Delineating patterns of the ***Spatial Crime Perception [Gaps]*** in Budapest

24th Annual Conference of the European Society of Criminology

Qilei Huang | Andrea Pődör | Ourania Kounadi

ÓBUDAI EGYETEM
ÓBUDA UNIVERSITY

universität wien

Digital Geography
University of Vienna

Mirror

Ground

Attribution:
Cmglee, CC BY-SA 4.0,
via Wikimedia Commons

Contents

1. The **survey** on Spatial Crime Perception
2. The **spatial crime perception gaps** based on different types of crime
3. The **spatial diffusion effect** on crime perception
4. The **activity space effect** on crime perception
5. Work in progress: **Frequent patterns of perceptual gaps**

Hypotheses

Hypothesis 1: *Violent crime has a greater influence on people's crime perception in space than other crime types.*

Hypothesis 2: *Visible crime has a greater influence on people's crime perception in space than other crime types.*

Hypothesis 3: *Spatial diffusion effect: people mislabel areas as unsafe (or safe) when they are in close proximity to unsafe (or safe) areas.*

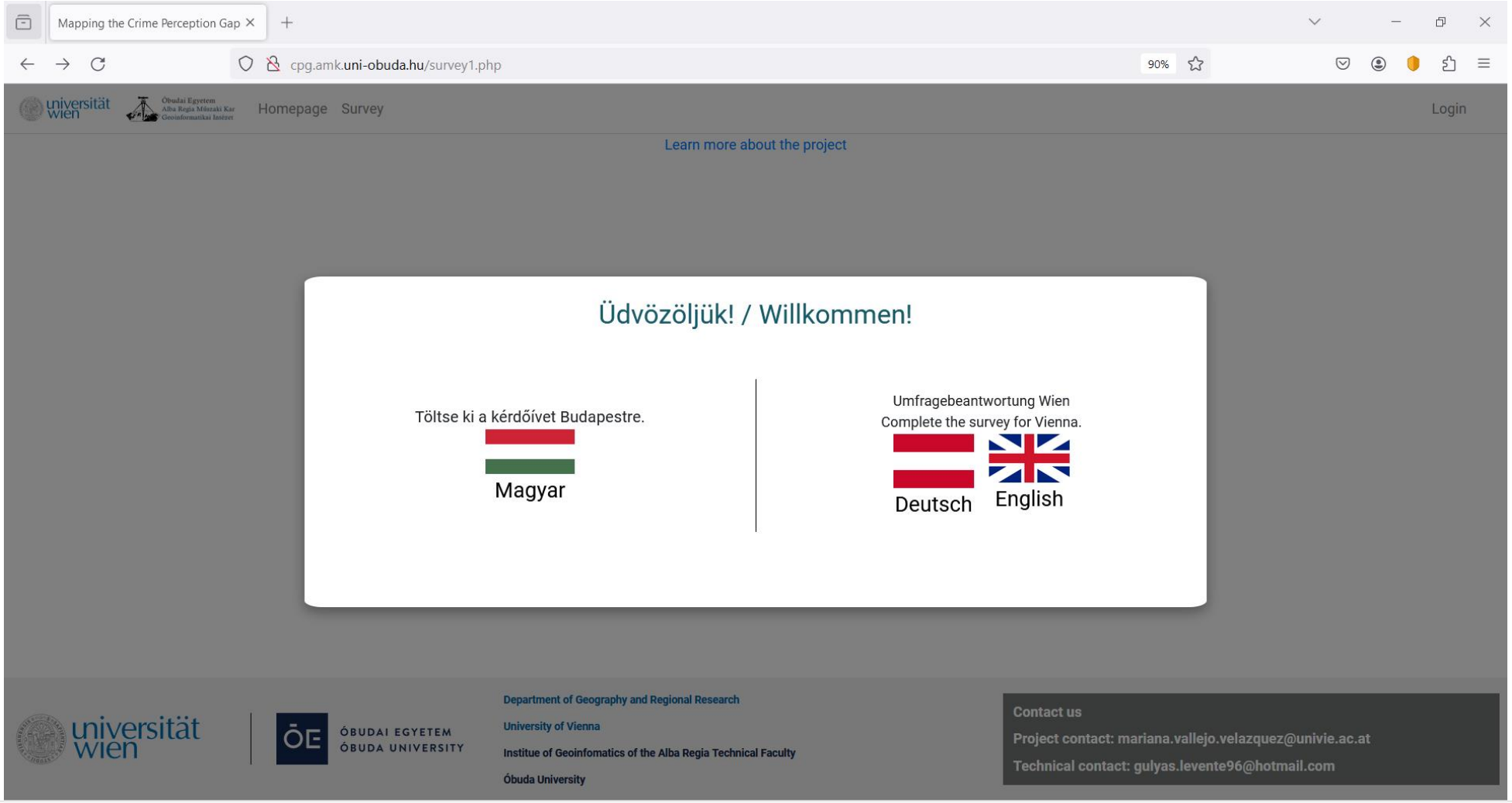
Hypothesis 4: *Perception of unsafety in space is heightened in areas outside one's activity space.*

***Hypothesis 5**: Perceptual gaps occur when unsafe and safe areas exhibit similar physical environmental properties while crime prevalence is significantly different.*

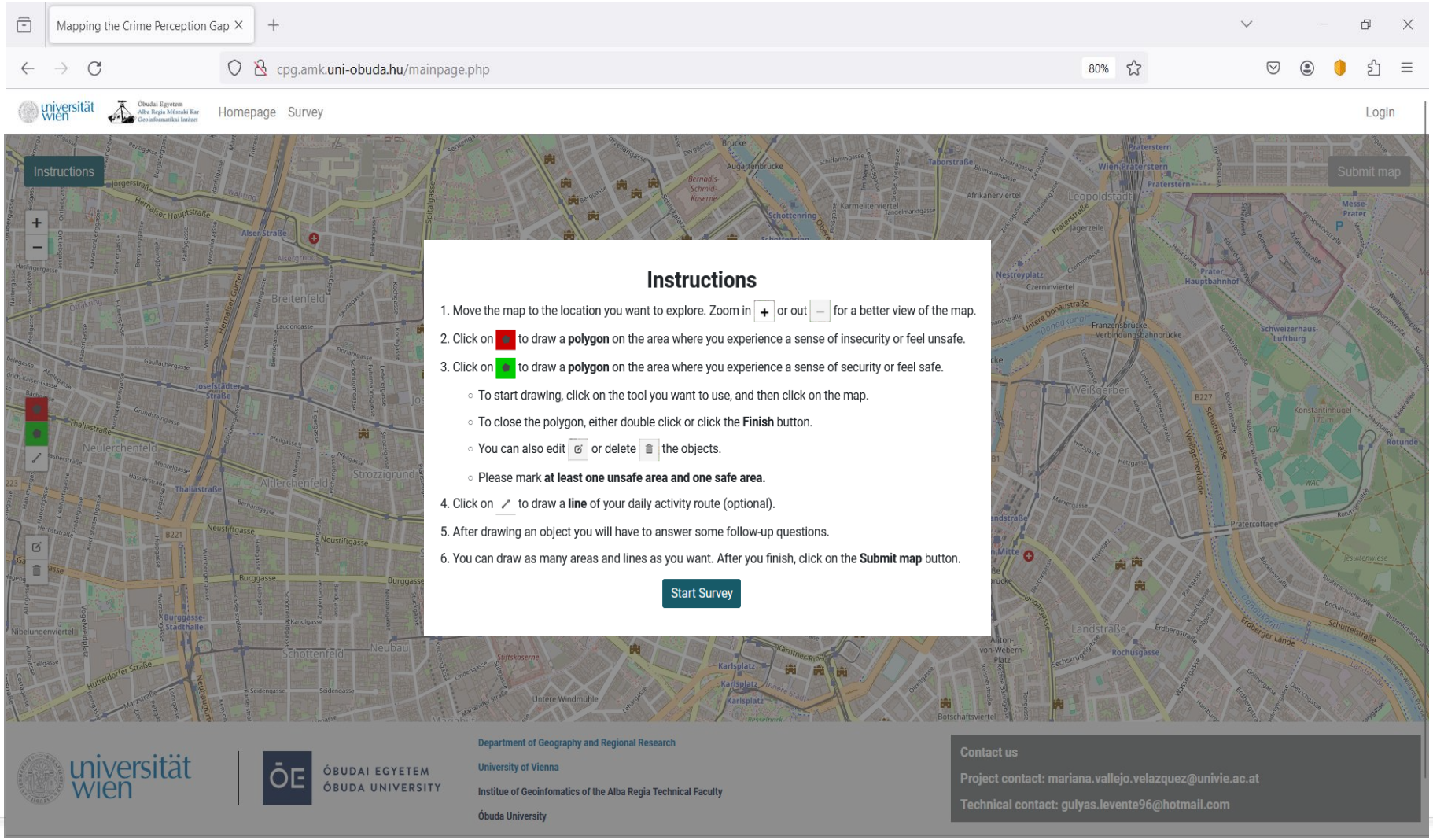
1. Survey Crime perception | Online Survey

Link to the Survey

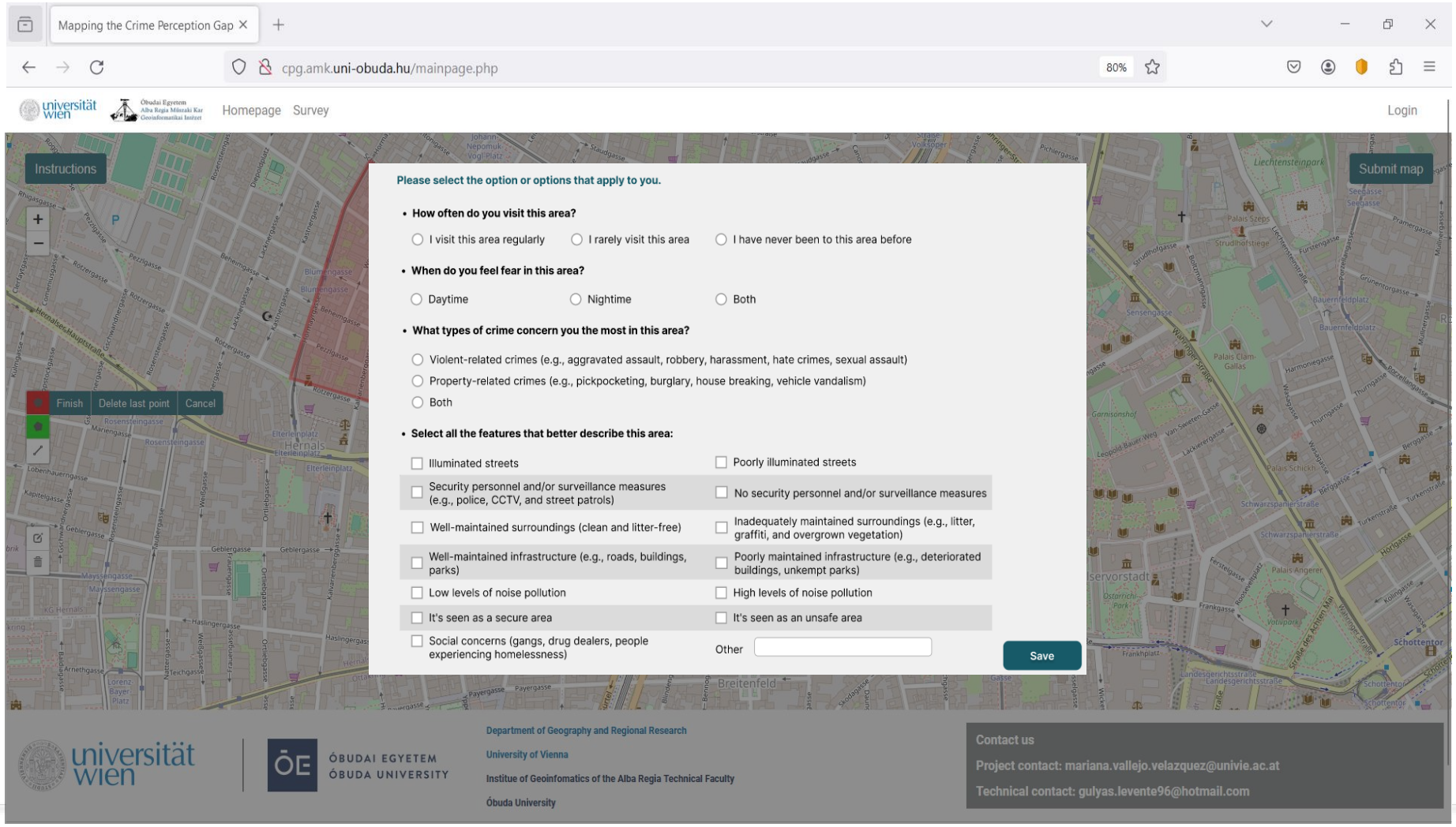
1. Survey Crime perception | Online Survey



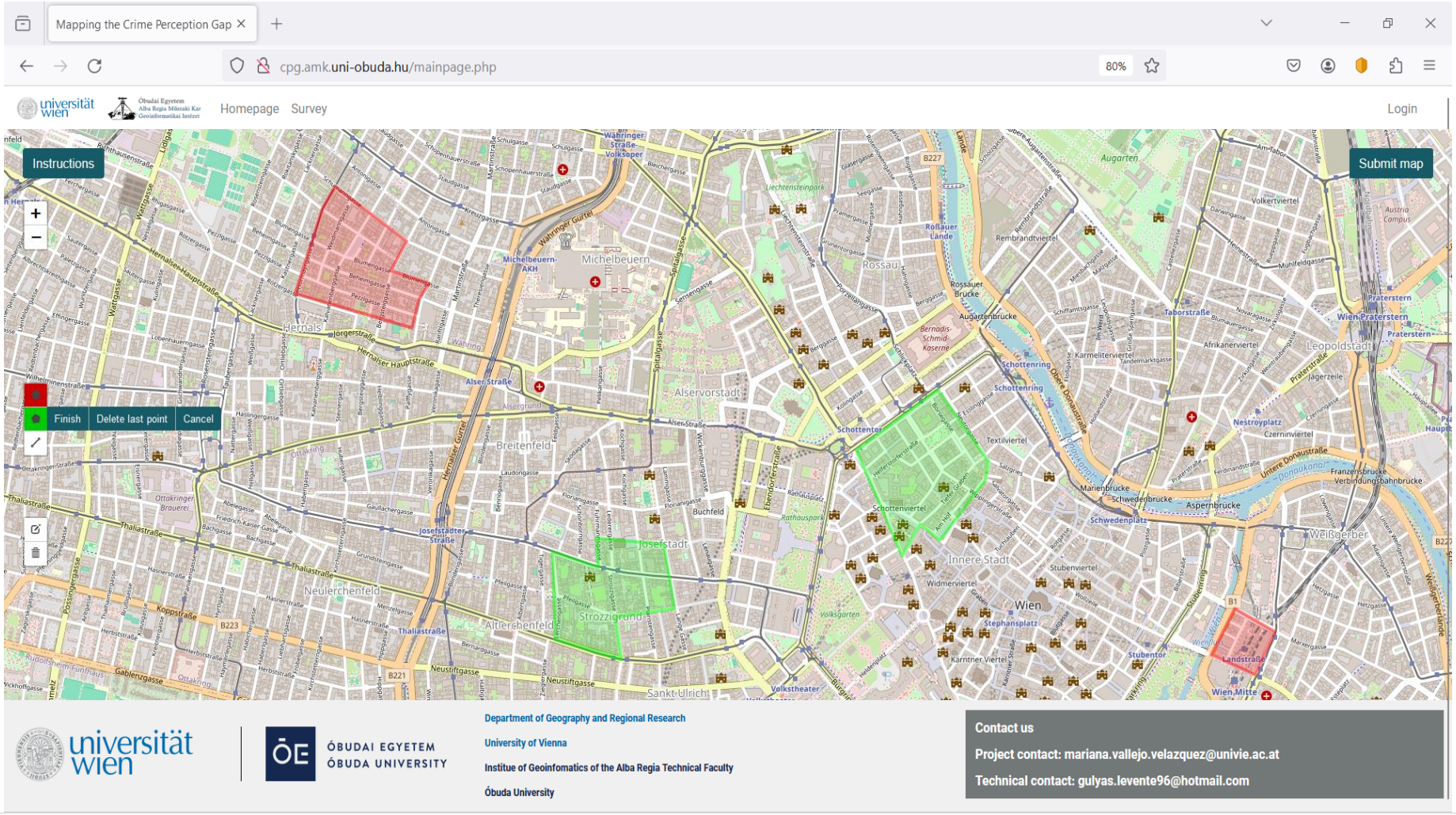
1. Survey Crime perception | Online Survey



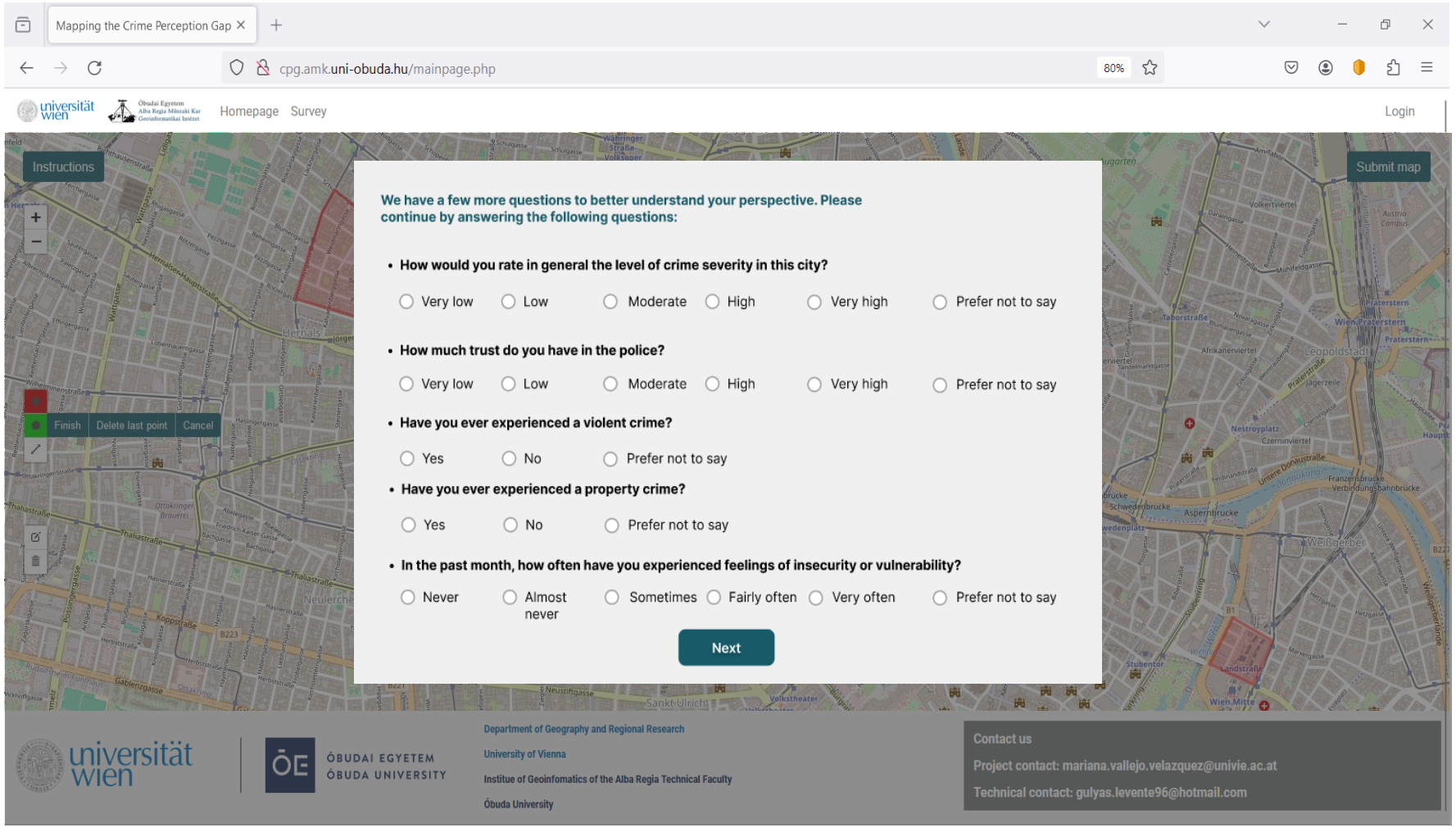
1. Survey Crime perception | Online Survey



1. Survey Crime perception | Online Survey

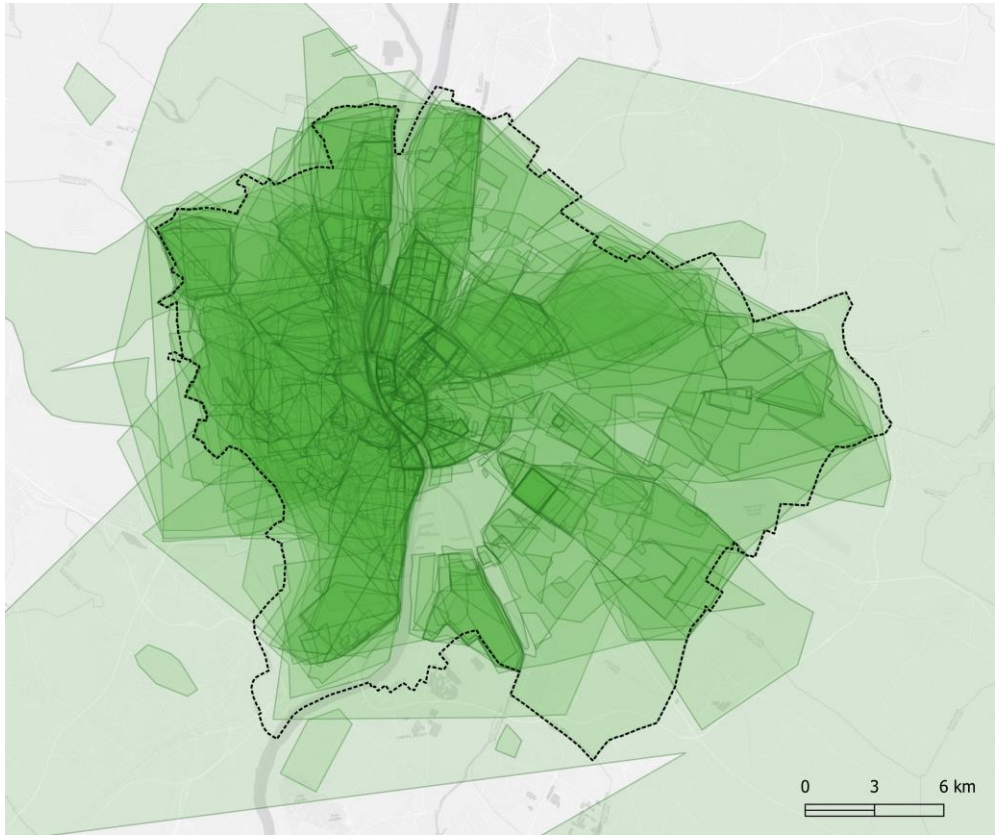


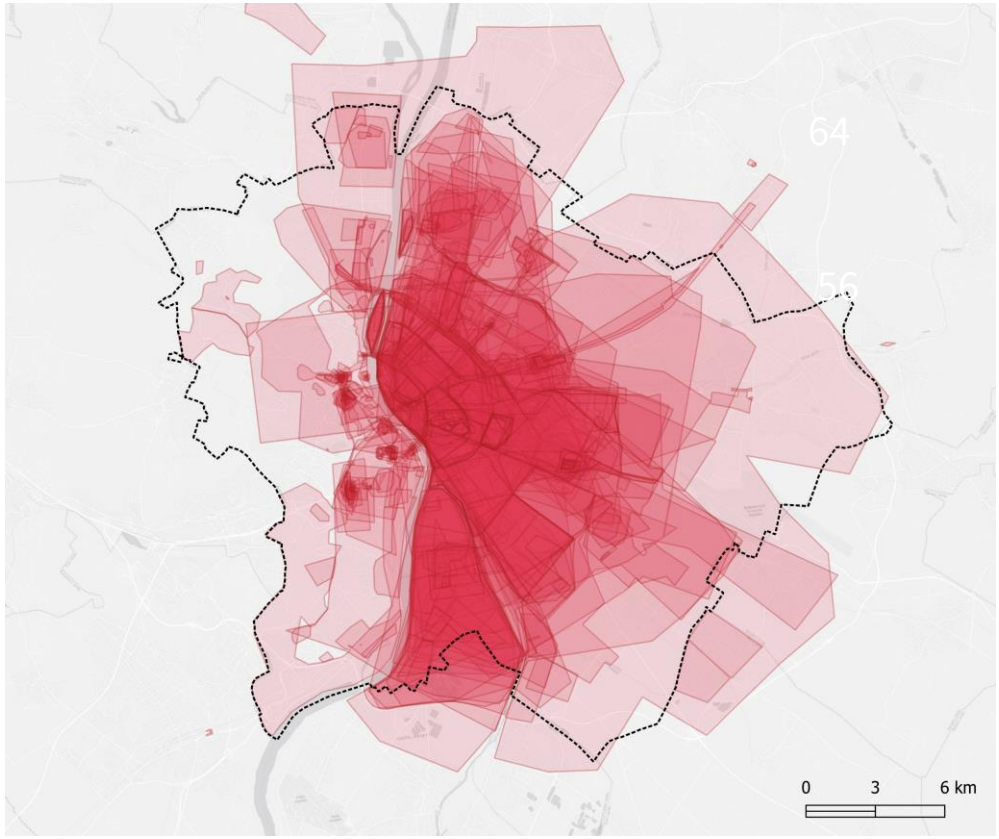
1. Survey Crime perception | Online Survey



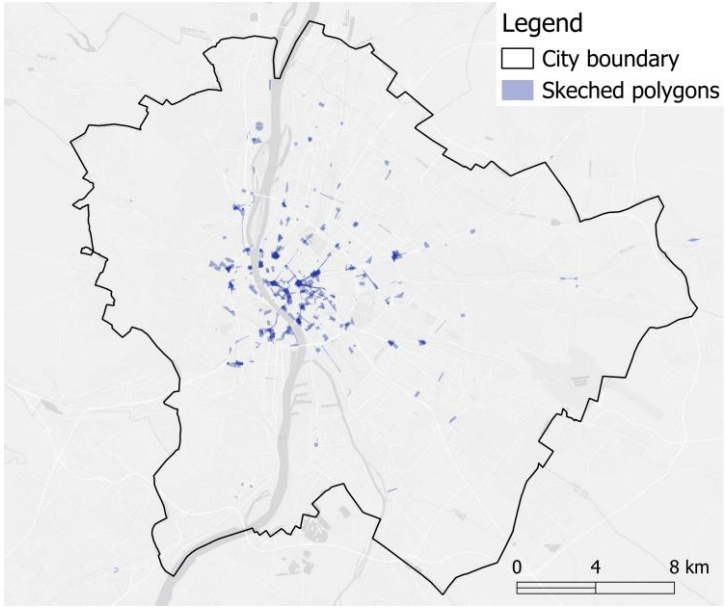
1. Survey Crime perception | Raw data & Geoprocessing

Budapest

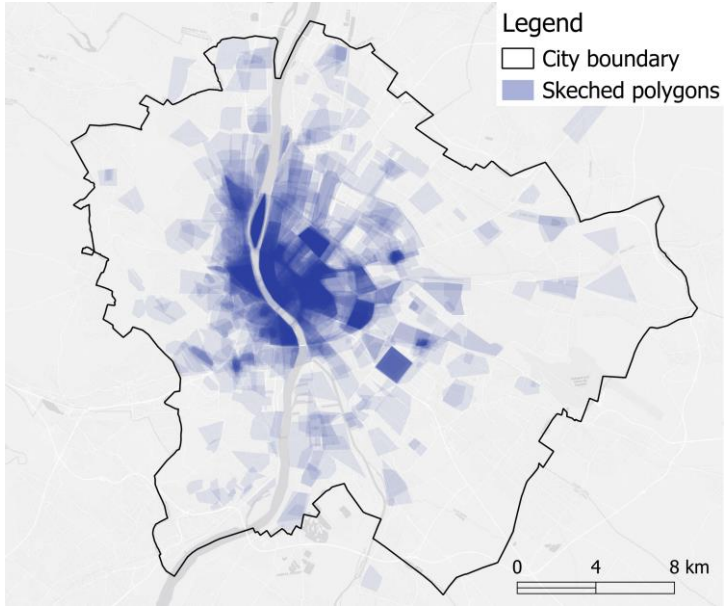




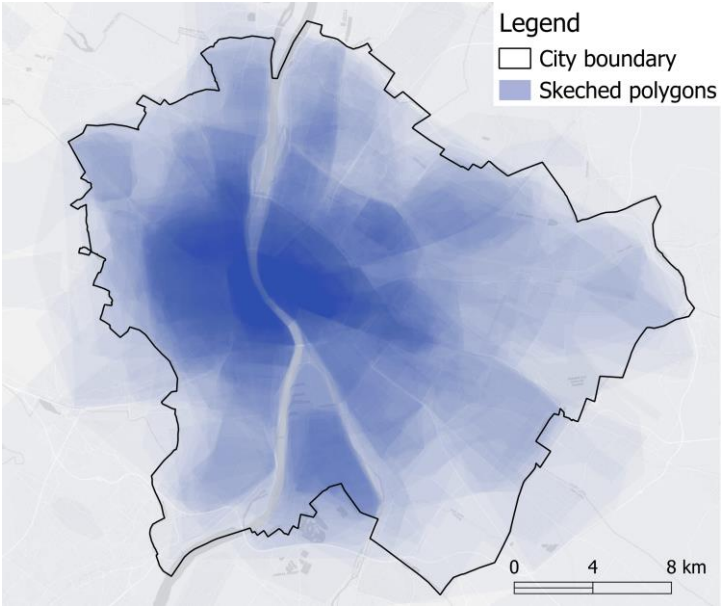
1. Survey Crime perception | Raw data & Geoprocessing



Area ≤ 0.071 km²



0.071 km² < Area ≤ 2.5 km²

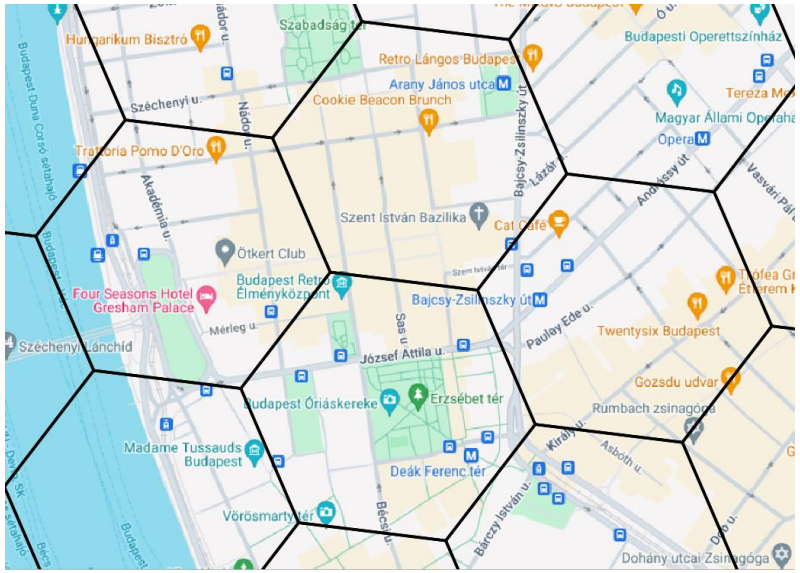


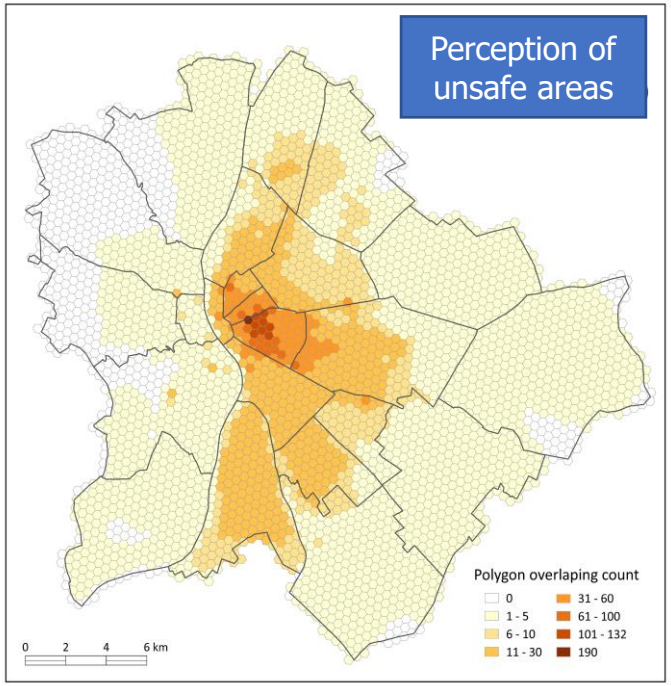
Area > 2.5 km²

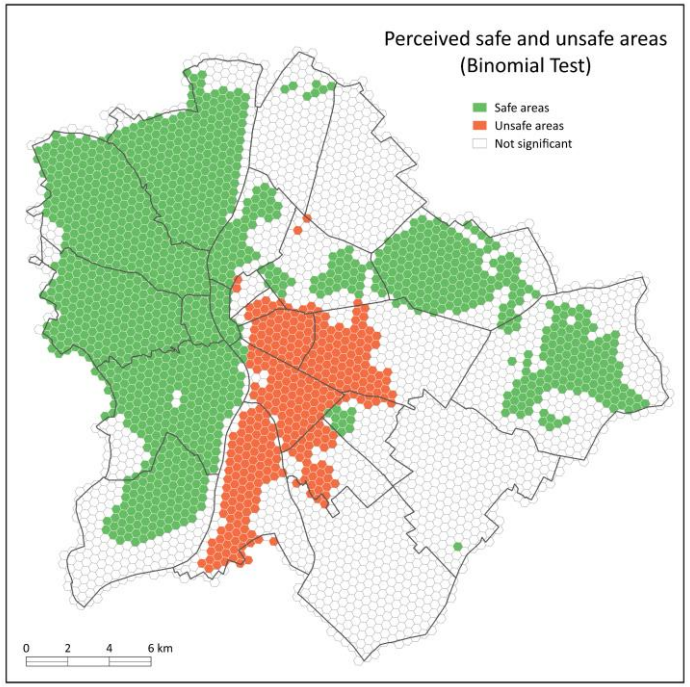
The size of polygons / km²	Number of safe polygons	Number of unsafe polygons
≤ 0.071	190	585
> 0.071 & ≤ 2.5	868	848
> 2.5	406	265
Total	1464	1698

1. Survey Crime perception | Final Perception Map

Hexagon unit of analysis







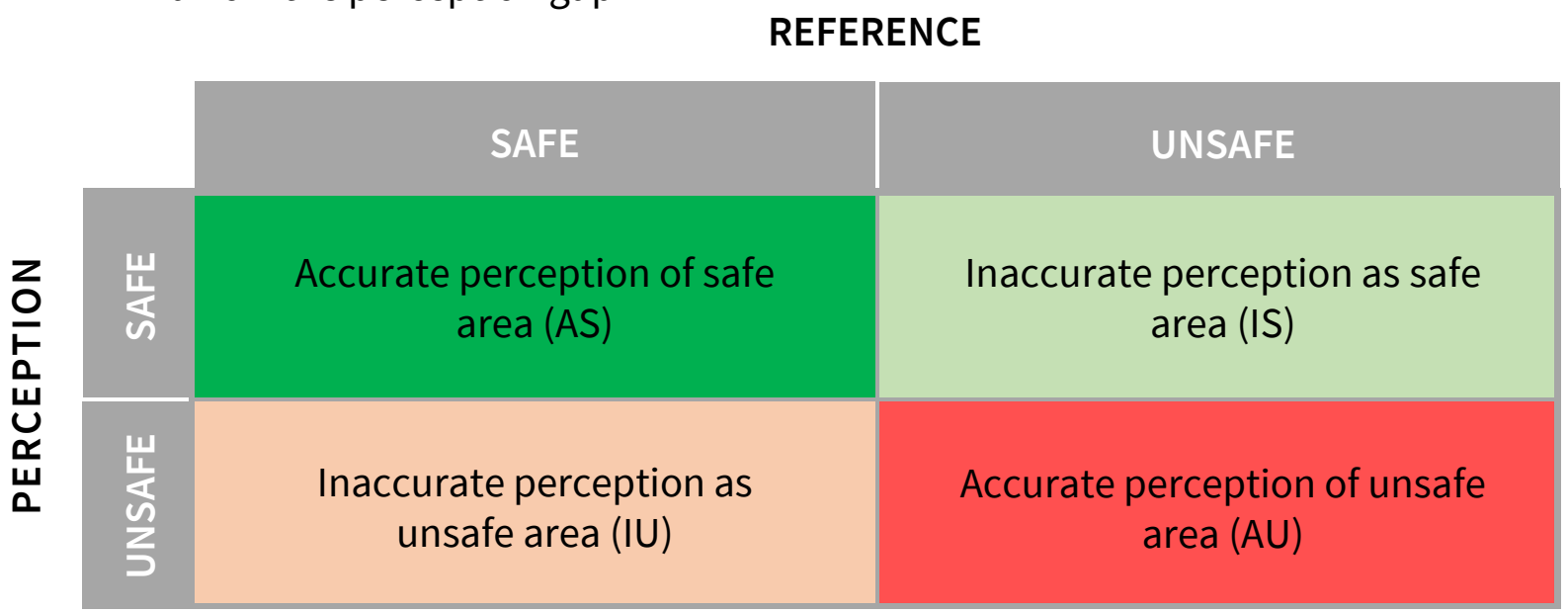
2. Spatial Crime Perception Gap | Definition

Perception data ≠ Real/Reference data → **Crime perception gap**

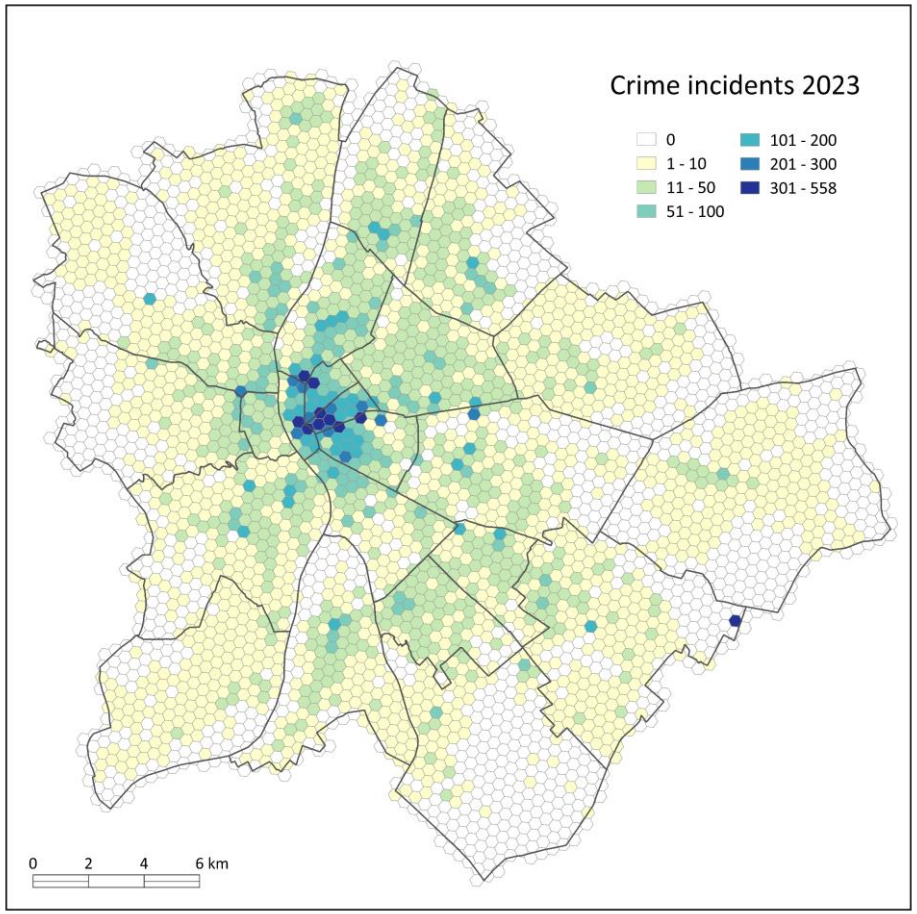
This can have repercussion on:

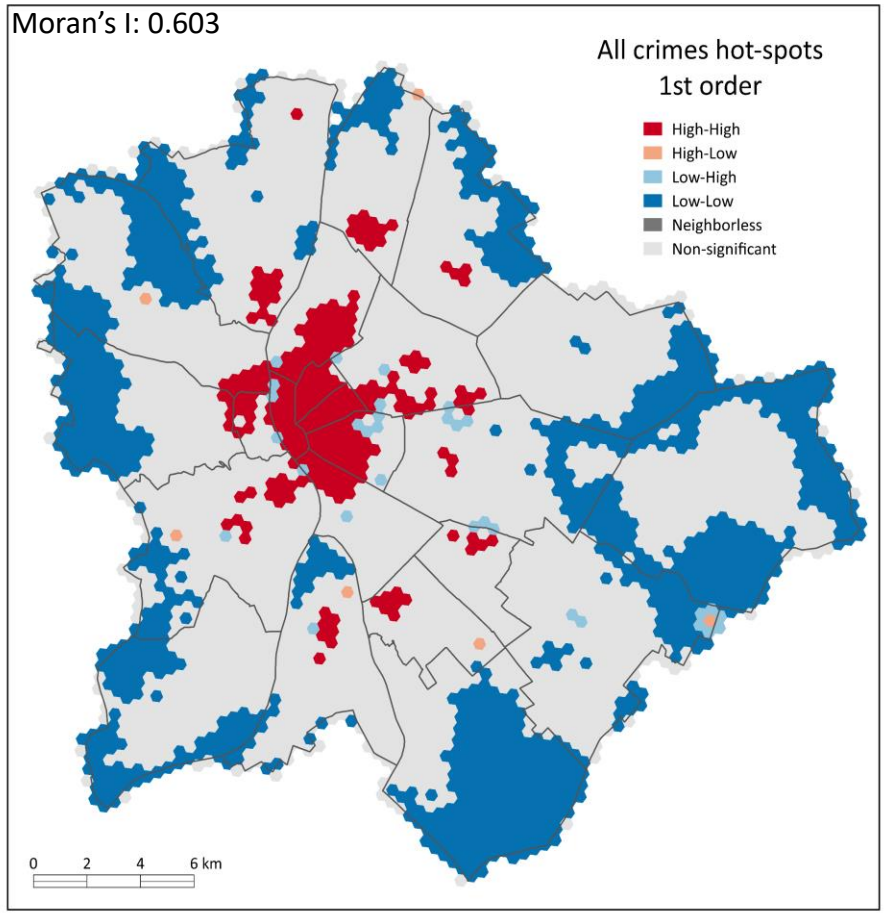
- people's lifestyle
- affect social behaviour
- spatial and economic dynamics

→ It is relevant that police agencies develop strategies directed to narrow the perception gap



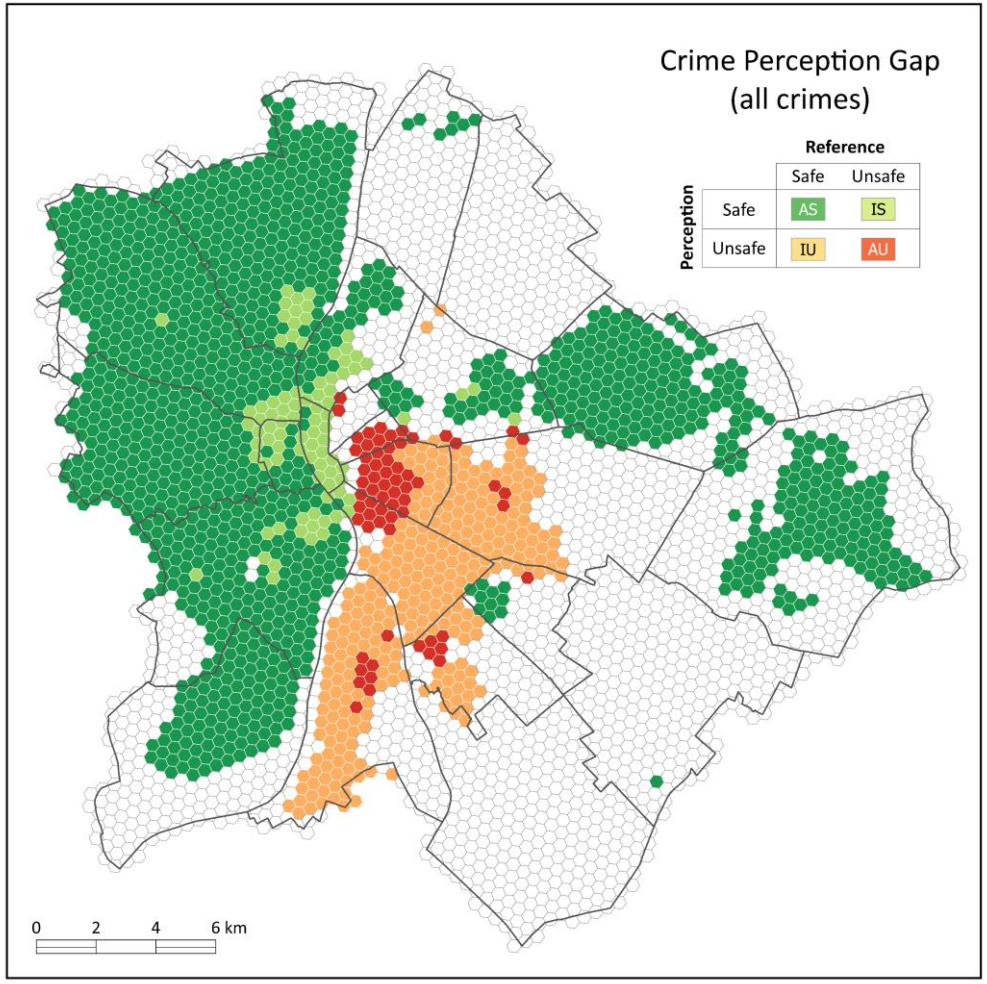
2. Spatial Crime Perception Gap | Detection of Hotspots

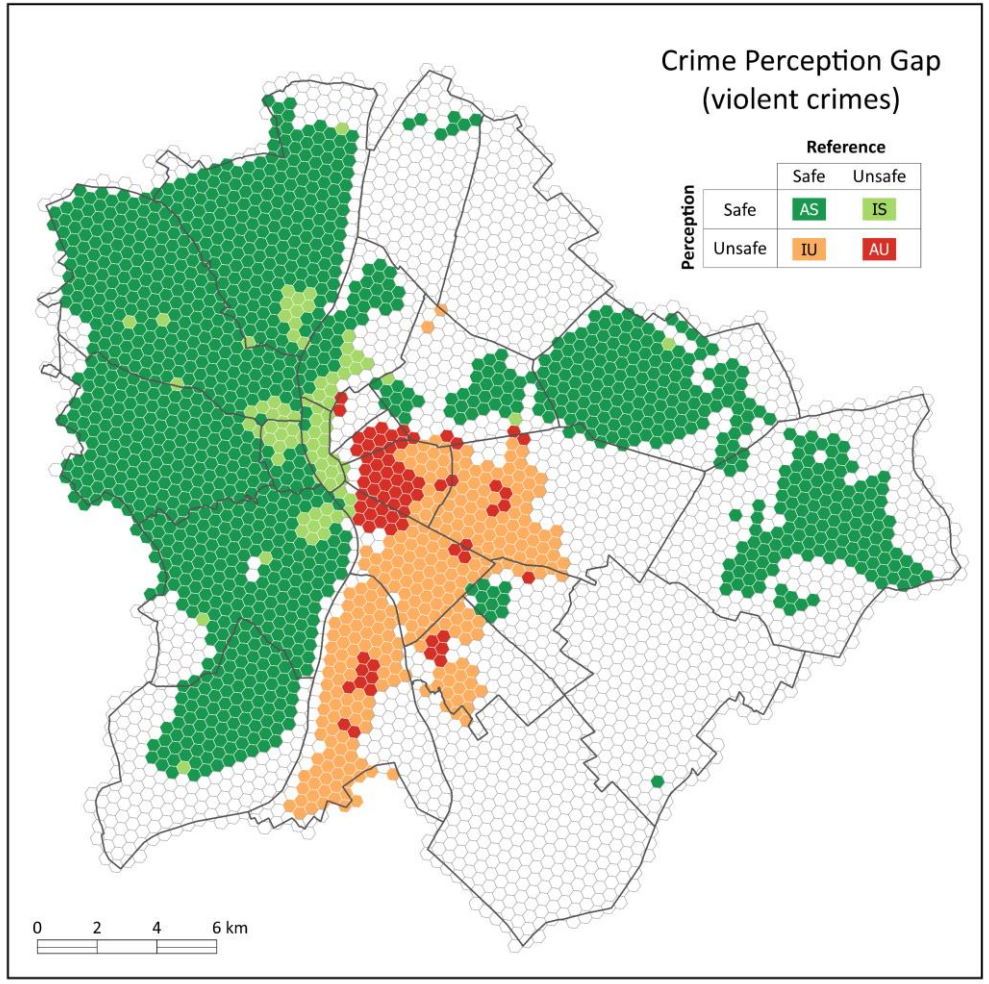




- **All crimes**
- **Property crimes**
- **Violent crimes**
- **Visible crimes**

2. Spatial Crime Perception Gap | Delineation of the Gap



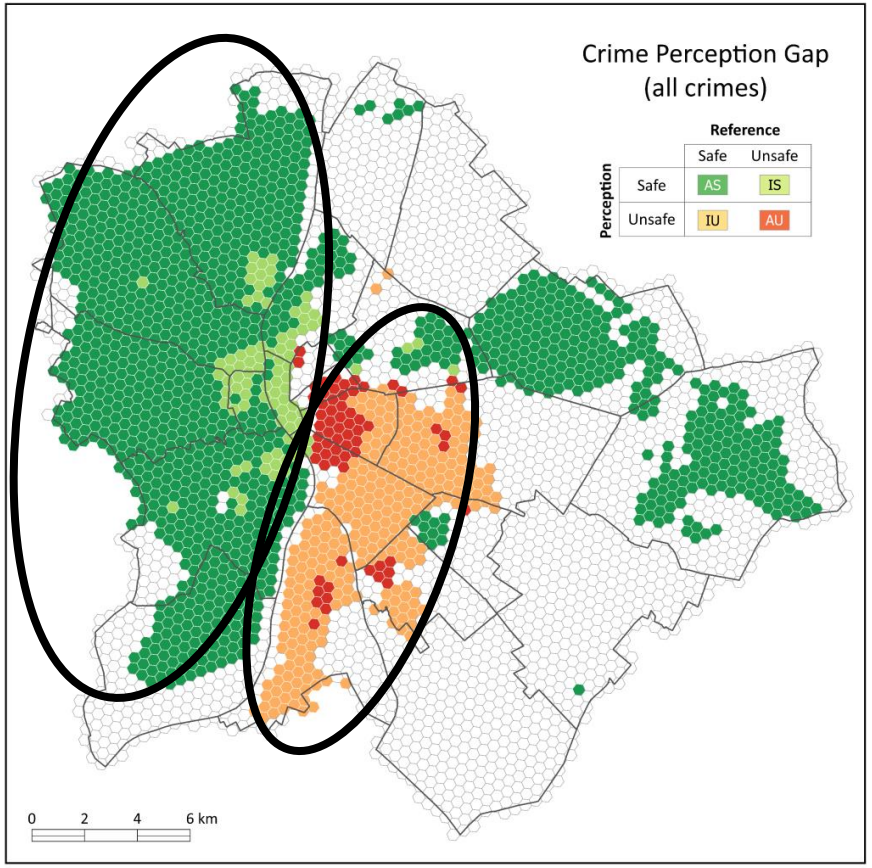


2. Spatial Crime Perception Gap | Evaluation Metrics

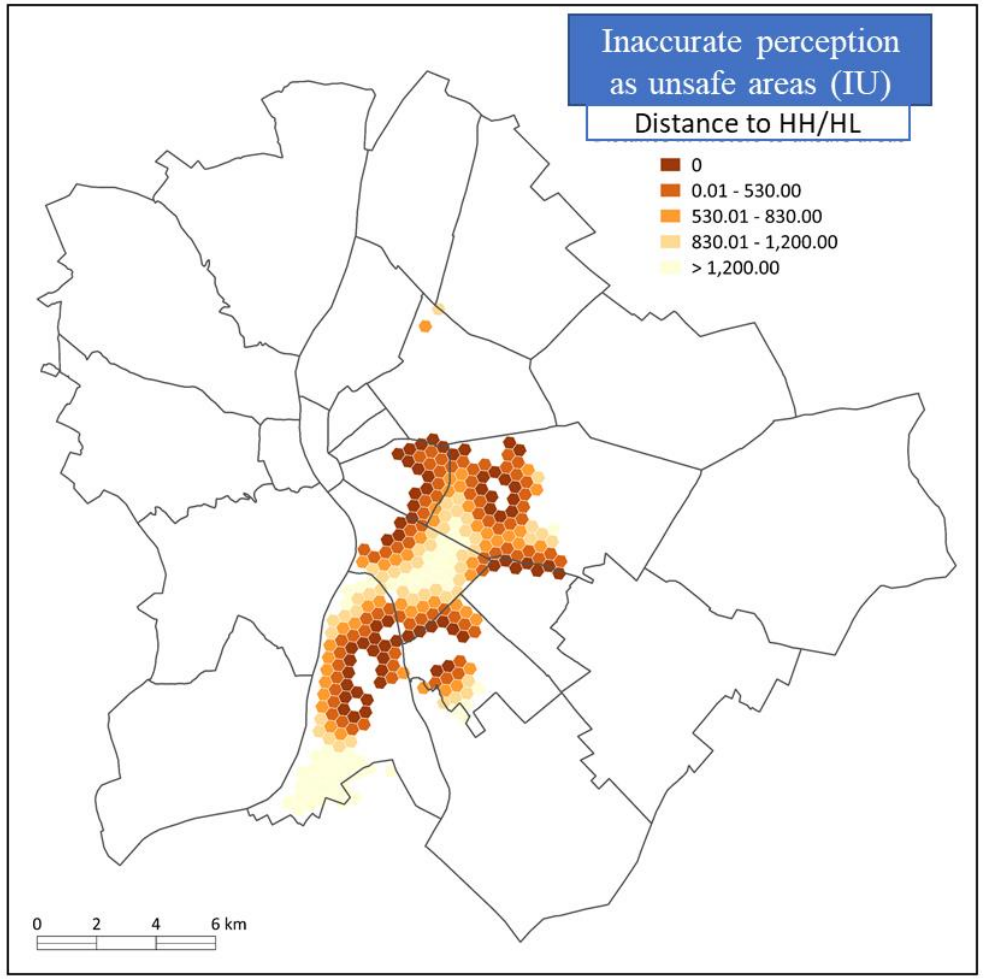
	Cohen's Kappa Statistic	Precision (U)	Accuracy
All Crime	0.149	0.183	0.779
Property	0.165	0.174	0.790
Visible	0.174	0.188	0.789
Violent	0.186	0.205	0.789

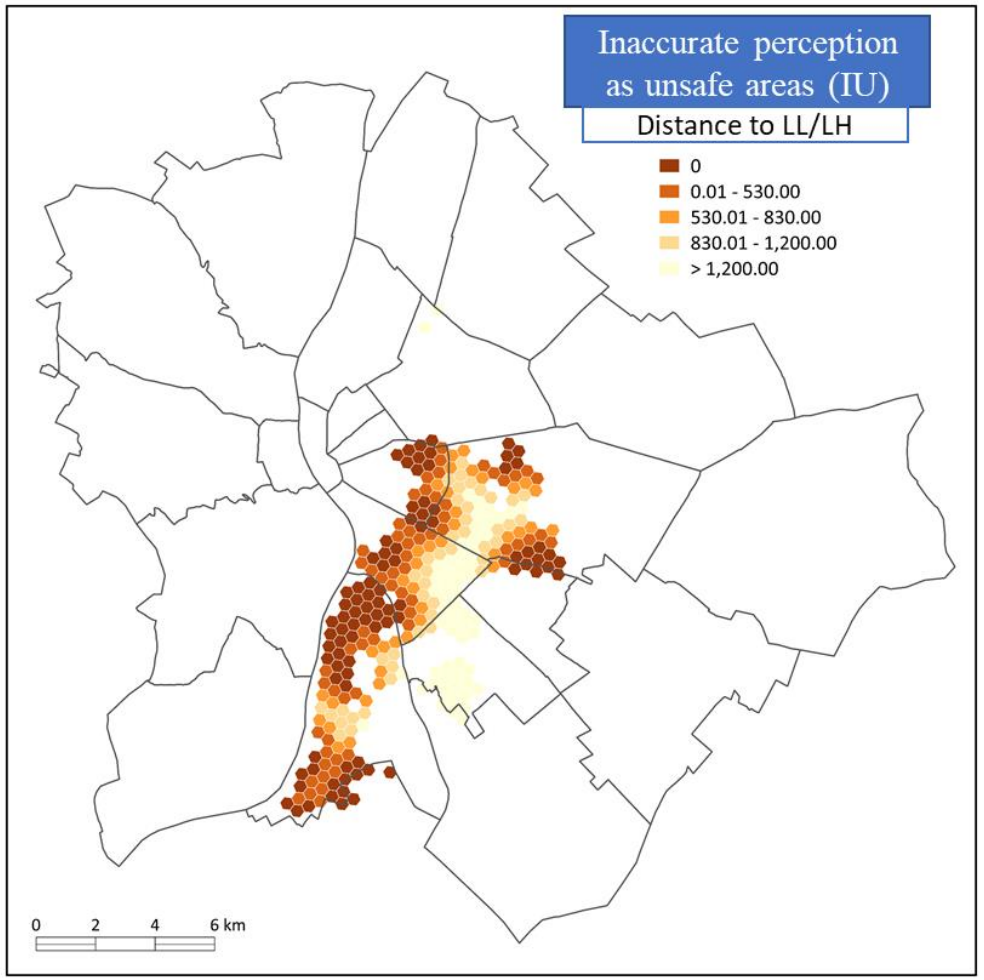
Precision: the proportion of the perceived unsafe areas that are correctly identified

Crime Types	Perception	Reference: Safe	Reference: Unsafe
All Crime	Safe	1269	88
	Unsafe	291	65
Property	Safe	1292	65
	Unsafe	294	62
Visible	Safe	1285	72
	Unsafe	289	67
Violent	Safe	1278	79
	Unsafe	283	73

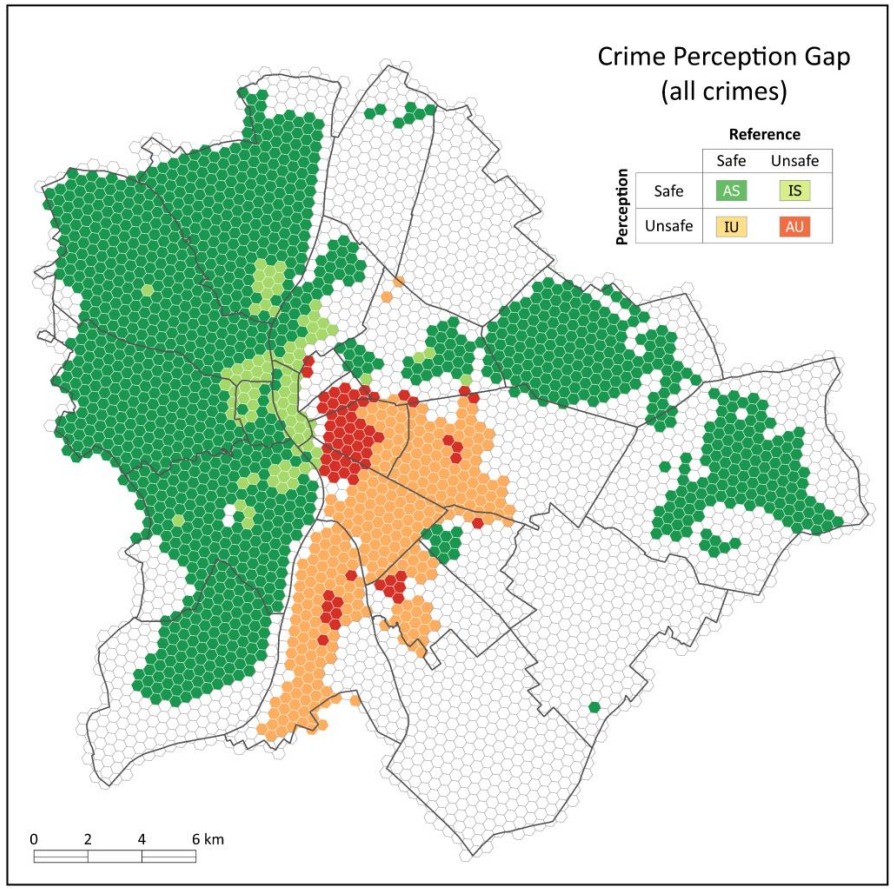


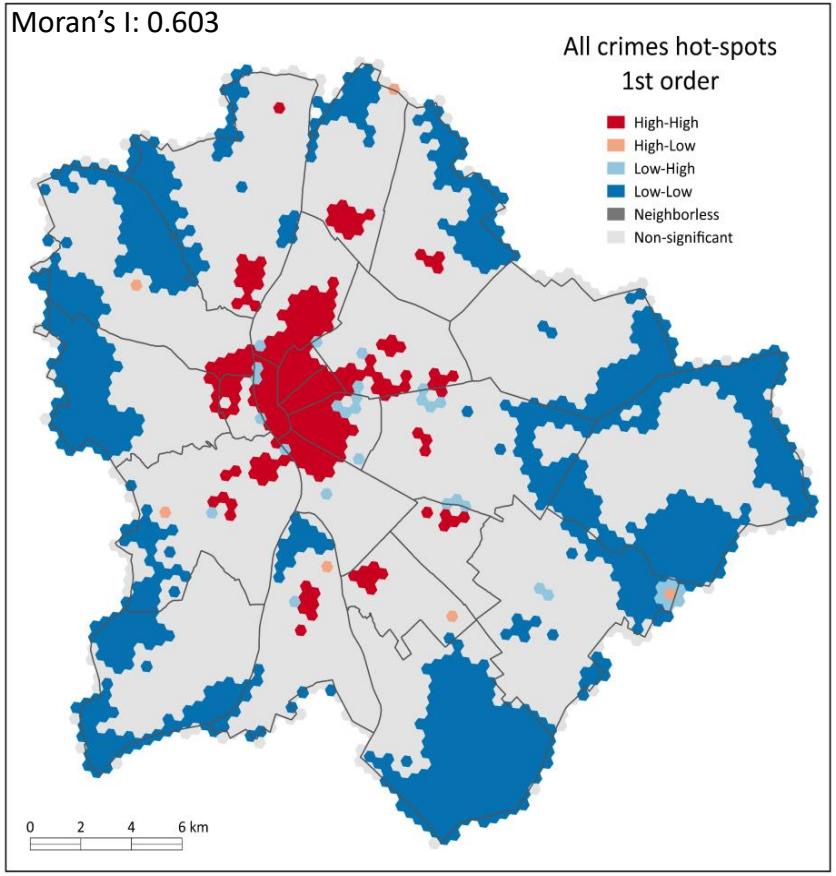
3. Spatial Diffusion Effect| IU - Distance to crime spatial groupings





3. Spatial Diffusion Effect| Inaccurate perception & spatial outliers





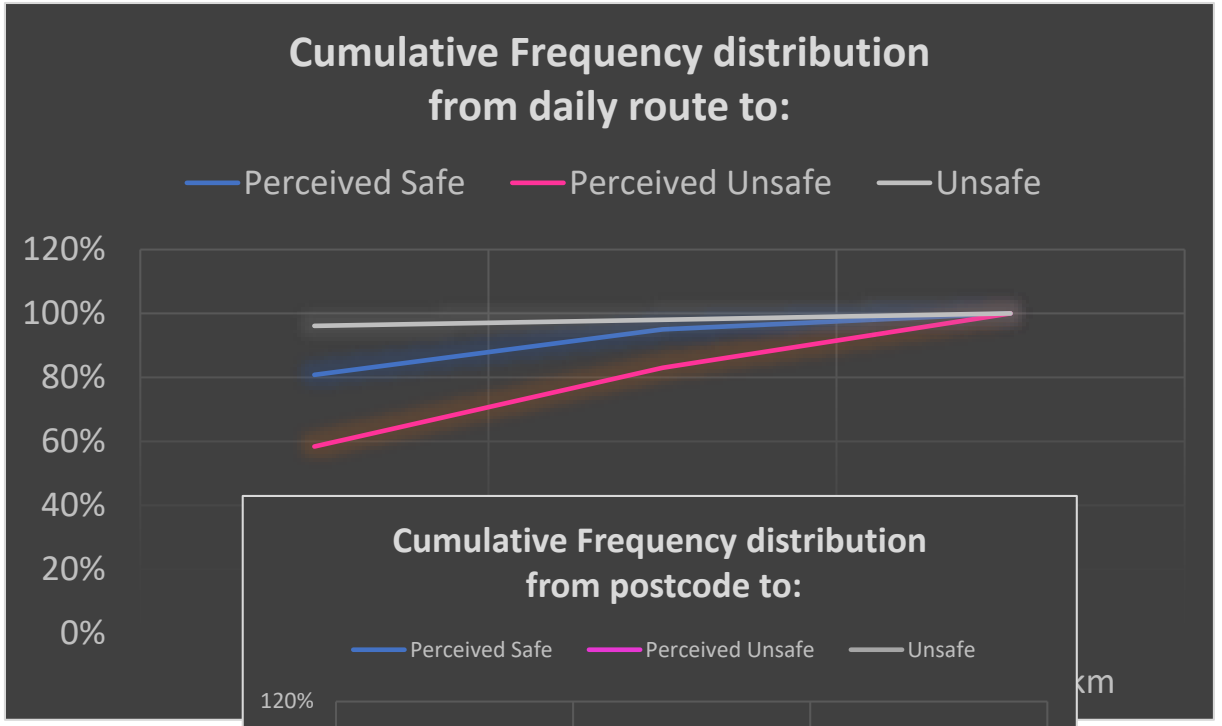
Spatial Grouping Accuracy	
LL	0,933
Non significant	0,795
HH	0,427
HL/LH (outliers)	0,333
All	***0,779***

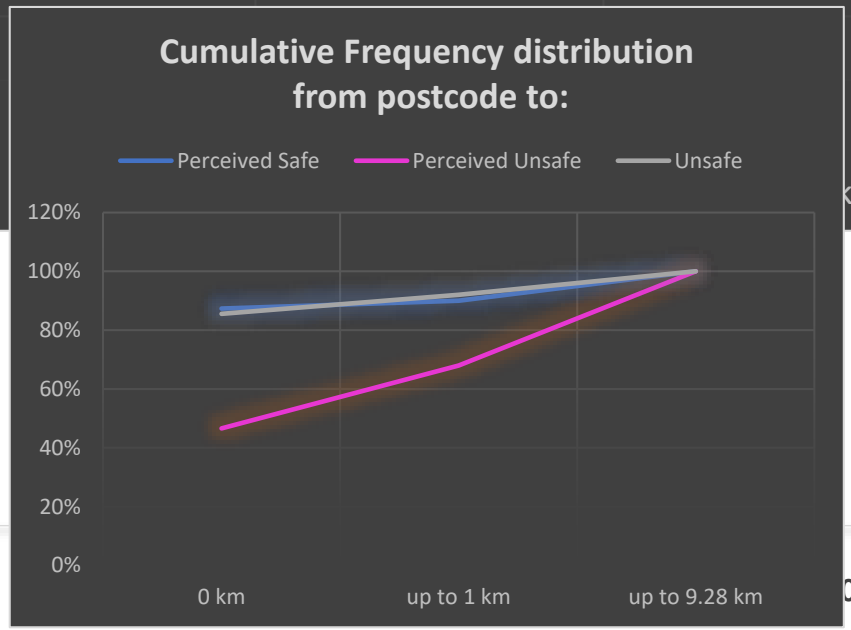
4. Activity Space Effect| Distance to safety perception & unsafe areas

Distance from daily route to			
Statistics	**Perceived Safe**	**Perceived Unsafe**	**Unsafe**
Mean	190.49	643.70	67.93
SD	797.41	1544.64	440.40
Range	0-5840	0-9150	0-3615

Distance	**Perceived Safe**	**Perceived Unsafe**	**Unsafe**
0 km	**81%**	**58%**	**96%**
up to 1 km	14%	24%	2%
1-2 km	1%	7%	0%
2-3 km	1%	3%	1%
3-4 km	1%	2%	1%
4-5 km	0%	3%	0%
5-10 km	1%	3%	0%

Distance from postcode to			
Statistics	**Perceived Safe**	**Perceived Unsafe**	**Unsafe**
Mean	386,68	1183,25	131,30
SD	1433,90	1781,24	364,02
Range	0-9280	0-6775	0-1313





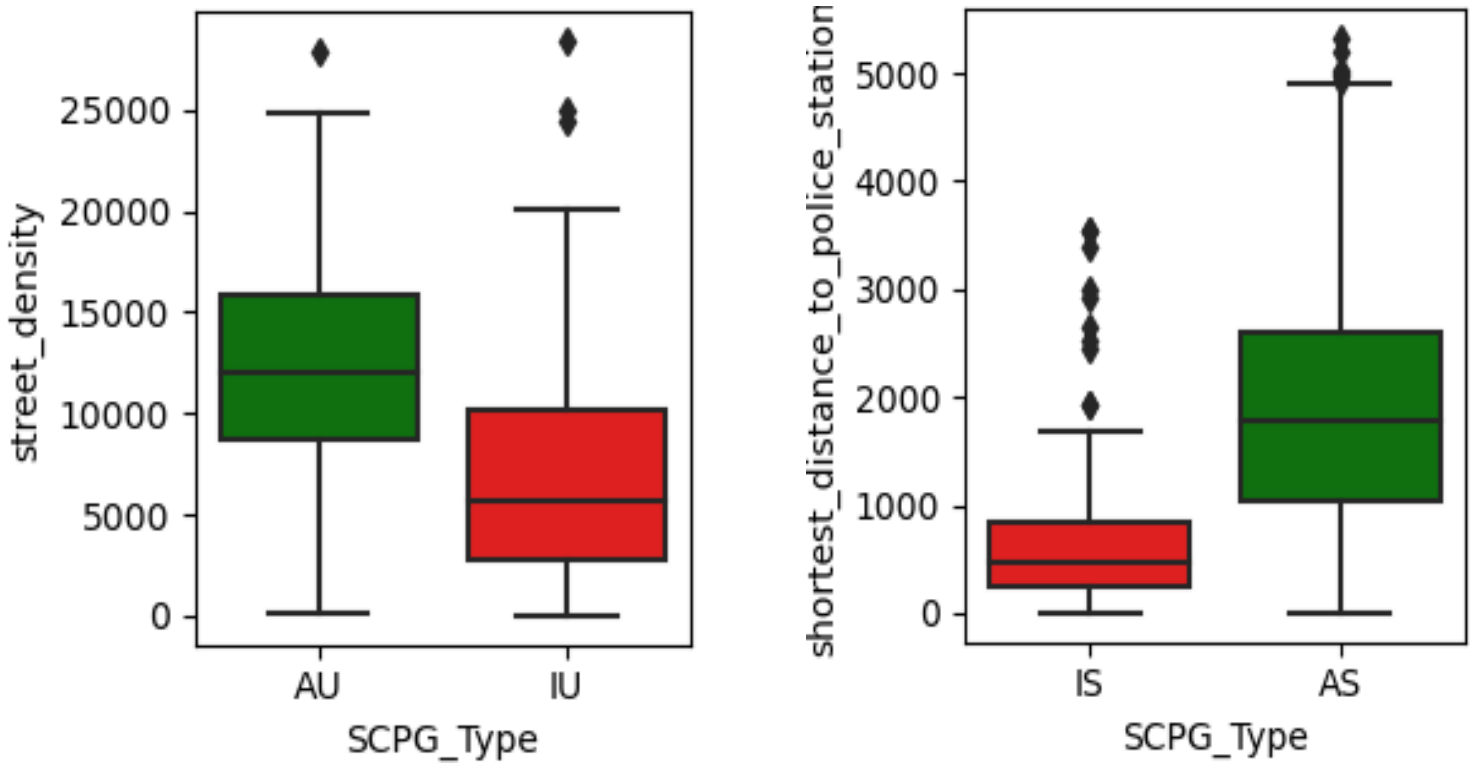
5. Frequent patterns of perceptual gaps| Work in Progress

- *Q1: Is the IU associated with more night or day visitation times?*
- *Q2: What social, economic, and demographic features tend to be more associated to perceptual gaps?*
- *Q3: What kinds of physical and social environment features tend to be more associated to perceptual gaps?*

→ About 90 variables to be examined in relation to SCPG

→ Point Biserial Correlation Coefficient & Apriori Algorithm

5. Frequent patterns of perceptual gaps| Examples



Examples with significant Point Biserial Correlation Coefficient

Conclusions

- ✓ **The spatial crime perception gap is extensive and more prominent for areas that are mislabeled as unsafe.**
- ✓ **Although violent crimes and visible crimes are closer to subjective crime perception than all crimes or property crimes, still the agreement between perception and reference data is rather poor.**
- ✓ **Safety perception seems to be linked to (or affected by) the safety perception of neighboring areas.**
- ✓ **Perception of unsafety in space is heightened in areas outside one's activity space.**
- ✓ ***There is still a lot to learn (and plenty of material to analyze) regarding crime perceptual gaps!***

Delineating patterns of the spatial crime perception [Gaps] in Budapest

24th Annual Conference of the European Society of Criminology

Website

Survey

Digital Geography

Thank you for your attention !