Te Ara Mua Future Streets – Influences on road user behaviour

Lily Hirsch[a], Hamish Mackie[a], Nick Wilson[a]
Zenobié Cornille[a], Greer Hawley[a]
[a]Mackie Research and Consulting

Abstract

Te Ara Mua – Future Streets is a controlled before-after study of a neighbourhood street retrofit in Auckland, New Zealand. This paper focuses on one aspect of the study – to understand if walking and cycling was made easier and safer. A video coding framework was developed to understand road user behaviour and interactions and was applied to three sites where streets were changed. Across the three sites, there was a shift towards vulnerable user behaviour that is indicative of safer and easier walking and cycling. In addition, lessons for the design of some infrastructure features were identified.

Background

In 2012, Central Māngere – a low socioeconomic suburb in South Auckland – was rated the fourth worst (out of 280 Auckland neighbourhoods) for fatal and serious crash risk (Auckland Transport 2012 unpublished data). In response to this, a neighbourhood-wide retrofit of street infrastructure was undertaken from 2015-2016 entitled Te Ara Mua ("the path ahead shaped by the past") Future Streets (Mackie et al, 2018). Infrastructure changes included the installation of separated cycle lanes, raised zebra crossings, a recreation loop trail, and wider footpaths. As part of a greater research programme, the goal of this paper is to understand if the changes achieved the goal of making walking and cycling easier and safer, and to identify aspects of the infrastructure design that could be further improved.

Method

Video footage was collected in 2014 (pre-intervention) and 2018 (post-intervention) at three sites: a busy collector road (Site A); a car park boarding a recreational area (Site B); and a collector road near a local school (Site C). The original roads and their modifications are presented in Figure 1. Each year, data were collected in March on four days from 7am to 7pm.

Figure 1. Video views of sites A, B, and C pre- and post-intervention

A coding framework (Figure 2) was devised to capture the behaviour of pedestrians and cyclists and to analyse their interactions with other road users (e.g. car, bus, van). The definitions of encounter types were adapted from Kraay (2013), Hunter et al (2012), and Johnson et al (2010). Two people coded the videos and an interrater exercise was conducted to ensure consistent agreement between the coders.

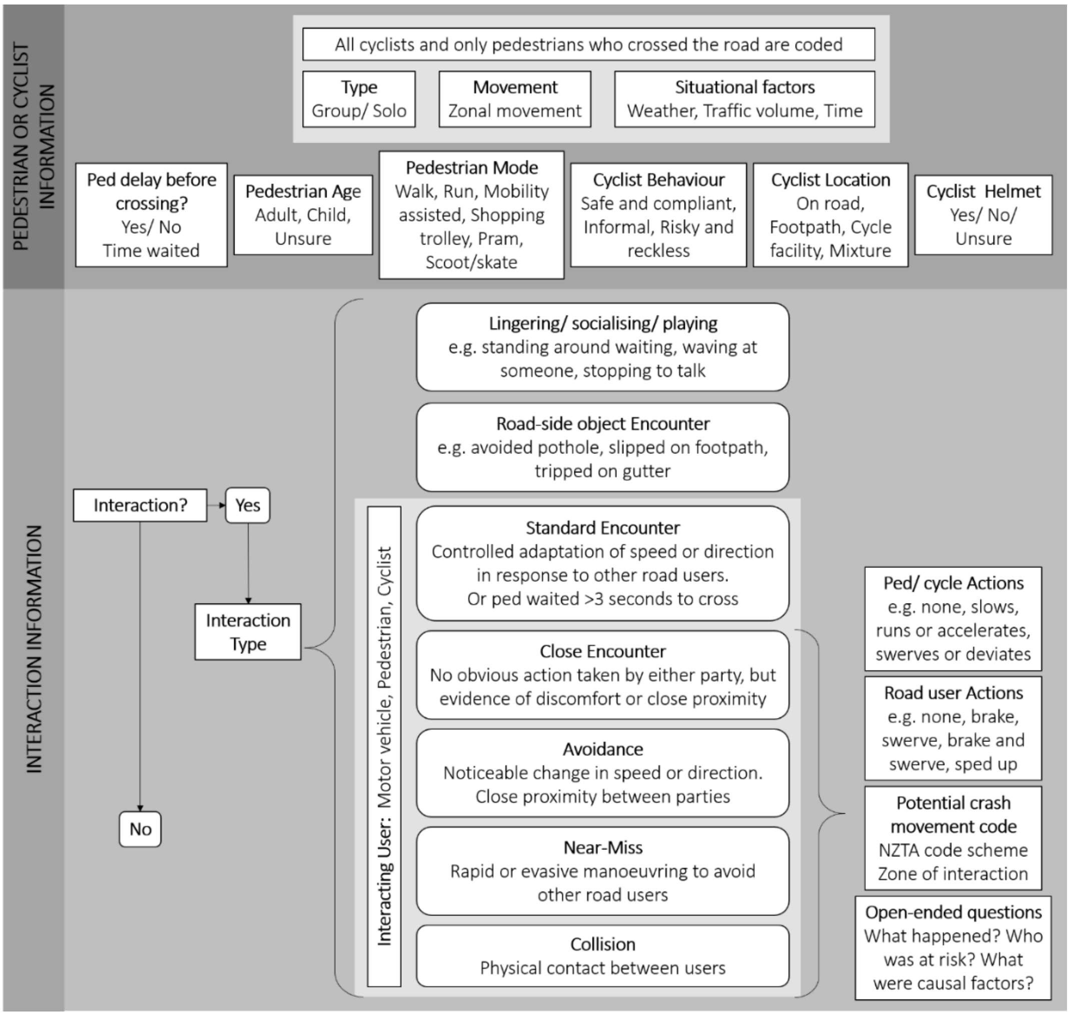

Figure 2. Outline of the coding framework applied to the three sites

Results

It was identified that walking and cycling was easier and safer following the intervention. In addition, infrastructure design improvements have been identified.

Ease

There was evidence across all sites that the changes in infrastructure improved mobility for pedestrians. Wider footpaths afforded more comfortable group walking behaviour as they reduced the number of people walking on the road or in single-file and emphasized social connections. For example, of the total observed pedestrians, proportionally there was a 6.8% increase of group walking at Site B. The introduction of raised zebra crossings improved accessibility for wheel-based pedestrians as the need to navigate a curb was removed. Finally, across all three sites there was a 53.2% decrease in the continuous movement of vehicles - supporting improved pedestrian priority particularly through the introduction of zebra crossings.

Safety

Figure 3 shows the location and frequency of all pedestrian/ vehicle interactions at Site A under both conditions. There is a clear shift in the location of interactions away from high-energy zones (in the general traffic lane) with the potential for more serious outcomes, to slow-moving low-energy zones (side road and start of speed table).

Figure 3. Location and frequency of pedestrian/ vehicle interactions at Site A pre- (left) and post-intervention (right)

For people on bikes, at Sites A and C, there was a shift towards use of the cycle facility, meaning there are proportionally fewer on the road (-19.2% Site A and -10% Site C), thereby reducing the potential for interactions between motor vehicles and people on bikes.

Design lessons

Infrastructure design lessons have emerged through this analysis. At Site A, it is suggested that the addition of more road markings and signage for vehicles may further reduce the frequency and severity of pedestrian/ vehicle interactions at the two new interaction zones (Figure 3). In addition, the data have identified that the raised separations of the cycle lane at Sites A and C may restrict cyclists' ability to make turns, thereby potentially affecting their uptake. Creating more, and wider spaces in the concrete barriers would ameliorate this. These design lessons may be beneficial for future neighbourhood development projects.

Conclusions

This analysis found that the broad goals of Te Ara Mua – Future Streets were successful in that walking and cycling within the community was made easier and safer. In addition, the analysis identified aspects of the new street design that could be improved to better serve pedestrian and cyclist access and safety. These lessons may be applied to a new-wave of neighbourhood projects in Auckland going forwards.

References

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