mobil.TUM 2024 – The Future of Mobility and Urban Space, April 10-12, 2024

Residential Relocation & Travel Behaviour – A Comparison between residents of a car-reduced neighbourhood and a control group

Simon Werschmöller[a] *, Martin Lanzendorf[a]

[a]*Goethe-University Frankfurt, Germany*

Keywords: *Car independence, Low Parking Requirements, Built Environment, Residential Relocation, Mode Use, Control Group*

This work addresses the following topic(s) from the Call for Contributions:
(Please check at least one box)

☒ Placemaking to integrate urban spaces and mobility
☐ Promoting sustainable mobility choices in metropolitan regions
☐ Governing responsible mobility innovations
☐ Shaping the transition towards mobility justice
☐ System analysis, design, and evaluation
☐ other: _____

Extended Abstract

Problem statement

In the context of reimagining car-centric German cities for a socio-ecological transformation of urban mobility, the planning of new neighbourhoods has been identified as a reinforcing factor in the continued system of automobility. Such developments, characterized by mandatory parking spaces per housing unit, limited public transport accessibility, and residential-only zoning, perpetuate the car's dominance, as the built environment significantly affects residents' mobility (Cervero & Kockelman, 1997; Elldér, 2014).
Car-reduced housing projects represent an innovative approach to reduce motorized private transport. These developments incorporate sustainable land use and mobility concepts aimed at reducing private car usage and providing less space for cars. Residential neighbourhoods with environmentally and socially compatible mobility concepts are a new development in Germany. From smaller pioneer projects such as Stellwerk60 in Cologne or the Vauban settlement in Freiburg, larger settlements have also been planned in recent years. A lighthouse project in this context is the car-reduced Lincoln-Siedlung in Darmstadt.
This research centres on the discourse of mobility biographies and the influence of key events on mobility behaviour (Lanzendorf, 2003). Several studies indicated that residential relocation is such a life event that can disrupt and alter travel mode usage patterns (Scheiner, 2006). However, the concept of residential self-selection (Cao 2009) questions the notion of behavioural change, as it implies that for some residents, the relocation to a car-reduced neighbourhood is mainly a means of maintaining already low-car travel or travel considerations (Selzer, 2021).

Research objectives

Reviews on existing literature on car-free/-reduced/-independent housing developments reveal a limited body of research, highlighting the need for further investigation (Sprei et al, 2020; Aumann et al., 2023). Early studies by Scheurer (2001) explore various new housing developments in Europe with minimal parking spaces and/or limited access for private cars. Nobis (2003) and Coates (2013) examine the parking-free Vauban housing estate in

* *Corresponding author. Tel.: +49-69-798-35187.*
E-mail address: werschmoeller@geo.uni-frankfurt.de

Freiburg. Ornetzeder et al. (2008) indicate the environmental effects of a car-free housing project in Vienna, emphasizing its lower carbon footprint compared to a similar, but non-car-free housing project. Baehler & Rerat (2022) provide insights into different car-free housing projects in Germany and Switzerland, underscoring the importance of social norms and the spatial context (infrastructures and built environment) in enabling car-free living.
In her dissertation project, Selzer (2022) adopted a qualitative, practice-theoretical approach to examine whether lived practice corresponds to the planning vision in two car-reduced housing estates in Darmstadt. A central result is that car-dependent practices persisted, even when certain daily routines and external environmental factors hindered complete demotorisation (Selzer, 2021). The already mentioned review articles critiqued the methodological quality of research on car-reduced projects. Aumann et al. (2023) criticized the lack of a longitudinal approach, making it difficult to discern causality from correlation. Sprei et al. (2020) arrived at a similar conclusion in their review of new neighbourhoods with low parking requirements. Additionally, they call for the addition of a control group.
This paper aims to contribute to the ongoing academic debate on the effectiveness of sustainable mobility concepts in car-reduced residential areas. Using a case-control study design, it intends to isolate the effects of residential relocation to a car-reduced development on the use of different modes of transport from the impact of residential self-selection (Cao, 2009).

Methodological approach

This research project centres on the aforementioned Lincoln-Siedlung in Darmstadt. Formerly a US Army Housing area, this development has been under construction since 2014 and is expected to house up to 5,000 residents upon completion.
The city of Darmstadt implemented an award-winning mobility concept in the Lincoln-Siedlung, featuring limited number of residential parking spaces, primarily located in neighbourhood garages (0.65 parking spaces per residential unit, with only 0.15 spaces in close proximity to flats). The neighbourhoods also provides various bike and car sharing schemes, two tram stations, as well as improved walking and cycling infrastructure connections to inner city destinations.
Our research is based on a three-wave panel survey that we conducted in 2020, 2021 and 2023 using a standardized questionnaire. The most recent survey was complemented by a control group consisting of other recent movers to the city of Darmstadt (N=1049). The control group is comparable to Lincoln residents in terms of recent relocation experience, length of residence in the current location, and the proportion of new citizens of Darmstadt.

(Expected) results

Preliminary results from the first two waves show a decrease in car use and an increase in car-sharing use among residents after the relocation. However, with the inclusion of a control group, this paper will provide a comprehensive comparison of transport mode use with other recent movers. The paper aims to investigate the impact of a car-reduced neighbourhood on the mobility and mode use of its residents.

(i) We seek to compare the two groups in terms of residential location choices, travel-related attitudes, mode use and socio-demographic characteristics.
(ii) We examine the effect of the residential relocation on travel behaviour changes and test whether individuals who have moved to the Lincoln-Siedlung have more sustainable mobility behaviour than those who have relocated to other urban areas in Darmstadt
(iii) Finally, using multivariate analysis, we want to identify the impact of the built environment in the car-reduced neighbourhood on the mode use changes, and therefore control for residential self-selection, operationalized by travel-related attitudes and relocation considerations.