

Perceived cycling safety during Corona times – Results of a longitudinal study in Germany

Angela Francke*, Paul Papendieck**, Lisa-Marie Schaefer***, Juliane Anke****

* Cycling and sustainable mobility
University of Kassel
Mönchebergstraße 7
34125 Kassel, Germany
email: angela.francke@uni-kassel.de

** Cycling and sustainable mobility
University of Kassel
Mönchebergstraße 7
34125 Kassel, Germany
email: paul.papendieck@uni-kassel.de

*** Traffic and transportation psychology
Technische Universität Dresden
01062 Dresden
email: lisa-marie.schaefer@tu-dresden.de

**** Traffic and transportation psychology
Technische Universität Dresden
01062 Dresden
email: juliane.anke@tu-dresden.de

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1 INTRODUCTION

With the beginning of the COVID-19 outbreak and the restrictions put in place to prevent an uncontrolled spread of the virus, the circumstances for daily activities changed. A remarkable shift in the modal split distribution was observed. Cycling was seen as a reliable and resilient option in pandemic times as it allowed social distancing and poses a low risk of contagion. There are detailed studies on the effect of the pandemic on cycling traffic all over the globe which used different data sources, like app data, counters or surveys [1][2]. Apart from the citizens' behavioral responses to the corona pandemic, the municipalities also put up interventions that were meant to support a shift to cycling-based movements in cities. The question to discuss is what changes will be permanent and which changed circumstances, e.g. increased subjective safety, lead to a long-term change of mobility patterns.

The changes in mobility during the COVID-19 pandemic had different impacts on road traffic collisions and road deaths in different countries. While there was a reduction of both indicators in 32 out of 36 countries in April 2020 compared to April 2019, there was an increase in the other four countries [3]. Others also found a reduction of traffic fatalities in 23 out of 24 countries in 2020 compared to a baseline of the previous years (2017-2019), the only exception being Switzerland [4].

The subjective well-being has also changed differently for the different transport modes throughout the pandemic. For example, in April 2020, 9% of respondents said they would feel more comfortable or much more comfortable if they used or would use a bicycle compared to pre-pandemic times; in summer and autumn 2020, this figure was 11%, in spring 2021, it was 13%. In autumn 2021, 15% of respondents said they would feel more comfortable or much more comfortable if they used or would use a bicycle than before the spread of the coronavirus [5].

2 OBJECTIVE

This study aims to assess the safety perception of cycling in Germany, to understand how safety perception changed during and after the restrictions put in place to slow down the pandemic. We want to assess how the different measures influenced the perception and not only compare during the different phases of the pandemic

but also compare between the different modes of transport used mainly. We also want to analyze if experienced cyclists or newly started cyclists show different perceptions.

With these results we will come up with conclusions how to use this knowledge to further enhance safety perceptions of cycling in Germany, and beyond.

3 METHODOLOGY

As part of a longitudinal study, several data collection points of a large-scale survey on the topic of mobility during the pandemic allow a detailed analysis of the perceived safety of cycling. The first survey took place in early 2020 right at the beginning of the first lockdown and about 5,000 respondents [2]. We have conducted a second wave of the survey in December 2020/January 2021 with about 1,500 people participating. A third wave was rolled out in April 2022 with a sample size of 1,000 participants.

The respondents were asked to put a personal code in order to be able to combine the three data sets and to see longitudinal effects. Further findings will emerge from the integrated analysis of these analyses which are done in summer 2022. In this way, conclusions can be drawn about the extent to which perceived safety of cycling changed depending on the different conditions during and after different phases of the measures against the spread of COVID-19.

4 RESULTS AND FURTHER ANALYSES

The first step was to analyze the perceived safety of cycling at the time of the first lockdown in early 2020. A sample of 3,364 respondents from Germany was used to record attitudes toward the subjectively perceived safety of road traffic, comparing cycling with other modes of transport. In this first step, the transport modes cycling, driving by car and public transport were investigated. Fig. 1 shows mean values of the modes in question on a scale from 0 (very dangerous) to 100 (very harmless).

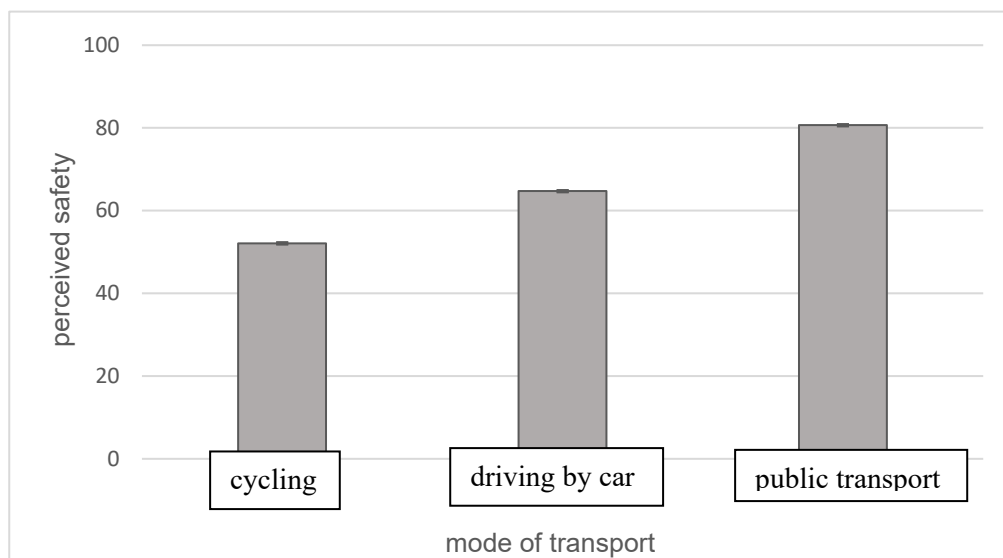


Fig 1. Mean values of perceived safety regarding different modes of transport.

A repeated measures ANOVA (sphericity not assumed: Mauchly-W(2) = .99, $p < .001$) shows that perceived traffic safety in the sample is significantly related to the mode of transport (Huynh-Feldt, $F(1,98,6653.76) = 829.47$, $p < .001$, $\eta^2 = .20$, $n = 3364$). Bonferroni-corrected pairwise comparisons show that perceived traffic

safety is significantly higher for motor vehicles ($M = 64.70$, $SD = 30.80$) compared to bicycles ($M = 52.08$, $SD = 29.84$). The use of public transportation ($M = 80.66$, $SD = 27.21$) is perceived as safer than driving by car and safer than cycling. The effect size f according to Cohen is 0.50, which corresponds to a strong effect [6].

In a second step, it will be investigated to what extent the perceived traffic safety of cycling compared to other traffic options has changed over time. Specifically, because to the different data collection points, this study will be able to compare differences in perceived cycling safety in early spring 2020, early summer 2020, in winter 2021 and spring 2022. In this way, it will be possible to assess whether the perceived cycling safety changed within the first lockdown and how sustainable such an effect might be.

5 PRELIMINARY CONCLUSION

Cycling is one of the environmentally-friendly alternatives to motorized private transport for individual transportation. The mere reduction of cars on the road at the beginning of the first lockdown in 2020 has been enough to alter the safety perception of some people sufficiently enough for them to see cycling as a viable option. The implementation of new bicycle infrastructure also supported this. However, cycling is still seen as a potentially dangerous mode of transport by many. Comparisons from different data collection points will allow conclusions to be drawn regarding the conditions in traffic that lead to perceived safety of cycling and how to promote said cycling safety.

REFERENCES

- [1] Hong, J.; McArthur, D.; Raturi, V., 2020. *Did Safe Cycling Infrastructure Still Matter During a COVID-19 Lockdown?*. Sustainability. 12. 8672.
<https://doi.org/10.3390/su12208672>
- [2] Anke, J., Francke, A., Schaefer, LM., Petzold, T., 2021. *Impact of SARS-CoV-2 on the mobility behavior in Germany*. Eur. Transp. Res. Rev. 13, 10.
<https://doi.org/10.1186/s12544-021-00469-3>
- [3] Yasin, Y.J.; Grivna, M.; Abu-Zidan, F.M., 2021. *Global impact of COVID-19 pandemic on road traffic collisions*. World J Emerg Surg 16, 51.
<https://doi.org/10.1186/s13017-021-00395-8>
- [4] Wegman, F.; Katrakazas, C., 2021. *Did the COVID-19 pandemic influence traffic fatalities in 2020? A presentation of first findings*. IATSS Research. Volume 45.
<https://doi.org/10.1016/j.iatssr.2021.11.005>
- [5] Nobis, C., Eisenmann, C., Kolarova, V., Nägele, S., Winkler, C., Lenz, B., 2021. *Effects of COVID on Mobility Behaviour*.
(<https://verkehrsforschung.dlr.de/en/projects/corotrans-effects-corona-pandemic-logisticsmobility-and-transportation-system/effects>).
- [6] Cohen, J. (1992). *A power primer*. Psychological Bulletin, 112(1), 155–159.
<https://doi.org/10.1037/0033-2909.112.1.155>