Without a ride in car country – A comparison of carless households in Germany and California

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ABSTRACT

One approach to making transportation more sustainable is to transition away from a car-oriented society. Unfortunately, our understanding of the factors that prompt households to voluntarily forgo their motor vehicles is limited. The 2008 Mobility in Germany (MiD) and the 2012 California Household Travel Survey (CHTS) provide an opportunity to start filling this gap by teasing out what built environment and socio-economic variables impact the likelihood that a household is carless (voluntarily or not) in Germany and in California, two car-dependent societies with different carless rates. Results from our generalized structural equation models show that in both Germany and California, households who reside in denser neighborhoods, closer to transit stations, and who have a lower income or fewer children, are more likely to be voluntarily carless. However, households with more education are more likely to be voluntarily carless in Germany, whereas the reverse is true in California. Moreover, employment density and public transit have a higher impact on voluntary carlessness in Germany than in California. Our results also show that different socio-economic groups have substantially different residential location preferences in Germany and in California. These differences may be explained by cultural preferences, historical differences in land use and transportation policies, and by the higher cost of owning a motor vehicle in Germany.

1. Introduction

A number of policies have been enacted to reduce greenhouse gas (GHG) emissions and air pollution from transportation such as particulate matter, ozone, and smog-forming pollutants, which cause premature deaths, trigger or worsen respiratory ailments like asthma, and increase the risk of cancer (UCS, n.d.). These policies include mandating fuel efficiency improvements, requiring cleaner fuels, promoting alternative fuel vehicles (e.g., electric or fuel cell vehicles), incentivizing higher vehicle occupancy, or encouraging people to forgo motor vehicles in favor of transit, biking, and walking. France and Great Britain recently pledged to ban the sale of new diesel and gasoline cars by 2040 (Castle, 2017). However, relatively little progress has been made to-date to transition away from a car-oriented society. In this context, the purpose of this paper is to conduct a comparative analysis of carless households in Germany and California, two car-dependent societies with different urban forms and transport policies, to elicit what socio-economic and built-environment factors can entice households to become voluntarily carless. Understanding these factors could help

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policymakers formulate policies to reduce our dependency on motor vehicles.

Germany and California have much in common when it comes to motor vehicles. Indeed, they both have vast road networks (Statistisches Landesamt Baden-Württemberg, 2016; Caltrans, 2014), with a high motor vehicle ownership rate, and a similar percentage of licensed drivers (BMVI, 2017; FHWA, 2017). Overall, both Germany (Flanagan, 2017) and California (Romero, 2014) had love affairs with cars, which have now soured.

Another similarity is that both Germany and California are environmental leaders, respectively in the European Union and in the United States, and their populations have similar attitudes toward the environment (Dallinger et al., 2013). For example, Germany has committed to cutting its emissions of GHG by 55% by 2030, compared to 1990 levels, which exceeds the 40% target cut by 2030 for the European Union as a whole (Appunn, 2017). California's GHG targets are not quite as ambitious - Executive order B-30-15 from April 29, 2015, requires a 40% cut in greenhouse gas emissions below 1990 levels by 2030 (Office of Governor E. G. Brown, 2015) –, but they compare favorably with U.S. targets of cutting GHG emissions by 6% to 12% below 1990 levels excluding land use, land use change, and forestry (Climate Action Tracker, 2017).

In spite of all these similarities, the percentage of carless households is substantially higher in Germany, where they represented 13.4% of all German households in 2016 (Statista, 2017), versus only approximately 9% of California households (2012 CHTS). One of our goals here is to understand this difference.

Our comparison of German and Californian carless households is possible thanks to the availability of the 2008 Mobility in Germany (MiD) survey and the 2012 California Household Travel Survey (CHTS). These two surveys asked a number of similar questions, and collected a wide range of socio-economic and built environment variables. Most importantly, both asked carless households why they do not own a motor vehicle, which enables us to distinguish between voluntarily and involuntarily carless households.

In Section 2, we review selected papers to inform our selection of explanatory variables and our methodology. In Section 3, we document our data sources and our variables, and justify our classification of carless households. Our generalized structural equations models are described in Section 4. In Section 5, we contrast our results for Germany and California. Finally, in Section 6 we discuss some implications of our findings, outline some limitations, and propose some avenues for future research.

2. Literature review

2.1. Studies of carless households in Europe and in North America

Although a number of scholarly papers analyze car ownership, few have investigated carlessness. We found only three published studies that focus on Europe: one in Great Britain (Bromley and Thomas, 1993) and two in Austria (Ornetzeder et al., 2008; Sattlegger and Rau, 2016). Bromley and Thomas, 1993 point out that carless households have to rely on local stores, which are more expensive, as they are unable to visit newer, larger shops that offer cheaper and more diverse goods. Ornetzeder et al. (2008) find that residents of car-free communities may have only slightly lower emissions than comparable motorized households partly because of CO_2 emissions due to air transport. Sattlegger and Rau (2016) conclude that in order for a household to successfully make the transition away from cars, alternative transportation modes should be available to all family members and carless mobility should be socially acceptable.

Carless households in the United States have not attracted much more attention from academics. In two early studies, Paaswell and Recker (1976) and Marquez (1980), set out to characterize carless individuals, the former in Buffalo, New York, and the latter in Los Angeles County, California. More recently, Klein and Smart (2017) analyze the dynamics of carlessness in the U.S. using the Panel Study of Income Dynamics. While ~13% of U.S. families are carless in any given year, only 5% are carless over the longer term. As expected, poor families, immigrants, and people of color are much more likely to frequently transition in and out of car ownership than non-poor families, the US-born, and Whites.

Life stages and life cycle events have been shown to be important determinants of why households transition between one car and no car and vice versa. For example, after analyzing data from the UK Household Longitudinal Survey, Clark et al. (2016) report that changes in household composition, moving out of employment, a decrease in household income and residential relocation are strongly associated with losing ownership of a motor vehicle. In Halifax, Canada, after analyzing retrospective survey data, Khan and Habib (2016) conclude that a birth, member move-in, and the addition of a job in the household foster the acquisition of a motor vehicle, while the death of a household member, residential relocation, and the loss of a job prolong the duration of carlessness.

To our knowledge, Mitra and Saphores (2017) is the first U.S. study to contrast voluntarily and involuntarily carless households. Their analysis of the 2012 California Household Travel Survey shows that voluntarily carless households are more affluent and live in more walkable, more diverse areas, with better transit coverage than their involuntarily carless counterparts. Their results highlight the importance of land use diversity to help households voluntarily forgo their vehicles.

2.2. Car ownership studies in Europe and in North America

The car ownership literature is much richer than the literature on carless households so we focus on recent studies to identify suitable explanatory variables for our models.

2.2.1. Socio-economic/demographic characteristics

Both European and U.S. studies agree that car ownership increases with income (e.g., see Van Acker and Witlox, 2010; or Cao and