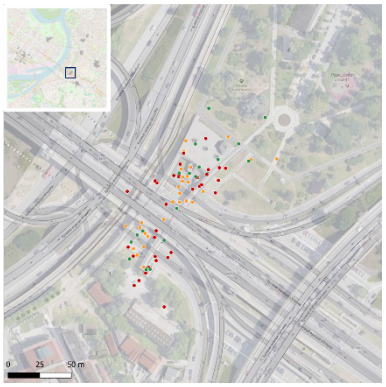
<tr><td>  </td><td> 
Positive experience
Concern
Negative experience

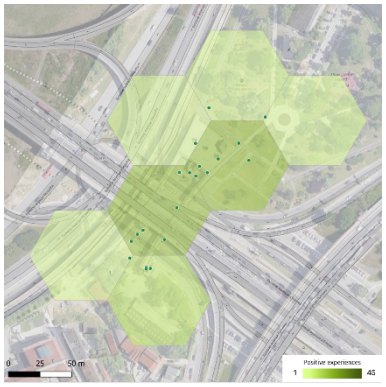
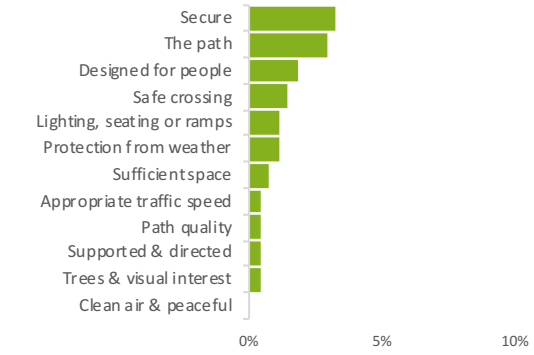
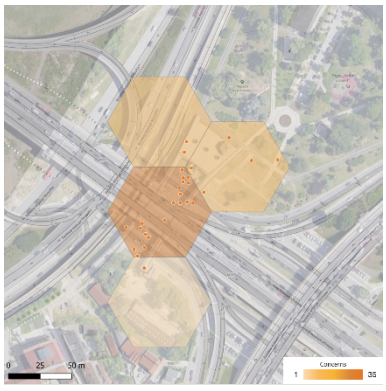
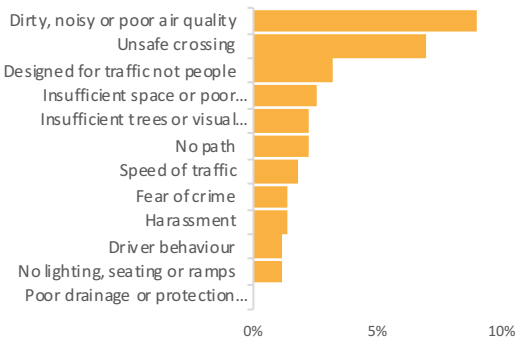
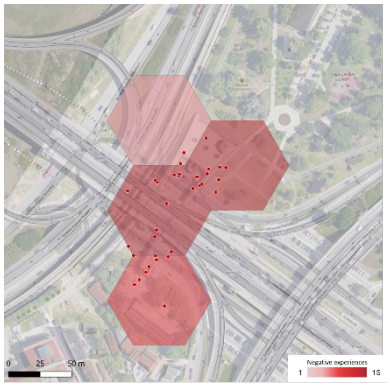
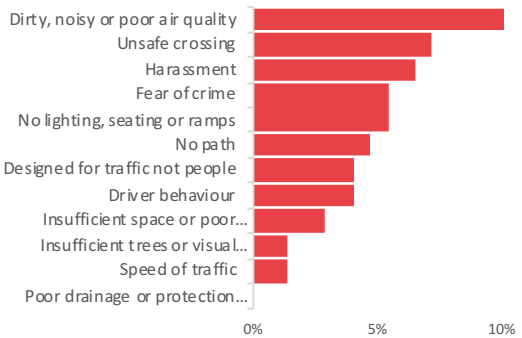
82 Participants
82 Experiences
277 Environmental determinants
Data collection period: 05/03/2024 – 12/03/2024
Location: 44.798736, 20.448917</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>  </td><td>  </td></tr>
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Figure 38. Most relevant determinants by type of experience at Mostar Tram Station.

Relationships between opposing environmental determinants and different walking experiences at Mostar Tram Station.

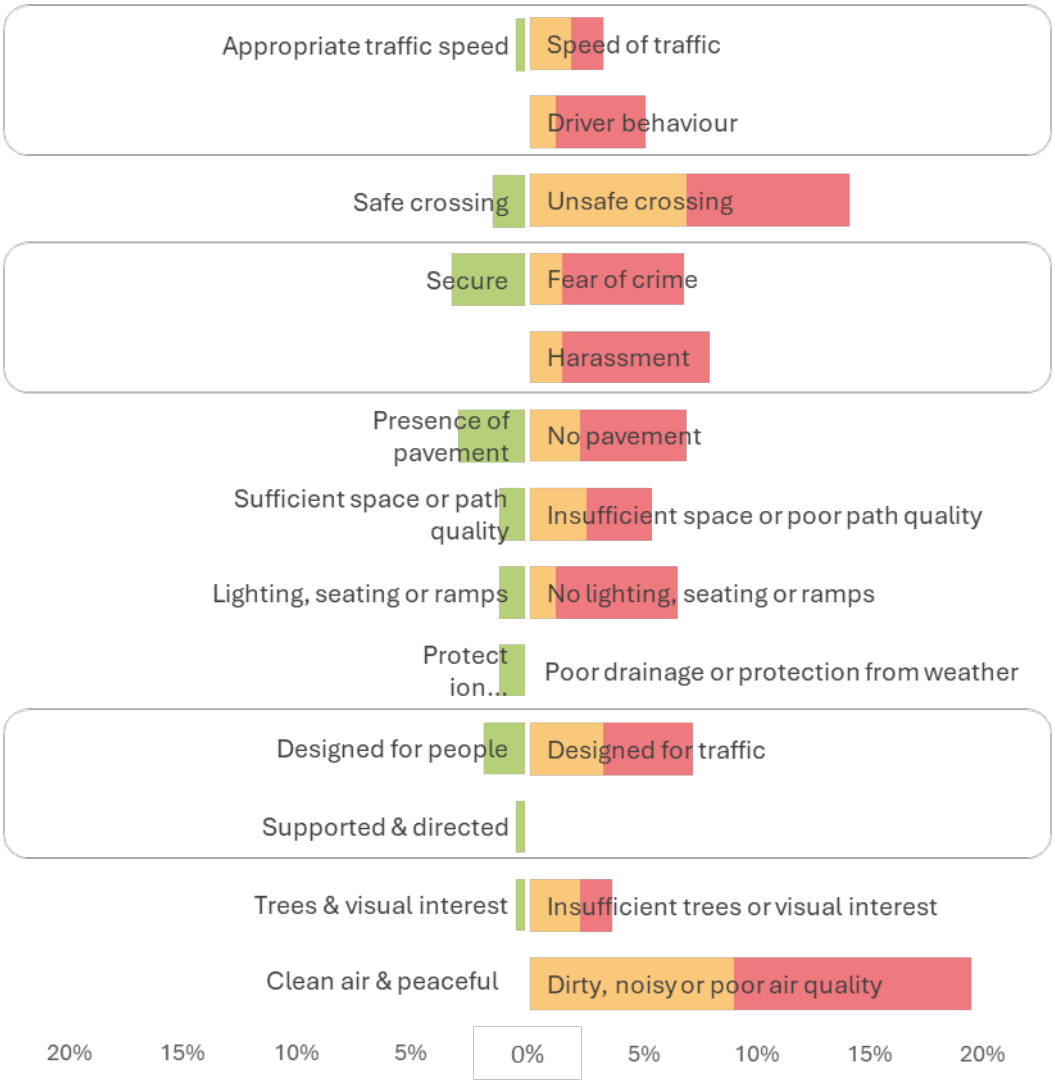


Figure 39. Opposing experiences and determinants at Mostar Tram Station.

Observations on each environmental determinant by type of experience at Mostar Tram Station.

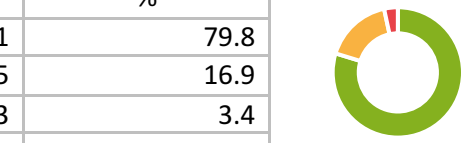
Experiences	Environmental determinants	N	%
Positive	Secure	9	3.2
	The path	8	2.9
	Designed for people	5	1.8
	Safe crossing	4	1.4
	Lighting, seating or ramps	3	1.1
	Protection from weather	3	1.1
	Sufficient space	2	0.7
	Appropriate speed	1	0.4
	Path quality	1	0.4
	Supported & directed	1	0.4
	Trees & visual interest	1	0.4
	Clean air & peaceful	0	0
Concerns	Dirty, noisy or poor air quality	25	9
	Unsafe crossing	19	6.9
	Designed for traffic not people	9	3.2
	Insufficient space or poor path quality	7	2.5
	Insufficient trees or visual interest	6	2.2
	No path	6	2.2
	Speed of traffic	5	1.8
	Fear of crime	4	1.4
	Harassment	4	1.4
	Driver behaviour	3	1.1
	No lighting, seating or ramps	3	1.1
	Poor drainage or protection from weather	0	0
Negative	Dirty, noisy or poor air quality	29	10.5
	Unsafe crossing	20	7.2
	Harassment	18	6.5
	Fear of crime	15	5.4
	No lighting, seating or ramps	15	5.4
	No path	13	4.7
	Designed for traffic not people	11	4
	Driver behaviour	11	4
	Insufficient space or poor path quality	8	2.9
	Insufficient trees or visual interest	4	1.4
	Speed of traffic	4	1.4
	Poor drainage or protection from weather	0	0
	TOTAL	277	100

Figure 40. Summary of observations at Mostar Tram Station.

3.8. Railway Station Belgrade Centar

At Railway Station Belgrade Centar, most walking experiences were positive (79.8%), related to 'Secure' (13.1%), `Sufficient space' (11.5%) and 'Lighting, seating or ramps` (11%). Followed by concerns (16.9%) related to 'Fear of crime' (0.3%), 'Harassment' (1.6%) and 'Insufficient trees or visual interest' (1.3%). Finally, negative experiences (3.4%), related to 'Unsafe crossing' (0.5%), 'Designed for traffic' (0.3%) and 'Driver behaviour' (0.3%).

Experience	N	%
Positive	71	79.8
Concern	15	16.9
Negative	3	3.4
Total	89	100



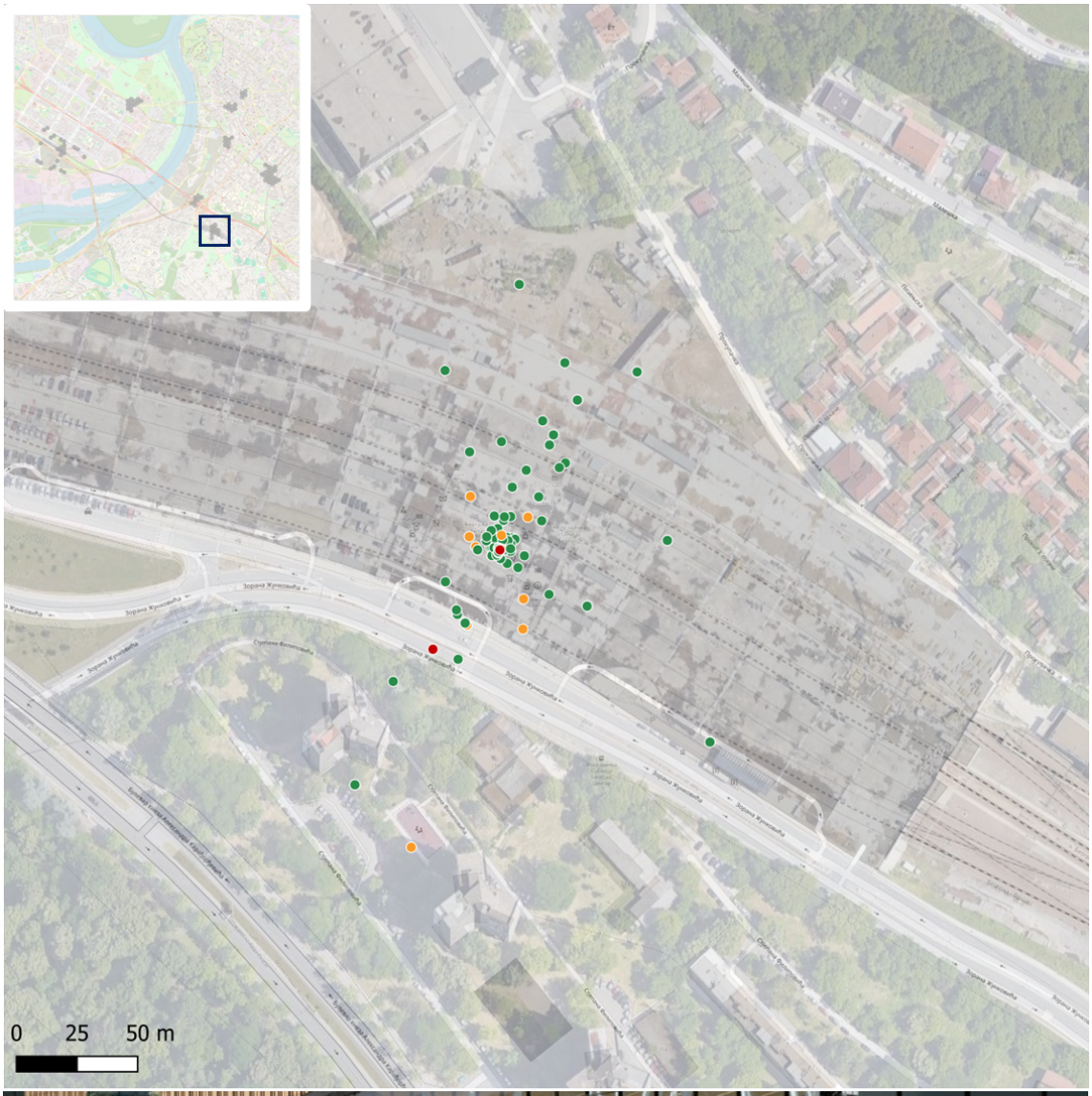
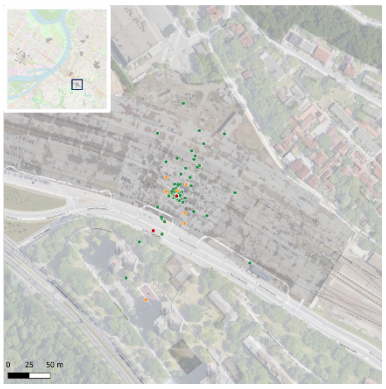
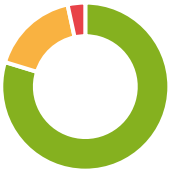
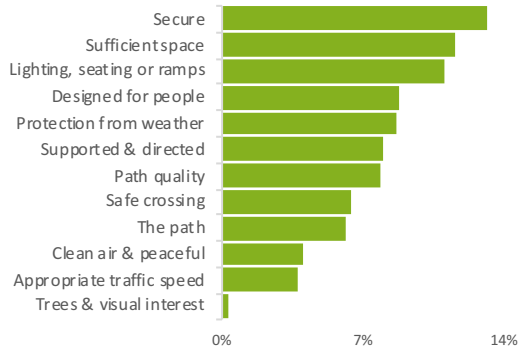


Figure 41. Observations at Railway Station Belgrade Centar.

Summary of walking experiences and related environmental determinants at Railway Station Belgrade Centar

<table>
<tr><th colspan="2">Railway Station Belgrade Centar</th></tr>
<tr><td>  </td><td> 

88 Participants
90 Experiences
374 Environmental determinants
Data collection period: 06/03/2024 – 13/03/2024
Location: 44.793311, 20.452829</td></tr>
<tr><td>  </td><td> 
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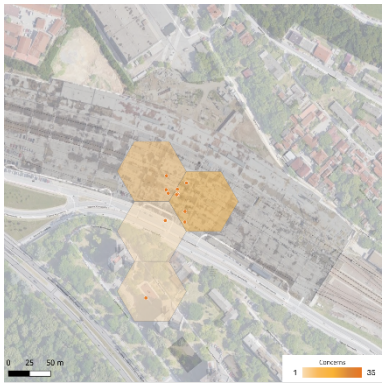
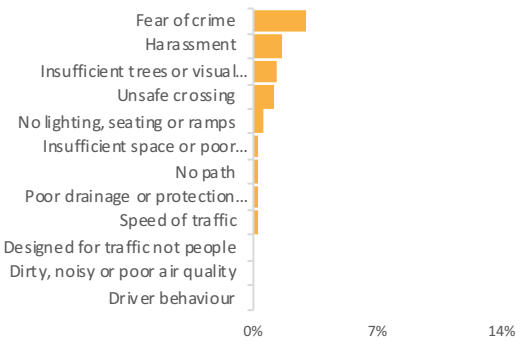
<tr><td>  </td><td> 
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Figure 42. Most relevant determinants by type of experience at Railway Station Belgrade Centar.

Relationships between opposing environmental determinants and different walking experiences at Railway Station Belgrade Centar.

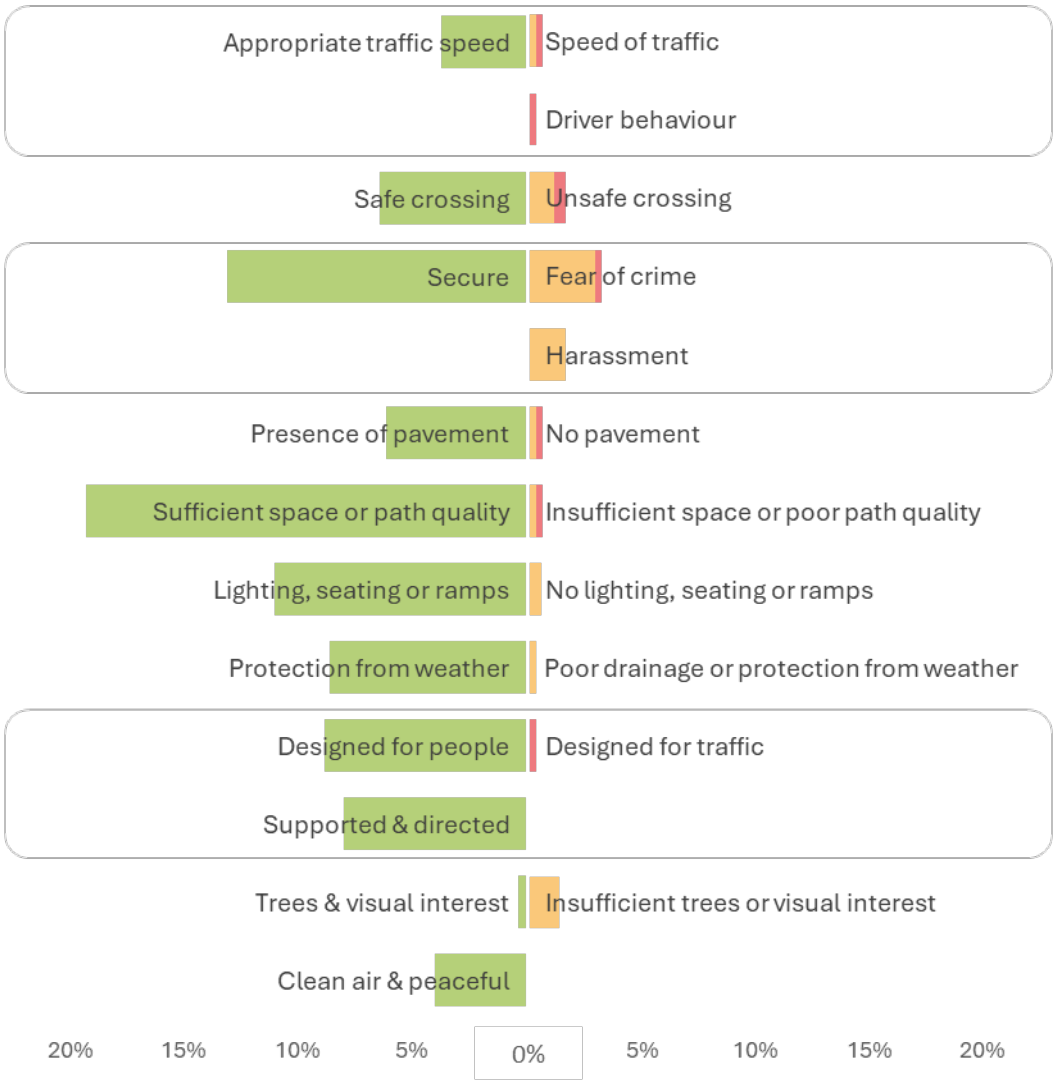


Figure 43. Opposing experiences and determinants at Railway Station Belgrade Centar.

Observations on each environmental determinant by type of experience at Railway Station Belgrade Centar.

Experiences	Environmental determinants	N	%
Positive	Secure	49	13.1
	Sufficient space	43	11.5
	Lighting, seating or ramps	41	11
	Designed for people	33	8.8
	Protection from weather	32	8.6
	Supported & directed	30	8
	Path quality	29	7.8
	Safe crossing	24	6.4
	The path	23	6.1
	Clean air & peaceful	15	4
	Appropriate speed	14	3.7
	Trees & visual interest	1	0.3
Concerns	Fear of crime	11	2.9
	Harassment	6	1.6
	Insufficient trees or visual interest	5	1.3
	Unsafe crossing	4	1.1
	No lighting, seating or ramps	2	0.5
	Insufficient space or poor path quality	1	0.3
	No path	1	0.3
	Poor drainage or protection from weather	1	0.3
	Speed of traffic	1	0.3
	Designed for traffic not people	0	0
	Dirty, noisy or poor air quality	0	0
	Driver behaviour	0	0
Negative	Unsafe crossing	2	0.5
	Designed for traffic not people	1	0.3
	Driver behaviour	1	0.3
	Fear of crime	1	0.3
	Insufficient space or poor path quality	1	0.3
	No path	1	0.3
	Speed of traffic	1	0.3
	Dirty, noisy or poor air quality	0	0
	Harassment	0	0
	Insufficient trees or visual interest	0	0
	No lighting, seating or ramps	2	0.5
	Poor drainage or protection from weather	0	0
	TOTAL	374	100

Figure 44. Summary of observations at Railway Station Belgrade Centar.

4. Walking environmental determinants in Belgrade, by study area

4.1. Personal security

Personal security was the most frequent determinant (11.2%) related to walking experiences in Belgrade, with 6.4% related to positive experiences. However, 2.9% were related to concerns and 1.9% to negative experiences due to fear of crime. By study area, there were six areas with more positive experiences: Republic Square (18.8%), Belgrade Centar (13.1%), Old Station (6.8%), Usce (5.3%), Slavia Square (5.1%) and New Station (2.8%). There was one area with more concerns: Zeleni Venac (7.4%) and one are with more negative experiences: Mostar (5.4%).

Places to learn from	Republic Square (18.8%), Belgrade Centar (13.1%), Old Station (6.8%), Usce (5.3%), Slavia Square (5.1%) and New Station.
Places to improve	Mostar and Zeleni Venac.

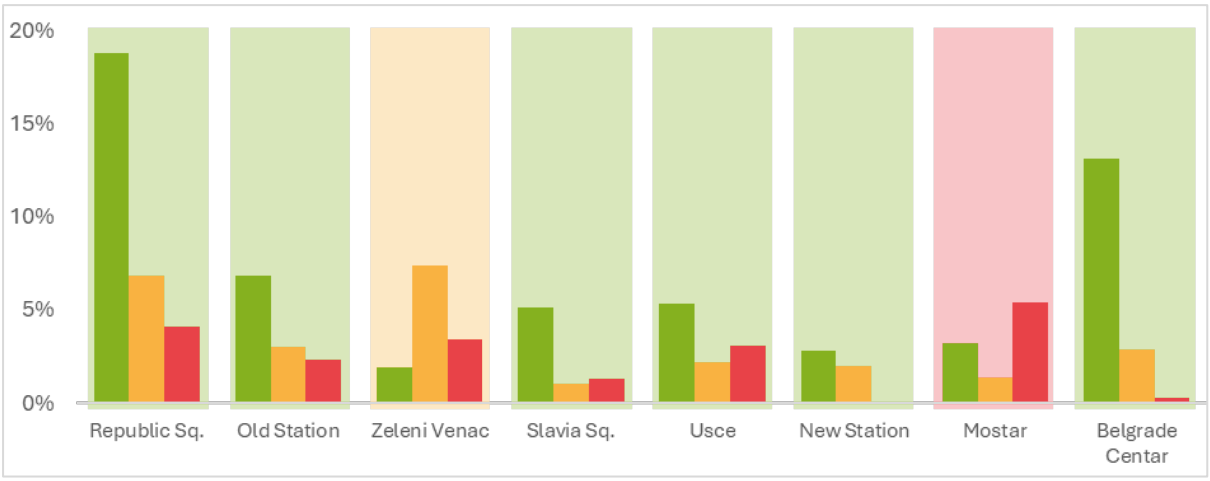


Figure 45. Experiences related to personal security by study areas.

4.2. Trees and visual interest

Trees and visual interest were the second most frequent determinant (11.1%) related to walking experiences in Belgrade, with 5.5% related to concerns and 2.1% to negative experiences due to lack of greenery or poor visual interest. On the other hand, 3.5% were related to positive experiences thanks to presence of greenery and visual interest. By study area, there were two areas with more positive experiences: Old station (12%) and Usce (7.1%). However, there were six areas with more concerns: Republic Square (19.8%), New Station (10.1%), Zeleni Venac (9%), Slavia Square (7.1%), Mostar (2%) and Belgrade Centar (1.3%).

Places to learn from	Old station and Usce.
Places to improve	Republic Square, New Station, Zeleni Venac, Slavia Square, Mostar and Belgrade Centar.

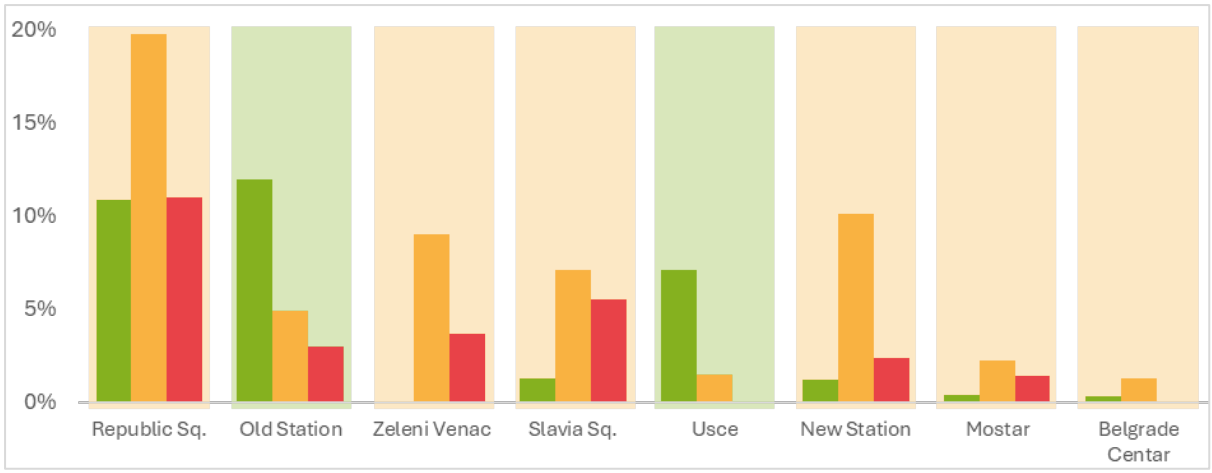


Figure 46. Experiences related to trees and visual interest by study areas.

4.3. Environmental quality

Environmental quality was the third most frequent determinant (11%) related to walking experiences in Belgrade, with 5.2% related to concerns and 3.1% related to negative experiences due to environments perceived as dirty, noisy or with poor air quality. On the other hand, 2.7% were related to positive experiences due to clean and peaceful environments. By study area, there were two areas with more positive experiences: Republic square (16.8%) and Belgrade Centar (4%). However, there were five areas with more concerns: Slavia Square (12.2%), New station (11.3%), Usce (6.5%), Old Station (4.5%) and Zeleni Venac (1.9%). Finally, there was one area with more negative experiences: Mostar (10.5%).

Places to learn from	Republic square and Belgrade Centar.
Places to improve	Mostar, Slavia Square, New station, Usce, Old Station and Zeleni Venac.

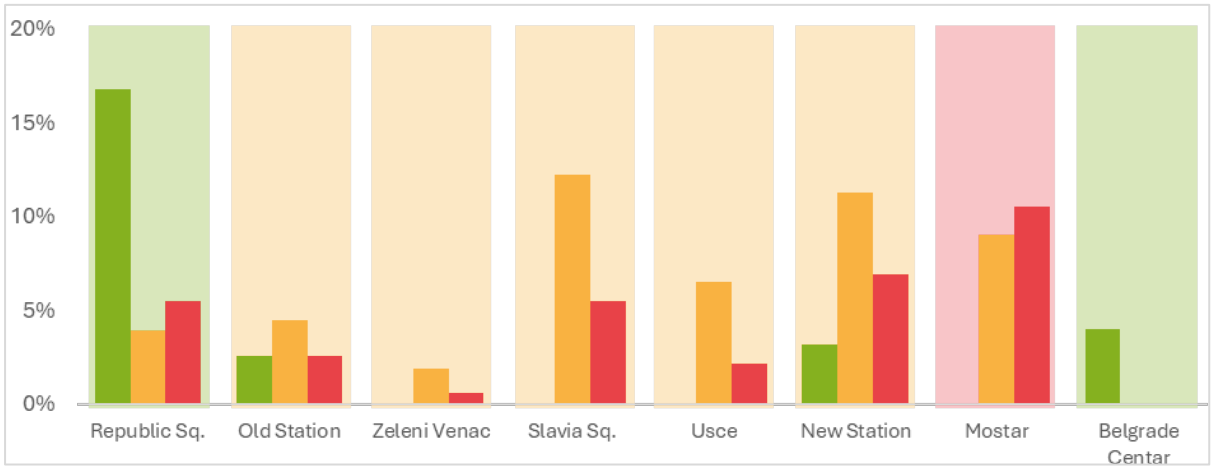


Figure 47. Experiences related to environmental quality by study areas.

4.4. Path space and quality

Path space and quality was the fourth most frequent determinant (10%) related to walking experiences in Belgrade, with 6.4% related to positive experiences. However, 2.4% were related to concerns and 1.2% to negative experiences due to insufficient space or poor path quality. By study area, four areas had more positive experiences: Belgrade Centar (19.3%), Usce (9.9%), Old Station (9.8%) and Slavia Square (4.5%). However, there were two areas with more concerns: Zeleni Venac (8.3%) and New Station (4.4%). As well as two areas with more negative experiences: Republic Square (8.2%) and Mostar (2.9%).

Places to learn from	Belgrade Centar, Usce, Old Station and Slavia Square.
Places to improve	Republic Square, Mostar, Zeleni Venac and New Station.

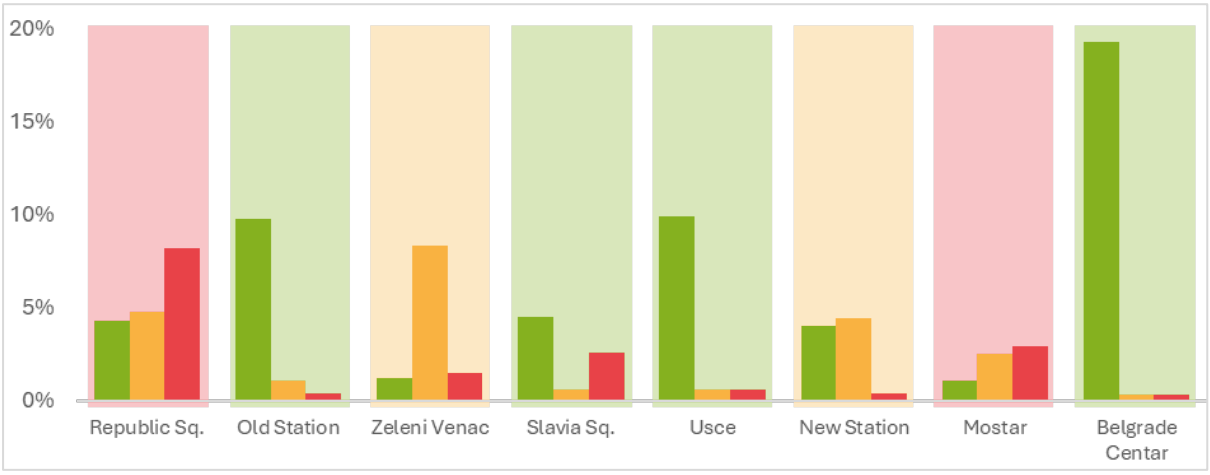


Figure 48. Experiences related to path space and quality by study areas.

4.5. Pedestrian crossings

Pedestrian crossings were the fifth more frequent determinant (9.7%) related to walking experiences in Belgrade, with 3.8% related to negative experiences and 2.3€ to concerns due to unsafe crossings. On the other hand, 3.6% were related to positive experiences thanks to safe crossings. By study area, there were four areas with more concerns: Slavia Square (8.4%), Zeleni Venac (7.1%), Usce (3.1%) and New Station (2.8%). There was one area with more negative experiences: Mostar (7.2%). Finally, there were three areas with more positive experiences: Old Station (10.2%), Republic Square (7.4%) and Belgrade Centar (6.4%).

Places to learn from	Old Station, Republic Square and Belgrade Centar.
Places to improve	Mostar, Slavia Square, Zeleni Venac, Usce and New Station.

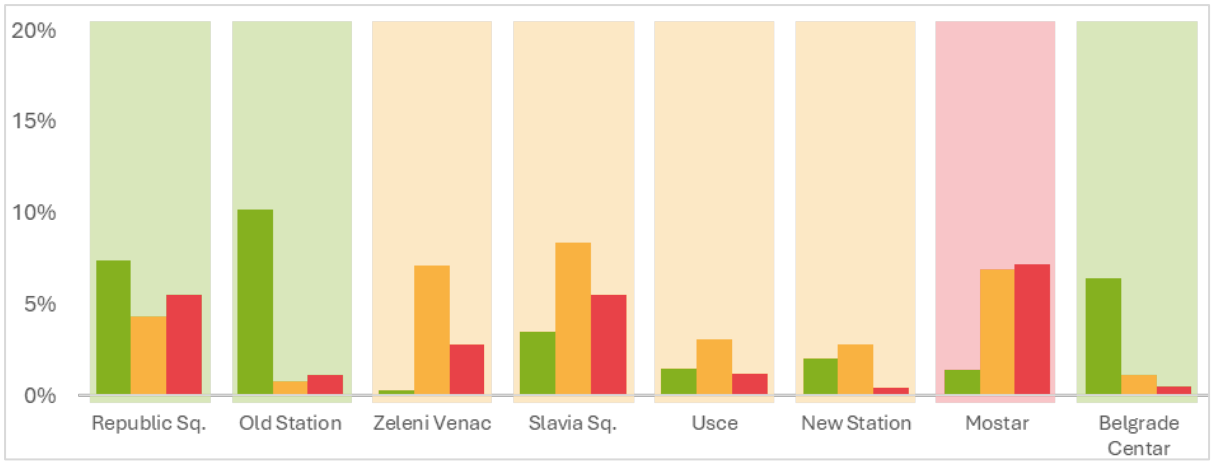


Figure 49. Experiences related to pedestrian crossings by study areas.

4.6. Pedestrian or car-oriented street design

Street design was the sixth most frequent determinant (9.4%) related to walking experiences in Belgrade, with 4.3% related to positive experiences thanks to pedestrian oriented design. However, 2.9% were related to concerns and 2.2% to negative experiences due to car-oriented street design. By study area, there were three areas with more positive experiences: Belgrade Centar (8.8%), Old Station (6.8%) and Usce (5.9%). However, there were three areas with more negative experiences: Republic Square (16.4%), Slavia Square (4.8%) and Mostar (4%). Finally, there were two areas with more concerns: Zeleni Venac (5.6%) and New Station (5.2%).

Places to learn from	Belgrade Centar, Old Station and Usce.
Places to improve	Republic Square, Slavia Square, Mostar, Zeleni Venac and New Station.

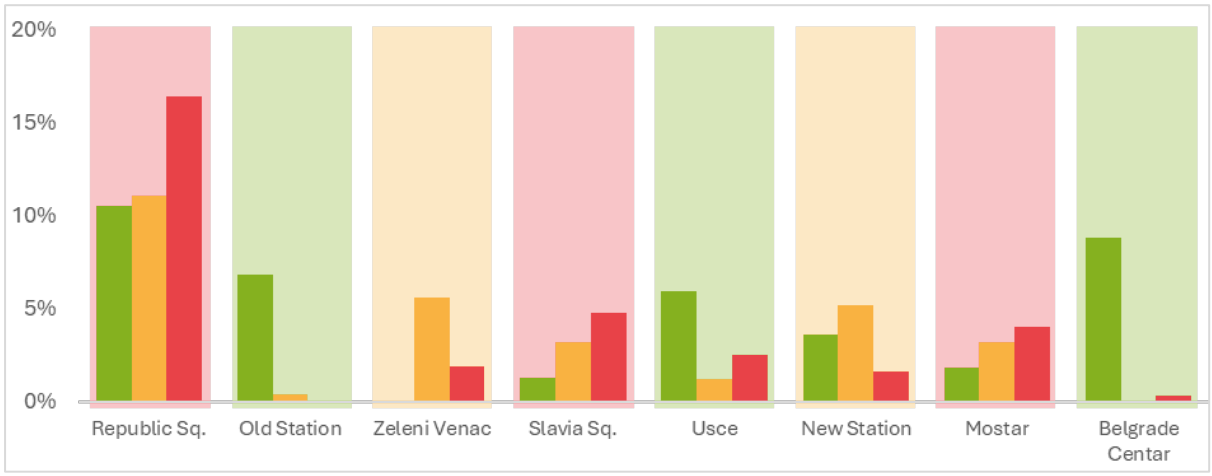


Figure 50. Experiences related to street design by study areas.

4.7. Lighting, seating or ramps

Lighting, seating or ramps were the seventh most frequent determinants (8.6%) related to walking experience in Belgrade, with 5.1% related to positive experiences. However, 2.3% were related to concerns and 1.2€ to negative experiences due to lack of lighting, seating or ramps. By study area, there were five areas with more positive experiences: Belgrade Centar (11%), Usce (9.3%), Old Station (4.5%), New Station (4%) and Slavia Square (2.6%). However, there were two areas with more concerns: Republic Square (15.5%) and Zeleni Venac (3.4%). Finally, there was one area with more negative experiences: Mostar (5.4%).

Places to learn from	Belgrade Centar, Usce, Old Station, New Station and Slavia Square.
Places to improve	Mostar, Republic Square and Zeleni Venac.

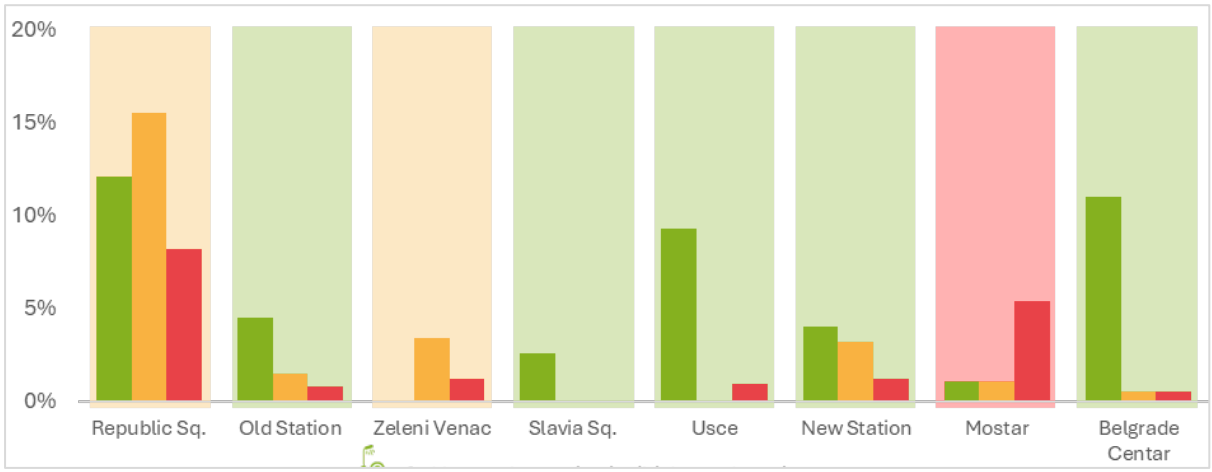


Figure 51. Experiences related to lighting, seating or ramps by study areas.

4.8. Traffic speed

Traffic speed was the eighth most frequent determinant (7%) related to walking experience in Belgrade, with 3.5% related to concerns and 1.9% to negative experience due to fast traffic. On the other hand, 1.6% were related to positive experiences thanks to appropriate traffic speed. By study area, there were seven areas with more concerns: Usce (6.2%), Republic Square (4.9%), Slavia Square (4.5%), Zeleni Venac (4.3%), New Station (3.2%), Old Station (2.3%) and Mostar (1.8%). Finally, there was one area with more positive experiences: Belgrade Centar (3.7%).

Places to learn from	Belgrade Centar
Places to improve	Usce, Republic Square, Slavia Square, Zeleni Venac, New Station, Old Station and Mostar.

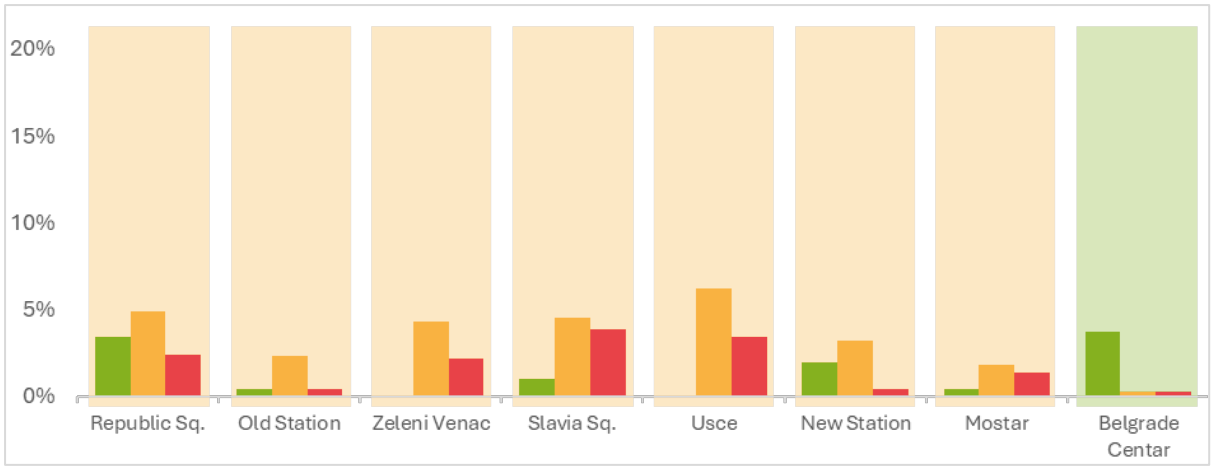


Figure 52. Experiences related to traffic speed by study areas.

4.9. Presence or absence of footpath

The presence or absence of footpath was the ninth most frequent determinant (6.6%) related to walking experiences in Belgrade, with 3.6% related to positive experiences. However, 1.9% were related to concerns and 1.1% to negative experiences due to lack of continuous footpath. By study area, there were six areas with more positive experiences: Republic Square (9%), Belgrade Centar (6.1%), Usce (4.6%), Slavia Square (3.5%), Old Station (3.8%) and New Station (1.6%). However, there was one are with more concerns: Zeleni Venac (10.5%) and another with more negative experiences: Mostar (4.7%).

Places to learn from	Republic Square, Belgrade Centar, Usce, Slavia Square, Old Station and New Station.
Places to improve	Mostar and Zeleni Venac.

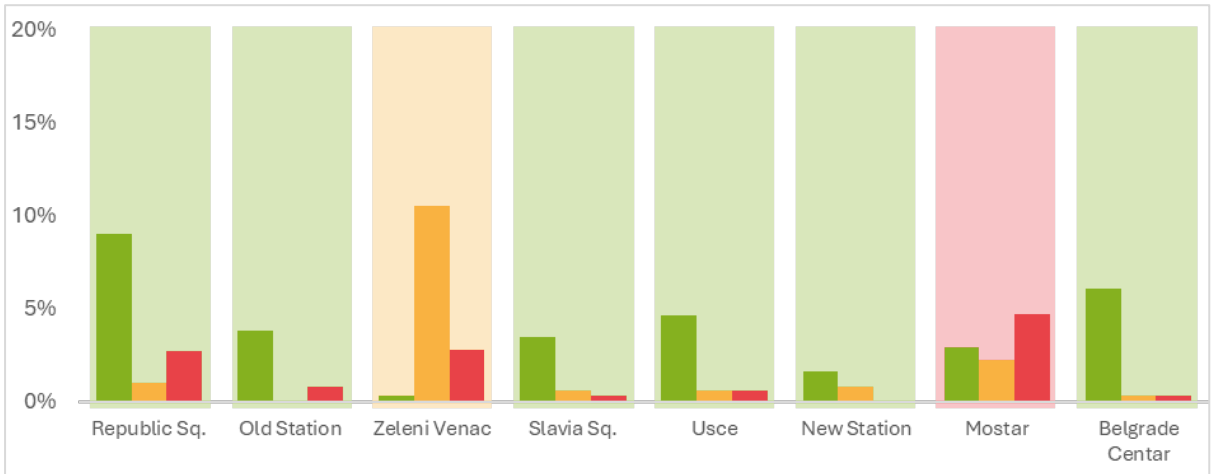


Figure 53. Experiences related to absence or presence of footpath by study areas.

4.10. Driver behaviour

Driver behaviour was the tenth most frequent determinant (5.3%) related to walking experiences in Belgrade, with 3.2% related to concerns and 2.1 to negative experiences. By study area, there were five areas with more concerns: Zeleni Venac (5.9%), Slavia Square (5.1%), New Station (4.4%), Usce (3.4%) and Old Station (1.1%). Finally, there were three areas with more negative experiences: Republic Square (13.7%), Mostar (4%) and Belgrade Centar (0.3%).

Places to learn from	Belgrade Centar and Old Station.
Places to improve	Republic Square, Mostar, Zeleni Venac, Slavia Square, New Station and Usce.

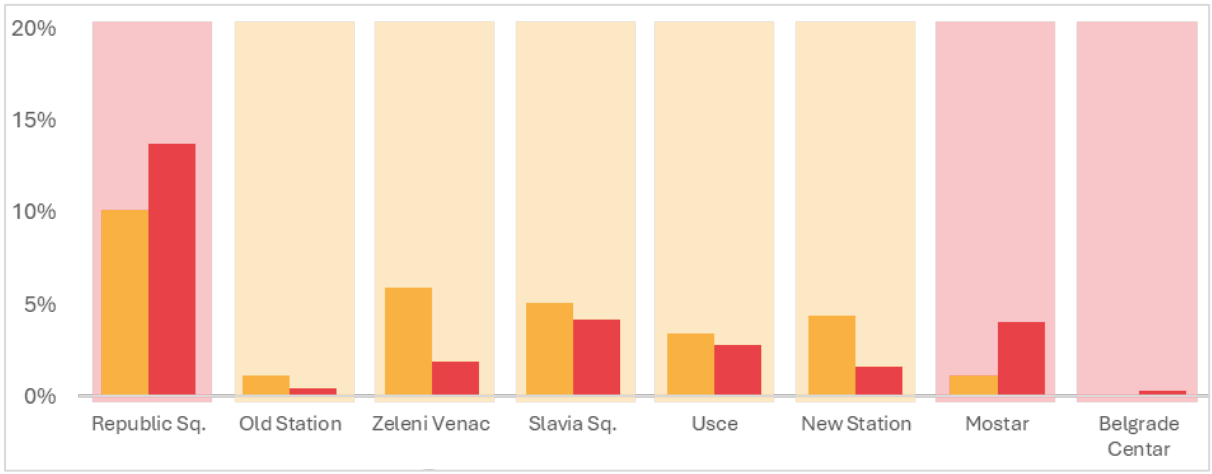


Figure 54. Experiences related to driver behaviour by study areas.

4.11. Protection from weather

Protection from weather was the eleventh most frequent determinant (4.2%) related to walking experience in Belgrade, with 1.8% related to positive experiences. However, 1.7% were related to concerns and 0.7% to negative experiences due to poor protection from weather. By study area, there were two areas with more positive experiences: Belgrade Centar (8.6%) and Mostar (1.1%). However, there were five areas with more concerns: Republic Square (6.3%), Usce (5%), New Station (2%), Zeleni Venac (1.9%), and Old Station (1.5%). Slavia Square did not have any observations related to protection from weather.

Places to learn from	Belgrade Centar and Mostar.
Places to improve	Republic Square, Usce, New Station, Zeleni Venac and Old Station.

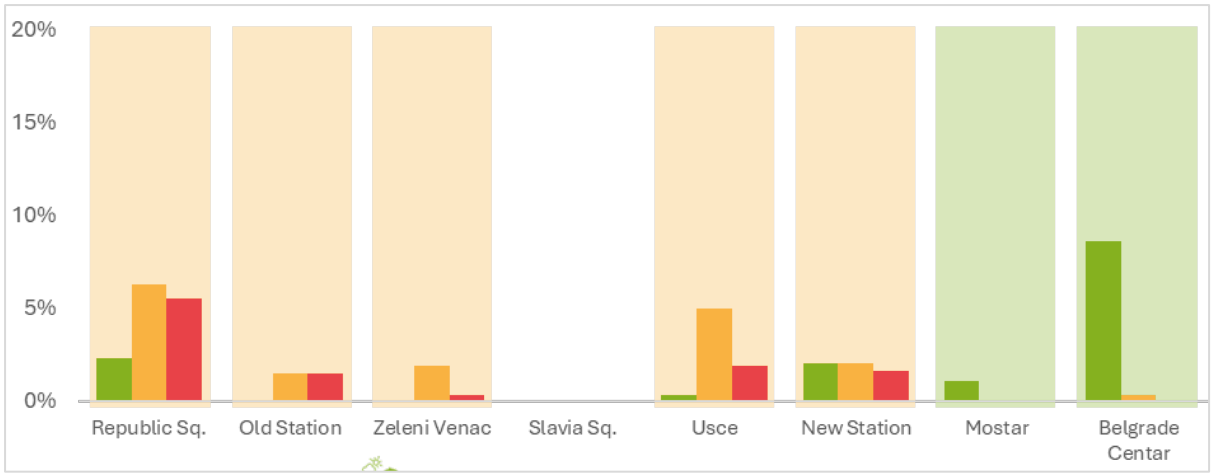


Figure 55. Experiences related to protection from weather by study areas.

4.12. Harassment

Harassment was the twelfth and least frequent determinant (3.2%)related to walking experiences in Belgrade, with 1.7% related to concerns and 1.5% to negative experiences. By study area, there were five areas with more concerns: Zeleni Venac (5.2%), Republic Square (3.9%), New Station (2%), Belgrade Centar (1.6%), Old Station (1.5%). Finally, there were two areas with more negative experiences: Mostar (6.5%) and Usce (1.9%). Slavia Square did not have any observation related to harassment.

Places to learn from	Slavia Square
Places to improve	Mostar, Usce, Zeleni Venac, Republic Square, New Station, Belgrade Centar and Old Station.

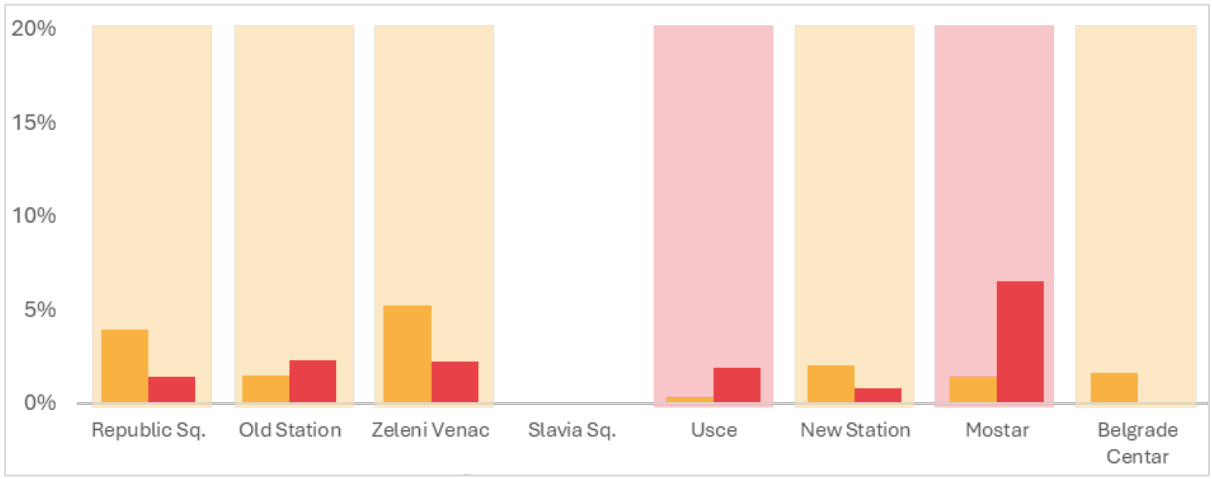


Figure 56. Experiences related to harassment by study areas.

5. Walking environmental determinants in Belgrade, by type of pedestrian.

This study found some differences in the way men and women experience the public space as pedestrians. Women shared slightly more concerns (42.3%) and negative experiences (22.6%) than men (41.3% and 14.5% respectively), especially related to traffic speed, crossing and harassment. While men shared more positive experiences (42.2%) than women (35.1%), specially related to personal security. By age, older people tend to share more concerns and negative experiences than the rest of age groups, but with no very significant difference. Regarding ability to move and interact with the environment, impaired pedestrians shared more negative experiences related to absence of footpath and no protection from weather, but also insufficient greenery and poor environmental quality. The following table shows the most frequent type of experience related to each environmental determinant by all variables considered in the pedestrian profile.

	Gender		Age				Ability		
	Men	Wo	Chil	Te	Adul	Olde	Able	Ass	Imp
Personal security									
Trees and visual interest									
Environmental quality									
Path space and quality									
Pedestrian crossing									
Street design									
Lighting, seating or ramps									
Traffic speed									
Presence or absence of footpath									
Driver behaviour									
Protection from weather									
Harassment									

Figure 57. Most frequent type of experience related to determinants by pedestrian profile.

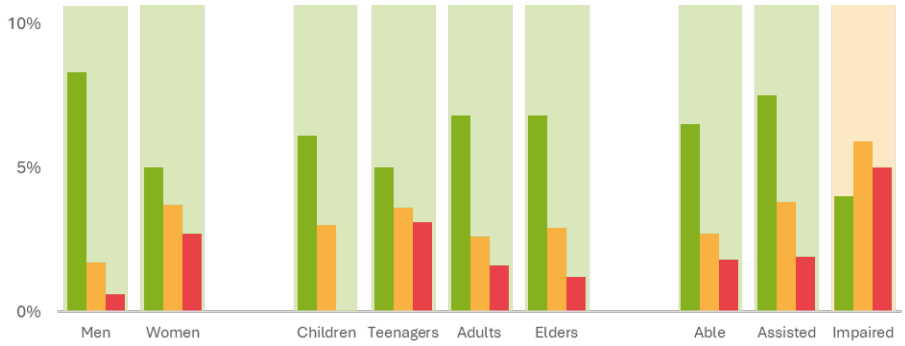
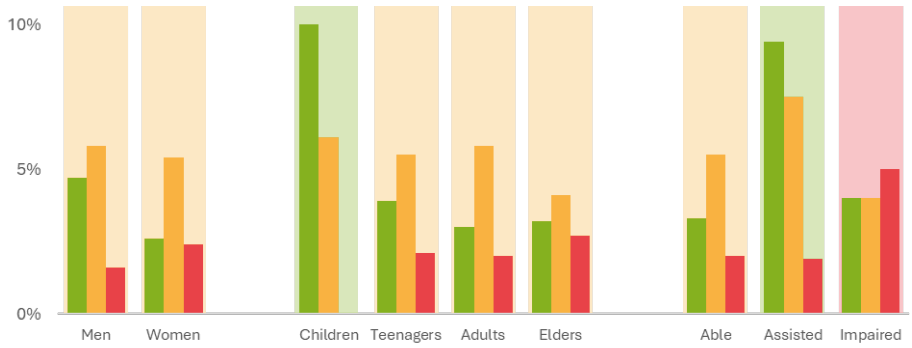
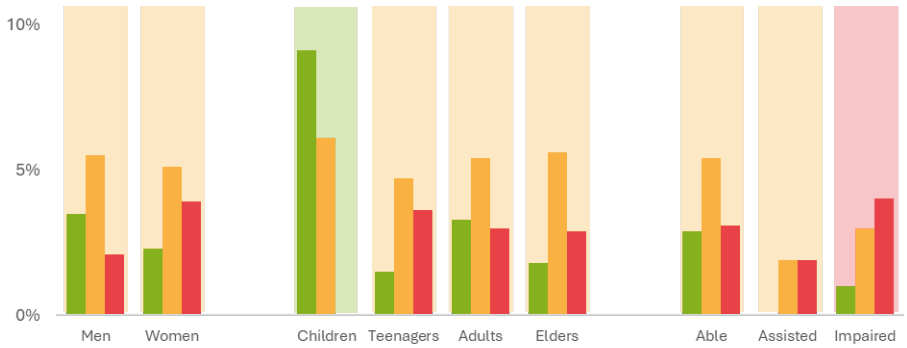
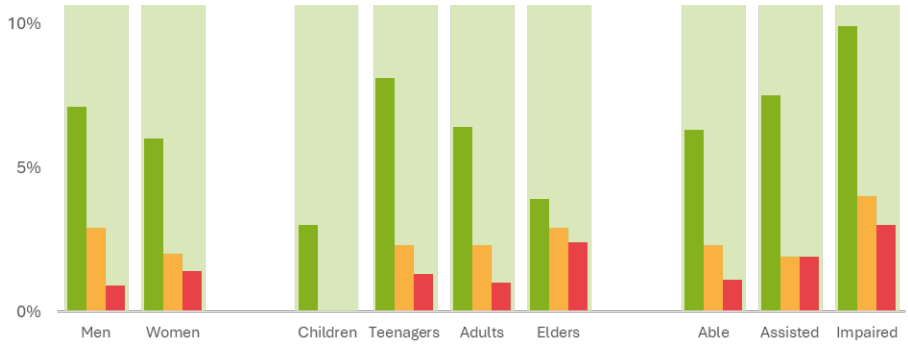
Determinant	Gender	Age	Ability
Personal seurity			
Trees and visual interest			
Environmental quality			
Path space and quality			

Figure 58. Most frequent type of experience related to determinants by pedestrian profile (1/3).

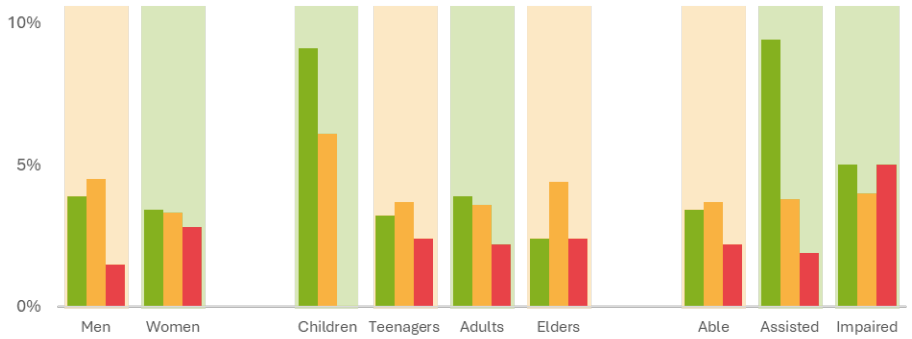
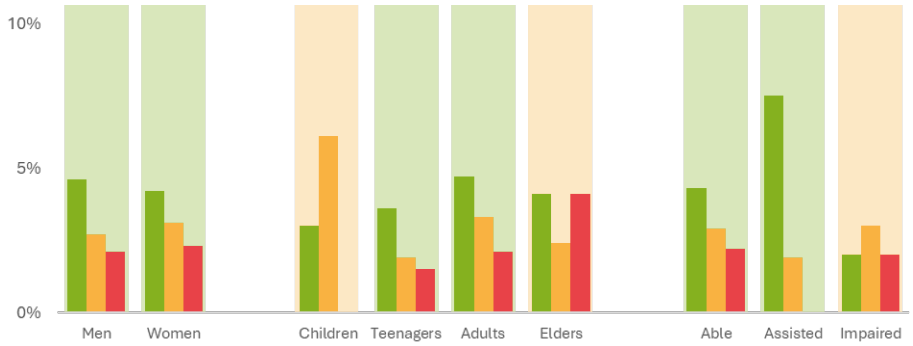
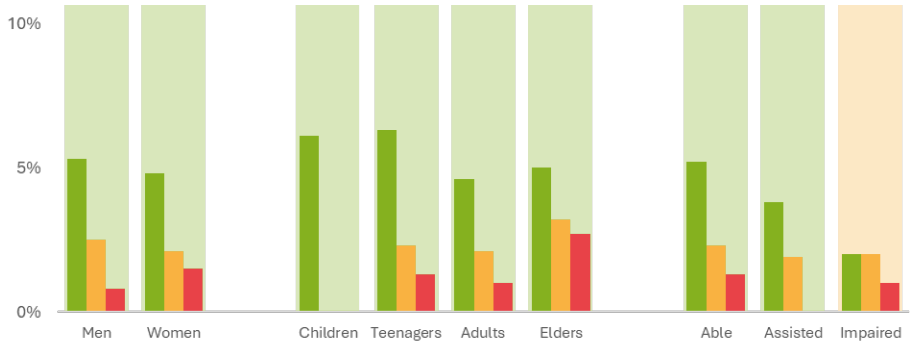
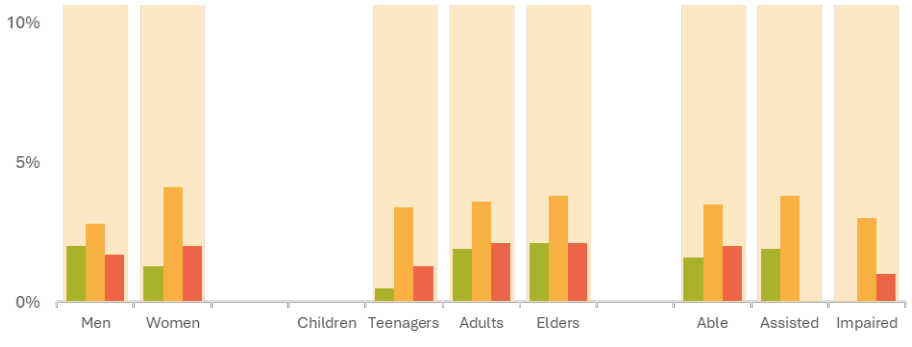
Determinant	Gender	Age	Ability
Pedestrian crossings			
Street design			
Lighting, seating or ramps			
Traffic speed			

Table 13. Most frequent type of experience related to determinants by pedestrian profile (2/3).

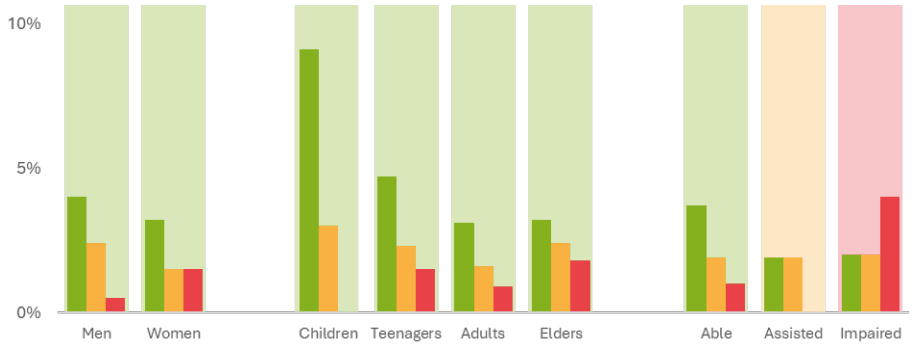
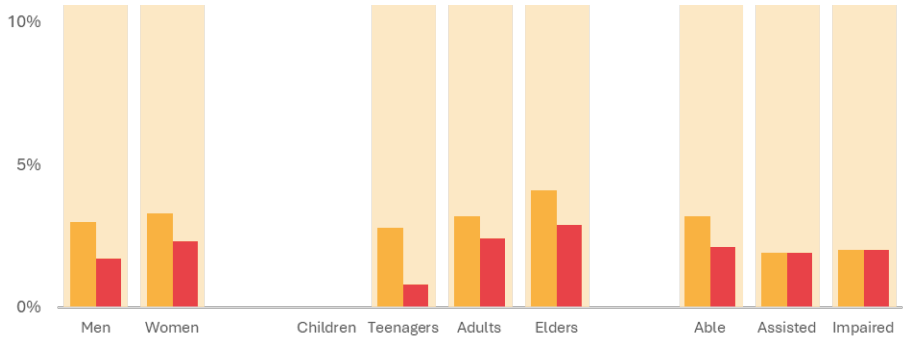
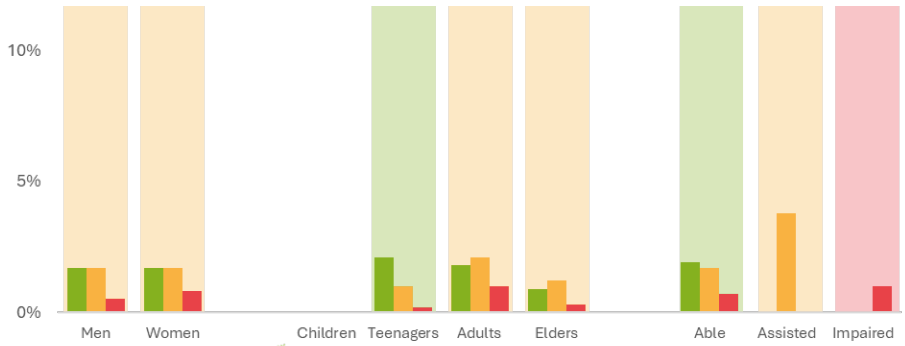
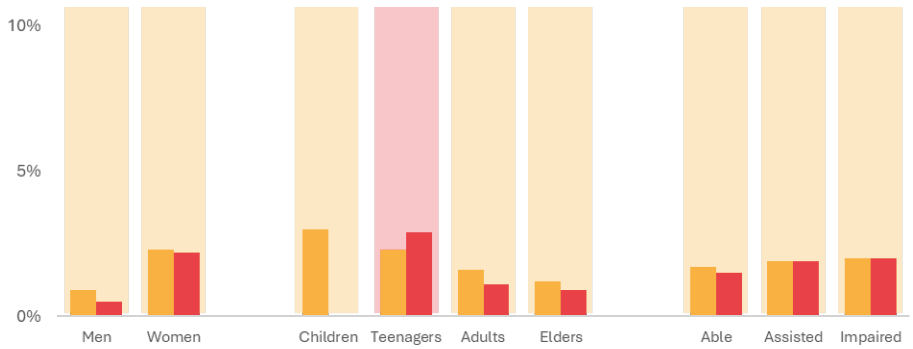
Determinant	Gender	Age	Ability
Presence or absence of footpath			
Driver behaviour			
Protection from weather			
Harassment			

Table 13. Most frequent type of experience related to determinants by pedestrian profile (3/3).

Appendix 1. Glossary of terms in the Walkability App

1.1 Pedestrian profile

1.1.1 **Gender:** Indicates the participant's gender

Man: The participant is a man.
Woman: The participant is a woman.
Other: The participant does not self-identify within the binary categories.

1.1.2 **Ability:** Indicates the degree of self-defined ability by the participant to walk and interact with the environment. Note that when we say ´walk' or 'walking' throughout the document we are including people who need additional support to 'walk' such as a frame or wheelchair.

Able: The participant can walk and fully interact with the environment.
Assisted: The participant needs assistance to walk and interact with the environment. Example: The participant walks with an assistive device, such as a wheelchair, crutches, a stick, cane or guide dog, or with the assistance of another person (carer).
Impaired: The participant cannot fully walk and interact with the environment. Example: The participant faces challenges or total inability to move, see, hear or interact with the environment for different reasons (mobility, visual, hearing or cognitive impairment).

1.1.3 **Age:** Indicates the participant´s age.

Child: Less than 12 years old.
Teenager: between 12 and 18 years old.
Adult: between 18 and 65 years old.
Elderly: More than 65 years old.

1.2 Walk context

1.2.1 **Decision:** Indicates whether the participant walks out of necessity or by choice.

Necessity: The participant walks because they do not have access to an effective viable alternative to reach their destination. Also known as "captive pedestrians", due to personal or service constraints (personal: economic status, ability, ownership etc.; service constraints: no public service, low frequency, low reliability etc.). Example: The participant walks because they do not own/cannot afford to buy a car or there is no accessible public transport that is affordable/reliable.

Choice: The participant walks out of choice. They could use private or public transport, but they choose to walk. Example: The participant chooses to walk as they consider it a better option compared to other means of transport (cheaper, more convenient, healthier, faster, more pleasant, more sustainable).

1.2.2 **Purpose:** Indicates whether the participant walks for transport or leisure.

Transport: The participant walks from one place to another (from A to B) to access a specific destination (within a specific time) Example: The participant walks to work or school, walks to a public transport stop or a shop.

Leisure: The main purpose of walking is not to access a specific destination but to walk as the main activity or together with other purposes, such as moderate physical activity or sociocultural activity.

Example: The participant walks to do exercise, talk or interact with others, do some sightseeing walking or window shopping.

1.2.3 **Group size:** Indicates the number of other pedestrians walking with the participant.

Alone: The participant walks on their own.
With a dependent: The participant walks with someone who needs their assistance to walk and interact with the environment. Example: Participants carrying babies in a stroller or elders on a wheelchair.
In a group: The participant walks with one or more companions.

1.2.4 **Familiarity:** Indicates the familiarity of the participant with the place.

Local: The participant is familiar with the place. They know the area where they are interviewed because they have been in the same place or area before. Example: They live, work or have walked and spent time in the area before.
Visitor: The participant is not familiar with the place. They have never been in the place or area before. Example: The participant has never walked in the area before or they do not live, work or have spent time in the area before.

1.2 Pedestrian experiences

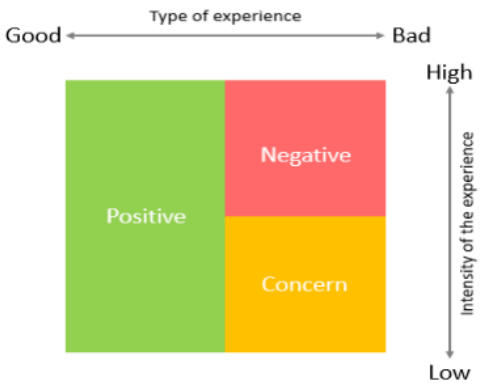
1.2.1. **Positive experiences** (green icon)

Positive pedestrian experiences while walking and interacting with the environment. The positive experiences may be related to the ease of walking in the area, as well as a positive personal sense of safety, comfort, pleasantness and vibrancy of the environment.

1.2.2. **Concerns** (amber icon)

Pedestrian concerns (mild negative experience) while walking and interacting with the environment. The concerns may be related to lack of ease of walking in the area, as well as a slightly negative personal sense of safety, comfort, pleasantness (and vibrancy) of the environment.

1.2.3. **Negative experiences** (red icon)
Negative pedestrian experiences while walking and interacting with the environment. The negative experiences may be related to high unease of walking in the area, as well as the negative personal sense of safety, comfort, pleasantness and vibrancy of the environment.



* Consideration between concerns and negative experiences: A concern does not warrant a change in behaviour but is noticeable as undesirable/annoying. However, a negative experience (i.e. problem) does warrant a change in behaviour due to the severity of the impact.

1.3 Environmental determinants

1.3.1. Linked to positive experiences

Appropriated (traffic) speed The traffic speed in the area is appropriate and not considered a threat or danger by pedestrians. Example: a street in which traffic moves slow enough so that pedestrians can make eye contact with the drivers.	
Clean and peaceful The area is not polluted with litter, odour, air or noise pollution. Example: a street with no litter, noise or air pollution.	
Designed for people The area is specially designed and managed to cater for pedestrian needs over any other means of transport or activity. Example: a pedestrianised area (street with no traffic).	
Lighting, seating or ramps The area is equipped with street furniture and infrastructure to cater for pedestrian accessibility, safety and comfort. Apart from lighting, seating and ramps, this category may include bins, public fountains and toilets, etc. (But participants/surveyors need to use the comments to add them or specify if the observation is only referring to lighting, seating or ramps in particular. Example: a street with streetlights and benches.	
Path quality The area has good quality pavements in terms of surface, width, design and maintenance. Example: a street with wide and flat pavements.	
Protection from weather The area is equipped with street furniture and infrastructure to protect pedestrians from harsh weather conditions, such as extreme heat and cold, rain, wind, humidity etc. Example: a street with shade and shelter (e.g. trees, buildings with arcades) and with storm drainage (e.g. rain sewer).	

Safe crossing

The area has a designated pedestrian crossing that provides an enhanced sense of safety to pedestrians from the risk of traffic.

Example: a street with signal crossing (zebra crossing) or light controlled junctions (traffic lights).

Secure

The area feels secure for personal security. This could be due to the presence of active surveillance (police, CCTV) or passive surveillance (other people in the street or buildings with open entrances), and the lack of threats to personal security, such as social misconduct, stray animals, etc.

Example: a street with other people showing friendly social interactions or non-dangerous/threatening behaviour.

Sufficient space

The area provides sufficient space for pedestrians, both with the presence of wide pavements and large pedestrianised areas, and with the absence of obstacles and barriers.

Example: a street with width and unobstructed pavements.

Supported and directed

The area provides infrastructure, urban and street design, and information to support pedestrian mobility.

Example: a street or area that supports walking directness (no need to take detours to reach a destination (e.g. bus stop) and it is easy to navigate on foot (e.g. there is wayfinding).

The path.

The area has dedicated space (a pavement/footpath/footway) for pedestrians.

Example: a street or areas with designated pavements for pedestrians.

Trees and visual interest

The area has trees or other types of greenery, as well as other elements that are considered of visual interest, such as buildings, landmarks and aesthetic scenery.

Example: a street with trees, a square with traditional architecture.

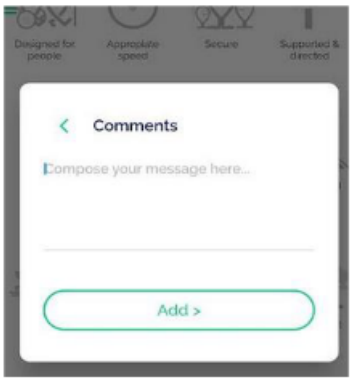
1.3.1. Linked to concerns and negative experiences.

Designed for traffic, not people The area is specially designed and managed to cater for the needs of motorised traffic at the expense of pedestrian accessibility, safety, and comfort. Example: a highway or street junction with no pavements or crossings. A large parking area with no pavements.	
Dirty, noisy or poor air quality The area is polluted with litter, odour, air or noise pollution. Example: a street with litter. A street with air and noise pollution from traffic.	
Driver (bad) behaviour The drivers of the area present bad driving behaviour that threatens or disrupts pedestrians, such as speeding, aggressive driving, disregard of traffic signs, invading the pavement (using the horn and shouting at pedestrians), etc. Example: a street where cars do not stop at pedestrian crossings or drive/park on the pavement.	
Fear of crime The area feels unsafe for personal security. This could be due to the absence of active surveillance (police, CCTV) or passive surveillance (other people in the street or buildings with open entrances), and the presence of threats to personal security, such as social misconduct, stray animals, etc. Example: A street with people presenting bad social behaviour (e.g. drinking alcohol or taking drugs, shouting or fighting). An empty street at night.	
Harassment Some people in the area present aggressive pressure or intimidation to pedestrians. This could also be unwanted Example: A street with people presenting bad social behaviour in which the participant feels they can be assaulted at any moment.	
Insufficient space or poor path quality The area has streets with insufficient space for pedestrian (safe and comfortable) mobility and their use of public space. This could be due to narrow pavements or due to the presence or obstacles and barriers, such as vehicles parked on the pavement, misplaced infrastructure and street furniture, vendors and other activities taking place on the pavement, crowded pavements (too many pedestrians). Path quality also refers to the quality of the pavement in terms of width, surface, design and maintenance.	

Example (insufficient space): An area with cars on the pavement, street vendors occupying all the pavement, crowded streets where all the pedestrians do not fit on the pavement. Example (Poor path quality): A street with narrow and broken pavements.	
Insufficient trees or visual interest The area does not have trees or any urban greenery. The area does not have any relevant urban scenery (lack of relevant architecture, buildings, landmarks, etc.) Example: a street without trees and buildings with poor architectural design.	
No lighting, seating or ramps The area is not equipped with street furniture and infrastructure to cater for pedestrian accessibility, safety and comfort. Apart from the lack of lighting, seating or ramps, this category may refer to bins, public fountains and toilets, etc (But participants/surveyors need to use the comments to add them or specify if the observation is only referring to lighting, seating or ramps in particular. Example: a street with no streetlights (or proper public lighting), and no benches.	
No path The area does not have designated pavements for pedestrians. Example: a street or segment of the street with no pavement.	
Poor drainage or protection from weather The area is not equipped with street furniture and infrastructure to protect pedestrians from harsh weather conditions, such as extreme heat and cold, rain, wind, etc. Example: a street with no shade and shelter (sun and rain) and with rain drainage (floods).	
Speed of traffic The traffic speed in the area is too fast and considered dangerous or annoying by pedestrians. Example: a street with fast traffic in which pedestrians cannot cross the road or use it to talk along the traffic.	
Unsafe crossing The area does not have a designated pedestrian crossing. Traffic has always priority at junctions. Example: a street with no signal crossing (zebra crossing) or no light-controlled junctions (traffic lights)	

1.3.3. Comments

Apart from the predefined categories to add observations on elements and characteristics of the public space, participants can add comments to their observations (Purple icon with three points at the top-right corner of the report window). This allows adding specific observations related to context-specific observations that may not be fully represented by the predefined categories included in the app.



Appendix 2. Step-by-step tutorial for surveyors: Walking interviews

2.1 Introduction of the project and the surveyor

“Hello, we are conducting a study about how pedestrians experience the public space around public transport stations. Would you like to respond a few questions during less than five minutes?” We use the Walkability.App to collect the information that you share with us.

2.2. Ask about the pedestrian profile

In the app, go to Main Menu / Pedestrian Profile

Ask the participant about their gender, age and ability. Input the information in the Pedestrian Profile form accordingly. Click on “Continue”.

2.3. Questions about the walk context

In the app, click on “Start Walk” and the Walk Context for will automatically appear on the screen.

Ask the participant about their walk decision, purpose, group size and familiarity with the place. Input the information in the Walk Context form accordingly. Click on “Continue”.

2.4. Questions about pedestrian experience

Ask the participant if the pedestrian experience in the specific place where you are is positive, negative or with some concerns. Click on the green icon (positive), amber icon (concerns) or red icon (negative) accordingly.

2.5. Questions about environmental determinants

Ask the participant the reason(s) why the experience is positive/concern/negative. Based on their response, click on the icons that represent what they say. Add a comment if necessary. Click on “Send”.

The interview is complete. Click on the ‘red and while icon with a cross’ to stop the walk and the interview.

Repeat steps 2.1 to 2.5 with the next participant.