Unmapped potentials: Measuring and considering the self-defined residential area of individuals

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Motivation

- Many research questions would benefit from information about individuals' self-defined residential area, i.e., where they spend their daily lives
- Location information usually collected in surveys (or available given anonymization) are larger aggregates such as postcode areas
- Such aggregates, calipers, or administrative units likely not congruent with self-defined residential areas of individuals (USA: Wong et al. 2020, McCartan et al. 2024; Germany: Vief et al. 2021)
- We collect such data using open source tools in an online survey
- Use case: Correlates of (mis-)perceptions regarding no. of Muslim-read establishments in residential area (e.g. opposition to new establishments)

Survey

- Project *Seeing Your Religion (SYR) - Anti-Muslim discrimination on the German labor market* in Research Alliance on Discrimination and Racism (FoDiRa)
- Main survey content:
  - Survey experiments on hiring discimination
  - Attitudes towards immigration/Muslims
  - **Location: postcode + self-drawn polygon of residential area**
  - **Perceptions about Muslims / Muslim life in Germany and in the respondents' residential area**

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Characteristic	
Target	General population in Germany, 18+
Language	German
Representativity	Representative of target population by Regierungsbezirk x gender (women/men only) and Regierungsbezirk x age group)
Field Phase	Nov-Dec 2022
Mode	Online (Qualtrics)
Sample Provider	Kantar
Net Sample size	~17,500

Self-defined residential area (Wohngebiet)

- Measured at the end of our survey with additional consent; voluntary
- We asked for a *rough shape* of the area *"...where you predominantly spend your free time and do errands (e.g., shopping, eating out, or doctor visits)."*
- Open Source Tools:
  - OpenStreetMap (© OpenStreetMap contributors)
  - Leaflet JavaScript Map Library (Agafonkin 2023)
  - Leaflet Draw (2017) extension
  - JavaScript implementation (should work beyond Qualtrics), info was saved with survey (polygons as WKT and metadata)
- Map was zoomed in on postcode surveyed prior

Figure: Drawing polygons with OpenStreetMap, Leaflet, and Leaflet Draw

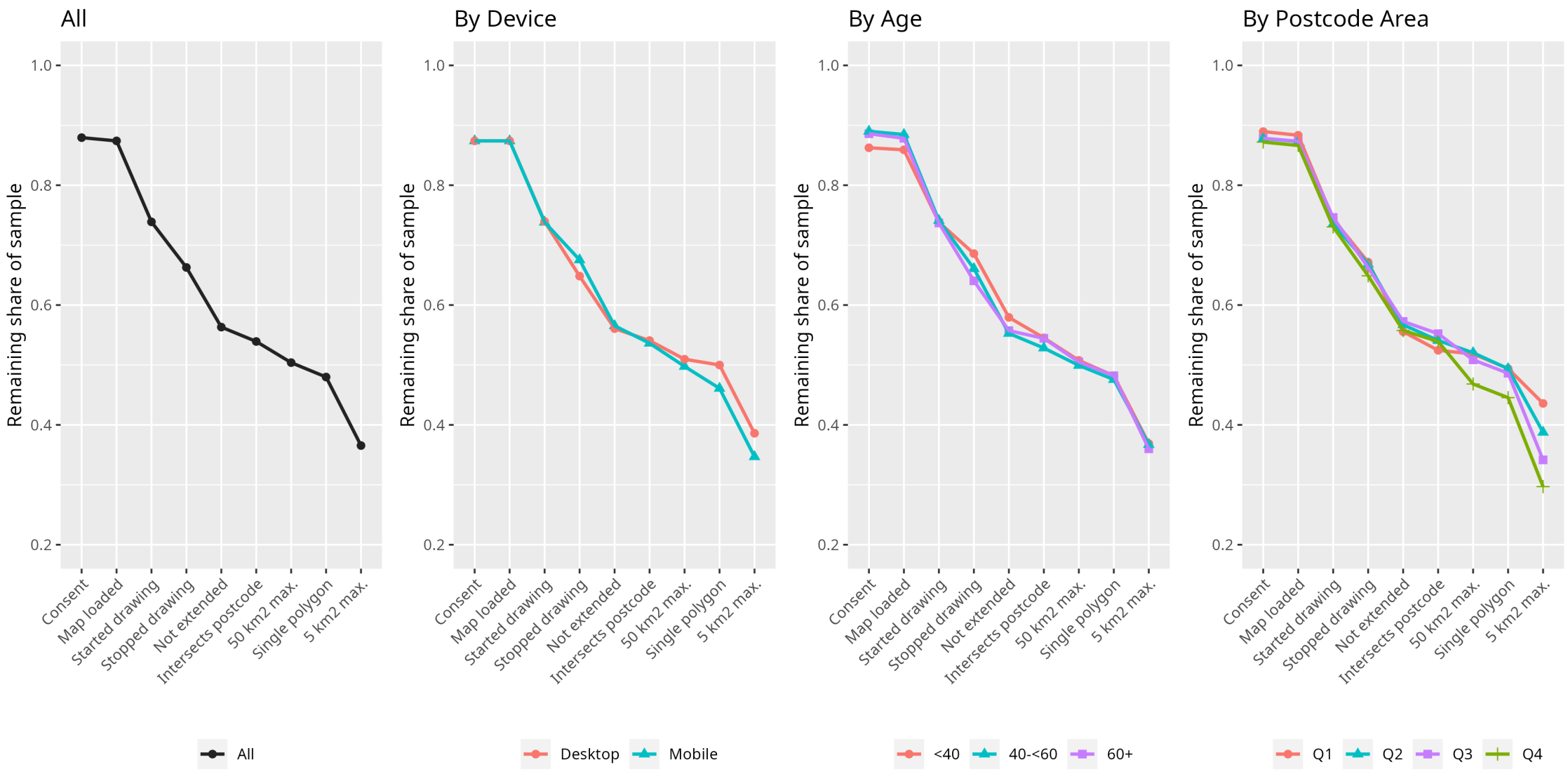


Figure: Non-response/Plausibility Patterns: Share of respondents remaining by interaction/cleaning step

Use Case

- Correlates of (mis-)perceptions regarding the number of Muslim-read establishments in residential area of individuals
- Intuition: Overestimation as a proxy for perceived threat (Herda 2010, Rios et al. 2018) $\rightarrow$ negative attitudes, potential opposition to new establishments
- We asked respondents about no. of establishments in their residential area:
  - "Turkish/Arab" supermarkets
  - "Turkish/Arab" restaurants
  - Mosques
- ...and merged the "true" number from the Google Maps API

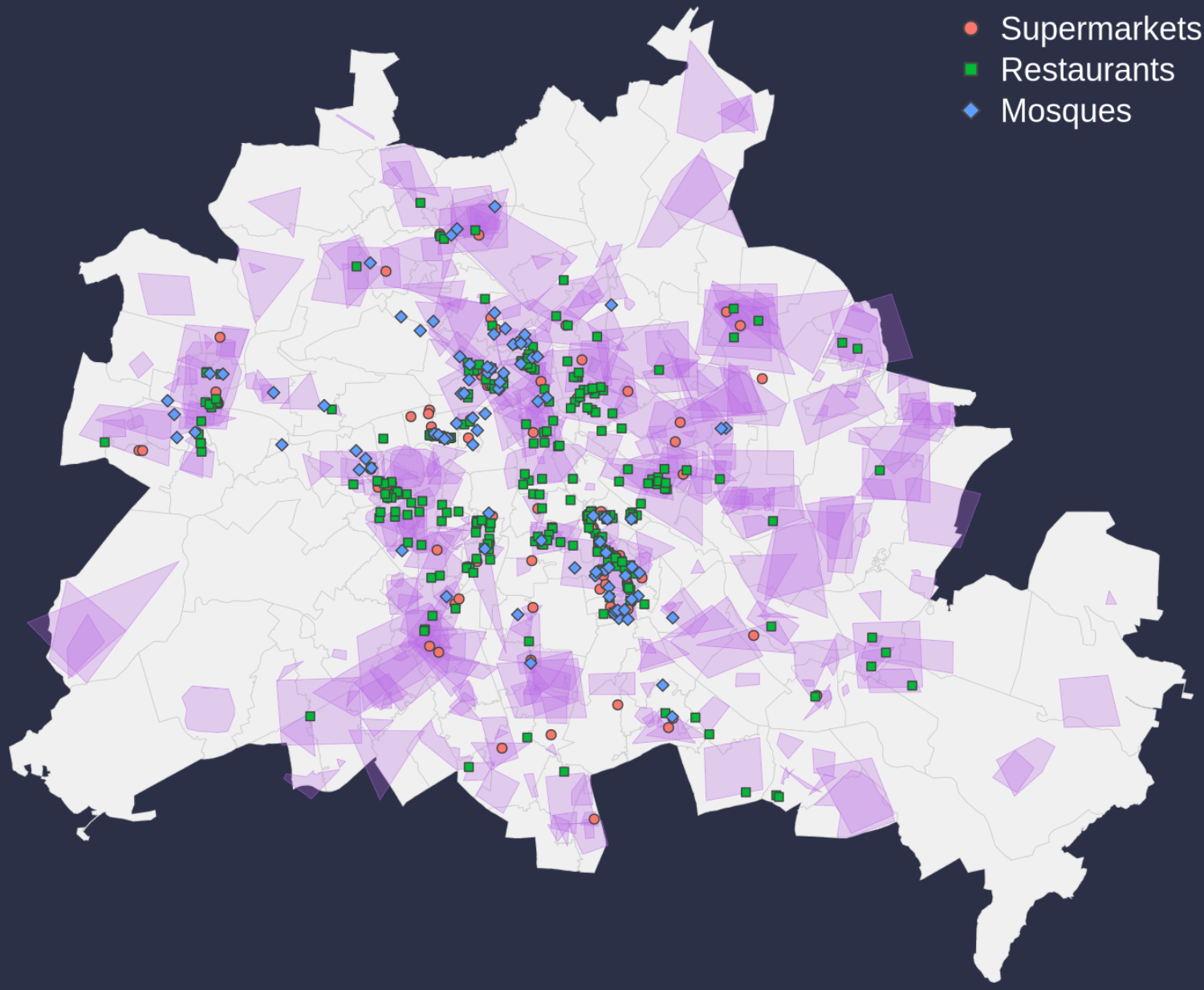
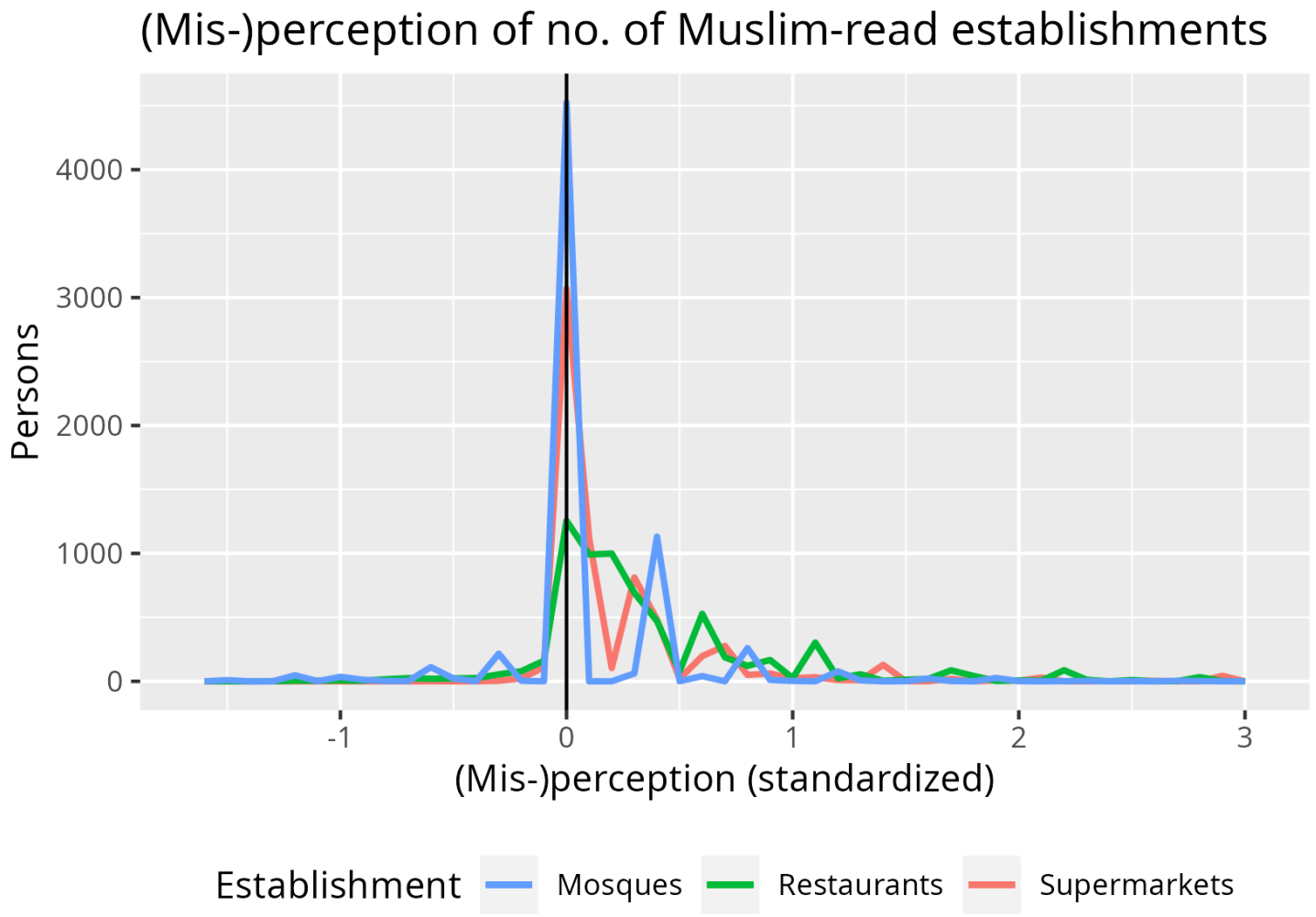


Figure: User drawn living areas (polygons, max. area = 10 km2) and 'Muslim-read' establishments in Berlin



- Usually overestimations; but also many true `0`
- No clear pattern of correlation with opposition to new establishments
- If anything: Those oppose most with (known) no establishment at all, particularly mosques (but: spurious)
- Not sure if valuable, more work needed

Figure: Distribution of standardized (mis-)perceptions of no. of Muslim-read establishments in self-defined residential area

Interim conclusion and next steps

- Digitally measuring individual residential areas works reasonably well with available tools already available (we'll publish our example code)
- Response rate and data quality might be increased by:
  - Map as central survey element; surveying precise not rough shapes
  - Map zoom based address search (but: might irritate given anonymity)
  - Free drawing of shape or fine grids with adding/erasing
  - No minimum size
- **Next:** In a cooperation we'll compare our self-defined residential areas to those collected *via analog maps* by Vief et al. (2021) for Berlin and examine:
  - Differences by measurement and congruence with administrative units
  - Heterogeneity within larger spatial units

References

Agafonkin, (2023). Leaflet - an open-source JavaScript library for mobile-friendly interactive maps. https://leafletjs.com/

Herda, D. (2010). How Many Immigrants?: Foreign-Born Population Innumeracy in Europe. Public Opinion Quarterly, 74(4), 674–695. https://doi.org/10.1093/poq/nfq013

McCartan, C., Brown, J. R., & Imai, K. (2024). Measuring and Modeling Neighborhoods. American Political Science Review, 1–20. https://doi.org/10.1017/S0003055423001429

Rios, K., Sosa, N., & Osborn, H. (2018). An experimental approach to Intergroup Threat Theory: Manipulations, moderators, and consequences of realistic vs. symbolic threat. European Review of Social Psychology, 29(1), 212–255. https://doi.org/10.1080/10463283.2018.1537049

Vief, R., Krüger, D., Blokland, T., Schultze, H. (2021). Do Neighborhoods Have Shapes? Studying Urban Practices and the Contours of the Imagined Neighborhood. RC21 Conference (online).

Wong, C., Bowers, J., Rubenson, D., Fredrickson, M., & Rundlett, A. (2020). Maps in People's Heads: Assessing a New Measure of Context. Political Science Research and Methods, 8(1), 160–168. https://doi.org/10.1017/psrm.2018.51

Misperception Standardization

- Given misperception mp, perceptipn p, benchmark b for individuals i, we perform a classic z-standardization, but with the mean $\overline{p}$ replaced by benchmark b

$$mp = \frac{p_i - b}{\sigma}, \quad where \quad \sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(p_i - b)^2}$$

- As self-defined residential areas are unique to each individual, there is no standard deviation for, e.g., the perceived number of mosques. In these cases, we estimate σ for all $b \in B$ (grouping higher value b's).
- The sensibility threshold for overestimation is 3σ.