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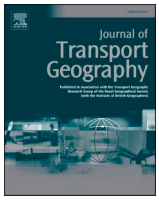

Support for car-restrictive policies between individual affectedness, eco-consciousness, and fear of ecological gentrification. Evidence from a vignette analysis in Berlin

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ABSTRACT

As cars account for about one sixth of all greenhouse gas emissions in Germany, a sustainable transformation of the German transport system is essential to combat climate change. However, effective policies to reduce private car use are often broadly unpopular. To better understand why, we conducted a representative survey of residents in two densely populated Berlin neighborhoods with extensive public transportation infrastructure in 2021 ($N = 1041$). With the help of the local municipality, we constructed three hypothetical scenarios (vignettes) of varying intrusiveness in restricting parking and other spatial privileges of private cars. We aim to identify the role of different individual-level factors for the acceptance of such policy measures: individual affectedness (habits of using private cars and other modes of transport), awareness of local problems caused by motorized private transport, general eco-consciousness, socio-economic status, and fear of rising rents in the neighborhood caused by the proposed policies. We find that individual affectedness, fear of rising rents, eco-consciousness, and, to a lesser extent local problem awareness explain about 56 % of the variation in residents' support for the policy. The socioeconomic status of residents (income, educational attainment, relative deprivation) is not an effective indicator of how they perceive car-restrictive policies. The fear of rising rents has not been widely acknowledged as a factor driving resistance to car-restrictive policies, and thus merits greater attention from both researchers and politicians.

1. Introduction

To avoid the potentially catastrophic effects of unchecked climate change and to meet the goals of the Paris Climate Agreement, a sustainable transformation of the transport system is essential (Creutzig et al., 2015). This is particularly true in industrialized countries such as Germany, which have far above-average per capita CO2 emissions. Roughly one sixth of all greenhouse gas emissions in Germany come from cars and motorcycles (Günther, 2023; own calculations, based on Allekotte et al., 2022). Paths to an environmentally sustainable mobility system were first suggested thirty years ago (Holden et al., 2019; Hesse, 1995; Canzler and Knie, 1998) since then, however, CO2 emissions from transport in Germany have remained almost constant. In particular, this is due to the fact that the share of motorized individual transport has not been significantly reduced, while overall transport has increased (Hill et al., 2019). As of January 2022, there were 580 passenger cars registered per 1000 inhabitants in Germany, up from 517 in 2011 (Federal Statistical Office of Germany, 2022). Of the 137 countries for which data are available, only Japan, the US and China had a higher absolute number of registered passenger cars than Germany (OICA, 2023), countries with considerably larger populations.

Private cars enjoy direct political support in Germany (e.g., commuters' tax allowance, tax privileges for using a private car for work) and indirect support through the creation of favorable regulatory conditions (Hermann et al., 2019). This includes, among other things, the possibility to park private cars free of charge in public spaces in most locations (Canzler et al., 2018). Given the importance parking availability plays in modal choice it is not surprising that a recent meta-analysis of measures to reduce motorized individual transport in European cities ranked parking reduction as one of the most effective measures (Kuss and Nicholas, 2022). But while parking policies and other measures to re-distribute public space are highly effective in reducing

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car use, their acceptability among residents tends to be low (Hysing and Isaksson, 2015; Schade and Schlag, 2003; Gössling and Cohen, 2014; Levi et al., 2021). Such measures are referred to as "push measures", which aim to make car use less attractive (Pressl et al., 2017; Becker, 2016; Schwedes and Riedel, 2011/2016; Loukopoulos and Scholz, 2004; Pucher and Buehler, 2008). In contrast, "pull measures" aim to increase the attractiveness of modes of transport other than private cars. The literature suggests that push measures regularly meet with less acceptance than pull measures (Hölzer, 2003; Rienstra et al., 1999; Steg and Vlek, 1997; Shoup, 2014; Steg, 2005).

Society's perception of cars and a car-oriented transport policy in Germany has started to change (Ruhrort, 2019). In 2015, for example, an initiative in Berlin collected around 100,000 signatures to demand bicycle-friendly road infrastructure (von Schneidemesser, 2021) and similar initiatives were subsequently launched in other German cities such as Munich or Hamburg. In 2019, there were massive protests against the International Motor Show (IAA) for the first time in decades. In the same year, a green mayor was elected in Hannover whose election program included a car-free city center. Simultaneously, a growing body of research suggests that the acceptance of push measures across the population can be changed. Studies on road pricing, for instance, have shown that temporary implementation of such measures can increase their acceptance (Schuitema et al., 2010). In recent years, cities in Europe and around the world have started to experiment with temporary or permanent implementation of car-restrictive policies at a large scale (e.g., Vienna, Barcelona, Paris, Berlin) (Bauer et al., 2023).

Although recent studies have demonstrated a high level of acceptance for at least certain traffic-restrictive policies in urban neighborhoods (Baumgartner, 2022; Kirschner and Lanzendorf, 2020), the underlying factors that drive support or opposition to such policies have yet to be systematically assessed and compared empirically. The objective of this study is to make a systematic contribution to the existing literature on the factors that explain why support for car-restrictive measures of varying intrusiveness differs across disparate groups of urban residents. This will be achieved by evaluating the theoretical arguments and/or empirical insights that have been previously put forward in this context and testing these different factors against each other.

For this end, we conducted a representative survey of residents in two densely populated neighborhoods that offer extensive public transport options in Berlin ($N = 1041$), Germany's capital and largest city, in 2021. We worked closely with the local municipality to construct three hypothetical scenarios of varying intrusiveness in restricting parking and other spatial privileges of private cars that are realistic and believable given local conditions. We aim to ascertain the role of the following factors in the support for such hypothetical measures: Affectedness by the proposed measures, habits of using private cars and other modes of transport, awareness of the problems caused by motorized individual transport in their neighborhood, general eco-consciousness, socioeconomic status, relative deprivation, and the fear of rising rents in the neighborhoods caused by the proposed policy measures (ecological gentrification). In order to account for the interdependence of these factors, we applied a path model to test a set of hypotheses. Our findings indicate that fear of ecological gentrification represents a major but previously underreported impediment to the broader acceptance of car-restrictive policies.

2. Theoretical background

Measures that reduce the number of parking spaces are effective interventions because they reduce both the everyday use of private cars and private car ownership (Weinberger et al., 2009; Antonson et al., 2017). However, these measures are most effective when combined with pull measures (e.g., increasing local car-sharing offerings) to achieve their full potential in encouraging modal shift towards more sustainable modes of transport (Antonson et al., 2017). In addition to reducing the number of parking spaces, imposing high parking fees or a congestion charge are considered effective but less socially acceptable push measure (Kuss and Nicholas, 2022).

The implementation of car-restrictive measures requires a combination of political willingness and planning readiness from the top and local willingness and public acceptance from the bottom (Selzer, 2021). However, measures that reallocate public space away from private cars or increase the financial cost of using public space for private cars have often proved to be emotional issues (Bracher, 2011). They repeatedly become the subject of heated local political discussions. For example, in a European study, over 90 % of car users supported improved public transport and park-and-ride schemes, while less than 20 % approved of reduced parking space and cordon pricing (Dümmler and Hahn, 2011/2016). Steg and Schuitema, 2007 summarize the problem of effective push measures and less effective pull measures as follows: "Effective policies are generally not acceptable to the public, while policies that are acceptable are generally not effective in reducing problems resulting from car use" (Steg und Schuitema 2007, 348).

A number of studies have been conducted since the 1990s to better understand what factors might influence the acceptance of push measures. The vast majority of them focused on pricing instruments, such as road pricing and congestion charging (Nilsson et al., 2016; Schuitema et al., 2010; Eliasson, 2008; Gärling and Schuitema, 2007; Schaller, 2010; Grisolía et al., 2015). The main factors influencing the acceptance of push measures to reduce private car use can be roughly divided into two categories. The first category consists of factors that vary across different policy measures, mainly their perceived effectiveness in terms of solving the problems they are targeted at (Kallbekken et al., 2013; Schuitema et al., 2010; Bamberg and Rölle, 2003) and their perceived fairness including the expectation of negative effects on poorer residents (Kallbekken et al., 2013; Schuitema et al., 2011; Eriksson et al., 2006). The second category are factors that vary across the population exposed to such measures: Individual affectedness, general and local problem awareness, mode of transport choice, socio-economic status, and exposure to/fear of ecological gentrification. The objective of our study is to examine the individual-level factors influencing the acceptance of measures to reduce parking space. Each of these factors but also their co-dependence on other factors will be discussed in more detail below.

2.1. Individual affectedness

The expectation of being negatively affected by the consequences of a policy measure is not the only explanatory factor for its acceptance but, according to the literature, of great importance (Schuitema et al., 2010; Schade, 2005; Jakobsson et al., 2000; Kallbekken et al., 2013). In particular, residents who frequently use private cars are most affected by the proposed policies. Numerous studies have shown that support for car-restrictive push measures is higher among people who use private cars less often (Steg, 2003; Schade, 2005; Schuitema et al., 2010; Jaensirisak et al., 2005).

A study by Andor et al. (2020) suggests that transportation use is two-dimensional in its effect on support for car-restrictive policies. They find that support for push measures is higher among German residents that frequently use alternative transportations modes in addition to private cars (Andor et al., 2020). Individual experiences with multimodal mobility increase preferences for car-restrictive measures potentially because people who regularly use alternative means of transport or could easily do so, would not only be negatively affected by such measures but would also profit from them (Kirschner and Lanzendorf, 2020). Furthermore, it is likely that they will find it easier to adapt to car-restrictive measures because they are already familiar with alternatives and do not have to learn to do something entirely new (Baumgartner, 2022). On the contrary, Nilsson et al. (2016) show that car use is considerably more important to explain support for car-restrictive measures like a congestion tax than ease of use of alternative modes of transport.

*Hypotheses: As numerous previous studies have found (*Andor et al., 2020*;* Kallbekken et al., 2013*;* Schade, 2005*;* Nilsson et al., 2016*;* Schuitema et al., 2010*;* Hamilton et al., 2014*), we expect that residents who use private cars more often (**H1a**) and alternative modes of transportation less (**H1b**) are less supportive of car-restrictive policies.*

2.2. Problem awareness

Studies on the acceptability of road pricing measures show that a high problem perception with regard to the problems caused by private car use is a necessary prerequisite (Eliasson and Jonsson, 2011; Schade and Schlag, 2003; Schlag and Schade, 2000). The problems of car traffic are particularly evident in dense inner-city neighborhoods in large cities where public space is often experienced as a scarce commodity in everyday life. Parking is scarce, traffic jams are common, and noise and air pollution reach critical levels more quickly. But even beyond local problems caused by car traffic, reducing private car use may help to solve problems wider than the local situation: protecting the environment and reducing emissions that cause global warming. High eco-consciousness therefore indeed has been found to increase the acceptance of car-restrictive policies (Hamilton et al., 2014) although it remains unclear if this in addition to local problem awareness. At the same time, eco-consciousness is an important motivation for individuals to own and use fewer private cars (e.g., Flamm, 2009). This raises the question whether the effects of eco-consciousness, local problem awareness, and car ownership/usage are indeed independent of each other, which has not been previously accessed.

Hypotheses: Residents who are less aware of local problems caused by car traffic (Eliasson and Jonsson, 2011; Schade and Schlag, 2003; Schlag and Schade, 2000) ***(H2a)*** *and less environmentally aware in general (*Hamilton et al., 2014*) **(H2b)** are less supportive of implementing car-restrictive policies in their neighborhoods. Furthermore, residents with higher eco-consciousness use private cars less frequently in favor of alternative modes of transport* (e.g., Flamm, 2009)*, further increasing their support for car-restrictive policies (see above) **(H2c)**. These effects are independent of each other **(H2d)**.*

2.3. Socioeconomic status

Previous studies on the acceptability of car-restrictive policies have somewhat neglected the influence of memberships in different socio-demographic groups. This neglect may be justified, as household income has only been found to be relevant for policy evaluation in the case of price-based measures, such as road pricing and parking fees (Hamilton et al., 2014; Kirschner and Lanzendorf, 2020; Kirschner, 2021), not regarding other car-restrictive measures (Andor et al., 2020). Household income levels neither reliably predict pro- nor anti-environmental attitudes (Eversberg, 2022). However, a higher household income generally increases the likelihood of owning private cars, including in Berlin (Gerike et al., 2019a), which means high-income households are more affected by car-restrictive policies (see above).

But it may be the subjective, not material, aspects of economic deprivation that lead to skepticism about car-restrictive policies. Individuals who suffer relative deprivation, i.e., feel that they are not getting their fair share compared to others, or who experience status anxiety, i.e., are anxious about losing their social status in the future due to societal change, may tend to perceive green policies as a threat (Reitz and Jörke, 2021).

Household income as an indicator of values and lifestyle choices has generally become unreliable, especially in urban contexts, where a new middle class has emerged in recent decades. This socioeconomic group is characterized not (only) by high household income, but (additionally) by high educational attainment, appreciation of broad cultural offerings in their neighborhoods, higher eco-consciousness, and a stronger focus on sustainability than the "old" middle class defined by household income levels (Dangschat et al., 2012; Neckel, 2018). Indeed, there has been a cycling boom in German cities that is largely driven by highly educated residents (Hudde, 2022) who tend to reside in central neighborhoods with high public transport accessibility (George et al., 2025; George and Salomo, 2025). Similarly, eco-consciousness is higher among highly educated Germans (UBA, 2023). Support for sustainability, eco-consciousness, and multimodal daily mobility behavior of the highly educated may lead them to favor car-restrictive policies in urban contexts.

*Hypotheses: For the first time, we test if residents that feel they do not get their fair share in society are less supportive of car-restrictive policies **(H3)**.*
*While the effect of household income on support of implementing local car-restrictive policies has been found to be unsystematic (*Andor et al., 2020*), we assume that this is because of two different underlying factors, and expect, that residents with higher household incomes are more supportive of car-restrictive policies because they are less affected by relative deprivation **(H5a)**. However, we also expect that they use private cars more often and alternative modes of transport less than others and are for that reason less supportive of car-restrictive policies **(H5b)**.*
Building on Andor et al. *(2020), we further predict: Residents with higher educational attainment are more supportive of car-restrictive policies. Going beyond previous literature, we predict that this is because they experience lower levels of relative deprivation **(H4a)**, are more aware of local problems caused by car traffic **(H4b)**, are more eco-conscious **(H4c)**, and use alternative modes of transport more frequently **(H4d)**.*

2.4. Ecological gentrification

A further contrast between the "old" and "new" middle class is the preference of living in inner-city districts among the former compared to a preference for suburban residential areas among the old middle class (Reckwitz, 2021; Jonas et al., 2016; Florida, 2019; George et al., 2025; George and Salomo, 2025). This trend has contributed to the displacement of other inner-city residents in German cities and elsewhere (Sterzer, 2017; Srinivasan et al., 2020; Hochstenbach and Musterd, 2018; Dohnke et al., 2012) a process generally subsumed under the term gentrification. More recently, the term "ecological gentrification" has been coined to describe the phenomena of environmental, traffic, or noise reduction policies that not only increase local livability but also raise rents, thereby displacing even more people from formally socio-economically diverse or even low-income urban neighborhoods (Cucca and Ranci, 2019; Checker, 2011; Weaver and Knight, 2018; Goossens et al., 2020). Ecological gentrification is part of a wider discussion about the conditions for a "just transition" towards sustainability that fairly distributes its benefits and burdens (Carley and Konisky, 2020). However, most of the findings so far relate to the United States, only some of them deal with transport-related measures and no such study has been conducted in Germany.

*Hypotheses: For the first time, we test whether residents who worry that the proposed policy measures might lead to rising rents in their neighborhood are less supportive of car-restrictive policies **(H6)**.*

Figure 1 displays all hypotheses as a directed acyclic graph or DAG. We include control variables for age, gender, if children below the age of 16 live in the household, and migration background of respondents because these factors have been shown to influence daily travel behavior to some degree (Dėdelė et al., 2020; Joan and Gracia, 2022; Goel et al., 2023; Roos et al., 2020; e.g., Cassel et al., 2013).

3. Data and methods

Vignette analysis is a common method for assessing support for policy measures (e.g., Busemeyer and Goerres, 2020). Presenting all

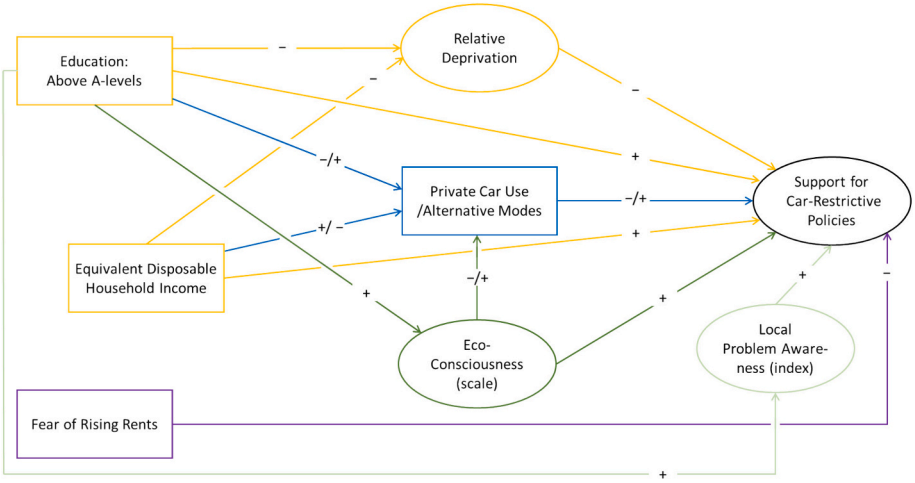


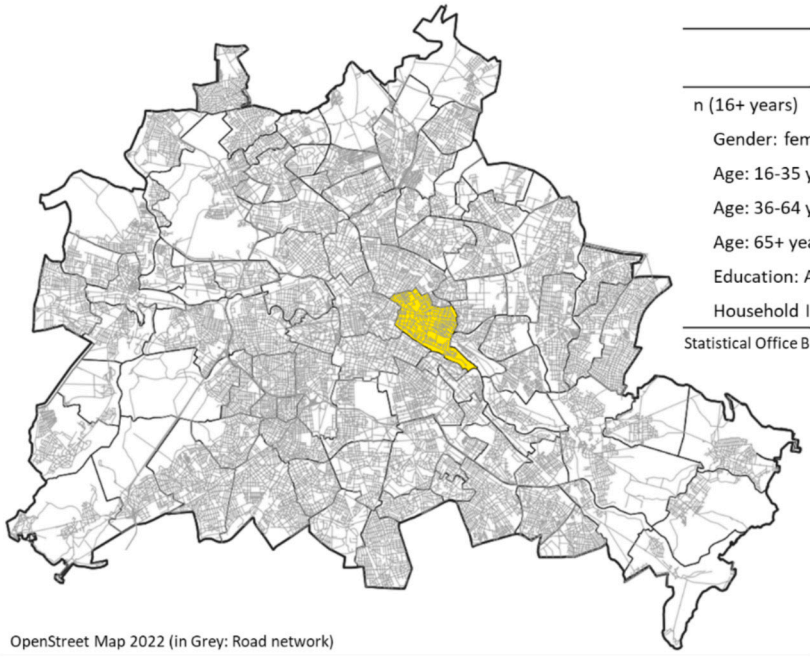
Fig. 1. Hypotheses (DAG).

respondents with a large number of theoretical meaningful scenarios in a single vignette is often impractical. Instead, respondents often are presented with a subset of vignettes selected according to a factorial or random design, resulting in experimental vignette data (Atzmüller and Steiner, 2010). While common, this approach was incompatible with our research objective, which was to assess general support for specific, realistic scenarios for reallocating public space currently occupied by private cars. The only meaningful variation between different scenarios was the degree of radicalism involved in the suggested reallocation, ranging from reallocating one in ten parking lots to establishing a practically car-free neighborhood. It was therefore important to ensure that respondents were aware of these differences. Vignette analyses, however, are exceedingly versatile (Thom Baguley, 2021) and we decided on a non-experimental approach, presenting three different vignettes to all respondents in order of increasing intrusiveness.

3.1. Data

To ensure the scenarios described by each vignette reflect real-world conditions as closely as possible, we conducted the survey in two neighborhoods in the district of Friedrichshain-Kreuzberg in Berlin. While there are potentially thousands of suitable urban neighborhoods in Germany, we utilized existing contacts to the civil engineering department of the district of Friedrichshain-Kreuzberg in Berlin. This allowed us to develop hypothetical scenarios in accordance with the local department of public works responsible for streets and green spaces that could realistically be implemented. Fig. 2 shows the district within the city of Berlin and provides some basic socio-demographic information about the population of the district compared to our sample.

A study conducted in 2018 characterized the mobility behavior of residents in Friedrichshain-Kreuzberg in comparison to the mobility behavior of residents in Berlin as a whole (Gerike et al., 2019a, 2019b): A noteworthy 80 % of residents resided within a 10-min radius of a metro station, a figure that markedly exceeds the citywide average of approximately 40 %. The accessibility of other public transportation options, including buses and various train systems, is comparable to the Berlin average. In consequence, residents of Friedrichshain-Kreuzberg are less likely to possess cars or motorcycles than the Berlin average.



	Friedrichshain-Kreuzberg	Sample
n (16+ years)	250.178	1.041
Gender: female	49 %	49 %
Age: 16-35 years	37 %	32 %
Age: 36-64 years	51 %	50 %
Age: 65+ year	12 %	15 %
Education: Above A-levels	73 %	72 %
Household Income: 1500+ €	67 %	84 %

Statistical Office Berlin-Brandenburg, as of June 30, 2021; own calculations

Fig. 2. Location Friedrichshain-Kreuzberg and basic statistics.

Specifically, 59 % of residents in Friedrichshain-Kreuzberg do not own individualized motorized transport, compared to 42 % across Berlin. However, if they do own cars, they are similarly likely to use them and, importantly, are more likely to park them on the side of public streets. Indeed, 73 % of residents in Friedrichshain-Kreuzberg park their first car on the street, compared to 52 % in Berlin as a whole. This results in Friedrichshain-Kreuzberg being a neighborhood where a minority of car users, who are likely able to utilize available public transport options, occupy a disproportionate amount of public street space with cars and motorcycles. The two neighborhoods in Friedrichshain-Kreuzberg, while not representative of all neighborhoods in major German cities, are illustrative of typical neighborhoods where parking restrictions may be reasonably implemented.

Addresses of respondents aged 16 and over in the Friedrichshain-Kreuzberg district were randomly selected from the population registers of the Berlin State Office for Civil and Regulatory Affairs. Selected respondents received an invitation for an online survey via mail, available in German and English. Out of 5400 contacted respondents, 1095 filled in the online questionnaire between the 18th of June and 12th of July in 2021. Out of these, 51 respondents were excluded from the final sample because their reported age or gender did not match official population register data (non-eligible) and a further 3 respondents because they refused to answer most questions or took an unreasonable short amount of time to fill in their answers (partial interviews). That leaves 1041 respondents in our analytical sample, corresponding to a net response rate of 19.5 % (calculated as RP3 response rate as defined in AAPOR, 2016) with the estimated proportion of cases of unknown eligibility that are eligible assumed to be equal to the proportion of eligible units among all units in the sample. Statistical weights correct the distribution of age, gender, nationality (German/other) and place of residency within the district (Friedrichshain or Kreuzberg) in accordance with the district's officially registered population (Fig. 2).

3.2. Variables

The three scenarios suggesting reallocation of public space at the expense of private cars are presented in Table 1, including mean average, standard deviation, and percentage of non-response answers (see Table A1 in the Online Supplement for a full description of the scenarios as presented to the respondents including maps and photos). Scenario 1 involves reallocating one in ten parking spaces to other uses. Scenario 2 describes the removal of all parking spaces in a given neighborhood. Scenario 3 goes one step further and defines a car-free neighborhood, in which the use of the streets by cars is no longer possible, with defined exceptions. Depending on which part of Friedrichshain-Kreuzberg respondents lived in, they were shown either a version that placed these measures in a neighborhood called Graefekiez (Kreuzberg) or in Samariterkiez (Friedrichshain) (see Fig. 2). In both cases, the description of the scenarios emphasized that measures would take place in the immediate neighborhood of respondents' homes. In contrast to other studies on the acceptance of such policies (Andor et al., 2020; Börjesson et al. 2016; Kallbekken et al., 2013; Schade and Schlag 2004), our focus is deliberately on a "radical" redistribution of traffic space.

Our hypotheses posit that a number of factors influence support for car-restrictive policies. These include local problem awareness as well as eco-consciousness, private car use and use of alternative modes of transport, car ownership, socioeconomic status of respondents (household income, educational attainment, subjective deprivation), and fear of rising rents. We also include control variables for age, gender, household size, and migration background of respondents in our analysis. Table 2 provides an overview of how we measured each concept, as well as the mean, average, standard deviation, and percentage of non-response answers for each variable.

Table 1
Scenarios for reallocating public space at the expense of private cars.

Scenario	Mean	SD	Miss.
(1) More space for green areas and other uses On all streets in the neighborhood, more space will be created for green areas, bicycle parking, seating, and stop zones for delivery vehicles. For this purpose, every tenth parking space will be reallocated. Only short stops for loading and unloading will be allowed in dedicated stopping zones. Response categories: 1 very negative to 6 very positive.	4.38	0.051	1.78 %
(2) Traffic-calmed neighborhood without parked cars, more green spaces Pedestrians, cyclists, and green spaces have priority in the neighborhood. To that end, all parking spaces for cars will be removed (except for handicapped parking spaces). Cars will still be able to enter and stop briefly (e.g. for loading and unloading) but not to park permanently. Parking for private cars is now only possible outside these designated streets where parking lots can be rented in private underground garages for a reduced fee of 30 euros per month. Response categories: 1 very negative to 6 very positive.	4.14	0.056	1.69 %
(3) Car-free neighborhood for pedestrian/bicycle traffic, more green spaces The neighborhood will become a car-free area reserved exclusively for pedestrians and cyclists. Private cars will no longer be allowed to enter the area as car traffic will be limited to deliveries, ambulances, and other exceptions (e.g., craftsmen, waste disposal, care services, owners of private parking spaces, etc.). As in scenario 2, parking spaces can be rented outside the designated streets in private underground garages for a reduced fee of 30 euros per month. Response categories: 1 very negative to 6 very positive.	3.75	0.057	1.68 %

3.3. Statistical approach

Our hypotheses require path modeling (Wright, 1934); the generalized linear model applies: $Y_i = \gamma_0 + \gamma_p X_{pi} + e_i$. Where Y_i is the level of support for each of the three scenarios as well as the mean average across all three scenarios of resident i and γ_0 is the intercept. $1 \ldots P$ are predictors X at the individual level and γ_p their slopes: Educational attainment (above A-levels), equivalent disposable household income, relative deprivation, private car use, use of alternative modes of transport, eco-consciousness, local problem awareness, long-term residency (10 years or longer) and control variables (gender, age, children in the household, migration status). Lastly, e_i are residual errors at the individual level. As Fig. 1 shows, relative deprivation, private car use, use of alternative modes of transport, eco-consciousness, and local problem awareness are assumed to mediate the influence of educational attainment and household income, i.e., they themselves are explained by these two variables (and control variables, not shown in Fig. 2). Private car use and use of alternative modes of transport are free to covary, as are environmental as well as local problem awareness and all control variables.

We copied the eco-consciousness scale from Geiger and Holzhauer (2020) and since the validity of the scale is not part of our research question, we included the mean average across all items (see Table 2) as a manifest variable in our statistical models. The results of a separate factor analysis of the eco-consciousness scale are presented in Table A2 of the online supplement. We tested hypotheses H1 to H7 with the combined support for all three scenarios as dependent variable and estimated the models using the SEM routine of Stata 17, fitted via maximum likelihood estimations. We report standardized estimates,

Table 2
Overview of explanatory variables.

Variables	Mean	SD	Mis.
Use of transport modes			
Frequency of private car use: 0 less than / 1 at least once per week	0.33	0.47	0
Use of alternative modes of transport: Frequency of use of bicycles/e-bikes, scooters, car-sharing, taxi/ride-hailing services, public transport services. Response categories: 1 (nearly) daily to 5 (almost) never. Use of alternative modes of transport is the mean average across frequency of use of individual transport modes (Nobis and Kuhnimhof, 2018).	1.07	0.49	0
Eco-consciousness			
(1) I am happy about initiatives that simply try out sustainable ways of living (e.g. eco-villages, slow food movement). (2) It makes me angry when I see that Germany misses its climate protection targets. (3) More environmental protection also means more quality of life and health for everyone. (4) I get angry when environmentalists try to tell me how to live (recoded). (5) Many environmentalists exaggerate environmental problems (recoded). (6) There are natural limits to growth, which our industrialized world has long since reached. (7) Each individual has a responsibility to leave a livable environment for future generations. (8) For a good life, other things are more important than the environment and nature (recoded). (9) We must find ways to live well independent of economic growth. Response categories: 0 fully disagree to 3 fully agree (follows Geiger and Holzhauer, 2020). Eco-consciousness is the mean average across all nine items (Geiger and Holzhauer, 2020).[a]	2.27	0.56	0.11 %
Local problem awareness			
Traffic problems in the neighborhood: frequent traffic jams, inability to find parking, lack of safe bike lanes, lack of pedestrian safety, noise, and pollution from cars. Local problem awareness counts how many of these problems were mentioned by respondents. Categories: 0 none to 5 all (empirically, 3 is the highest category).	1.99	0.84	0
Socioeconomic status			
Relative deprivation: Compared to how others live in Germany: do you think you receive your faire share? Response categories: 1 receive my fair share to 4 receive much less than my faire share (Baumann et al., 2022, p. 43).	1.07	0.49	2.99 %
Household income: Disposable income of households (after taxes, deductions), in 11 categories. Adjusted for household size, where the first person aged 14 or over is weighted by a factor of 1, each additional person in that age group is weighted by a factor of 0.5, and each child under 14 is weighted by a factor of 0.3 (OECD modified scale, see Hagenaars et al., 1994).	3.86	1.84	4.84 %
Educational attainment: 0 Below A-levels / 1 A-levels or higher	0.72	0.45	3.41 %
I'm concerned about rising rents if the neighborhood is traffic-calmed: 0 no / 1 yes	0.22	0.41	0.48 %
Gender: 0 male / 1 female	0.46	0.50	0.91 %
Age of respondents in years (log-transformed for regression analyses)	44.65	16.22	0.78 %
Number of children <16 years of age in household: 0 none / 1 one or more	0.44	0.50	3.54 %
Migration history: 0 respondents and their parents have been born in Germany / 1 respondents or at least one parent has been born outside Germany	0.42	0.49	2.44 %
Cars owned by the household: 0 none / 1 at least one	0.47	0.50	0.11 %

"Mis" stands for missing values and SD means standard deviation. [a]We did a reliability analysis and confirmatory factor analysis to assure the scale developed by Geiger and Holzhauer (2020) is valid across our sample. Cronbach's α is 0.863, suggesting high reliability. The factor analysis assumes a one-factor model and was solved via maximum likelihood estimation. With SRMR = 0.049 and GFI = 0.871 we conclude reasonable validity across our sample, individual factor loadings of each item can be found in Table A2 in the Online Supplement.

weights apply.

3.4. Limitations

(1) The limitations of our study are inherent to its ex post facto design. While our primary research question concerns the identification of social groups that support car-restrictive policies, this does not necessarily imply causal inference. Consequently, we must exercise caution in interpreting any reported statistical association. This is particularly relevant in the context of our assumptions that the effects of socioeconomic status variables are mediated by problem awareness, modal choice, and relative deprivation. These assumptions are consistent with the extant literature, but the causal relationship between these factors could be very different. For instance, individuals who do not utilize private cars with any regularity may be more environmentally conscious due to their capacity to adopt a more critical perspective without being compelled to undergo radical changes in their lifestyle. (2) The sample is somewhat underrepresented with regard to residents with low household incomes and lower educational attainment, due to their higher likelihood of not responding to the survey. This raises the possibility that important variation that is related to household income and low educational attainment is lost in our analysis. Consequently, our result may not necessarily apply to neighborhoods with a much different socio-economic composition.

4. Results and discussion

Support for car-restrictive policies in the two neighborhoods in Friedrichshain-Kreuzberg is generally high (see Fig. 3). Even for the most intrusive Scenario 3, support is at 56 %. Fig. 4 provides an overview of the results obtained. The explanatory variables collectively explain 56 % of the variance in support for car-restrictive policies across the entire sample.

4.1. Private car use vs. alternative modes of transportation

*Hypotheses: Residents who use private cars more often **(H1a)** and alternative modes of transportation less **(H1b)** are less supportive of car-restrictive policies.*

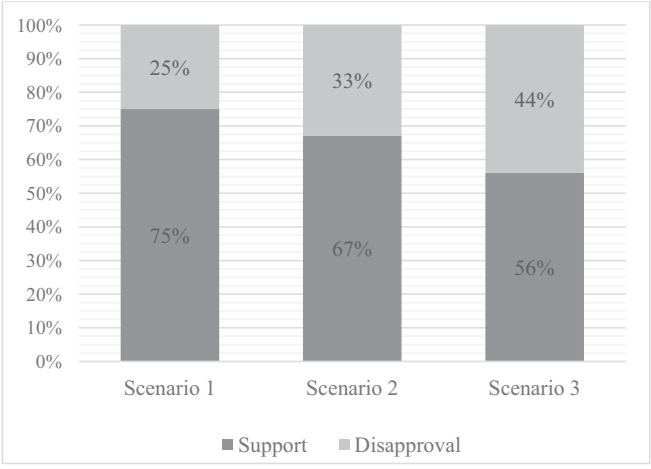


Fig. 3. Support for each scenario.
Support means answers above 3 on a scale of 1 to 6.

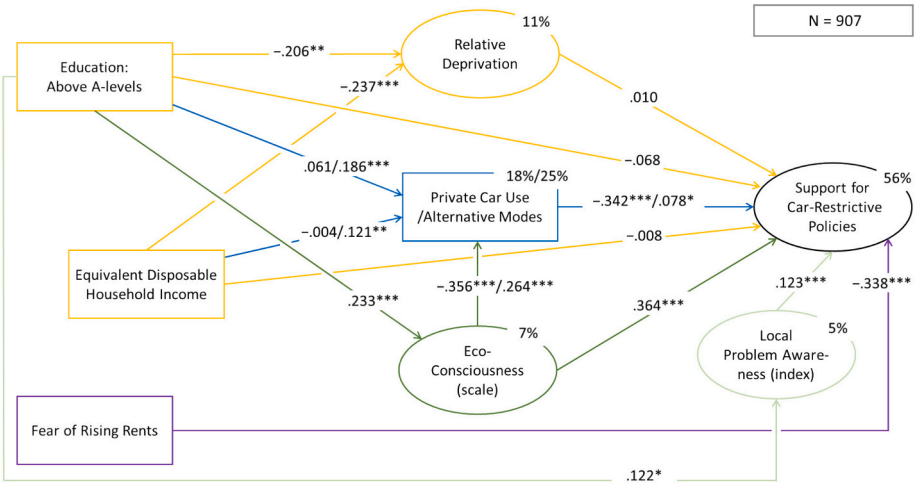


Fig. 4. Results overview (standardized effects and R-squared).
*$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed tests); percentages are variance explained by all direct effects (R-squared); maximum likelihood estimation, weights apply. For full models including control variables, constants, standard errors, total effects, effects of control variables, and correlations between explanatory variables please see Table A3 in the online supplement. For a comparison between those residing in households with at least one car and those without cars see Fig. A2 in the online supplement. For a comparison of the influence of the explanatory variables between the three different scenarios see Table A4 in the online supplement.

In support of Hypotheses H1a and previous research, residents who use private cars more frequently are also more opposed to car-restrictive measures (Steg, 2003; Schade, 2005; Schuitema et al., 2010; Jaensirisak et al., 2005). The frequency of private car use is the second strongest explanatory variable overall according to direct standardized effects. More frequent use of alternative modes of transport, on the contrary, increases support for these measures, supporting Hypotheses H1b. Those who have previously engaged in the use of multiple transportation modes are likely to be more aware of the positive effects of car-restrictive measures and therefore better positioned to adapt their own daily mobility behavior towards less dependance on private cars (Andor et al., 2020). However, we have to concur with Nilsson et al. (2016) that private car use is, statistically, considerably more important than the use of alternative modes of transport to explain car-restrictive policy support.

4.2. Problem awareness

*Hypotheses: Residents who are less aware of local problems caused by car traffic (**H2a**) and less environmentally aware in general (**H2b**) are less supportive of implementing car-restrictive policies in their neighborhoods. Furthermore, residents with higher eco-consciousness use private cars less frequently in favor of alternative modes of transport, further increasing their support for car-restrictive policies (**H2c**). These effects are independent of each other (**H2d**).*

The data supports both Hypotheses H2a and H2b. Eco-consciousness is the explanatory variable with the strongest direct effect and total effect. It indirectly increases support for car-restrictive policies through both reduced private car use and more frequent use of alternative modes of transport,in support of Hypothesis H2c. The total standardized effect of eco-consciousness indicates that an increase of one standard deviation is associated with a 0.572 standard deviation increase in support for car-restrictive policies. The impact of eco-consciousness on support for car-restrictive policies has been previously documented by other researchers (Hamilton et al., 2014), yet local problem awareness has received greater attention (Eliasson and Jonsson, 2011; Hamilton et al., 2014; Schade and Schlag, 2003; Schlag and Schade, 2000). While hypothesis H2d holds, in direct comparison, we find that general considerations about the importance of protecting the environment as measured by the eco-consciousness scale are more important to residents in deciding whether to support local car-restrictive measures than how car traffic affects their own neighborhood.

4.3. Socioeconomic status

Hypotheses: For the first time, we test if residents that feel they do not get their fair share in society are less supportive of car-restrictive policies (H3).

Hypothesis H3 is contradicted by our findings. This is significant because it challenges the narrative that such policy measures may be a driver of societal polarization in cities. While relative deprivation has been shown to lead to rejection of environmental policies more generally (Reitz and Jörke, 2021), this does not seem to apply specifically to car-restrictive policies in one's own neighborhood. It is possible that measures that target the entire population and are thus somewhat vague are more likely to be perceived as a threat to one's status than very concrete, specific measures with more predictable consequences.

*Hypotheses: Residents with higher educational attainment are more supportive of car-restrictive policies because they experience lower levels of relative deprivation (**H4a**), are more aware of local problems caused by car traffic (**H4b**), are more eco-conscious (**H4c**), and use alternative modes of transport more frequently (**H4d**).*

Educational attainment is associated with higher support for car-restrictive measures, but only indirectly. With an indirect effect of 0.146** (SE 0.148), its statistical impact is rather weak. The effect of educational attainment is largely mediated by eco-consciousness, in support of hypothesis H4c, but also by awareness of local problems, in support of H4b, and use of transport modes other than private cars,in support of H4d. The association between educational attainment and eco-consciousness is consistent with previous research (e.g., Poortinga et al., 2019; UBA, 2023). However, educational attainment (in conjunction with control variables) only accounts for 7 % of the variation in eco-consciousness across respondents. This suggests that unobserved factors may be more influential in explaining eco-consciousness. Although educational attainment has a statistically significant effect on relative deprivation in the expected direction, relative deprivation itself does not explain support for car-restrictive measures, thus rejecting hypothesis H4a.

*Hypotheses: Residents with higher household incomes are more supportive of car-restrictive policies because they are less affected by relative deprivation (**H5a**). But they also use private cars more often and*

*alternative modes of transport less than other income groups and are therefore less supportive of car-restrictive policies (**H5b**).*

Our results indicate that household income has no significant direct or indirect effect on support for car-restrictive policies. Therefore, the data do not support hypotheses H5a and H5b. Furthermore, the study found that household income has no effect on eco-consciousness, local problem awareness, or the frequency of private car use. This is broadly in line with previous findings, which find no systematic effects of household income on the support of environmental policies (Eversberg, 2022). Contrary to our expectations, higher household income is associated with a greater frequency of use of alternative modes of transport. However, this does not translate to a significant indirect effect of household income on support for car-restrictive policies. As anticipated, higher household income is associated with lower relative deprivation (which in turn, however, does not impact support for car-restrictive policies).

4.4. Ecological gentrification

Hypothesis: Residents who worry that the proposed policy measures might lead to rising rents in their neighborhood are less supportive of car-restrictive policies (H6).

Hypothesis H6 is supported by data. The fear of rising rents is a similarly strong indicator of support for car-restrictive policies as private car use and lower eco-consciousness. This finding supports the presumption that gentrification dynamics could influence the support of car-restrictive policies. Berlin has experienced a wave of gentrification following the fall of the Berlin Wall, which was largely driven by speculation on the future status of Berlin as the capital of Germany. This was further strengthened by the sale of approximately two-thirds of publicly owned property by the Berlin government in the late 1990s. The district of Friedrichshain-Kreuzberg is among the most affected in Berlin (e.g., Padilla, 2019). Policy measures to curb rising rents have encountered both judicial and implementation challenges (e.g., Böldt, 2023). Some residents appear to perceive car-restrictive policy measures as a further catalyst for gentrification, which could have a detrimental impact on their livelihoods.

5. Conclusion

Despite a growing consensus that private car use in Germany must be reduced in order to effectively combat climate change and meet the goals of the Paris Climate Agreement, there is currently no clear pathway for achieving this policy goal. “Push” measures that aim to reduce the attractiveness of private car use are the most effective, but they tend to be broadly unpopular. To gain a deeper understanding of the underlying causes of this unpopularity, we conducted a survey in two Berlin neighborhoods in 2021 ($N = 1041$). With the assistance of the local municipality, we constructed three realistic and believable scenarios (vignettes), each representing a different level of restriction on parking and other spatial privileges of private cars. The aim was to identify the role of different individual-level factors in determining support for these hypothetical measures: habits of using private cars and other modes of transport, awareness of the local problems caused by motorized individual transport in the neighborhood, eco-consciousness, socioeconomic status, relative deprivation, and fear of rising rents in the neighborhoods caused by the proposed policy measures. One problem in estimating the importance of each of these factors in determining support for car-restrictive policies is that they are not independent of each other. We applied path models to account for these interdependencies.

In terms of the impact of respondents’ socioeconomic status, no effect was found in our sample for household income or relative deprivation, while only a weak, indirect effect was observed for educational attainment. It can be concluded that within rather affluent, densely populated inner-city neighborhoods with ample public transportation options, the socioeconomic status of residents is not a significant factor in understanding who supports and who opposes car-restrictive policies. However, our result may not necessarily apply to neighborhoods with a different socio-economic composition or a different traffic infrastructure.

We found that individual affectedness (higher frequency of private car use and a lower frequency of use of alternative modes of transport), a lower eco-consciousness, and concerns about the impact of proposed policies on local rent prices, are the strongest predictors of opposition to car-restrictive policies. It is noteworthy that while general concerns for the environment at large increase support for car-restrictive policies in our sample, considerations for local problems caused by traffic had only a minor effect.

Our key finding points to concerns about ecological gentrification driven by car-restrictive policies. While residents might adapt to alternative modes of transport over time or become more aware of environmental issues, it is unlikely that car-restrictive policies will receive the necessary level of support for successful implementation if residents are concerned about the impact of sustainable transportation policies on their livelihoods. Gentrification affects cities around the world (Krase and DeSena, 2020). Consequently, the fear of ecological gentrification may act as a barrier to the implementation of more sustainable transportation policies in numerous countries. With regard to Germany, it is not clear how policies designed to increase the sustainability of traffic affect rent prices and the socio-economic composition of neighborhoods (Betschka, 2022). Further research is required to either refute the concerns of residents or to develop policy interventions that will maintain rent prices at a stable level. It is challenging to ascertain how this can be achieved without addressing the increase in short-term rentals or spatially unequal access to public transportation systems (Chen et al., 2023) and other preventable causes of gentrification.

CRediT authorship contribution statement

Katja Salomo: Writing – review & editing, Supervision, Formal analysis, Visualization, Data curation, Writing – original draft, Conceptualization. **Theresa Pfaff:** Writing – original draft, Writing – review & editing. **Lisa Ruhrort:** Supervision, Methodology, Conceptualization, Writing – original draft, Funding acquisition. **Franziska Zehl:** Data curation, Project administration, Formal analysis.

Declaration of competing interest

The authors report there are no competing interests to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jtrangeo.2025.104441.

Data availability

Data is available under: Lisa Ruhrort, Franziska Zehl & Katja Salomo: **Nachbarschaftsbefragung zur Verkehrswendeakzeptanz in Friedrichshain-Kreuzberg (Berlin)**. Version 1.0.0. Wissenschaftszentrum Berlin für Sozialforschung. Dataset. DOI: https://doi.org/10.7802/2803.

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