



Acceptance of transport policies: A factorial survey experiment in the German Longitudinal Environmental Study (GLEN)

2026

Christiane Bozoyan, Claudia
Schmiedeberg & Henning Best

GLEN Technical Report No. 1

Cite as: Bozoyan, C., Schmiedeberg, C. & Best, H. (2026). Acceptance of transport policies: A factorial survey experiment in the German Longitudinal Environmental Study (GLEN). GLEN Technical Report No.1.
https://doi.org/10.31235/osf.io/dyz7c_v3

1 Introduction

The transport sector is one of the main drivers of greenhouse gas emissions worldwide and substantially contributes to air pollution (European Environment Agency, 2025; Jaramillo et al., 2023). Compared to other sectors, progress on reducing carbon emissions in the transportation sector in Europe is lagging behind (Kreye et al., 2024). The transition to e-mobility is widely regarded as one crucial step to significantly decarbonize the transport sector (Jaramillo et al., 2023). As public support is essential to the feasibility of policy interventions (Anderson et al., 2017; Roddis et al., 2018), how to enhance support for e-mobility policies is a central question.

To gain insight on the level of public support in Germany, a factorial survey experiment on interventions to promote the transition from vehicles with combustion engines to battery electric vehicles (BEVs) was implemented in the GLEN starter survey in January/April 2025 (GLEN, 2026). Factorial survey experiments provide a methodological framework for assessing respondents' attitudes, beliefs, and intended behaviors within an experimental design. In these studies, participants evaluate one or more short descriptions of hypothetical situations that incorporate systematically varied information on relevant attributes. Because these attributes are manipulated independently, factorial surveys allow researchers to isolate the influence of multiple factors that jointly shape judgments. For comprehensive discussions of factorial survey methods, see Auspurg and Hinz (2015), Mutz (2011), and Wallander (2009).

The present factorial experiment is designed to investigate the acceptance of a number of interventions in the field of transport policy currently under debate (e.g., Andor et al., 2020; Hoppe et al., 2023; Schulthoff et al., 2025). These interventions vary in that they either seek to discourage the use of vehicles with combustion engines through regulatory constraints or increased costs, or to promote electromobility by reducing prices of BEVs and improving the available charging infrastructure. In this experiment, the framing of the intervention and the timing of its introduction are varied. It is particularly interesting whether these two factors interact with the type of intervention and whether acceptance in specific subgroups can be increased, for example through framing.

2 Description of the factorial survey experiment

The experimental module was placed roughly in the middle of the questionnaire, embedded in a section on policy interventions. In this section, respondents were also asked about their acceptance of other policy interventions. The introductory text was kept very short, beginning with the question: "Now it is about how electric vehicles could be promoted in Germany." After this, the goal of the intervention (framing) was presented as the first vignette dimension: "The goal is to protect the climate [vs. to reduce dependence on oil imports from other countries]", followed by the respective

intervention: “Please imagine the following: Starting in 2026 [vs. 2030], ...”, with one out of seven different interventions shown. Figure 1 displays an example of the full vignette text.

Figure 1: Vignette example text

“Let’s turn to how electric cars could be promoted. The aim is to protect the climate. Please imagine the following: Starting in the year 2026, charging stations for electric cars would be mandatory in newly built houses.”

After reading the vignette, respondents were asked to answer the following question: “How do you assess this intervention?” using a five-point scale: “strongly oppose”, “somewhat oppose”, “neutral”, “somewhat in favor”, “strongly in favor” (and “no opinion”). Each respondent received one vignette.

In Table 1 we list all possible levels for the three dimensions used in this experiment (see the Appendix for the original German wording). The complete vignette universe consists of $2 \times 2 \times 7 = 28$ vignettes. With 28 vignettes and 16,856 valid answers, this results in an average of 602 responses per vignette.

Table 1: Overview of dimensions and levels

Dimensions	Levels
Framing	(0) To protect the climate (1) To reduce dependence on oil imports from other countries
Year of intervention	(0) 2026 (1) 2030
Intervention	(1) Cars with petrol or diesel engines would be no longer allowed to drive in inner cities. (2) Charging stations for electric cars would be mandatory in newly built houses. (3) The prices for petrol and diesel would be strongly increased. (4) Additional taxes would be charged when purchasing a new car with a petrol or diesel engine. (5) Electricity prices for charging electric vehicles would be significantly reduced. (6) Buyers of a new electric vehicle would receive a government subsidy. (7) Charging stations for electric vehicles in public spaces would be greatly expanded.

In addition to the seven policy interventions included in the final experiment, three additional policy interventions were tested during the pretest. As respondents had difficulty understanding them, they were not included in the final experiment: (1) reduce the number of parking spaces for cars with combustion engines in inner cities; (2) increase parking fees for cars with combustion engines on all public parking spaces; and (3) abolish parking fees for electric vehicles on all public parking spaces. As all remaining vignettes were considered plausible, a full factorial design was implemented.

3 Sample, descriptive results, and data quality

A total of 17,003 respondents participated in the GLEN starter survey. As Table 2 displays, a total of 16,855 vignette evaluations were provided. The item nonresponse rate is 0.33%, and the proportion of respondents who dropped out at or before reaching the question is 0.54%. One respondent's answers were retrospectively anonymized due to a late request for data deletion (0.01%).

Table 2: Case numbers

viglq1	N	Percent
Strongly oppose	3,949	23.23
Somewhat oppose	3,269	19.23
Neutral	3,336	19.62
Somewhat in favor	3,938	23.16
Strongly in favor	2,363	13.90
N	16,855	
Break-off	91	0.54
Item nonresponse	56	0.33
Not available due to a late data deletion request	1	0.01

Table 3 presents the variable names and labels. The vignette data are released as a separate dataset (o2_starter_2025_vig) as part of the release package. To use the vignette data, these can be merged with the other GLEN datasets using the `id` and `survey` variables. This also allows for the analysis of respondent characteristics as well as interactions between participant attributes and vignette dimensions.

Table 3: Variables in the vignette dataset

Variable name	Variable label	Categories (code, label)
id	Respondent ID	
survey	Survey number	2. Starter survey (2025)
viglid	Vignette study on transport policies: vignette id	-11. Not available Codes [1...28] with vignette text
vigl1dim1	Vignette study on transport policies: framing of the intervention	-33. Break-off -11. Not available 0. To protect the climate 1. To reduce dependence on oil
vigl1dim2	Vignette study on transport policies: year of the intervention	-33. Break-off -11. Not available 0. 2026 1. 2030
vigl1dim3	Vignette study on transport policies: type of intervention	-33. Break-off -11. Not available 1. Ban combustion cars in city centers 2. Mandatory EV charging stations in new houses 3. Significant fuel price increase 4. Additional tax on new combustion vehicles 5. Reduced electricity price for EV charging 6. Subsidy for buying new EV 7. Expansion of public EV charging stations
vigl1q1	Vignette study on transport policies: acceptance of intervention	-33. Break-off -11. Not available -2. No answer 1. Strongly oppose 2. Somewhat oppose 3. Neutral 4. Somewhat support 5. Strongly support

References

- Anderson, B., Böhmelt, T., & Ward, H. (2017). Public opinion and environmental policy output: a cross-national analysis of energy policies in Europe. *Environmental Research Letters*, 12(11), 114011. <https://doi.org/10.1088/1748-9326/aa8f80>
- Andor, M. A., Frondel, M., Horvath, M., Larysch, T., & Ruhrort, L. (2020). Präferenzen und Einstellungen zu vieldiskutierten verkehrspolitischen Maßnahmen: Ergebnisse einer Erhebung aus dem Jahr 2018. *List Forum Für Wirtschafts- Und Finanzpolitik*, 45(3), 255–280. <https://doi.org/10.1007/s41025-019-00184-x>
- Auspurg, K., & Hinz, T. (2015). *Factorial survey experiments*. Sage.
- European Environment Agency. (2025). *Emissions of air pollutants from transport*. <https://www.eea.europa.eu/en/european-zero-pollution-dashboards/indicators/emissions-of-air-pollutants-from-transport-indicator>
- GLEN. (2026). *The German Longitudinal Environmental Study: Release 1.0*. Contributors: Auspurg, K., Best, H., Bozoyan, C., Diekmann, A., Schmiedeberg, C., Behringer, T., Emmer, J., Friedrich, M., Joraschek, A., Königer, L., Leßner, L., Ries, F., Schmidt, M., Schick, T., Schütze, P., Wolter, F. (ZA9085; Version 1.0) [Data set]. GESIS, Cologne.
- Hoppe, J., Patt, A., & Tröndle, T. (2023). Public support for phasing out carbon-intensive technologies: the end of the road for conventional cars in Germany? *Climate Policy*, 23(7), 813–828. <https://doi.org/10.1080/14693062.2023.2211042>
- Jaramillo, P., Kahn Ribeiro, S., Newman, P., Dhar, S., Diemuodeke, O. E., Kajino, T., Lee, D. S., Nugroho, S. B., Ou, X., Hammer Strømman, A., & Whitehead, J. (2023). Transport. In I. P. o. C. Change (Ed.), *Climate Change 2022 - Mitigation of Climate Change: Contribution of working group III to the sixth assessment report of the Intergovernmental Panel on Climate Change [P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]* (pp. 1049–1160). Cambridge University Press. <https://doi.org/10.1017/9781009157926.012>
- Kreye, K., Kasten, P., Appenfeller, D., Zimmermann, M., Greinus, A., & Peter, M. (2024). *Verkehrssektor auf Kurs bringen: Szenarien zur Treibhausgasneutralität 2045: Ressortforschungsplan des Bundesministeriums für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz, Abschlussbericht* (Umweltbundesamt Texte 2024/59).
- Mutz, D. C. (2011). *Population-based survey experiments*. Princeton University Press. <https://doi.org/10.23943/princeton/9780691144511.001.0001>
- Roddiss, P., Carver, S., Dallimer, M., Norman, P., & Ziv, G. (2018). The role of community acceptance in planning outcomes for onshore wind and solar farms: An energy justice analysis. *Applied Energy*, 226, 353–364. <https://doi.org/10.1016/j.apenergy.2018.05.087>

- Schulthoff, M., Anstett, P., Lange, J., Arend, D., Gencer, E., & Kaltschmitt, M. (2025). Federal transformation costs of e-mobility in Germany: Effectiveness and efficiency of EV incentives between 2015 and 2023. *Transportation Research Interdisciplinary Perspectives*, 31, 101435. <https://doi.org/10.1016/j.trip.2025.101435>
- Wallander, L. (2009). 25 years of factorial surveys in sociology: A review. *Social Science Research*, 38(3), 505–520. <https://doi.org/10.1016/j.ssresearch.2009.03.004>

Appendix: Original German wording

Dimensions	Levels
Framing	[Damit soll ...] (0) das Klima geschützt werden (1) die Abhängigkeit von Öl-Importen aus anderen Ländern verringert werden
Year of intervention	[Ab dem Jahr ...] (0) 2026 (1) 2030
Intervention	(1) ... dürften Autos mit Benzin- oder Dieselmotor nicht mehr in Innenstädten fahren. (2) ... würden bei neu gebauten Häusern Ladestationen für Elektro-Autos Pflicht. (3) ... würden die Preise für Benzin und Diesel stark erhöht. (4) ... fielen beim Kauf eines neuen Autos mit Benzin- oder Dieselmotor zusätzliche Steuern an. (5) ... würden die Strompreise für das Laden von Elektroautos deutlich gesenkt. (6) ... bekäme man beim Kauf eines neuen Elektroautos einen staatlichen Zuschuss. (7) ... würden Ladesäulen für Elektroautos im öffentlichen Raum stark ausgebaut.