



Experiences of connectivity and severance in the wake of a new motorway: Implications for health and well-being



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ABSTRACT

The construction of new urban roads may cause severance, or the separation of residents from local amenities or social networks. Using qualitative data from a natural experimental study, we examined severance related to a new section of urban motorway constructed through largely deprived residential neighbourhoods in Glasgow, Scotland. Semi-structured and photo-elicitation interviews were used to better understand severance and connectivity related to the new motorway, and specifically implications for individual and community-level health and well-being through active travel and social connections.

Rather than a clear severance impact attributable to the motorway, a complex system of connection and severance was spoken about by participants, with the motorway being described by turns as a force for both connection and severance. We conclude that new transport infrastructure is complex, embedded, and plausibly causally related to connectedness and health. Our findings suggest the potential for a novel mechanism through which severance is enacted: the disruptive impacts that a new road may have on third places of social connection locally, even when it does not physically sever them. This supports social theories that urge a move away from conceptualising social connectedness in terms of the local neighbourhood only, towards an understanding of how we live and engage dynamically with services and people in a much wider geographical area, and may have implications for local active travel and health through changes in social connectedness.

1. Introduction

The neighbourhood built environment is an important influence on the health and wellbeing of residents. However, isolating the health impacts of specific changes in built environments (such as new transport infrastructure) is challenging as changes often occur within complex systems of associated micro- and macro-level changes. For example, building major new roads may promote health by improving access to employment, amenities and services, and contributing to economic development. However, new roads may also worsen the health and wellbeing of residents; for example by causing pollution, or impairing local connections (Boniface et al., 2015) and discouraging health-protective behaviours such as walking (Mindell and Karlsen, 2012). One such mechanism through which detrimental effects can occur is transport severance (Egan et al., 2003). Severance, a concept commonly associated with new transport infrastructure, is often defined as the creation of a physical and/or psychological barrier that

divides people from local services or social connections within the community (Clark et al., 1991). As such, it has been shown to affect the health and wellbeing of residents through their use of local resources such as health services (Smith and Gurney, 1992; Mackett and Thoreau, 2015), their active travel (Smith and Gurney, 1992) and, although this has been less widely studied, influencing their social capital and feelings of community cohesion (Appleyard and Lintell, 1972; Hart and Parkhurst, 2011). These impacts have the potential to be particularly harmful in neighbourhoods with pre-existing low levels of resilience. Changes to transport infrastructure, however, do not take place in isolation, and it may be overly simplistic to view severance arising from such changes without reference to related micro- and macro-level factors and changes such as other infrastructure, economic climate, population change, and wider regeneration initiatives. In this paper, we examine the severance impacts of a new section of urban motorway constructed through largely deprived residential neighbourhoods in Glasgow, Scotland. We consider the effects of the motorway within a

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wider *system* of change as described by participants, and propose a novel mechanism through which severance is enacted in the form of the disruptive but non-bisecting impacts that new roads may have on third places of social connection within local areas.

2. Background

2.1. The relationship between new roads and severance

The creation of new roads may connect communities to each other, but can also form physical or psychological barriers, cutting one part of a community off from another. This ‘cutting off’ is also known as transport severance. Several definitions of severance are offered in transport and health literature and beyond (OECD, 1973; Lee and Tagg, 1976; Clark et al., 1991; James et al., 2005; Anciaes et al., 2015, 2016). Severance has been classified as being either primary (restricting movement from one side of the infrastructure to the other) or secondary (indirectly or inconstantly contributing to severance effects); or as being physical in nature (preventing movement) or psychological (creating a perception of barriers) (Clark et al., 1991).

James et al. (2005) present a typology of the mechanisms through which severance is enacted by new roads. They suggest that this may occur through the creation of permanent physical barriers (physical infrastructure), temporary physical barriers (such as high traffic flows, which may be temporally patterned), omission barriers (lack of pedestrian infrastructure or crossing facilities), legal barriers (prohibitions against certain types of transport, e.g. no cycling on motorways), time barriers (weather-related, or fear of using some facilities at night), quality barriers (poor surfaces or lighting), attitudinal barriers (fear for personal safety leading to reluctance to travel), and information barriers (lack of knowledge about how to use or access facilities). For the purposes of this paper we will employ Clark et al. (1991) definition of severance, broadly encompassing any physical and/or psychological barrier that divides people from either local services or social connections within their communities, but will also make reference to James et al. (2005) *mechanisms* through which severance may be enacted.

2.2. The relationship between severance and health-related behaviours

Whether through physical or psychological means, transport-related severance may affect individual behaviour. If residents feel compelled to avoid a new road, this may lead to changes in their route or mode of travel (Smith and Gurney, 1992), their access to local health and other services (Smith and Gurney, 1992; Mackett and Thoreau, 2015), and their local social interactions (Appleyard and Lintell, 1972; Hart and Parkhurst, 2011). All three of these behaviours have been linked to health outcomes.

Although there is little evidence directly linking health outcomes with severance (Douglas et al., 2007) due to both a dearth of studies and the challenge of ascribing causality, there is evidence suggesting links in a plausible causal chain between severance and health-related behaviours (Mindell and Karlsen, 2012). For example, active travel is associated with positive health outcomes (Saunders et al., 2013) and therefore, transport infrastructure which curtails active travel through any of the mechanisms that James et al. (2005) describe may have negative health implications. Additionally, severance may affect residents’ access to local goods and services or the pleasantness of local streets or other sites as social spaces, and may therefore have an impact on social participation due to erosion of local connectedness (Appleyard and Lintell, 1972; Mindell and Karlsen, 2012) or may prevent residents from accessing amenities directly related to health, such as primary care or sports facilities. In short, if new infrastructure reconfigures social space in a way that severs social connections and networks, this is likely to have implications at both the individual (social support) and neighbourhood (social capital) level (Illich, 1974). Social capital itself has many definitions, but is often conceptualised as a benefit emergent

from social connectedness at a neighbourhood/ecological level, and realised at both local and individual levels through social contacts, networks and participation (Coll-Planas et al., 2016). It can be enacted through bonding (cementing group cohesiveness) as well as bridging mechanisms (connecting those in disparate groups). Few studies have demonstrated strong evidence of a causal relationship between social capital and health (Coll-Planas et al., 2016; Durlauf, 2002), perhaps because of the complex nature of measuring or even defining such a multi-dimensional phenomenon (Rocco et al., 2014). However, there is evidence to suggest that social capital and its proxy social participation may be associated with outcomes such as decreased mortality (Kawachi et al., 1997), lowered blood pressure (Andersson, 1985) and better self-reported health via psychosocial mechanisms (Wilkinson, 1996).

2.3. Gaps in the literature

According to Anciaes et al. (2015), there is a lack of qualitative research exploring the possible severance effects of new transport infrastructure as experienced and perceived by local people. Such qualitative studies that do exist tend a) to come from diverse disciplines that may not overlap; and b) not to be published in academic journals, and to suffer from a lack of international dissemination. There are a few notable exceptions, including Hines’ seminal 1994 study using interview and video data to examine the impact of traffic on pedestrian behaviour in Edinburgh, and Mindell et al.’s (2017) study of transport severance in England. A Department of Transport review (James et al., 2005) has suggested a need for more “robust social research” (p6) on the topic, and recent guidance from Mindell et al. (2017) suggests that qualitative evidence can and should be meaningfully integrated into mixed methods severance evaluations. In addition, previous studies have largely been focused on causally isolating the severance effects related to new transport infrastructure and have not investigated transport severance as existing within a complex system of physical and social connecting forces. This study endeavours to address these gaps in social research.

2.4. Background to the study

In 2011, a five-mile (8 km) extension to the M74 motorway was opened in Glasgow. Proponents of the road advocated that the motorway would enhance the wellbeing of local residents, at least partially through increased connectivity, whereas opponents claimed it would be detrimental, causing severance. There was considerable local opposition to the proposed motorway. This research forms the qualitative part of a mixed-method longitudinal natural experimental study of the health impacts of the motorway extension on local residents, with a particular focus on wellbeing, active travel and road traffic accidents. The overall study is described in detail elsewhere (Ogilvie et al., 2017).

The qualitative data collection reported in this paper was carried out with local residents (to capture micro-level change) and key informants (meso and macro-level change) in areas abutting the motorway extension. The analytical aims differed between the interviews with key informants and those with residents. The aim of the key informant interviews was to gain an overview of key environmental changes related to the new motorway. With resident interviews, the aim was to understand how participants perceived, experienced and used their neighbourhood, whether these had changed, and what role (if any) the new motorway had played in these changes. In this paper, we will present the combined findings from both resident and key informant interviews. For the resident interviews, we sampled participants from two neighbourhoods, Govanhill and Rutherglen (including Farme Cross) (Fig. 1). By viewing these two neighbourhoods as qualitative case study areas, we were able to observe differences in severance and connectivity at both neighbourhood and individual level, and consider the ways in which active travel and social cohesion related to health may have been affected by the motorway extension.

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