

Barriers to cycling: A typology of non-cyclists in Germany

Johannes Mahne-Bieder, Monika Popp, Henrike Rau
Department of Geography, Luisenstr. 37, 80333 München, Germany

Increasing the cycling modal share has become a central aim of transport planning and development in many European countries. This trend occurs against the backdrop of a number of impressive pro-cycling initiatives in cities such as Munster (Germany), Copenhagen (Denmark) and Amsterdam (The Netherlands) as well as a proliferation of sustainable mobility debates. In addition to encouraging those who already cycle to use their bicycle more frequently, efforts can be made to persuade non-cyclists to take up cycling. In Germany the latter group accounts for 46.7% of the population. In contrast, only 13.4 % of the German population do not own a bicycle (infas et al. 2008).

Non-cyclists form a highly heterogeneous group (e.g. Davies et al. 2001). Interestingly, limited efforts have been made to investigate and differentiate this group. Social researchers use typologies to identify and describe subgroups such as non-cycling women, migrants or people who experienced cycling accidents in the past. This enables the identification of subgroup characteristics that typically remain invisible in the context of more general analyses of data sets. Moreover, knowledge about subgroups and their characteristics helps to design and implement group-specific change initiatives and to enhance science-policy exchanges and generate knowledge for action in the process (Hunecke et al. 2007: 41). The latter relates to the fact that it is often easier to communicate person- and group-specific features than more abstract relationships between variables.

Typologies have also found application in mobility research (e.g. Götz et al. 1998; Hunecke et al. 2007; Deffner et al. 2006). However, few studies have focused solely on the group of cyclists and its segmentation (but see Deffner 2009 for Germany and Damant-Sirois et al. 2014 for Canada). Importantly, the group of non-cyclists received almost no attention so far, except in cases where they were treated as a homogeneous group to be contrasted with the group of cyclists. For example, UK-based research published by Gatersleben et al. (2010) and Davies et al. (2001) compares and contrasts attitudes among cyclists and non-cyclists. This said, Davies et al. (2001) conclude that non-cyclists cannot be treated as a homogeneous group, partly because different subgroups of non-cyclists vary significant in their propensity towards taking up cycling.

Recent 'Mobility in Germany' studies (*Mobilität in Deutschland – MiD*, infas et al. 2008, 2018) have delivered some basic information about the composition of the group of non-cyclists in Germany. Older people, people with lower educational status and homemakers (male and female, including people on parental leave) are overrepresented in this group. Moreover, the share of non-cyclists appears to be particularly high in certain socio-demographic groups (e.g. migrants from particular countries or regions where cycling is stigmatized). However, the MiD studies do not deal with specific barriers to cycling. As a result, in Germany and elsewhere little is known about which social groups harbor the largest shares of non-cyclists that would be willing to take up cycling as well as the specific barriers they face.

Research on the reasons for not cycling and related barriers covers a wide range of factors. Some studies focus on situations and circumstances in which cyclists refrain from using the bike (e.g. poor weather conditions, necessity to carry heavy or bulky items). Yet others concentrate on more general reasons for not taking up cycling (e.g. inability to cycle, fear of accidents, physical strain). Distance, duration of the trip, infrastructural deficits such as a lack of cycling routes and adequate bicycle parking facilities, inability to cycle, weather

conditions, socio-demographic aspects and, lastly, (work-related) dress code that prevents cycling are frequently debated reasons for not cycling. Other reasons that have not received the same attention include cultural and social norms around cycling, the image of cycling and safety risks and perceptions such as real and perceived dangers arising from car traffic and road-based freight transport (e.g. Parkin et al. 2007; Goetzke et al. 2009; Pooley et al. 2011; Heesch et al. 2012; de Sousa et al. 2014; Northern Ireland Executive 2014; Sun 2014; Manton et al. 2015; Hobusch 2015; Sinus 2015). Some studies conclude that future research on barriers to cycling needs to adopt a broader view of cycling behaviour. In particular, aspects of risks, physical strain, perceptions of cyclists among non-cyclists and cultural and social network effects appear to be just as important as 'traditional', well-researched barriers such as distance and duration of the trip (e.g. Parkin et al. 2007; Gatersleben et al. 2010; Aldred et al. 2014).

Importantly, barriers are rarely stable but undergo frequent changes across the life course. Biographical approaches to mobility research have addressed the question when and why mobility changes, especially regarding people's modal choice (e.g. Lanzendorf 2003, Beige et al. 2012; Chatterjee et al. 2013; Muggenburg et al. 2015; Rau et al. 2015; Rau et al. 2016; Scheiner et al. 2015, Sattlegger et al. 2016, Scheiner 2017). This longitudinal view of change is particularly important given the habitual nature of everyday mobility practices that makes them quite resistant to short-term changes (Bamberg 1996, Axhausen et al. 2001). This poses particular challenges to but also offers chances for change initiatives. Rau and Manton (2016) distinguish between life events such as residential relocation or the birth of a child, and mobility milestones such as the acquisition of a drivers' license or a traffic accident, all of which may provide windows of opportunity for a change in mobility behaviour. This said, some life events and mobility milestones may in fact help to cement existing practices, for example when people who retire from paid work continue to keep up some or all of their commuting habits.

The proposed conference paper presents the first typology of cyclists and non-cyclists for Germany. The main aim of this typology is to demonstrate the heterogeneity of the group of non-cyclists. At the same time, the study captures motivations and barriers that characterize particular types of non-cyclists and that relate to specific life events. Initially, the paper draws on the qualitative part of the research, presenting evidence from 15 in-depth interviews with non-cyclists and also with people who took up cycling again after a long pause. The interview data allowed for the identification of motives and barriers that have hitherto received little or no attention in the literature as well as capturing the heterogeneity of the group of non-cyclists. For example, it emerged from the data that the birth of a grandchild can lead to a renewed uptake of cycling.

Based on the results of the qualitative part of the study and an extensive literature review, a large-scale online survey was designed and delivered to a representative sample of the German population (n= 3000). The survey explicitly targeted both cyclists and non-cyclists, focusing on 1) recent life events and mobility milestones and their impact on bicycle use, 2) socio-cultural and physical barriers and 3) a wide range of socio-demographic characteristics. A multivariate cluster analysis was subsequently deployed to develop a typology of (non-)cyclists, including typical combinations of barriers, life events and mobility milestones that characterize them. The results of this typology-building analysis close an important research gap but also serve to inform the design of targeted cycling campaigns and supports that are suitable for different types of (non-)cyclists. Moreover, the survey helped to identify life events and mobility milestones that could potentially serve as windows of opportunity for encouraging non-cyclists to take up cycling. Overall, the results allow for a systematic comparison of cyclists and non-cyclists that can be used to inform

urban planning initiatives to improve conditions for cyclists and increase the cycling modal share.

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