

Evaluating Cycling Routes in a Bicycle Simulator

Frauke Luise Berghoefer, Mark Vollrath

Technische Universität Braunschweig | Traffic and Engineering Psychology

f.berghoefer@tu-braunschweig.de | Phone +49 (0) 531 391-3654

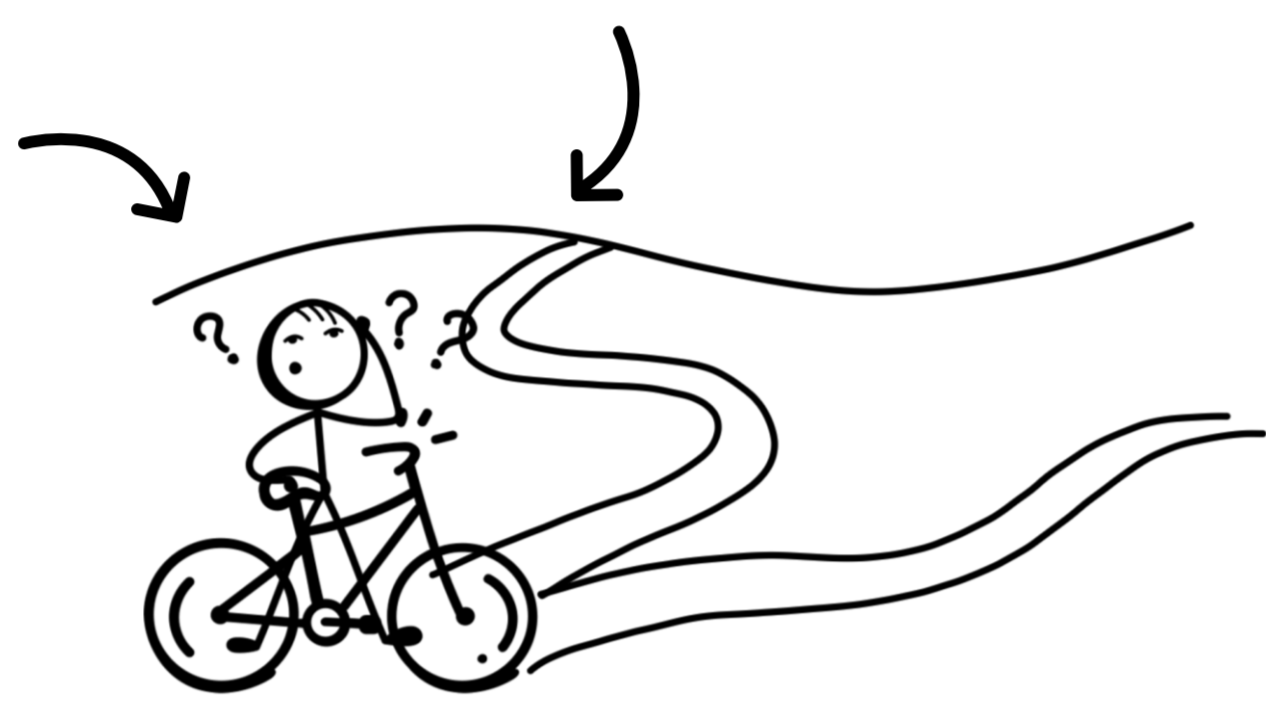
Background

Attributes

Facility type, traffic volume, stops, surrounding, ...
(e.g., Vedel et al, 2017; Zimmermann et al., 2017)

Criteria

Mental Comfort, Interaction, Comfort, Surrounding, Ease of Use
(Berghoefer & Vollrath, 2022)



Q1) How are attributes rated on criteria?

Q2) How are routes (or the combination of attributes) ranked?

Bicycle Simulator Study

39 Participants...

- 17 female; 22 male
- Age range 20-66 years ($M = 27$; $SD = 7.5$)
- Mostly daily cyclists

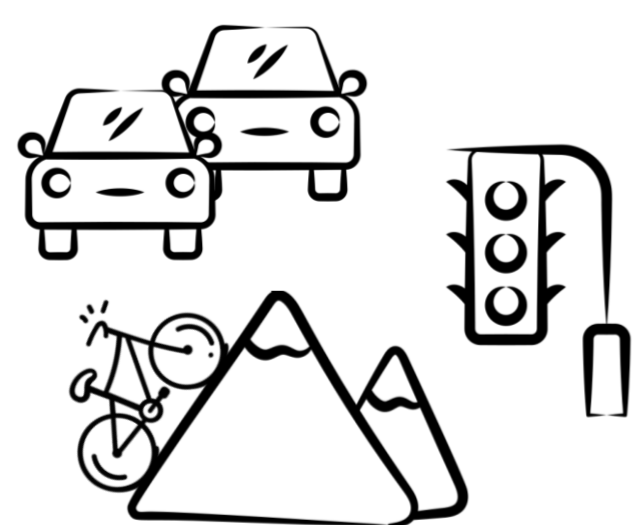


... cycled 13 scenarios with...

- various cycling facilities

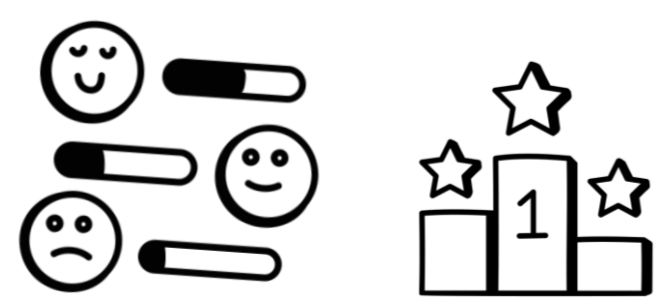


- high or low traffic volume
- signalized intersection
- unsignalized intersection
- gradient



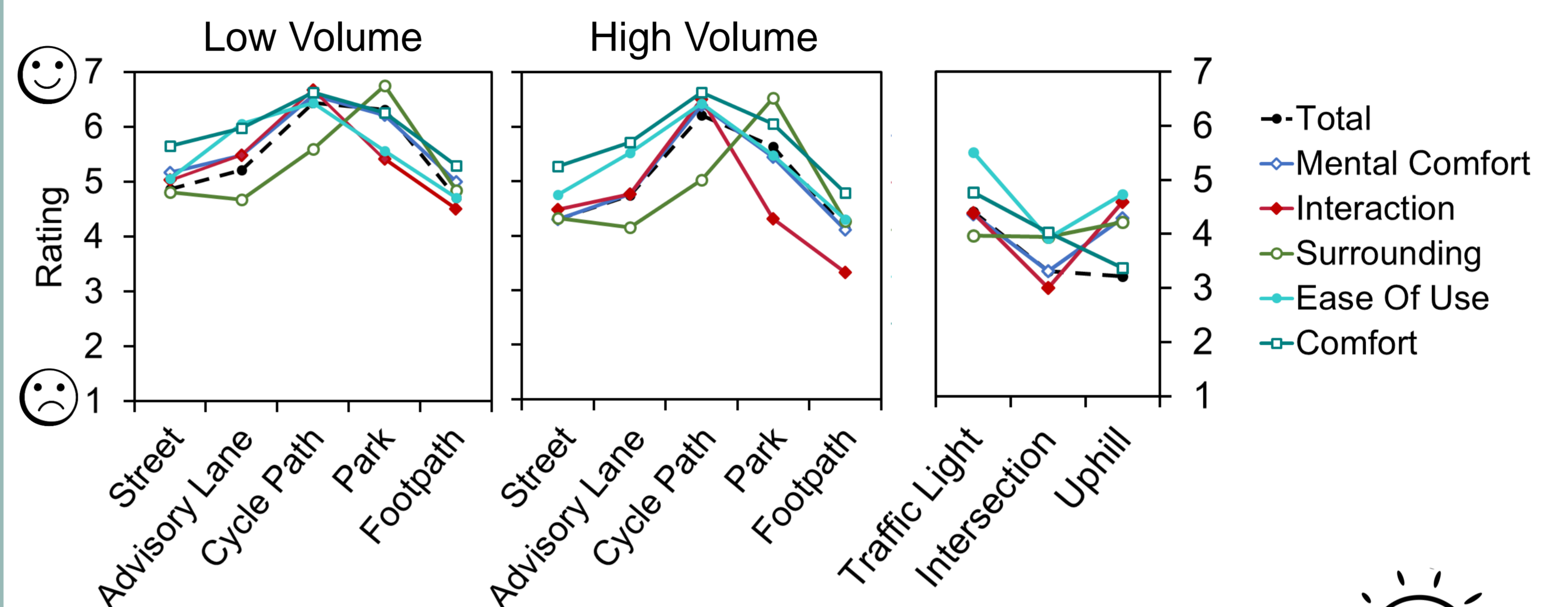
... and were asked to...

- evaluate the scenarios in total [1-7] and on the five criteria [1-7]
- describe the best and worst aspect in the scenario
- rank the scenarios



Results

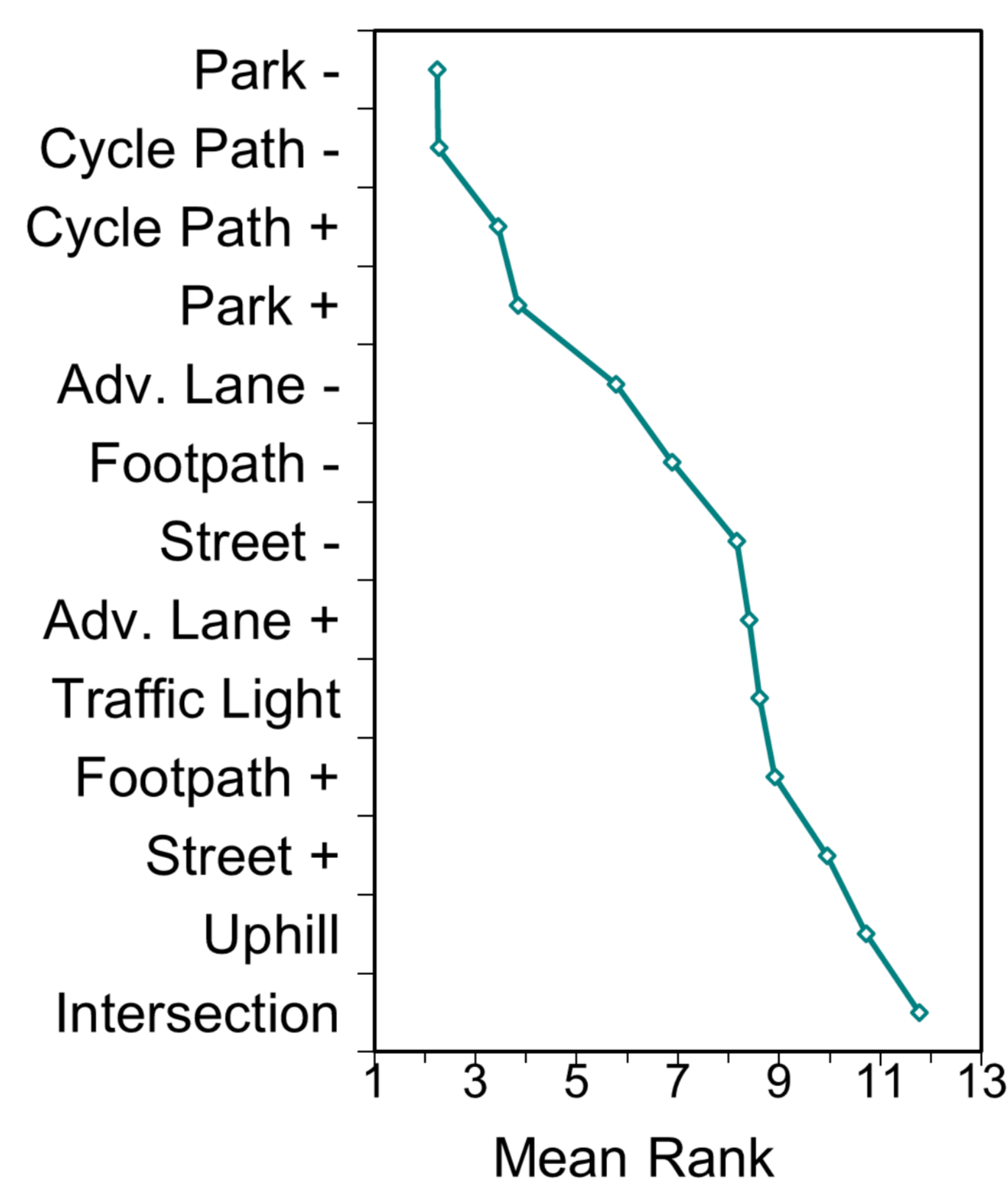
Q1) Evaluation of Route Attributes



- Pedestrians are interactive, but less stressful
- Cars are less interactive, but more stressful
- The total rating follows Mental Comfort, but not uphill



Q2) Ranking of routes



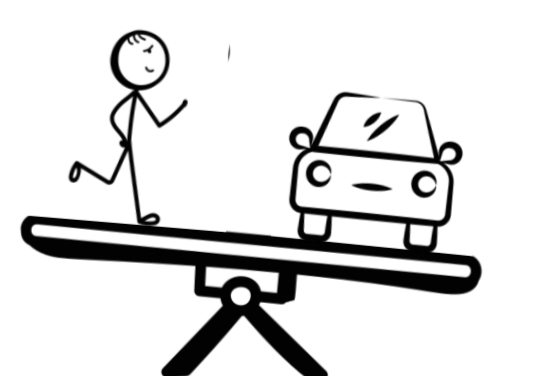
- Park and Cycle Path share a rank, even with high volume (although Park is not separated)
- Footpath preferred over street, even with high volume
- No separation with low volume still preferred over weak separation with high volume



Discussion

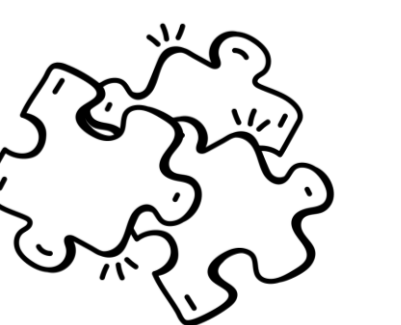
Not every traffic volume is the same.

- The interaction partner determines how stressful the traffic volume is perceived to be.
- That's why sharing might be preferred over separation in some cases



The total rating is more than the sum of its parts.

- Does the importance of the criteria differ between routes?
- Or did we forget a criterion?
- How can we find out?



References

- Berghoefer, F. L., & Vollrath, M. (2022). Cyclists' perception of cycling infrastructure – A Repertory Grid approach. *Transportation Research Part F*, 87, 249-263. <https://doi.org/10.1016/j.trf.2022.04.012>
- Vedel, S. E., Jacobsen, J. B., & Skov-Petersen, H. (2017). Bicyclists' preferences for route characteristics and crowding in Copenhagen – A choice experiment study of commuters. *Transportation Research Part A*, 100, 53-64. <https://doi.org/10.1016/j.tra.2017.04.006>
- Zimmermann, M., Mai, T., & Frejinger, E. (2017). Bike route choice modeling using GPS data without choice sets of paths. *Transportation Research Part C*, 75, 183-196. <https://doi.org/10.1016/j.trc.2016.12.009>
- Icons made by smashingstocks from @flaticon

