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The role of infrastructure in shaping active travel behaviours: Experience in Sydney

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1 Introduction

Active travel (AT) delivers a range of societal and health benefits, including reductions in air pollution, noise and greenhouse gas emissions from road traffic (Chapman et al., 2018), as well as improvements in mental health and cardiovascular health (Oja et al., 2011, Vardoulakis and Kinney, 2019). At the same time, concerns remain around safety risks linked to poorly designed infrastructure such as cycleways (Pearson et al., 2022a). The provision of accessible, high-quality walking and cycling infrastructure is therefore widely recognised as critical to enabling safe AT and, in some cases, decisive in determining AT uptake (Pearson et al., 2022b, Lawlor et al., 2022).

Building on the established link between infrastructure provision and AT uptake (Jahanshahi et al., 2021), this paper examines how a newly constructed cycleway influences travel behaviour, with a focus on the specific infrastructure features that support or hinder use. Drawing on walking and cycling counts, an online survey of users, and a focus group with non-users, we analyse AT behaviours at both individual and societal levels. The case study centres on the Moore Park Road pop-up cycleway (MPC) in Sydney, Australia. Two questions guide this research: (i) What AT behaviours and behaviour changes have been observed at the MPC? (ii) How do the characteristics of the MPC infrastructure shape its use?

2 Methodology

The MPC is located in Paddington, within the City of Sydney Local Government Area, about two kilometres from the CBD. The surrounding land use is mixed and relatively dense (Sydney Local Environmental Plan, 2012), including residential areas alongside major destinations such as the Sydney Cricket Ground, Allianz Stadium, Centennial Park, defence establishments and a university building. Public transport options are limited: the nearest light rail stop is over one kilometre away, while Moore Park Road itself is served by a single bus route in addition to school services. Opened in August 2020, the MPC provides an important cycling corridor but, as a temporary “pop-up” facility, it continues to attract mixed community feedback.

The research team conducted three data collection strands for MPC: (i) traffic counts (by counters and observation), (ii) an online user survey (N = 80), and (iii) a focus group (face to face) with non-users (N = 5). Ethics approval was obtained from the lead author’s institution (protocols 2023/766 and 2023/860). This mixed-methods design enabled triangulation across population groups, with surveys capturing trip-related behaviours among users (Stopher and Stecher, 2006) and the focus group exploring perspectives of local residents as non-users (Nyumba et al., 2018).

3 Main findings

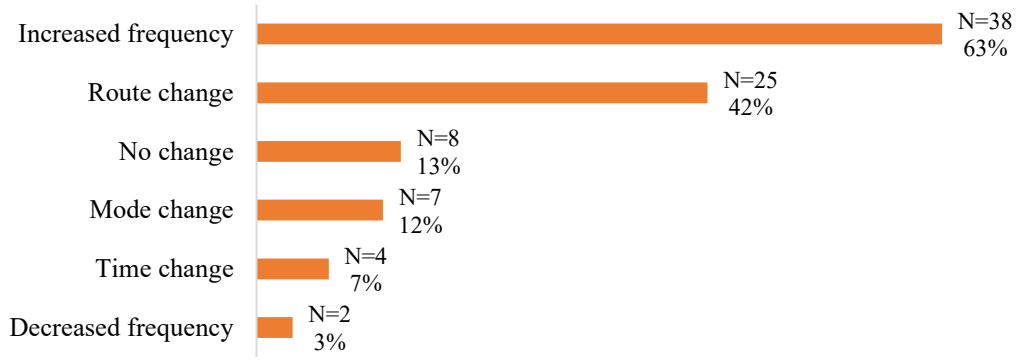
3.1 Active travel behaviours

Three existing data sources capture usage of the MPC between 2010 and 2024, each maintained by different government agencies: (i) automated cycle counts on the MPC from the NSW Open Data Hub (NSW Government, 2023); (ii) automated walking and cycling counts for Moore Park Road more generally (Transport for NSW, 2024); (iii) automated cycle counts at the west and east intersections of Moore Park Road collected by the City of Sydney (City of Sydney, 2024). Together, these bi-directional counts provide a baseline understanding of AT activity, though they do not distinguish between recreational and utilitarian trips.

Across these sources, daily cycle counts on the MPC initially ranged from 200–300 (both directions combined) following its opening in August 2020, with fluctuations linked to seasonality, weather, equipment faults, and COVID-19 restrictions. Despite this variability, usage was sustained and showed an upward trajectory over time, suggesting the facility increased in popularity. Data from 2023–2024 further indicate substantial levels of walking relative to cycling, with nearly four million walking trips recorded across monitored sites compared with just over one million cycling trips. While pedestrian volumes were consistently higher, cycling activity displayed intermittent peaks, particularly around major events near Allianz Stadium. Longer-term counts (2010–2024) reveal divergence between the two monitored intersections: cycling activity at the west end declined sharply after 2019, while the east end showed steady growth, peaking in 2024. This divergence is likely due to the west end counter being positioned away from the MPC, meaning many cyclists shifted to the new infrastructure after its installation. Overall, the data highlight the strong and growing role of the MPC in supporting AT, while also confirming walking as the dominant mode along Moore Park Road. To supplement the automated data, the research team conducted manual traffic counts. These observations, combined with data from two other AT infrastructure sites in Greater Sydney, were analysed using regression modelling and published as Zhang et al. (2024).

The user survey captured respondent characteristics and AT behaviours. Over half were aged 30–59, male, Australian-born, child-free, and highly educated. In terms of household income, 45% reported earning less than $3,000 per week, while 28% earned more. Most respondents were employed (78%) and not students (76%). Regarding mode, more than 85% were cyclists or e-cyclists, 10% were pedestrians, and 2% used kick scooters. Behavioural changes following the opening of the MPC were evident from survey responses (Figure 1). Nearly two-thirds (63%) reported increased frequency of AT, and 42% reported changes to their routes. Smaller shares indicated mode change (12%) or altered travel times (7%). A few participants highlighted improved perceptions of safety and comfort, while only 3% reported reduced frequency. About 13% reported no change. Overall, the MPC was viewed as encouraging more frequent and safer AT use. Two additional survey questions assessed AT patterns before the COVID-19 pandemic, at present, and in the future. Results show that low-frequency AT users stated that they were most likely to increase their activity after the pandemic, while frequent users expected to largely maintain their habits. The majority expected to sustain their current behaviour into the future. Key reasons cited for increased AT included new infrastructure, relocation of home or workplace, environmental concerns, health and well-being, and acquiring a bicycle. Other influences included work-from-home arrangements, financial factors, public transport changes, and social support. In contrast, decreases in AT were mainly attributed to home relocation and work-from-home.

Figure 1. Changes in active travel behaviour by type after the Moore Park Road pop-up cycleway was opened (N=60, multi-choice).



3.2 Factors Influencing active travel behaviours

The online user survey asked respondents to report the start and end points of their most recent trip using the MPC. We mapped the shortest-distance route between the reported start and end points using the existing road network in ArcMap. Reported origins and destinations were diverse, spanning Waverley, Randwick and Woollahra councils, with one trip extending to North Sydney. Most trips were between 2–5 km (46%), followed by 5–10 km (27%) and 1–2 km (21%); shorter trips were rare (4%). Work destinations were concentrated in the Sydney CBD, North Sydney, the Inner West and Waverley, while study locations included several universities and colleges. Most trips were undertaken by bike or e-bike, with fewer reported by walking or mixed modes, and only limited connections to public transport. Trip purposes included commuting, business, exercise, shopping, socialising, recreation, and attending appointments.

Respondents identified multiple benefits of the MPC, most commonly increased physical activity and enjoyment of AT. Other cited advantages included independence, improved health, cost savings, congestion reduction, time efficiency, lower pollution, recreation and social interaction. Health-specific benefits were primarily mental health, cardiovascular health and weight control. Key concerns centred on safety: almost half reported fear of collisions with vehicles or other AT users, while others mentioned kerb collisions, slips, falls and pollution exposure. Additional issues included poor or closed infrastructure, inadequate lighting, sun and noise exposure.

Over 60% of respondents expressed satisfaction with aspects of the MPC such as safety, infrastructure, rules, health and environment. However, several highlighted shortcomings, particularly poor connectivity and lack of intersection priority. Suggestions for improvement included fully segregated walking and cycling paths, stronger links to eastern and western networks, higher pavement quality, clearer signage and continuity without footpath diversions. Respondents also called for enhanced intersection safety, reduced car speeds, wider lanes, better protection from traffic, and making the cycleway permanent and accessible during major events.

The focus group with non-users of MPC explored perceived benefits and concerns about AT, as well as broader socio-cultural and economic factors influencing uptake. All participants were employed adults aged 30–60+, with diverse educational backgrounds.

Non-users highlighted significant concerns about infrastructure design, particularly conflicts between pedestrians, cyclists, and cars. Shared paths were viewed as problematic due to speed differentials, especially with the rise of e-bikes and e-scooters. Participants emphasised that poor design, over-engineering, inadequate maintenance, and lack of integration into a broader network reduced safety and usability. Confusion about the naming and visibility of the cycleway also emerged, suggesting that clearer communication and consistent infrastructure

standards are important. Socio-cultural and lifestyle changes were also evident. Increased working from home after COVID-19 shortened commutes and, in some cases, encouraged more local AT use. However, participants also noted barriers such as car hostility, unsafe intersections, bad weather, and fragmented media environments that hinder governments' ability to promote AT effectively. Overall, participants emphasised the importance of distinguishing the needs of pedestrians and cyclists in infrastructure design and to prioritise safety, connectivity, and comfort over promotional campaigns. For cultural change to occur, infrastructure must be designed to make AT both safe and appealing, while addressing community concerns about conflict and risk.

4 Discussion

Our findings show that the MPC has supported greater uptake of AT, particularly for commuting to work and study. Its mid-scale design, location along a key transport corridor, and surrounding mixed land use have helped attract users. However, effectiveness is limited by poor intersection design, lack of connectivity to the east, and its on-road form, which raises safety concerns. Users most often cited increased physical activity and associated health benefits, while both users and non-users highlighted safety conflicts as the main drawback. These conflicts could be reduced through improved connectivity, clearer signage, better maintenance, and greater separation from traffic.

While infrastructure plays a central role, behaviour change is shaped by multiple influences, including personal experiences and broader socio-cultural factors (Bamberg et al., 2011). Our survey sample was small and geographically constrained, limiting generalisability, but focus group data provided valuable context on perceptions and barriers. Future studies should examine not only positive drivers but also unintended consequences, such as bike lanes being repurposed by cars.

Policy implications include three priorities. First, invest in safe, practical infrastructure: segregated paths, stronger connectivity to employment and education hubs, and reliable maintenance and lighting. Weather-resilient features and design for diverse micromobility modes should also be incorporated. Second, promote AT's health benefits through campaigns and community programmes highlighting mental and cardiovascular gains. Third, support cultural and behavioural change through education, incentives (e.g., bike-share discounts, workplace rewards), and stronger community engagement. Continuous monitoring with standardised data collection, including counters on key routes, is essential for evaluating outcomes and guiding further investment.

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