Final Report

Title: Examining the Effect of Implementing Low-Speed Zones on Road Safety in the ACT

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Table of Contents

1. Executive summary

- This report presents findings from a two-stage research project that investigated drivers' speeding behaviour in low-speed zones within the Australian Capital Territory (ACT).

  Stage 1 - Examining drivers' perception of the low-speed zones in ACT.

  Stage 2 - Understanding young drivers' speeding behaviour in low-speed zones in ACT.

- The project aimed to examine self-reported and actual speeding behaviour in low-speed zones and the potential effectiveness of cognitive-based interventions in promoting safer driving. A detailed report from Stage 1 is shown in Appendix A, and from Stage 2 in Appendix B.

Findings of the Stage 1 revealed that:

- 71.5% of participants reported their own speeding behaviours, mostly in low-speed zones (i.e., 40 km/h and 50 km/h speed zones).
- While most participants agreed that reduced speed limits can improve public safety, many expressed concerns toward the effectiveness of 30 km/h zones.
- School zones, and other educational establishments, as well as areas with pedestrian and cyclist activities were identified as areas where the 30 km/h speed zones would be beneficial for road safety and vulnerable road users.
- Participants acknowledged the value of existing ACT Government road safety initiatives and also identified several areas for improvement.
- Educational campaigns and speed awareness programs about low-speed zones should be introduced to educate and increase public awareness about the effects of reduced speeds and road safety, as well as benefits for vulnerable road users.
- Overall, the results highlight the need for context-aware, and multidimensional strategies, revisiting the speed limits relevance for conditions, and the surroundings around.
- Future research and trials, particularly those evaluating 30 km/h implementations in high-risk areas, will be essential to guide evidence-based road safety improvements and foster long-term behavioural change among drivers.

Findings of the Stage 2 indicated that:

- The 30 km/h and 40 km/h speed zones were identified as the most difficult to comply with.
- Most common situations in which drivers exceeded the speed limit, as indicated by the participants, were: being in a rush, inattention, peer pressure from other drivers, lack of clear signage, and road designs that encouraged speeding (i.e., driving on a wide and straight road).
- While 75.4% recognised the link between reduced speed limits and improved public safety, and benefits for vulnerable road users only 44% of respondents supported the introduction of 30 km/h zones in the ACT.
- Overall, less participants supported implementations of the 30 km/h speed zones, which shows low public acceptance of these zones in ACT.
- However, 80 % of respondents did not believe that lower-speed zones, such as 30 km/h, would improve drivers' speeding behaviour.
- Participants reported that low speed zones were perceived to create more dangerous situations.
- Reducing speed alone was reported by participants to have low effectiveness.
- Cognitive-based training in the form of feedback can be introduced for young driver education to improve their speed management behaviour.
- These findings offer valuable insights for policymakers, educators, and transport authorities seeking to improve speed management and enhance road safety in urban environments.

2. Introduction

Speeding is a major contributor to road trauma both globally and in Australia. The World Health Organization (WHO; 2020) identifies speeding as a leading cause of fatal crashes worldwide, with an estimated 1.25 million road deaths annually (WHO, 2020). Even small speed increases significantly raise crash risks by reducing a driver's reaction time and increasing stopping distances (National Safety Council, 2022). In Australia, 1,116 road fatalities were recorded in 2021 (BITRE, 2023), and in the ACT, excessive speed is particularly prevalent among young drivers aged 18–25 (ACT Government, 2021). Recognising the urgency of the issue, the

National Road Safety Strategy 2021–2030 has prioritised speed management—through safer road design, enforcement, and education—with a goal of reducing the annual number of fatalities by at least 50%, and serious injuries by at least 30 % by 2030 (Infrastructure and Transport Ministers, 2021).

Reducing speed limits in urban environments is a proven method to enhance safety for vulnerable road users such as pedestrians and cyclists. For instance, the likelihood of pedestrian fatality increases from around 10% at 30 km/h to over 90% at 50 km/h (National Road Safety Strategy 2021–2030). In the ACT, where pedestrian activity is concentrated around schools and urban centres, non-compliance with low-speed zones continues to pose a serious risk. Trials across Australia suggest that while initial public resistance to 30 km/h zones is common, community support often grows with clear communication and demonstrated safety benefits. For example, the City of Yarra saw increased public acceptance during its 2017 trial following targeted awareness campaigns (City of Yarra, 2021). Similarly, Perth's Safe Active Streets program received strong community support for improved cyclist and pedestrian safety (Bicycle Network, 2022), and a NSW survey found two-thirds of Australians support reduced residential speed limits for safety reasons (UNSW, 2021).

In response to these challenges, cognitive-based training has emerged as a promising intervention for improving driver speeding behaviour. This approach involves actively engaging individuals in the learning process and has shown effectiveness in improving desired behaviours for up to six months post-training (Molloy et al., 2018; Molloy et al., 2021; Molloy et al., 2023; Gu et al., 2022). Feedback, a core component of this method, provides specific, unbiased information that helps drivers better assess their performance — particularly with regard to speed perception and estimation (Hill & Salzman, 2012). Studies suggest that combining performance-, safety-, and finance-related feedback — especially when delivered in various formats — is the most effective approach in improving drivers' speed compliance

(Blair et al., 2013; Molloy et al., 2021). Gaps in current driver training highlights that compliance with speed limits remains poor in low-speed areas, with half of drivers exceeding limits in school zones by an average of 10 km/h (Ellison et al., 2011). Hence, new training approaches to improve drivers' speeding behaviour need to be introduced as part of the driver licensure.

This two-stage study extends existing research by examining drivers' speeding behaviour and perceptions of low-speed zones in the ACT through a self-report survey in stage 1. It also aimed to assess the effectiveness of a cognitive-based feedback training intervention in improving speed compliance among young drivers using a driving simulator in stage 2.

3. Methodology

Detailed methodology for each stage of this study is provided in the Appendix A and Appendix B.

Stage 1. Understanding perceived effectiveness of introducing low-speed zones on speed compliance.

Aim: To examine the perceived effectiveness of low-speed zones on drivers' speed compliance.

Method: An online survey was designed to investigate the self-reported speeding behaviour, speed compliance in low-speed zones (i.e., 30km/h).

Study 2. Understanding the actual driver speeding behaviour in low-speed zones.

Aim: To examine novice and experienced drivers' speeding behaviour in low-speed zones.

Methodology: An experimental design, consistent with Molloy et al. (2023), was conducted in a fixed-based driving simulator (UC WIN Road Version 16, and a Logitech G25 Racing Wheel set). The driving simulator was used as a valid, cost-effective instrument and objective measure

to examining young drivers' speed compliance in low-speed limit zones. In total, 40 participants participated in the study. The research was conducted within 1 session that took no longer than 1 hour. In the session, participants were asked to complete a demographic questionnaire, a practice drive, followed by one drive in a driving simulator. The driving scenario contained low speed zones of 30 km/h, 40 km/h, 50 km/h, and 60 km/h. Participants were randomly divided into two groups: the control and the training. The training group received a cognitive-based training in the form of combined feedback (i.e., about performance, financial and safety implications) following the baseline drive, while the control group received no training.

4. Results

This section provides key findings from both stages of this research. More detailed information on the results can be seen in Appendix A for Stage 1 and in Appendix B for Stage 2.

4.1. Results: Stage 1

The survey results (N=166) provided insights into drivers' self-reported speeding behaviours, and perception of other drivers' speeding behaviours in the 40 km/h, 50 km/h, 60 km/h, 70 km/h, 80 km/h, 90 km/h and 100 km/h speed zones as well as their perceptions about speed limits and road safety.

- Overall, the results of the survey revealed that 71.5% of participants reported engagement in speeding behaviour across all speed zones, on average under 10 km/h.
- Respondents' perception was that other drivers 'sometimes' exceed the speed limit just under 10 km/h across all speed zones.

- Participants appeared to find lower speed limits the most difficult to comply with. The most challenging speed zones to comply with were reported to be: 40km/h, 50km/h, and the 60km/h speed zones. The 40 km/h speed zone is typically applied in school zones, areas with a high volume of pedestrians, dense residential areas, and areas with road works. The 50 km/h speed zone is in suburban streets and local roads. The 60 km/h speed zone is found in main roads and urban arterials.
- Some participants expressed that the 40 km/h speed limit felt unnecessarily slow, requiring them to concentrate more on maintaining speed than on their surroundings.
- Speed zones were reported to mismatch the road conditions. In the 50 km/h speed zones, wide and straight residential streets with minimal traffic and pedestrian activity encouraged driving over the posted speed limit.
- Speeding in the 60 km/h speed zones was reported to occur unintentionally, when transitioning from higher speed zones. Similar accidental speeding in the 70 km/h speed zones was reported by the participants.
- In the 80 km/h speed zones, participants reported unintentional speeding, often due to driving downhill, cruise control drift, or being distracted by traffic or passengers.
- In the 90 km/h speed zones, many drivers felt that 90 km/h roads were virtually indistinguishable from 100 km/h ones, leading to inattention or underestimation of speed. External pressures, such as tailgating or keeping up with faster traffic, especially on highways or in overtaking situations, also played a role in exceeding speed limit. Some participants mentioned being distracted, in a rush, or simply focused on navigating road conditions without noticing their speed had increased.
- The most common situations in which drivers reported exceeding the speed limit were: road design (i.e., driving down the hill, or wide empty roads), unclear signage, lack of speed zones awareness, inattention to the driven speed, and pressure from other drivers (i.e., tailgating, traffic flow).
- The most common reasons for speeding were: ‘being in a rush’, driving in a school zone, with respondents often unaware of active school hours or failing to recognise school zone signage, and inattention to speed zones and the driven speed.
- In total, 75.4% of participants agreed that there was a link between reduced speed limits and public safety.
- Overall, 43.80% of participants would support the implementation of 30 km/h speed zones in locations with high pedestrian and cyclist activities, like school zones and local

streets, town centres, hospitals, aged care facilities, childcare centres, and pedestrian crossings.

- Specific suburbs and streets mentioned as suitable for 30km/h speed zones include: Civic, Braddon, Dickson, Kingston, Forrest, Coombs, Turner, Campbell, and Amaroo. Participants highlighted particular locations such as City Walk Road, London Circuit, Theatre Lane, Cooyong Street, Lonsdale Street, Northbourne Avenue near Reid and Civic, Kingsley Road, and Russell Offices — where pedestrian risks were noted.
- Shopping areas like Marketplace Gungahlin, Westfield Belconnen, and the Canberra Centre were also seen as zones where lower speed limits could be beneficial. Some respondents pointed to tram station precincts, such as the Gungahlin tram station, and streets near playgrounds and parks as appropriate for reduced limits.
- Similarly, 46.9% of participants agreed that introduction of 30 km/h speed zones would enhance road safety for vulnerable groups such as pedestrians and cyclists.
- More than half of respondents (60.8%) do not believe that introducing 30 km/h speed zones will improve public safety, as shown in Figure 1.

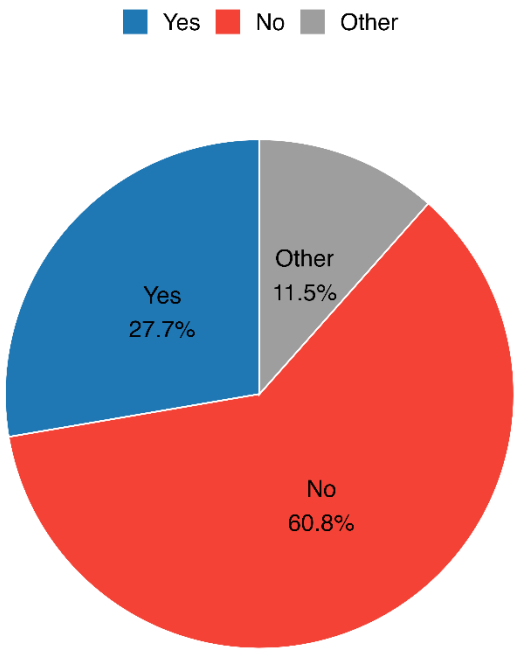

Figure 1. Participants' perception about the effect of the 30 km/h speed zone on improving safety.

- Interestingly, 80 % of respondents do not believe that lower-speed zones, such as 30 km/h, would improve drivers' speeding behaviour.

- Participants questioned whether lower speed limits would be effective if driver behaviour remains unchanged, and little speed compliance in low-speed zones could raise more issues in these areas.
- Other concerns associated with introducing 30 km/h speed zones included: driver frustration, and issues with cruise control functionality at 30 km/h.
- Several participants emphasized that regardless of the speed limit, the focus should be on driver training, attention, and decision-making, as these 'human factors' play a critical role in road safety.
- Surprisingly, 64.6% of respondents were unaware of other countries' implementation of 30 km/h speed zones.
- Participants considered the ACT Government's Road Safety initiatives, such as installing speed cameras, social advertising campaigns, police enforcement and school zone awareness programs to be effective.
- Participants proposed additional road safety initiatives that include: speed limiters for vehicles, increased signage in risks of speeding, higher police enforcement on speeding, targeted driver education programs, incentives for safe drivers, harsher penalties for offenders, infrastructure changes.

4.2. Results: Stage 2

Following the first stage of the research, the second stage examined actual driving behaviour and speed compliance in low-speed zones in the ACT, and the effect of cognitive-based training on young drivers' speeding behaviour through a simulated driving experiment.

- The results highlight that participants in both groups (i.e., the control and training) found it more challenging to comply with lower speed zones, like 30 km/h and 40 km/h speed zones, compared to other tested speed zones.
- Specifically, maximum speed for participants in both groups was above 10 km/h in the 30 km/h speed zone (as shown in Figure 2a), and below 10 km/h in the 40 km/h speed zone (as shown in Figure 2b).

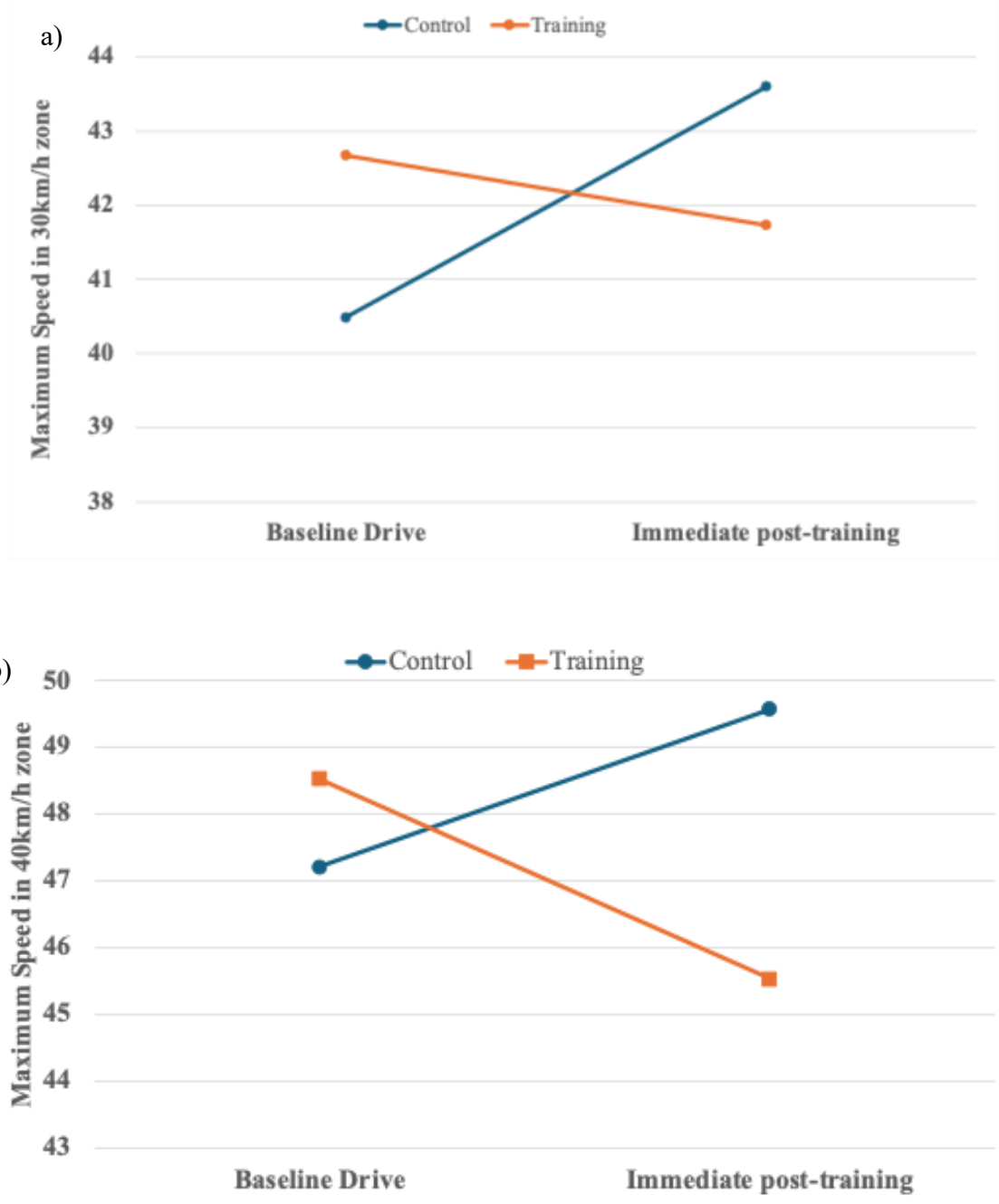

Figure 2. Maximum speed: a) 30 km/h speed zone; b) 40km/h speed zone

- Maximum speed exposure was lower in the 50 km/h and 60 km/h speed zones. Drivers in both groups exceeded the 50 km/h speed limit by 2-3 km/h, and the 60 km/h speed limit by 1km/h. In addition, the 30 km/h speed zone was the speed zone in which the participants spent most time speeding, compared to other tested speed zones.

- At the baseline drive, 50% of time drivers in the Control group exceeded the speed limit in the 30 km/h speed zone, followed by approximately 44% of time speeding at the test drive. Participants in the Training group spent approximately 29% of time speeding at baseline, followed by 26% of time speeding in the 30 km/h speed zone, at the test drive.
- A cognitive-based training intervention in the form of feedback about performance, financial and safety implications was provided to the Training group after the baseline drive. The results showed a promise in improving young drivers' speed management behaviour, compared to the Control group.
- This is evident from the results of maximum speed in the 30 km/h and 40 km/h speed zones in the test drive, where participants in the Control group drove significantly faster compared to the Training group. Although the trend in speed reduction was notable for the Training group, the maximum speed remained above the speed limit in both speed zones (i.e., 30 km/h and 40 km/h).
- Surprisingly, speeding in each of four tested speed zones was a conscious choice for some drivers in both groups. The results from the self-reported post-drive survey showed that at least 65% of all drivers perceived that they were speeding in each speed zone. Importantly, 95% of the drivers in the Control group and 80 % of drivers in each group perceived they were speeding in the 30 km/h speed zone, as shown in Figure 3.

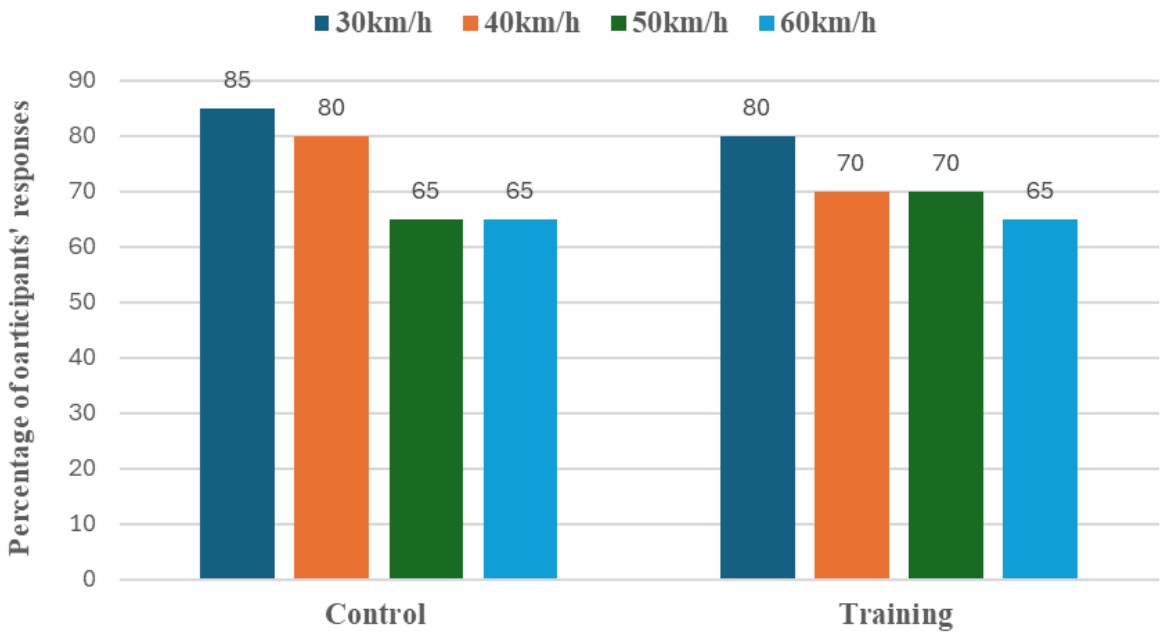

Figure 3. Percentage of drivers' perception of speeding in the 30 km/h, 40 km/h, 50 km/h and 60 km/h speed zones

5. Discussion

This research examined drivers' perceived speeding behaviour and perceptions of low-speed zones in the ACT. In addition, this research aimed to understand young drivers' speeding behaviour and impacts of a cognitive-based training intervention on speed compliance in low-speed zones. Overall, this research highlights that speeding remains problematic for many drivers. The findings from both the survey and simulator studies provide evidence that drivers find it most difficult to comply with low-speed zones, such as 30 km/h or 40 km/h.

In the survey, 71.5% of participants admitted to exceeding speed limits, particularly in 40 km/h zones. Similarly, in the simulator study, most young drivers exceeded the speed limit in all tested zones, especially in the 30 km/h and 40 km/h zones. Furthermore, 95 % of participants in the Control group and 80% in the Training group reported that they exceeded the posted speed limits in their drives.

While most participants agreed that reduced speed limits can improve public safety, many expressed concerns toward the effectiveness of 30 km/h zones on improving drivers speed compliance. Additional concerns were raised due to low-speed compliance that may lead to more dangerous situations, driver frustration, and issues with cruise control functionality at 30 km/h. Several participants emphasized that regardless the speed limit, the focus should be on driver training, attention, and decision-making, as these 'human factors' play critical role in road safety than speed limits alone.

Out of those participants who supported positive effects of the 30 km/h speed zones, the benefits of these zones are seen in contexts with high pedestrian and cyclist activity, such as near schools, hospitals, childcare centres, aged care facilities, town centres, or shopping precincts. Participants also suggested strategies to enhance speed compliance, including speed limiters for the cars, improved and clear signage, increased speed enforcement, and targeted education.

Interestingly, a cognitive-based training intervention, in the form of feedback about performance, financial and safety implications showed a promise in improving young drivers' speed compliance, as maximum speed and percentage of time speeding was considerably lower than for the control condition. This is in line with previous research, where notable changes in young drivers' speed compliance were notable in both driving simulator and on-road studies (Molloy et al., 2018, Molloy et al., 2019; Molloy et al., 2023). These effects retained for at least six months (Molloy et al., 2021). This supports the potential value of incorporating feedback-based cognitive training into young driver education programs.

6. Conclusion

This research aimed to investigate speeding behaviour and perceptions of low-speed zones in ACT and to evaluate whether a cognitive-based training intervention could improve compliance, particularly among young drivers. The provided training showed a positive trend in reducing maximum speed and the percentage time spent speeding among young drivers, compared to the control. Although the maximum exposure of drivers who received training remained above the posted speed limit, further research is needed to better understand the effectiveness of a cognitive based training retention (i.e., at least 6 months post-training). These findings support the potential value of targeted behavioural strategies to reduce speeding in low-speed zones.

Key takeaway from study in Stage 1 (See Appendix A):

- A significant proportion of participants, 71.5%, reported exceeding the speed limit, particularly in 40 km/h and 50 km/h zones.
- The 40 km/h zone was consistently reported as the most difficult to comply with.
- Introducing lower-speed zones in high pedestrian areas such as schools/ shopping precincts would improve road safety for vulnerable road users. For this process to be effective, further communication and consultations with community are needed, as 80% of the ACT community were not supportive of 30km zones.
- In addition, implement awareness campaigns and initiatives about the effects of the 30 km/h speed zones on public safety, as the results of the research indicate that the majority of respondents were not aware of international best practices and understanding of benefits of low-speed zones for vulnerable users.
- Lowering speed zones alone will not be sufficient to achieve positive road safety outcomes. Continuing a combined approach of enforcement, community education and communication, engineering solutions to slow traffic will be essential to achieving road safety outcomes.

Key takeaway from study in Stage 2 (See Appendix B):

- Young drivers consistently exceeded the speed limit in all tested zones (30, 40, 50, and 60 km/h), similar to Stage 1 findings.
- The 30 km/h and 40 km/h zones were the most challenging for maintaining speed compliance. Poor compliance with low-speed zones was also found in Stage 1.
- At least 65% of young drivers reported speeding in each speed zone, and 80% acknowledged doing so in 30 km/h and 40 km/h zones.
- A cognitive-based training intervention—providing feedback on performance, safety, and financial impacts —led to measurable reductions immediately post-training in both maximum speed and time spent speeding, compared to control in the 30 km/h and 40 km/h speed zones. Drivers who received no training drive significantly faster and for longer time (i.e., speed increased by 2-3km/h in these speed zones), compared to those who received training (i.e., speed reduced by 1-3km/h in these speed zones).
- Participants who received training, although reduced maximum speed, remained driving over the speed limit.
- Further research is needed to understand its longer-term effects, and the ways to improve better speed compliance within the posted speed limits.
- The majority (60%) of trained participants perceived the intervention as effective in helping them manage speed.

7. Recommendations

This study provides some impactful insights regarding speeding behaviour, reasons for speeding, perception about other drivers' speeding behaviour and considerations for any implementation of low-speed zones, 30km/h in the ACT. This study showed a promise of cognitive based training the speed compliance of respondents, via reducing maximum speed and percentage of time speeding for participants who received training, compared to control. This research opens the avenue for the future considerations for improving road safety and low-speed zones (i.e., 30 km/h) in specific areas in the ACT. In addition, this research provides evidence that the incorporation of cognitive based feedback training in driver training may improve speed management behaviours of drivers.

. Future research could further explore the effects of cognitive-based training on young drivers in a trial with driver training providers. In addition, future work could further examine the actual driving performance of drivers in different age categories, and at specific low speed zone site locations.

Key recommendations:

- Conduct a trial including a cognitive-based training intervention with feedback about performance, financial and safety implications in a driver training program. This can be organised as the next stage of the research between the certified driver training provider and the research/academic institution.
- Conduct an on-road trial with the 30 km/h speed zones and specific locations of interest, examining road safety benefits and drivers' speed compliance with the posted speed limits.
- Develop educational initiatives to educate the ACT community about the effects of the 30 km/h speed zones in Australia and globally. Develop a public awareness campaign to raise awareness about the benefits of low-speed zones.
- The ACT Government should revise the proposed by participants locations for trialling the 30 km/h speed zone project. These locations may be: locations with high pedestrian and cyclist activity, school zones (i.e., roads along Ainslie school), areas near aged care facilities, childcare centres, hospitals, town centres, shopping precincts.
- There is concern from participants in both stages of this research about drivers' speed compliance, which is poor at low-speed zones (i.e., 30 km/h, 40 km/h). The concern highlights non-compliance with low-speed limits, leading to more dangerous situations, as highlighted by respondents in the research. The non-compliance with the speed limit may lead to ineffective countermeasure for speed reduction. Similar to the NSW trials (i.e., City of Sydney, 2017) the 30 km/h speed limits were considered as ineffective countermeasure for improving road safety and speed reduction intervention.
- Consider a combined effort in addressing 'speed management' problem, including: road design, signage (engineering), anti-speeding messages (enforcements), and training for speed management (education). Specifically, in terms of engineering countermeasures, implement clear road markings and clear signs along the low-speed roads, and consider narrower roads for low-speed zones, and wide roads for higher-speed zones. Regarding enforcement, more enforcement to comply with the speed

limits was welcomed by participants, as well as higher fines for offenders with repetitive speeding behaviour, and rewards for safe driving (complying with the speed limits – car insurance rewards). In terms of training, introduce as part of drivers' licensure process, speeding-related training that target speed compliance and speed management behaviour. It is believed that reducing speeds alone will not improve drivers' speeding behaviour and road safety.

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9. Appendix

Appendix A – Stage 1 – Examining drivers' perception of the low-speed zones in ACT.

Appendix B – Stage 2 – Understanding young drivers' speeding behaviour in low-speed zones in ACT.

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APPENDIX A

Summary Report: Stage 1

Title: Examining drivers' perception

of low-speed zones in ACT

Date: July 14th, 2025

Table of Contents

1. Introduction

Speeding – risky and illegal behaviour – is cited as one of the major killers on roads throughout Australia and the world (World Health Organisation, 2019). Excessive speed is a leading cause in crashes involving young drivers between the age of 18 and 25 years old (Australian Capital Territory (ACT) Government, 2021). For the last 10 years, at least three people have died on Australian roads every day (Transport for New South Wales – TfNSW, 2023). According to the National Road Safety Strategy 2021-2030, speed management is a critical factor in managing the physical forces to which human bodies are subjected in any crash. Vulnerable road user safety (i.e., pedestrians, cyclists, and motorists) is a key focus of the National Road Safety Strategy 2021-30. For instance, at 30 km/h, the chance of a pedestrian being killed is about 10%, but this jumps to over 90% at 50 km/h. Targeting lower speed zones in urban areas, improving infrastructure, and raising awareness can significantly reduce fatalities and injuries among these vulnerable groups (National Road Safety Strategy 2021-30).

Introducing low-speed zones may reduce the risk of fatality for pedestrians involved in a vehicle crash (Lawrence et al., 2021). For example, Lawrence et al., (2021) evaluated the 30km/h trial in Melbourne and found the likely safety benefits of the 30 km/h trial with increased support from the residents. Recent research finds that introducing 30 km/h speed limits in cities reduces fatalities by more than 40% (Yannis & Michelaraki, 2025). Lower speed zones, such as the 30 km/h limit, are not only essential for reducing the incidence and severity of road crashes but also for promoting greater use of active travel modes, such as walking and cycling (Pearson et al., 2024). Speed reductions in the control region suggested a carry-over of the effects of the trial but also added support from local residents for reduced speed limits in the region. Potential injury savings were estimated at a 4% reduction in the risk of a pedestrian injury from the observed treatment effect in the trial region.

While low-level speed zones may reduce the severity of a collision and road trauma, the consequences of speeding may be acute, particularly in high pedestrian zones (40km/h speed zones), not only in terms of violating the speeding rules, but also by jeopardizing safety and lives of drivers as well as other road users, including passengers and pedestrians. The compliance with speed limits in areas with high proportion of pedestrians, such as city centres

or around school zones, can be described as poor, at best. For the last 10 years, the research has shown noncompliance with speed limit in low-speed zones (Krasnova et al., 2015a; Krasnova et al., 2015b; Krasnova et al., 2016; Molloy et al., 2018a; Molloy et al., 2018b; Molloy et al. 2019; Molloy et al., 2021a; Molloy et al., 2011b; Molloy et al., 2023). For example, Molloy and colleagues (2023) found that 100% of young drivers (between 18 and 25 years old) failed to comply with lower the speed limit of 50 km/h, while 50% failed to comply with the higher speed limit of 80km/h. Ellison et al. (2011), and Hawkins (2007) found that only 50% and 17% accordingly comply with the low-speed limit, and speeding is usually greater than 10km/h over the posted speed limit. Failure to adhere to the speed limit in low-speed zones is thought to occur for various reasons including: underestimation of the outcomes associated with speeding (McKenna & Horswill, 2006), lack of speed awareness, attitude toward speeding, and poor speed management skills.

Research on road safety emphasizes the critical role of speed management in preventing accidents and reducing fatalities, particularly among vulnerable road users such as pedestrians. Various studies have demonstrated that even small speed increases can dramatically affect crash outcomes and injury severity (Perez et al., 2007; Molloy, 2021a). Low-speed zones, particularly 30 km/h limits, have been identified as effective interventions to enhance safety and reduce risks. Evaluations of specific trials, such as those conducted in Melbourne, indicate that these measures can foster community support while yielding significant benefits in reducing pedestrian injury risks (Fisa et al., 2022; Molloy, 2021b). However, the persistence of low compliance rates among drivers, especially younger individuals, underscores the necessity for continued efforts in education, policy reform, and infrastructure improvements to ensure the effectiveness of low-speed initiatives. Importantly, the trials in New South Wales showed that overall it was not successful as it appeared that most drivers were either unaware of the speed limit or ignored the speed limit (City of Sydney, 2017). Overall, adopting lower speed limits is a crucial strategy for improving road safety in urban areas, necessitating a coordinated approach from policymakers, local councils, and community stakeholders (Martínez & Jin 2020; Molloy, 2018).

Fildes et al. (2022) examined the effectiveness of lowering residential speed limits to 30 km/h in the City of Yarra, Melbourne to reduce fatal and severe injuries among vulnerable road users. The study involved replacing 40 km/h speed signs with 30 km/h signs in the trial area and comparing the outcomes with a control area. Results indicated modest reductions in mean speeds, with notable safety benefits for vehicles that had been traveling at higher speeds,

reflecting a 4% decrease in the risk of severe injury for pedestrians during collisions, thereby reinforcing the role of lower speed limits in enhancing road safety. The survey results from the trial showed community support for implementing the 30 km/h speed limit to safeguard vulnerable road users, as well as concerns regarding enforcement. Community acceptance is generally higher in areas with more pedestrians, while concerns persist in other regions about the potential for traffic delays. Public awareness campaigns highlighting the link between reduced speed and safety have been crucial in fostering support. The findings offer important insights that can guide the scaling of similar interventions in other urban locations, contributing to a comprehensive vision for road safety and injury prevention in local streets.

In contrast, Pearson et al. (2024) explored the barriers affecting the implementation of 30 km/h speed zones as a cost-effective road safety measure in Victoria, Australia, while also comparing the successful adoption of similar policies in Canada. Through 26 semi-structured interviews with policy and implementation partners in both regions, six key themes emerged: a growing recognition of the significance of 30 km/h speed zones (appetite for change), policy misalignment hindering widespread adoption, and insufficient local evidence about suitable road environments for these limits. The research indicated promising support for 30 km/h speed limits among local and state governments but underscores the necessity for state-level policy reforms to facilitate easier adoption by local councils. Overall, the study highlighted the complexity of advancing such initiatives and offers critical guidance for policymakers aiming to improve road safety and urban liability through the establishment of lower speed limits.

As part of an Active Streets pilot program by the ACT Government, a 30 km/h speed limit was trialled at two primary schools. The 30 km/h school zone was considered an infrastructure intervention to promote safe routes to school via active travel. The results of the trial showed that implementing the 30 km/h speed zone had a trend toward reducing the average travelled speeds. Specifically, over the six-month time period the average daily traffic speeds reduced from 35.5 km/h to 32 km/h. These results, however, showed that drivers remained exceeding the speed limit six months-post training.

A survey conducted by We Ride Australia showed growing public acceptance of 30 km/h speed zones, especially in high pedestrian areas like local streets and school zones. The perception of safety benefits, such as reduced risk for pedestrians and cyclists, is a key factor in fostering support. Studies also indicate that after implementing 30 km/h speed zones, public opinion often shifts positively as residents experience benefits like calmer traffic and safer streets for

walking and cycling. In areas like Sydney's Manly and Parramatta, as well as Melbourne's Yarra Council, trial zones have been met with increased public approval following their implementation (https://www.weride.org.au/policy-planning/are-we-ready-for-lower-speeds/).

Moreover, trials in cities like Hobart and Yarra have shown that after the introduction of 30 km/h zones, the perceived benefits—such as increased safety and reduced traffic noise—often lead to a reduction in public opposition to the lower speed limits. These findings suggest that while initial public resistance exists, awareness campaigns highlighting the safety and broader community benefits of 30 km/h speed zones can help shift perceptions positively. The surveys and trials on 30 km/h zones in Australia highlight diverse public perceptions, shaped by safety concerns, local context, and education efforts:

- City of Yarra (Victoria): A trial conducted in 2017 in Fitzroy and Collingwood aimed to reduce speeds to protect vulnerable road users. Community acceptance grew during the trial, especially after public awareness campaigns on safety benefits.
- Western Australia: Trials in Perth's Safe Active Streets program have also shown significant support, driven by perceived safety improvements for cyclists and pedestrians.
- NSW Transport: Surveys revealed that two-thirds of Australians support lower speeds in residential areas due to the safety benefits for pedestrians.
- These trials demonstrate that while initial resistance may exist, community support generally increases with clear communication on the benefits, especially around safety and local amenities.

Hence, the proposed research aims to further understand the perceived speeding behaviour of ACT residents, potential effectiveness of 30 km/h speed zones in reducing motor vehicle crashes, road trauma and improving road safety in ACT. In addition, this research aimed to examine the potential of introducing 30km/h speed zones in ACT on drivers' speed compliance and driver behaviour.

1.1 Aim and Research Questions

The main aim of the study is to examine self-reported drivers' speeding behaviour and perception of the low-speed zone on road safety in ACT. In pursuit of this aim, the following research questions should be answered:

1. What is drivers' perception of low-speed zones and their speed compliance in ACT?
2. What is the perceived effectiveness of introducing low-speed limits in ACT on speed compliance, pedestrian safety, and road safety?
3. What are reasons and situations in which drivers exceed the speed limit in ACT?

2. Method

In total, 166 drivers aged 18 years old and above, who reside in the ACT completed an online survey. The survey was advertised to the population of ACT via online advertisements from the official channels of University of New South Wales, Australasian College of Road Safety, Pedal Power, and local community notices across ACT. The survey comprised questions to examine drivers' speeding behaviour, and perception of the effectiveness of reducing speed limit to 30 km/h on the ACT roads. Building on the work of Molloy et al., (2023), the survey also explored reasons and situations in which drivers exceed the speed limit, and drivers' perceptions of implementing 30 km/h speed zones in the ACT. The study was approved by HREA Ethics Panel from the University of New South Wales.

Out of 166 responses, 130 responses were considered valid. Thirty-six responses were excluded as invalid responses. Responses were considered invalid, if: less than 50% of responses was provided, as consistent with previous research (Engelman, White, & McGee, 2019); if answers contained words/letters to the questions asking for numbers, and vice versa.

Overall, data from 130 participants (41 females) were analysed. Table 1 shows a summary of demographic data.

Table 1. Summary of demographic data.

Variable	Levels	Percentage, %
Age Group	18 - 25	19.23
	26 - 35	36.15
	36 - 45	27.69
	46 - 55	12.31
	56 - 65	3.08
	65+	1.54
Gender	Female	31.54
	Male	68.46
Driving License	Provisional 1	5.38
	Provisional 2	13.85
	Full Licence	70

	Other (International)	10.77
Infringement Notice for speeding	Yes	44.62
	No	55.38
Highest Exceeded Speed - for drivers who had received infringement for speeding	No Speeding	54.62
	<10 km/h	19.23
	10-20 km/h	3.08
	20-30 km/h	18.46
	31-40 km/h	3.85
	> 41 km/h	0.77
Accident Involvement	Yes	44.62

The average age of drivers was 35.42 years old (SD = 11.52). Participants' average age when they first started to drive without supervision was 22.79 years old (SD = 6.02). As shown in Table 1, 44.62% of respondents reported receiving the infringement notice. Out of those drivers who received an infringement notice for speeding, 19.23% had exceeded the speed limit under 10 km/h, 3.08% of drivers had exceeded the speed limit between 10 and 20 km/h, 18.46% of drivers had exceeded the speed limit between 20 and 30 km/h, 3.85% had exceeded the speed limit between 30 and 40 km/h, and approximately 1% sped more than 41 km/h. In addition, 44.62% per cent of drivers were involved in a motor vehicle accident in the ACT. Among the participants who have received infringement notice for speeding, 20% received it on one occasion, while one participant received 15 speeding infringement notices.

Approximately 44% of respondents reported to have been involved in at least one accident during their driving history. Amongst the reasons that contributed to an accident, road design, weather conditions, visibility issues, human error, rush, intoxication were reported most often.

3. Design

The online survey was designed in a way that it included demographic questions (i.e., age, type of driver's licence, any previous speeding infringements, etc.) and questions regarding self-reported speeding behaviour, including three parts: (I)speed management behaviour, (II) perception of other drivers' speeding behaviour, and (III) perception of speed limits and road safety, as shown below.

Part I: Speed Management Behaviour

This part of the survey included questions about drivers' speed management behaviours and performance on the road. Participants were asked about frequency of exceeding speed limits in various speed zones, the circumstances in which they exceeded the speed limit, and reasons for

speeding. This part also examined the speed zones in which drivers found it most challenging to comply with speed limits.

Part II: Perceptions of Other Drivers' Speeding Behaviour

This part of the survey examined participants' perceptions of other drivers' speeding behaviour and speed compliance. Questions addressed the common reasons and situations in which other drivers are perceived to be speeding. Participants were also asked about other drivers' speed compliance in various speed zones, including 40 km/h, 50 km/h, 60 km/h, 70 km/h, 80 km/h, 90 km/h, and 100 km/h speed zones.

Part III: Perceptions of Speed Limits and Road Safety

This part of the survey investigated participants' perceptions of the relationship between speed limits and public safety. Participants were asked whether they believed implementing a 30 km/h speed zone would enhance public safety. Additional questions explored their perception of the potential effectiveness of 30 km/h speed zones in specific ACT areas, and suggestions where these speed zones could be implemented. Finally, participants were asked to provide feedback on the ACT government's road safety initiatives and suggest any additional measures they believed could further improve road safety.

4. Data Analysis

The survey data were analysed using both quantitative and qualitative methods to address the research aims and questions. Quantitative analysis focused on summarising means and standard deviations of participants' responses (i.e., identifying the most common reasons and situations for speeding in different speed zones). The data were collected through the UNSW Qualtrics software and subsequently transferred to an Excel spreadsheet for further analysis.

Qualitative analysis complemented the study by providing insights into the questions (i.e., reasons for speeding behaviour). The combined findings from both analytical approaches provide an understanding in relation to potential implications of implementation of 30 km/h speed zones and background to inform development of training interventions and road safety initiatives aimed at improving speed compliance.

5. Results

5.1. Part I: Speed Management Behaviour

5.1.1. Driver's self-reported speed management behaviour in ACT

This section examined drivers' self-reported speeding behaviour. Participants were asked "Have you ever exceeded the speed limit when driving in ACT?". Figure 1 shows that 71.5% of respondents reported engaging in speeding behaviour. Participants were also asked to report how often they exceed the speed limit in the different speed zones in the ACT. Figure 2 illustrates the frequency of participants speeding in various speed zones. In all speed zones, except for the 40 km/h, almost half of respondents reported that they never exceeded the speed limit. Approximately 30% of respondents admitted that they rarely exceeded the speed limit, while just under 20% of respondents stated that they sometimes exceeded the speed limit in various speed zones.

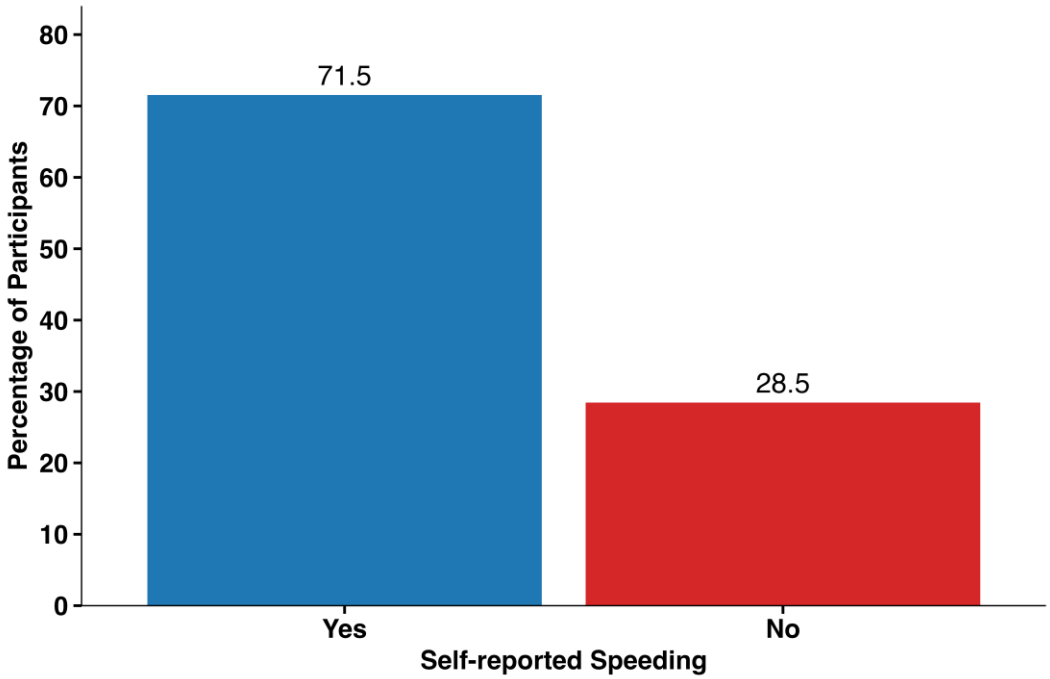

Figure 1. Percentage of participants exceeding speed in different speed zones

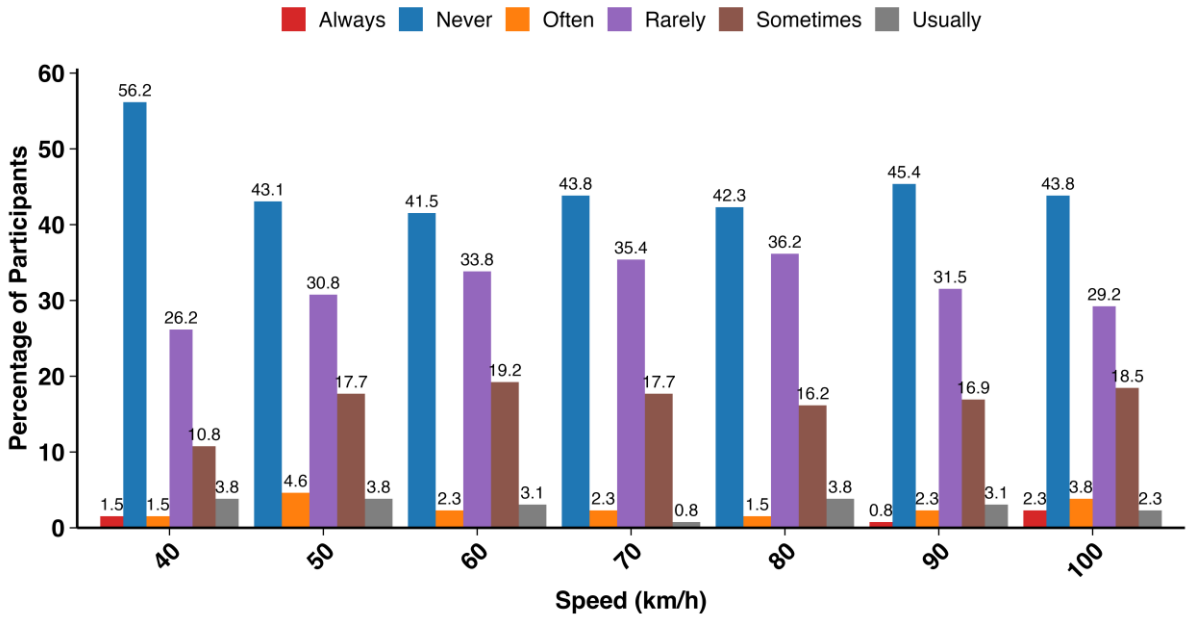

Figure 2. Percentage of participants exceeding speed in different speed zones

Next, participants were asked "When driving over the speed limit, how many km/h do you usually drive over the speed limit (on average) in various speed zones?" Figure 3 illustrates speed (km/h), which was exceeded above the speed limit across the different speed zones. A notable portion admitted to exceeding speed limit by various amounts, most commonly under 10 km/h, with a few participants exceeding speed above 10km/h across all speed zones.

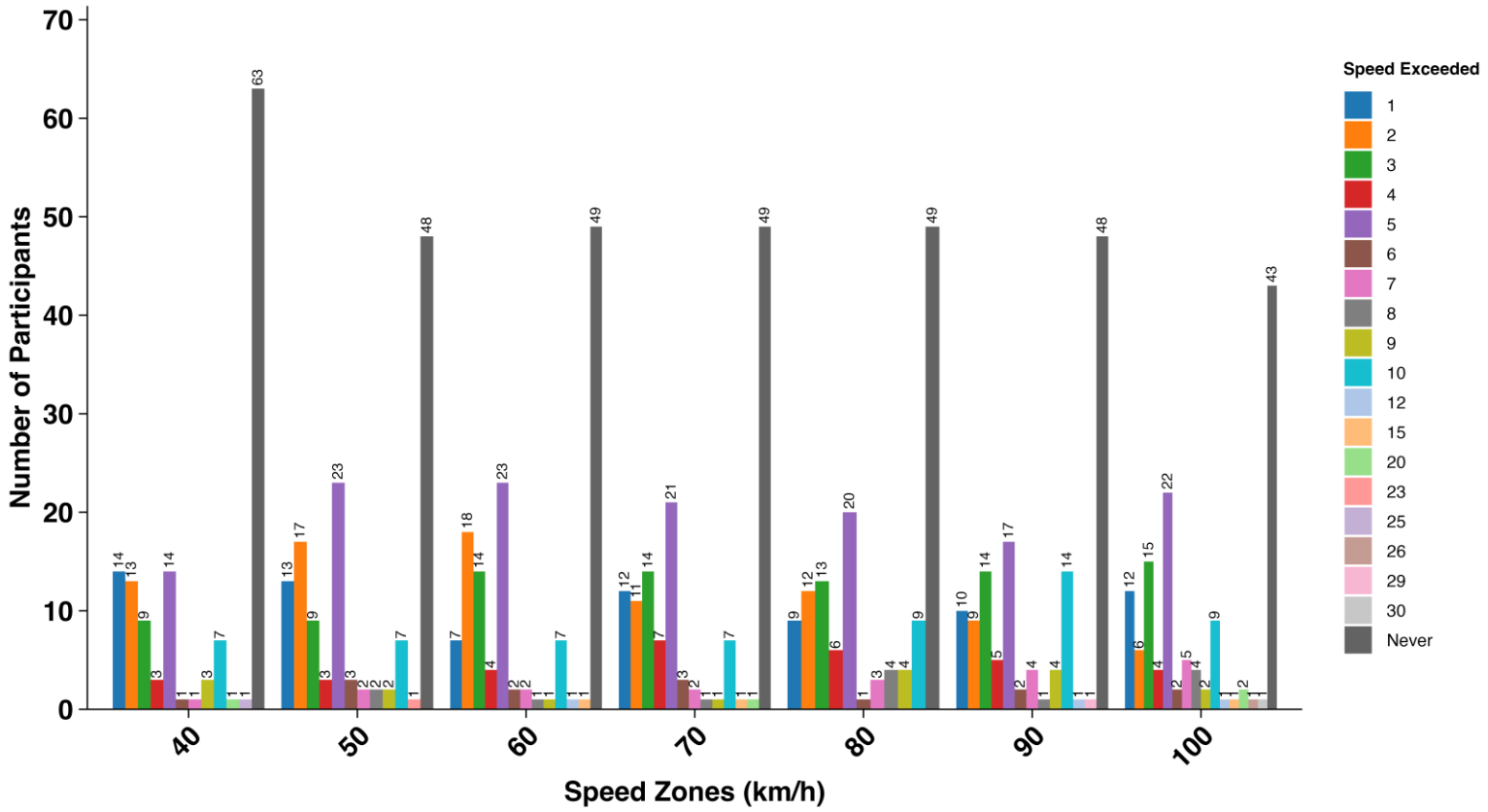

Figure 3. Speed (km/h) above the speed limits in different speed zones

5.1.2. Situations in which young drivers exceed the speed limit

Table 2 shows a summary of participants responses regarding the situations in which they exceed the speed limits. Participants reported a range of reasons for exceeding the speed limit in the 40 km/h speed zones. Many of the participants mentioned inattention and lack of awareness as the cause of speeding. Some respondents mentioned that they did not realise they were driving in a school zone, not being aware of school hours, and missing speed limit signs. Some respondents emphasised that any speeding in these areas was unintentional, as they recognised the importance of school zones. A few participants reported confusion due to inconsistent signage, especially around school zones. Some of the respondents acknowledged the difficulty of remembering school zone hours. A few respondents mentioned driving through empty or quiet roads, where the lack of other vehicles or visible hazards made the low speed feel unnecessary. Lastly, some participants cited habitual driving behaviour and rushing to work as contributing to occasional speeding in 40 km/h areas.

In the 40km/h speed zone, road design also emerged as a significant factor. Participants mentioned that certain roads (i.e., wide roads, multi-lane roads, those with no visible pedestrian activity) did not feel appropriate for such a low-speed limit. Some participants expressed that the 40 km/h speed limit felt unnecessarily slow, requiring them to concentrate more on maintaining speed than on their surroundings. This issue was particularly noted in manual or newer vehicles where cruise control is unavailable at low speeds. Other situations, such as tailgating or the pressure to keep up with the traffic flow, were also noted by participants. Distraction, both from within the vehicle and from the road environment (e.g., intersections, changing lanes), were reported as contributing to speed exceedances.

In the 50 km/h speed zones, participants reported exceeding the speed limit due to various factors. For example, participants felt that wide and open residential streets with minimal traffic or pedestrian activity encouraged driving over the speed limit. Similar to the 40 km/h speed zones, participants felt pressure from the traffic flow and being tailgated, which often resulted in driving above the posted speed limit.

In the 60 km/h speed zones, many participants mentioned that speeding often occurred unintentionally, especially when slowing down from higher-speed areas or during transitions between speed zones. A recurring theme was distraction—whether from conversations with passengers in the car, focusing on navigation, or dealing with traffic conditions—which made it easy for drivers to lose track of their speed. Several respondents mentioned difficulty in managing speed, particularly when driving downhill or using cruise control, which sometimes allowed the vehicle to drift slightly over the speed limit. Others reported the road conditions that encouraged faster driving, such as wide, straight roads with little traffic, where the 60 km/h limit felt unnecessarily restrictive. External pressure, including the behaviour of other drivers and the general pace of traffic, also influenced speeding. Some participants felt compelled to speed in order to keep up with others, avoid being tailgated, or while overtaking other vehicles.

In the 70 km/h speed zones, participants reported their speeding as accidental or situational, frequently linked to road design and traffic flow. Many indicated that these roads—typically multi-lane and open—felt as though they could safely accommodate higher speeds, leading them to unintentionally exceed the limit. Some noted that speed transitions between zones were not always well marked, and when coming from 80 or 100 km/h speed zones, it was easy to overlook the reduction to 70 km/h.

In the 80 km/h speed zones, participants cited unintentional speeding, often due to driving downhill, cruise control drift, or being distracted by traffic or passengers. Many felt that straight, wide, and quiet roads encouraged driving slightly above the speed limit. Overtaking, tailgating pressure, and the urge to keep pace with traffic were also key factors. In several cases, drivers noted they were simply focused on the road and didn't realize their speed had increased.

In the 90 km/h speed zones, many drivers felt that 90 km/h roads were virtually indistinguishable from 100 km/h ones, leading to inattention or underestimation of speed. External pressures, such as tailgating or keeping up with faster traffic, especially on highways or in overtaking situations, also played a role in exceeding speed limit. Some participants mentioned being distracted, in a rush, or simply focused on navigating road conditions without noticing their speed had increased.

In the 100 km/h speed zones, participants reported unintentional speeding, especially when using cruise control, driving downhill, navigating long and open roads. Many felt that these roads—particularly highways and quiet country routes—felt safe at slightly higher speeds, especially when other vehicles were commonly traveling at 110–115 km/h. External pressure

from tailgating or the need to keep up with faster traffic during overtaking was a recurring factor. Some drivers cited inattention, distraction, or being in a rush, while others admitted that on such roads, driving a little faster felt normal and enjoyable.

Table 2. Situations in which drivers exceed the speed limit in the 40 km/h, 50 km/h, 60 km/h, 70 km/h, 80 km/h, 90 km/h, 100 km/h speed zones

40 km/h	**50 km/h**	**60 km/h**	**70 km/h**	**80 km/h**	**90 km/h**	**100 km/h**
School zones: - Inattention to school hours (i.e., not paying enough attention regarding school hours - Not realising I was driving through a school zone - Never on purpose, school zones are important - Not aware of school zone	Minor increase to control speed	Lack of awareness of the speed limit (i.e., missed the sign)	Difficulty in controlling the speed	Overtaking (i.e., overtaking lane ending)	Overtaking (i.e., traffic flowing greater than speed limit or while overtaking; overtaking lane ending)	Overtaking (i.e., a long line of trucks; overtaking lane ending; on a country road)
Poor speed management skills to control speed in this speed zone	Driving through Aranda, the 50 km/h zone is a constant area for confusion as the Cook side of the road when it continues is 60km/h	Unintentional speeding (i.e., when slowing down from higher speeds)	Lack of awareness of the speed limit (i.e., missed the sign)	Distracted (i.e., by passenger talking)	Just before the Tuggeranong parkway becomes 100, there is lots of pressure to go above 90	Tailgating
Speed zones and road design: - Driving in the City and departing Jolimont. Naturally want to drive above 40km/h on the three lane road but then realise there are cameras. - Outside Radford where it is dual lanes and no students crossing the road	Unintentional speeding	Inattention to speeding	Speed limits feel slow for condition – it should be 80 km/h.	Accidental	90 km roads feel the same as 100 km	Pressure from other drivers to drive faster (i.e., Keeping up with the rest of traffic).
Unintentional speeding (i.e., accidental)	Lack of speed limit awareness (i.e., missed sign)	Normal driving	Inattention (i.e., speed inattention, speed limit sign)	Tailgating, other drivers push me to drive faster than needed.	Tailgating, other drivers push me to drive faster than needed.	Cruise control went over the speed limit

Lack of speed sign awareness (i.e., Braddon/City didn't see the 40km/h sign; missed sign); unawareness of change of area, esp. as I am not usually driving at school times. I got to work before and come home after, so if I leave early or late and I find myself in school zone during the 40km times is unusual. I am often surprised and sometimes have to slow down quickly as soon as I realise (usually a few seconds)	Road design (i.e., empty road; driving on suburban roads)	Pressure from other cars (i.e., keeping with the rest of the traffic);	Pressure from other cars (i.e., keeping with the rest of the traffic); Speeding as a norm for other drivers (i.e., most other people are also doing 10 over)	Cruise control went over the speed limit	Cruise control went over the speed limit	Normal driving
Misleading sign (i.e., Construction where there is nothing actually happening) -Missed the speed limit sign	Inattention to speed	To cope the speed at upward slope	Few cars on road and good driving conditions	Normal driving	Inattention to speed	Inattention to speed
Inattention to speed (i.e., not paying attention to my speed; I was concentrating on traffic/road conditions and didn't notice my speed had crept up) -Accidental	Pressure from other drivers to drive faster (i.e., Keeping up with the rest of traffic; inadvertent following of lead car).	Get through traffic lights	Get through traffic lights	Inattention to the driven speed	Road transitions to 100 km/h	Emergency
Normal driving on non-busy roads	Empty roads (i.e., when driving via a quicker route along the backstreets of the suburbs; Far back streets or rural areas when not busy or late at night; driving along quiet long residential streets)	Driving on suburban roads	Driving a little over on the main roads	Driving on a downward slope	Not much traffic	Single lane country roads with very little traffic if any.
Poor speed management skills when driving downhill (i.e., Management of speed downhill)	Poor speed management when driving downhill	Management of speed downhill,	Unintentional speeding	In a rush (i.e., get to location quicker)	Driving on highways a little over, especially when travelling through national parks	Distraction

Distraction (i.e., traffic distraction)	Distraction (i.e., traffic distraction)	Distraction (i.e., traffic distraction)	Poor speed management when driving downhill	Few cars on road and good driving conditions	When driving on Highway	Lack of awareness of speed driven
Too slow speed zone	Lack of speed awareness (i.e., I was concentrating on traffic/road conditions and didn't notice my speed had crept up)	Tailgating on the road (i.e., being chased by other cars)	Distraction (i.e., traffic distraction; driving across the bridge I get distracted by the view)	Driving a little over on the main roads	Unintentional speeding (i.e., generally, not intentionally and just trying to keep it at 90kph but with changes in terrain it may go over and will need to actively brake or slow to correct)	Not too much traffic on the road
Tailgating (i.e., being chased by other cars)	When speed changes from one speed limit to another.	I was concentrating on traffic/road conditions and didn't notice my speed had crept up	Too many traffic lights on the road slow down travel time (i.e., Multi lane main roads with lots and lots of sets of traffic lights slowing travel time considerably)	Unintentional speeding	Distraction	Always going a little bit faster on the highways
Night time (i.e., roadwork sign, but it is a night time)	Misleading signs (i.e., non-existent road works)	Speed limit does not correspond the road design (i.e., major roads that should be at least 70km/h)	Tailgating (i.e., being chased by other car)	Driving on roads like Bindubi street or Drakeford Drive where it's sometimes quiet and you can get away with going a few km over	When driving down the hill	When on highway (i.e., everyone is doing 10-20 over)
In a rush (i.e., trying to get to a destination faster)	In a rush (i.e., trying to get to a destination faster)	Road design (i.e., straight road; wide lanes that can easily	Accidental speeding	Management of speed downhill, traffic distraction	In a rush	Unintentional speeding

		accommodate faster speeds)				
Following other vehicles	Changes in speed limits in residential areas (i.e., Usually by accident when I forget that smaller streets are 50. I have to remind myself of that even though it's been ages since the speed limits changed)	Overtaking	Road design (i.e., wide, straight lanes)	Unintentional speeding (i.e., generally not intentionally and just trying to keep it at 80km/h but with changes in terrain it may go over and will need to actively brake or slow to correct)	I was concentrating on traffic/road conditions and didn't notice my speed had crept up	Speed management when driving down the hill (i.e., I was concentrating on traffic/road conditions and didn't notice my speed had crept up, if the speed creeps slightly while descending a hill, there is little point in slowing the vehicle when it will naturally slow down on the ascent up the other side)
Overtaking	Missed sign	Misleading signs (i.e., non-existent road works)	In a rush	Driving on back roads	Motorway speed drops; change of speed on a motorway.	When driving on back roads
Dropping kids at school	Following other vehicles	In a rush (i.e., just getting somewhere faster)		Focus on traffic, and speed went up (i.e., I was concentrating on traffic and didn't notice my speed had crept up)		It feels safe to drive a little faster, esp. when many cars speeding and drive past you at like 110 and 115. I usually use cruise control though
	Driving suburban roads			Road design (i.e., Straight road; wide often empty lanes)	.	It's fun and the road is usually empty
	Miss understanding of speed zones			When driving on highway		Too slow
						In a rush (i.e., just trying to get somewhere faster)
						Driving to Wollongong

5.1.3 Most Common reasons of speeding

Respondents reported a variety of reasons for speeding across different speed zones. This section summarises the most common reasons of speeding as shown in Table 3. In the 40km/h speed zone, the most common reasons of exceeding the speed limit were 'being in a rush' (16.1%), driving in a school zone (11.86%), with respondents often unaware of active school hours or failing to recognise school zone signage, and unintentional speeding (5.93%). In the 50 km/h speed zone, the most common reasons for speeding were 'being in a rush' (17.7%), followed by unintentional speeding (7.08%), and inattention to speed zones (6.19%).

In the 60km/h speed zone, rushing (20.87%) was most reported reason for speeding. Unintentional speeding (5.22%), followed by distraction (3.48%) and inattention (3.48%) were amongst other reasons for speeding. In the 70km/h speed zone, the most common reasons were 'being in a rush' (19.09%), overtaking (4.55%), unintentional speeding (4.55%), and traffic flow pressure (3.64%). In the 80km/h, 90km/h and 100km/h speed zones, the reasons for speeding were similar: 'being in a rush', when overtaking, and traffic flow pressure from other traffic.

Table 3. Most common reasons for speeding in which drivers exceed the speed limit in different speed zones

Most Common Reasons of Speeding	40km/h Speed Zone		50km/h Speed Zone		60km/h Speed Zone		70km/h Speed Zone		80km/h Speed Zone		90km/h Speed Zone		100km/h Speed Zone	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Rushing	19	16.1	20	17.7	24	20.87	21	19.09	17	14.91	11	9.82	12	10.26
School zone and child-related	14	11.86	0	0	0	0	0	0	0	0	0	0	0	0
Distracted while driving	5	4.24	4	3.54	4	3.48	3	2.73	3	2.63	2	1.79	2	1.71
Unintentional and carelessness	7	5.93	8	7.08	6	5.22	5	4.55	2	1.75	1	0.89	2	1.71
Overtaking	1	0.85	2	1.77	2	1.74	5	4.55	8	7.02	9	8.04	11	9.4
Frustration or emotional	0	0	0	0	1	0.87	1	0.91	2	1.75	1	0.89	1	0.85
Speeding by habit	0	0	1	0.88	3	2.61	1	0.91	2	1.75	2	1.79	2	1.71
Not paying attention	5	4.24	7	6.19	4	3.48	2	1.82	2	1.75	2	1.79	2	1.71
Time Pressure	1	0.85	1	0.88	1	0.87	1	0.91	1	0.88	2	1.79	2	1.71
Unconsciousness	0	0	1	0.88	2	1.74	2	1.82	2	1.75	1	0.89	1	0.85
Felt it was safe	0	0	2	1.77	2	1.74	2	1.82	4	3.51	3	2.68	4	3.42
Following or pressured by traffic	1	0.85	1	0.88	3	2.61	4	3.64	6	5.26	5	4.46	4	3.42
Unaware of zone or signs	5	4.24	1	0.88	1	0.87	1	0.91	1	0.88	1	0.89	0	0
Too slow	2	1.69	1	0.88	0	0	0	0	0	0	0	0	0	0
Accidental	0	0	3	2.65	2	1.74	0	0	0	0	0	0	0	0
Empty road	0	0	2	1.77	1	0.87	0	0	0	0	1	0.89	0	0

5.1.4 Speed zones in which drivers find it difficult to comply with.

Participants were asked which speed zones they found the most difficult to adhere to. The results are shown in Figure 4. The most challenging speed zones to comply with were reported to be: 40km/h, 50km/h, and the 60km/h speed zones. The 40 km/h speed zone is typically applied at school zones, high volume of pedestrians crossing and dense residential areas, and areas with road works. Furthermore, the 50 km/h speed zone is often found in suburban streets and local roads. The 60 km/h speed zone is found in main roads and urban arterials. Overall, participants appeared to find lower speed limits the most difficult to comply with.

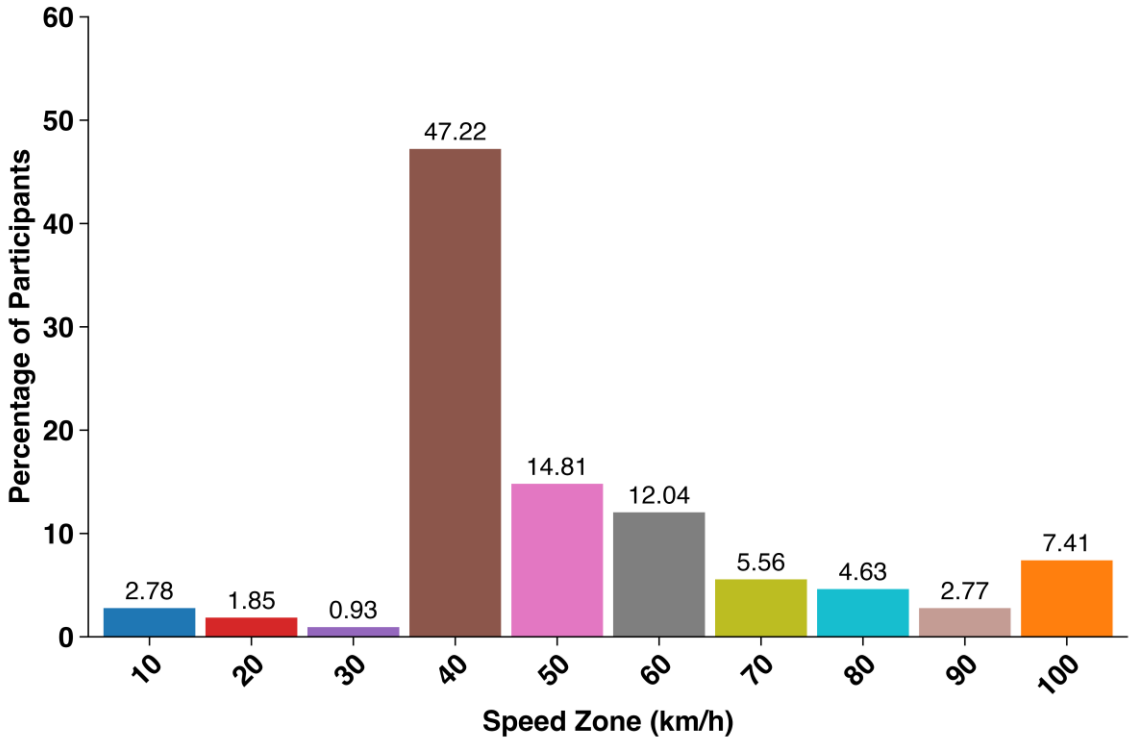

Figure 4. Percentage of participants' responses about speed zones that are difficult to comply with

Participants stated that they exceeded the speed limit when the speed zone was not clearly marked, with a short section of 50 km/h speed zones in residential suburbs, and a continuous mix of 50 km/h and 60 km/h speed zones. Overall, participants found it more difficult to comply with low-speed zones.

As shown in Figure 4, 47.22% of participants found 40 km/h speed zones the most difficult zone to comply with. This was explained by this speed limit being too slow, or too low for the conditions, or the need to drive very slowly and continuously checking the speedometer not to exceed the speed limit. Some participants mentioned that in manual cars changes from third gear to second require time to continuously calibrate this change. Others found that modern cars are difficult to control at the low speed. In fact, some of the cars will not allow engagement of cruise control at that speed so a significant amount of concentration is placed on the vehicle speed rather than surroundings and other road users, including bikes and pedestrians. Although these zones are designed to reduce the severity of crashes, they were often perceived by respondents as creating more dangerous situations. Specific examples where driver found it difficult to comply with the speed zone are:

- Driving on a busy road in traffic hour on Barry Drive in Canberra (Figure 5)
- Driving on College St near Radford in a school zone (Figure 6), but no kids crossing the road during the day.
- However, outside Canberra High it remains 60 km/h when there are kids crossing to Aranda ovals all day (Figure 7 and Figure 8).
- There are also different rules between ACT and NSW. For example, in terms of school zones policies depending on day/time. This makes confusion to complying with the 40km/h speed zones, in school zones.
- Participant also mentioned that there are a number of road work signs of 40 km/h, where no actual roadworks is in place.
  - Some participants expressed that 40 km/h zones are too slow and difficult to comply with, even when driving modern vehicles.
  - Maintaining compliance with such low speeds requires constant attention. This is even more challenging when vehicles do not allow cruise control at that speed.
  - As a result, drivers may become more focused on controlling the vehicle than on monitoring their surroundings, potentially increasing risks to other road users, including cyclists and pedestrians. While the intention is to reduce the severity of crashes, some participants believe these zones may unintentionally create more hazardous situations.

Figure 5. School zone on the college street near the Radford area

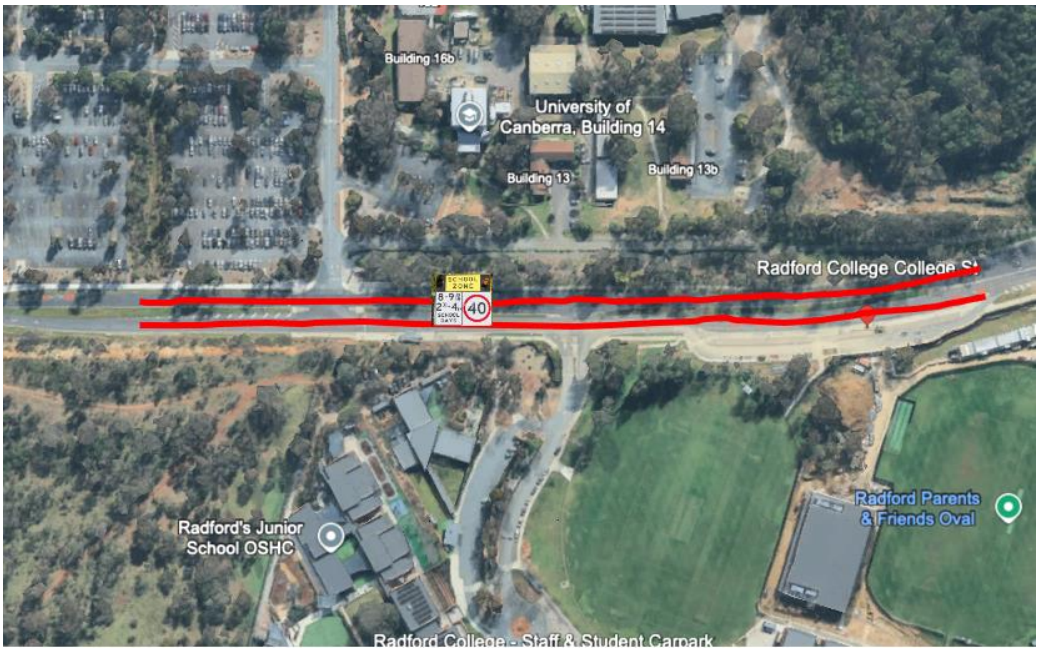

Figure 6. Map of College Street near the Radford area

Figure 7. School zone on the Bandjalong Cres, in Aranda

Figure 8. Map of Bandjalong Crescent near Aranda primary school

Participants found the 50 km/h speed zone to be the second most difficult speed limit to comply with. This was explained by confusing speed zones in residential areas, or not clear marking of the speed zone, or being too slow. They also found that the road in residential area is wide, which can fit higher speed than 50km/h. Participants found that the 50 km/h speed zones were less common, as most build-up suburban streets have 60 km/h speed limits.

Slower speeds were reported to be more challenging – especially in Civic where the attention is taken away from the speed to pedestrians (everywhere) as shown in Figure 9, changing lanes, speed camera, different traffic lights, etc. In addition, 50 km/h speed zones are residential streets that are wide and support higher speeds, as well as are quiet with limited traffic lights, traffic or pedestrians, encouraging smooth 'sailing through'. Participants noted that it is easier to go faster when going downhill, so need to constantly check the travelled speed and adjust

accordingly. Some participants mentioned that when they learnt to drive the main speed was 60 km/h, then didn't drive for 5 years, and when got back to driving the rules changed, hard to re-learn and adjust, as there is a temptation to go back to 60 km/h.

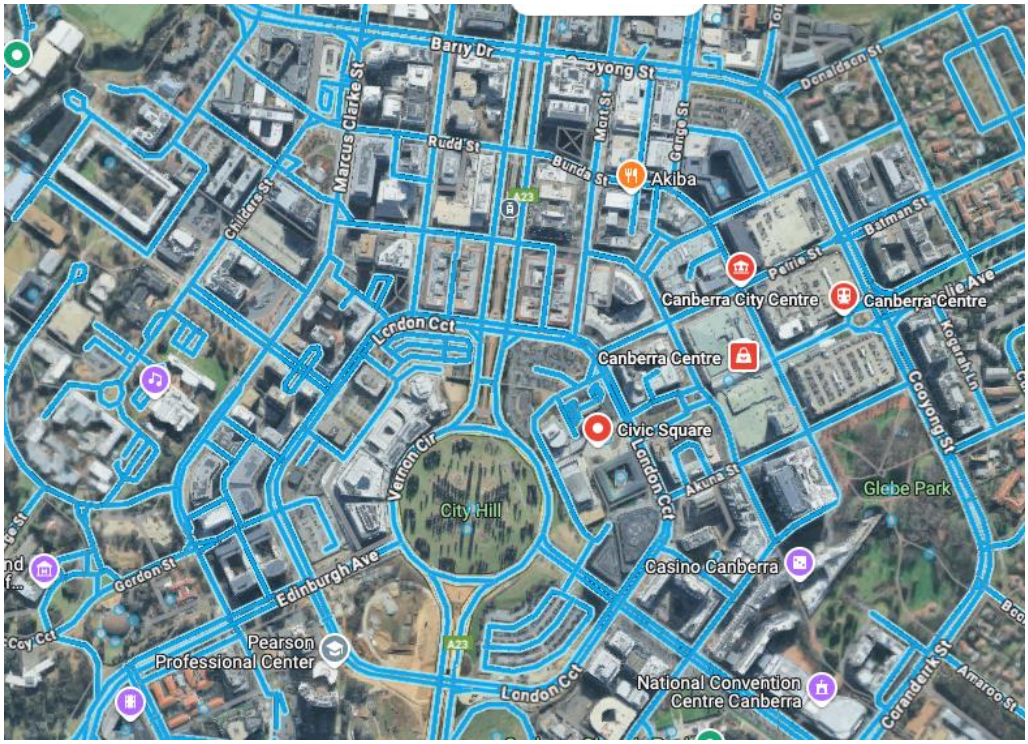

Figure 9. Canberra civic area

The reasons for exceeding the speed limit in the 60 km/h speed zones were explained by the misleading signs, or missing signs, remaining to guess whether the speed limit is 50 km/h or 60 km/h. Others mentioned the challenges with speeding in this speed zone due to changes from 60 km/h to 80 km/h and vice versa, as well as under pressure from other cars to drive faster. According to one of the participants "Maintaining a slow speed can feel unnatural, when there are a few other vehicles around". This speed zone is also cited as 'so slow' or "too slow for getting around main roads", like the left side of Belconnen way going toward Higgins as shown in Figure 10. Participants feel that it doesn't fit the conditions and should be a higher speed zone in that area. It is also hard to comply with 60 km/h, when there is a need to transition from a higher zone of 70 km/h or 80 km/h. Some participants claimed that the 60km/h speed zone was enforced for road work, but speeding happened when there were no road works.

Figure 10. Left side of Belconnen way and Higgins

While only just over 5% of participants found it difficult to comply with the 70 km/h speed zones, participants found this speed zones to be more of a transitional speed zone between 60km/h and 80 km/h. Similarly, the 80 km/h speed zone is hard to comply with when slowing down or speeding up from this speed zone. In contrast, it was reported that maintaining 80km/h during peak hour is sometimes not possible due to not the difficulty to comply with but otherwise driving under the conditions that seem to be hard to do in Canberra (driving too slow in the peak hour). The use of cruise control causes speeding in the 80km/h speed zone.

Participants who mentioned that 90 km/h was the most difficult to comply stated that there is pressure from other cars 'who honk you' to drive faster; and usually the 90 km/h speed zone is located right after the 100 km/h speed zone, with road conditions exactly like for 100 km/h zones, but force to drive slower. Provisional licence holders indicated that the 100 km/h speed zones was the hardest. Provisional drivers stated that they found it difficult to stay within the posted speed limit when pressured by other drivers to exceed the speed limit. The speed limit of 100 km/h was reported to easy go over and that it can be dangerous. Indeed, some participants acknowledged that 'when fatigue kicks in during the prolonged period of time driving at this speed' it is hard to maintain this speed due to fatigue and the focus required.

5.1.5 Effects of speed camera on the speed choice

Figure 11 illustrates participants' speed choice in the presence of the speed camera. A majority of respondents (79.07%) indicated that they generally drive within the posted speed limit when a speed camera sign is visible, suggesting a high level of compliance in the presence of visible enforcement cues. In contrast, 16.28% reported that they generally drive more slowly only when passing the speed camera implying more situational or strategic compliance rather than consistent adherence to speed limits. A very few participants (six) selected "Other" response. Participants were further classified according to the driver typology proposed by Blincoe et al. (2006) as shown in Figure 12. The majority of participants (94.6%) were identified as manipulators those who change their speeding behaviour only when the speed enforcement is visible to them.

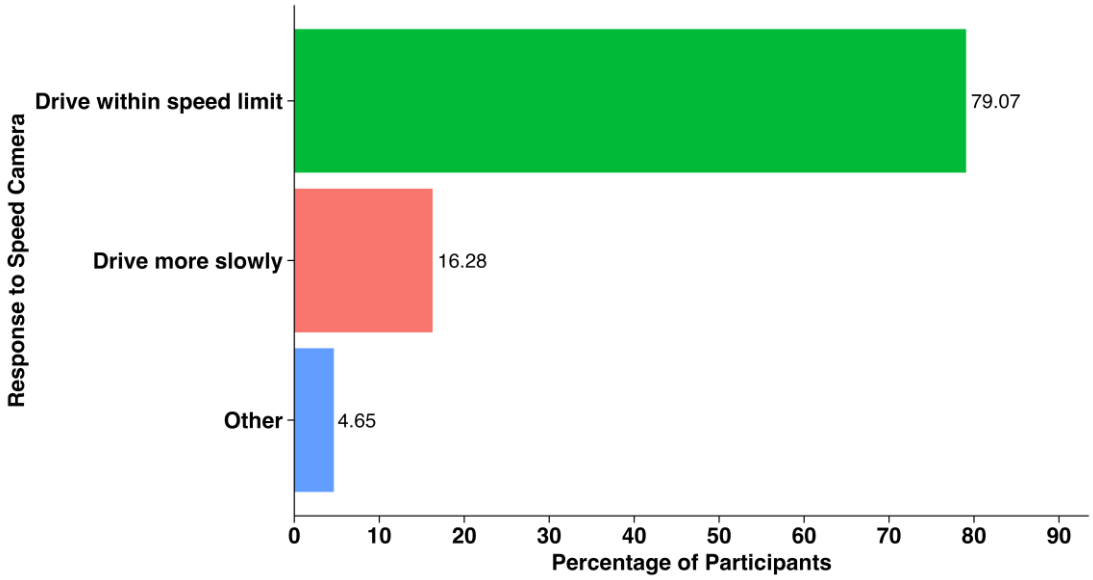

Figure 11. Effects of camera on the speed management behaviour

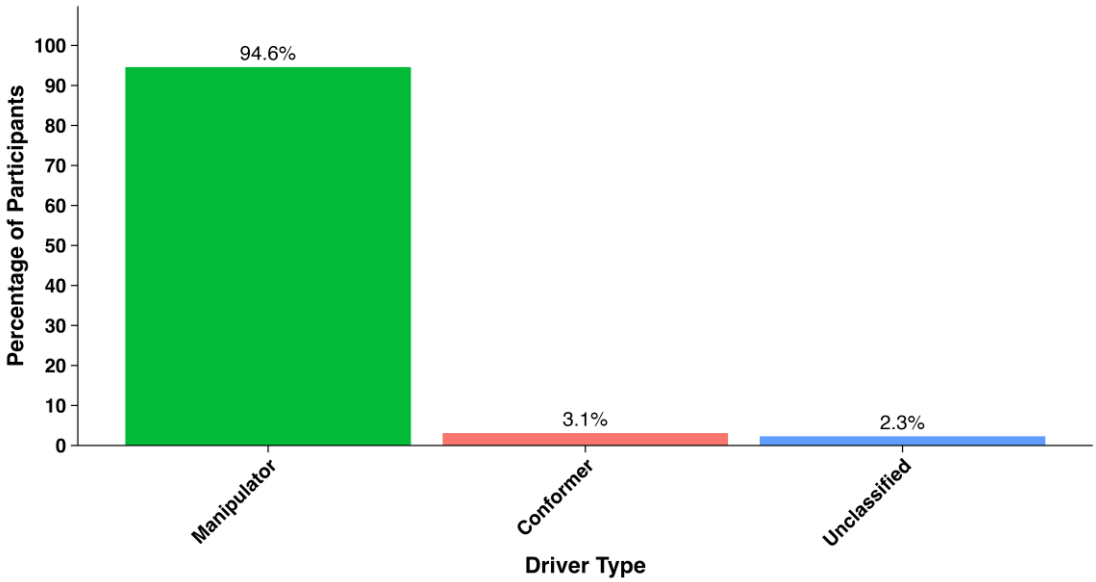

Figure 12. Types of drivers based on the reaction to the speed camera

5.1.6 Effects of speed related message on participants' speed

The participants were asked: "Do speed-related messages on the road affect your choice of speed (e.g., 'Speeding hurts', 'Alcohol and speed – dead ahead', 'Thank you for not speeding')?" A vast majority of respondents (80%) believed that such messages do not affect their speeding behaviour, as shown in Figure 13. This implies that anti-speeding message alone may not be sufficient to alter speeding behaviour. In contrast, only 13.08% indicated that these messages influence how they comply with speed.

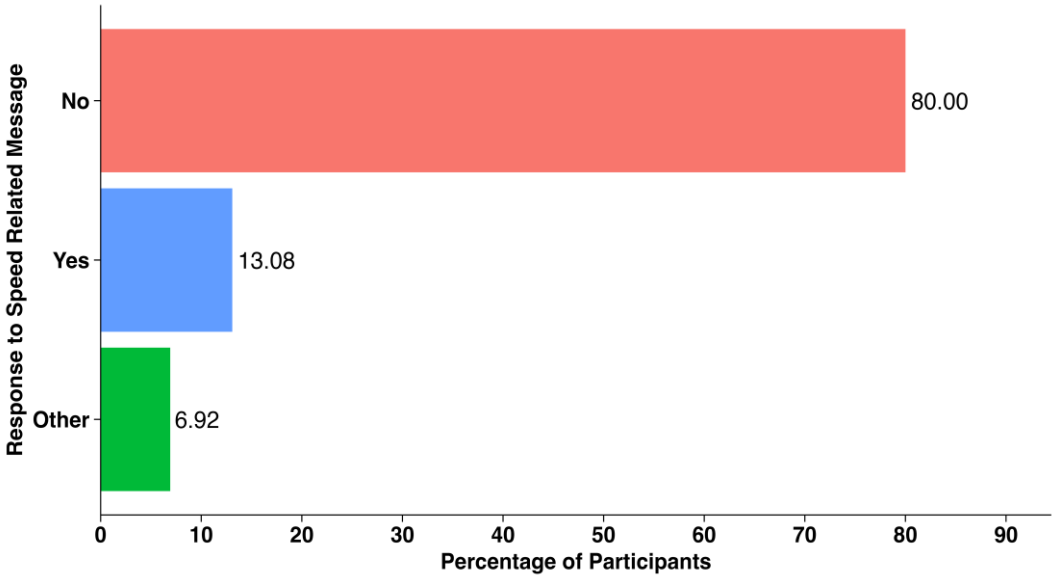

Figure 13. Effects of self-speed related messages on the speed management behaviour

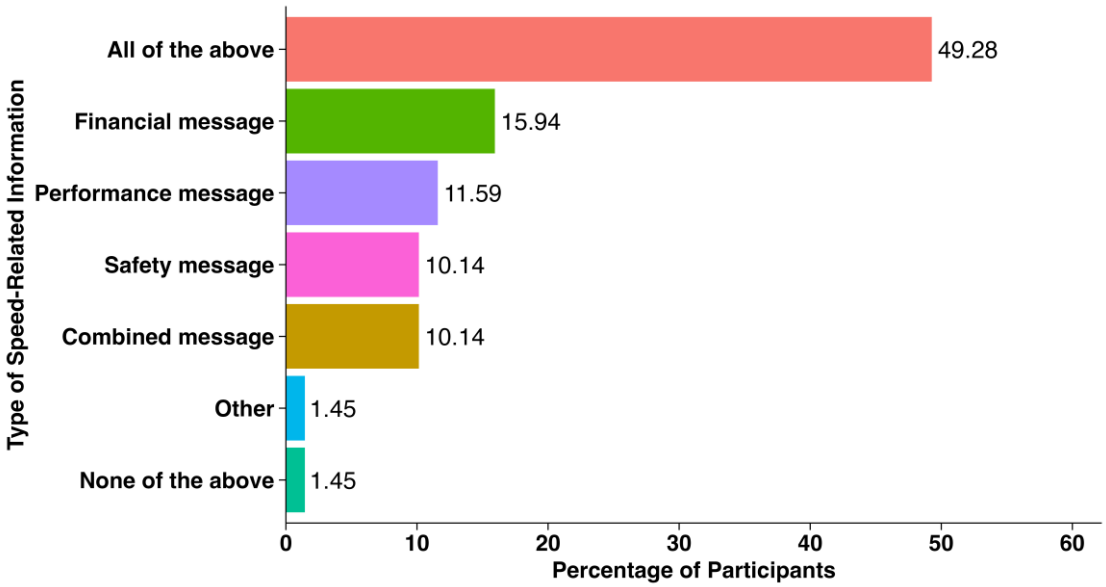

Figure 14. Effects of self-speed related messages on the speed management behaviour

The Figure 14 illustrates the types of speed-related messages that influence participants' speed management behaviour. Nearly half of the respondents (49.28%) reported that a combination of performance, financial and safety messages ("All of the above") would be effective in their speed choices. Financial messages alone were reported to be influential for 15.94% of participants, followed by performance (11.59%) and safety messages (10.14%).

5.2 Part II: Perceptions of Other Drivers' Speeding Behaviour

5.2.1 Other drivers' speed management behaviour

In this section, participants were asked about their perception of other drivers' speeding behaviour, frequency of their speeding, the most common situations and reasons for speeding. Participants were asked: "How often do you think other drivers exceed the speed limit in the following speed zones (40km/h, 50km/h, 60km/h, 70km/h, 80km/h, 90km/h and 100km/h?"

Overall, participants responded that other drivers 'sometimes' speed across all speed zones, with highest percentage of 42.3% responses in the 50km/h speed zone, as shown in Figure 15. Approximately 20% of respondents believed that other driver 'often' speed in the 40km/h, 50km/h, 60km/h, 70km/h, and 80km/h speed zones, 23.8% in the 90km/h speed zone, and 25.4% in the 100km/h speed zone. Ten to fifteen per cent of respondents believe that other drivers rarely or never speed in all speed zones.

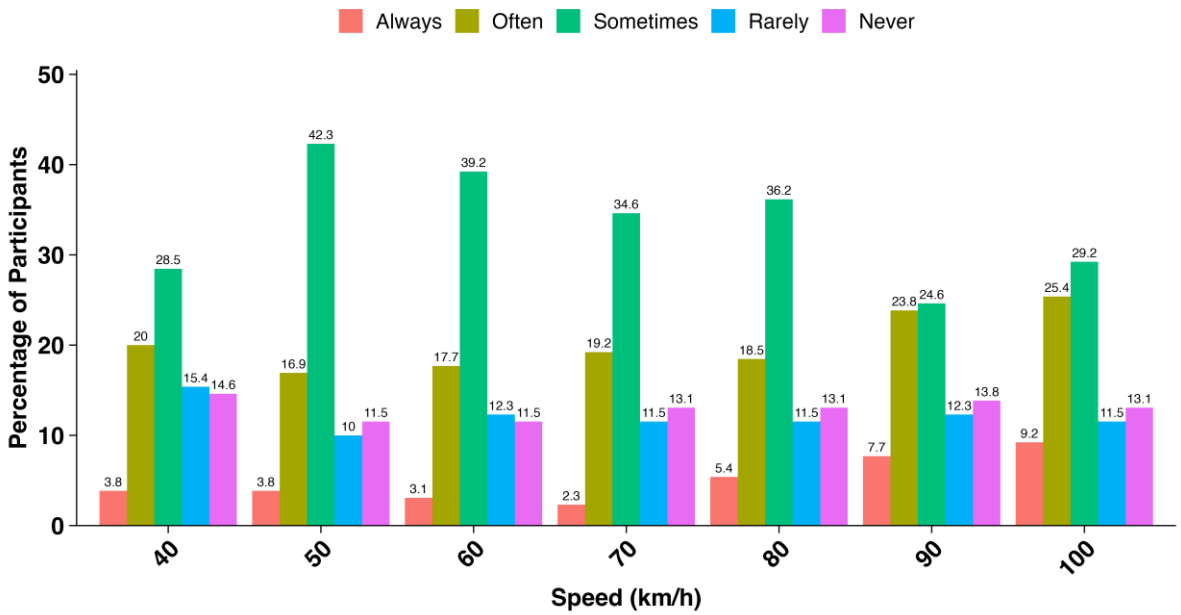

Figure 15. Participant responses about other drivers' frequency of speeding

Figure 16 shows the percentage of participants who reported other drivers' speeding over the speed limit between the 40 km/h and 100 km/h speed zone. Each group of bars corresponds to a specific zone, with individual bars representing how much over the limit respondents perceived other drivers to go over the posted speed limit, from 1 to 30 km/h. The data indicate that lower levels of speeding (especially between 1 and 10 km/h over the limit) were the most frequently reported, with higher percentages across all zones. In contrast, reports of higher levels of speeding (above 20 km/h) were much less common, reflected in the lower bars. The proportion of participants who reported zero converted to "Never" was lowest in the lower speed zones (40 and 50 km/h).

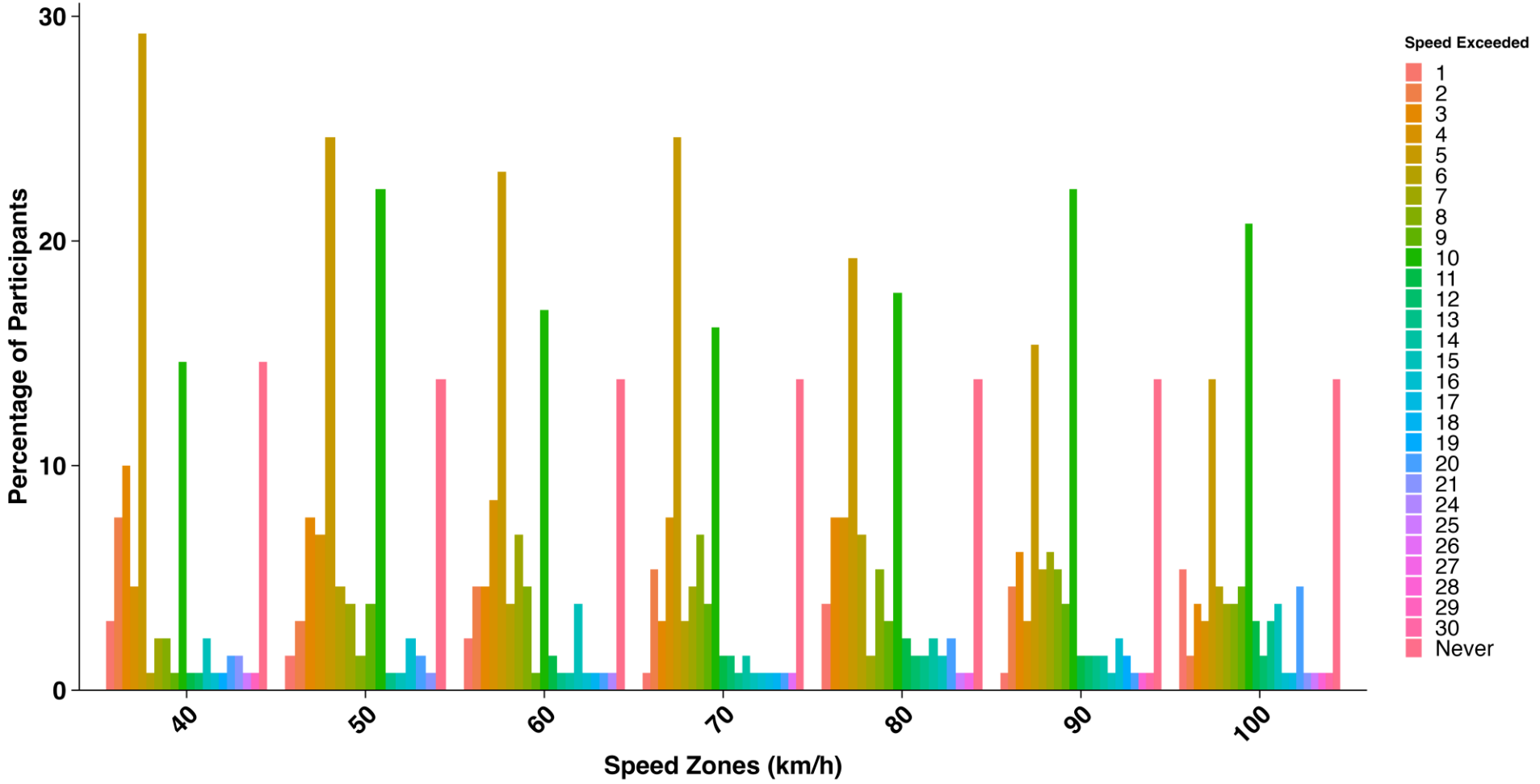

Figure 156. Speed over the speed limits of the participants

5.2.2 Situations and reasons for other drivers' speeding

Table 4 and 5 provides a summary of participants' responses about situations and reasons for speeding by other drivers in different speed zones in ACT. Other drivers were reported to find it challenging to comply with lower speed zones (40-60 km/h) due to perceived unnecessary restrictions, impatience, and distractions, while higher speed zones (70-100 km/h) often encourage speeding due to factors such as overtaking, long highway stretches, and the perception that the speed limit should be higher. Additionally, in school zones (40 km/h), some drivers assume school hours have ended or fail to notice speed limit changes, leading to non-compliance.

Impatience and 'being in a rush' are the most common reasons for speeding in lower speed zones (40-60 km/h), while overtaking and competition with other drivers become dominant factors at higher speeds (70-100 km/h). Additionally, the use of cruise control and long highway stretches contribute to increased speeding at 100 km/h or more.

The most common reasons for speeding in 40 km/h zones include mistakes or lack of awareness, where drivers either forget they are in a 40 km/h zone or assume school hours have ended. Impatience is another key factor, particularly in non-peak hours when drivers feel the speed limit is unnecessarily restrictive. Rushing to work or appointments often leads to prioritizing time over speed compliance, while external pressure from honking vehicles can also encourage speeding. Distractions in busy urban environments divert drivers' attention from speed monitoring, and some modern vehicles do not allow cruise control at such low speeds, making it harder to maintain compliance. Additionally, drivers tend to follow the flow of surrounding traffic, even if it exceeds the speed limit. In 50 km/h zones, common reasons for speeding include the perception that the limit should be higher, as many roads with a 50 km/h limit feel like they should be 60 km/h. Boredom and lack of engagement also contribute, particularly on wide, open streets where low-speed limits seem unnecessary. Road design inconsistencies, where some streets appear built for higher speeds, naturally encourage faster driving. Speeding is also common during peak hours when drivers rush to work or home. Habitual speeding plays a role, as drivers accustomed to higher speeds may struggle to adjust,

and poor signage, with unclear or inconsistent speed limit postings, leads to unintentional speeding.

Table 4. Situations Where Drivers Are Most Likely to Exceed Speed Limits

Speed Zone	Common Situations in which other drivers exceed the speed limit
40 km/h	School zones, empty roads, drivers unaware of speed changes, rushing to work, impatience with slower speeds.
50 km/h	Residential streets, drivers assuming it should be 60 km/h, light traffic, office rush, distracted driving.
60 km/h	Suburban areas, main streets, keeping up with traffic, unaware of speed changes, road previously posted at 70 km/h.
70 km/h	Transitional speed zones, highways, overtaking slower vehicles, drivers distracted or in a hurry.
80 km/h	Highways and parkways, long stretches of road, overtaking, competition with other drivers.
90 km/h	Main roads, feeling the limit should be higher, keeping up with traffic, low risk of detection.
100 km/h	Highways, long-distance driving, cruise control, fatigue, overtaking vehicles.

Table 5. Most Common Reasons for Speeding in Different Speed Zones

Speed Zone	Reasons for Speeding
40 km/h	Mistake, impatience, rushing to work, distraction, assuming school time is over.
50 km/h	Impatience, running late, boredom in low-speed zones, believing the limit should be 60 km/h.
60 km/h	Keeping up with traffic, distracted driving, unaware of speed changes, assumption that cameras are absent.
70 km/h	Rush, competition with other drivers, assumption that 70 is equivalent to 80 km/h.
80 km/h	Feeling that the speed limit is too low, following faster traffic, overtaking.
90 km/h	Long roads encouraging higher speeds, lack of enforcement, distraction.
100 km/h	Fatigue from long-distance driving, use of cruise control, overtaking slower vehicles.

5.3 Part III: Perceptions of Speed Limits and Road Safety

5.3.1 The effect of 30 km/h speed zones on drivers' speed management

Participants were asked: "Do you think there is a link between reduced speed limit and public safety?" A majority of participants, 75.4%, agreed that there was a link between reduced speed limits and public safety, as shown in Figure 17. Around 13% of participants did not agree that introducing 30 km/h speed zones will improve other drivers' speed management. These included suggestions that it may affect people time management; and that these zones are too slow; suggested that it may not necessarily change drivers' speed management but will be safer for pedestrians which is important for many Canberrans. "Other" category included individuals who did not support neither of responses.

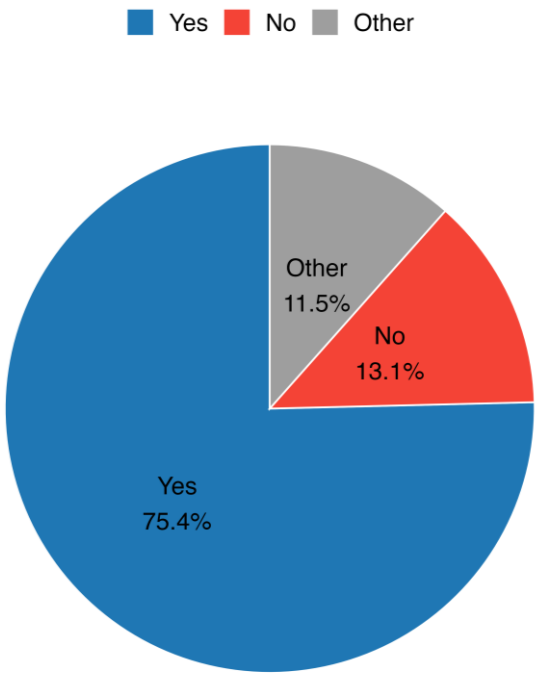

Figure 167. Perception about the reduced speed and public safety

The participants were also asked the question – "Do you believe 30 km/h speed zones can improve safety?" Figure 18 illustrates the participants' opinion on the effectiveness of the 30km/h speed zones on public safety. More than half of respondents (60.8%) do not believe that introducing the 30 km/h speed zone will improve public safety. Participants who reported that the 30km/h speed zones may improve public safety (27.7%), believe that these speed zones can provide drivers with more time to react, increase situational awareness, and enhance

vehicle control, thereby reduce the likelihood of crashes. Lower speeds result in reduced impact force in the event of a collision, minimising injury severity for all road users, especially pedestrians. Additionally, slower-moving vehicles allow drivers to remain more focused on their speed and surroundings, further decreasing a likelihood and probability of an event to occur. Participants reported that the effectiveness of reduced speed limits is evident in regions such as South Australia, where school zones are set at 25 km/h, demonstrating a commitment to pedestrian safety. Overall, the lower energy involved in crashes at reduced speeds significantly enhances road safety for both drivers and pedestrians.

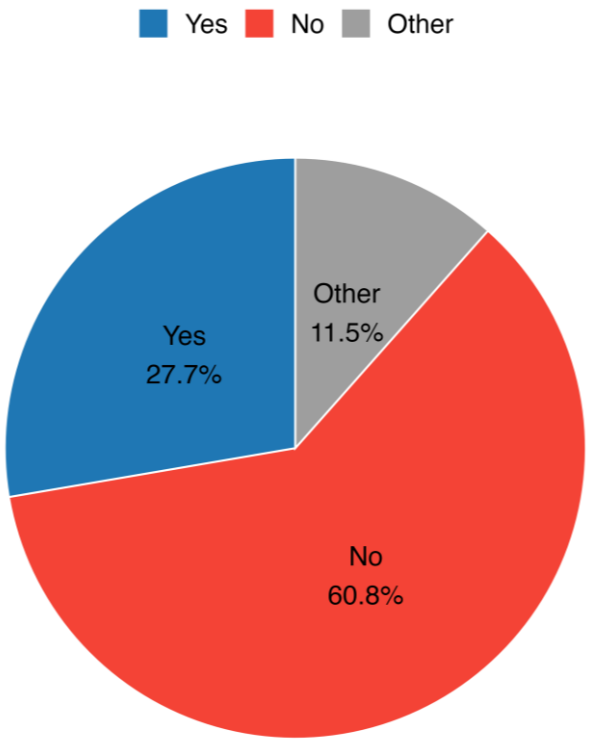

Figure 18. Perception of participants about 30km/h zone on the improvement of safety

The participants were asked if they would support the implementation of 30 km/h zones in the ACT, in high pedestrian areas like local streets and school zones, as shown in Figure 19. Overall, 43.80% of the participants agreed that they would support the implementation of 30 km/h zones in the ACT, in high pedestrian zones like local streets and school zones as shown in Figure 20.

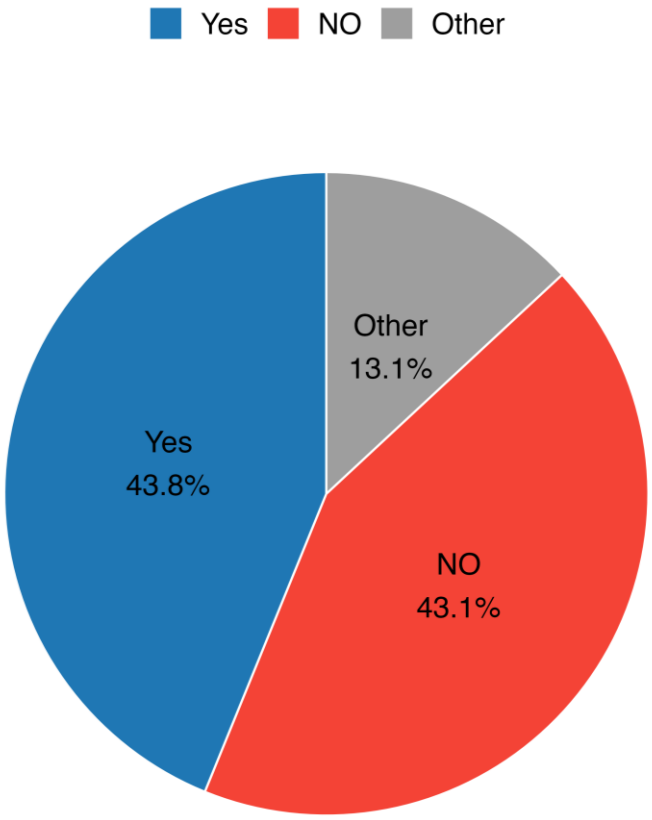

Figure 19. Recommendation of participants to implement 30km/h speed zone

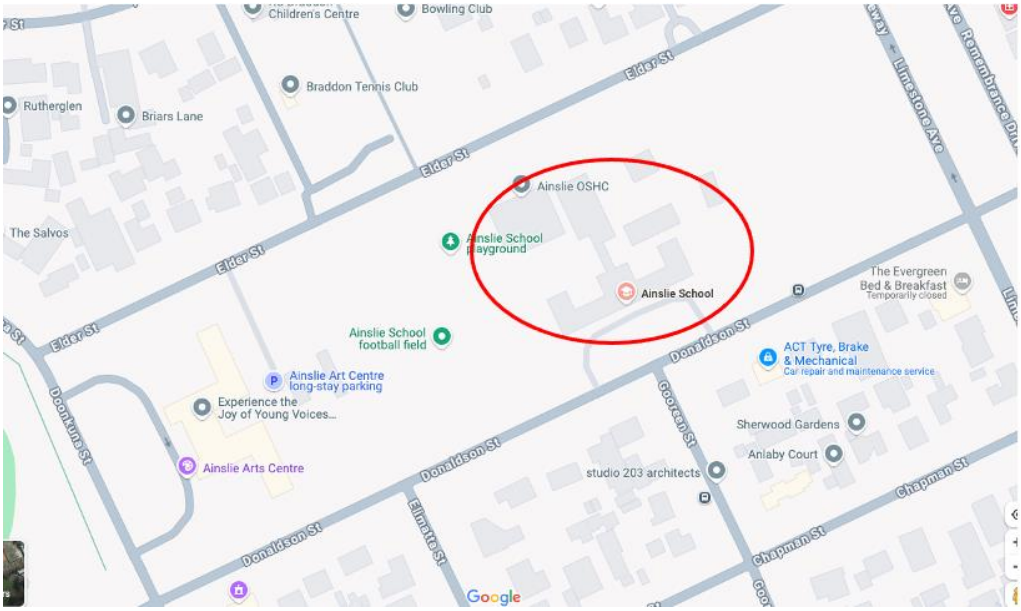

Figure 20. Ainslie school surrounded by local streets, Donaldson and elder street

Participants were asked, "Do you think 30 km/h zones in the ACT would reduce risks for pedestrians, cyclists, and other vulnerable road users?" Nearly half of the participants (46.9%) agreed, as shown in Figure 21. Overall, opinions were mixed, but there were slightly more

responses in recognising the value of 30 km/h zones in enhancing road safety for vulnerable groups.

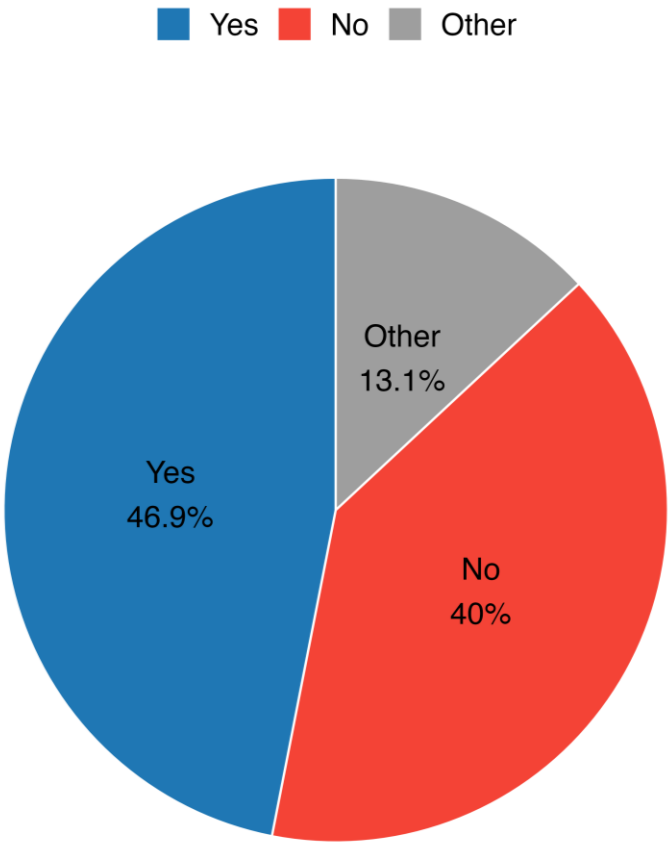

Figure 21. Perception of participants about 30km/h zone on the improvement of road safety

Figure 22 shows that 64.6% of respondent were unaware that other countries have implemented 30 km/h speed zones. This highlights a lack of public knowledge about the countries' practices of the 30 km/h speed zones, where these speed zones have been introduced, which may contribute to less public acceptance toward similar measures locally. As many global cities have adopted these zones aiming at improving road safety and vulnerable road users (i.e., cyclists, pedestrians), it is important to raise public awareness through targeted education and communication campaigns to better understand the effects of these speed zones on road safety, and their potential benefits in the ACT' areas (i.e., school zones, high-pedestrian areas, city centres).

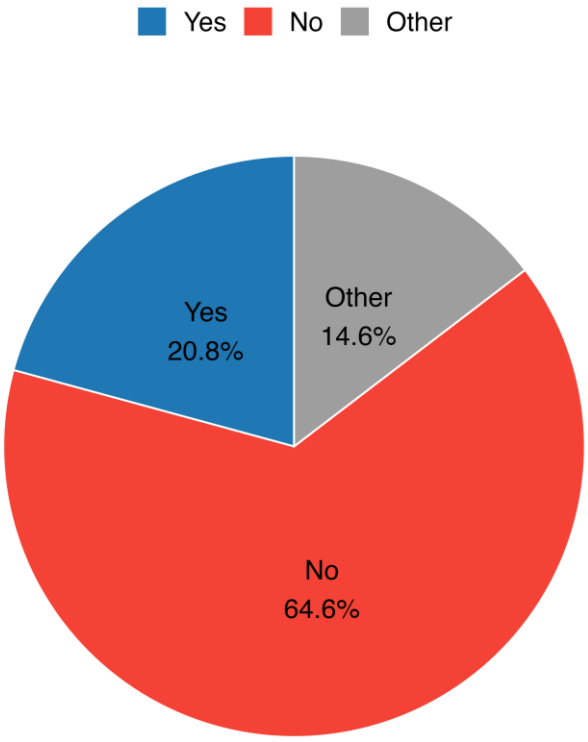

Figure 22. Perception of participants about 30km/h zone in other countries

5.3.2 Effects of 30km/h speed on speed management

The participants were asked the question, "Do you think introducing a 30km/h speed zone will improve drivers' speed management?". As shown in Figure 23, a majority of the participants (80%) did not agree. Only 13.08% believed such a measure would lead to better speed management, suggesting that these will be beneficial in school zones and high traffic/high pedestrian areas. Some respondents think that this speed zone will impacts people's time management of daily activities.

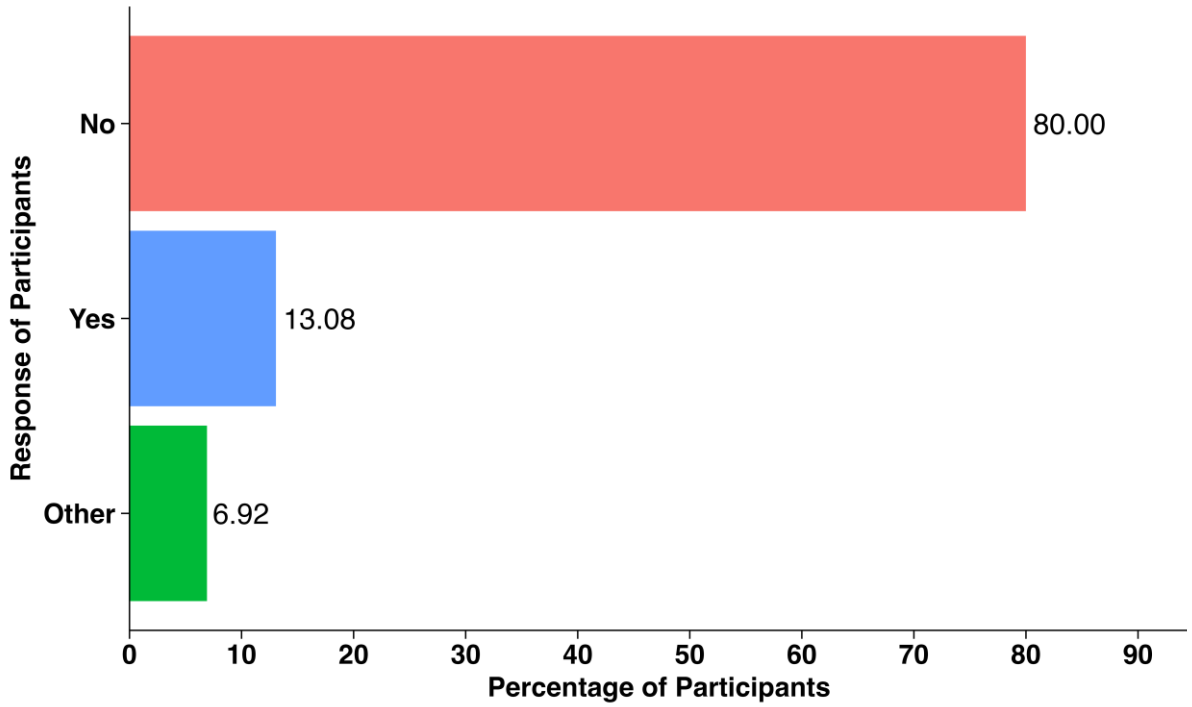

Figure 23. Effects of perceived effectiveness of the 30 km/h speed zone on drivers' speed management behaviour

The participants were asked "Do you think introducing 30km/h speed zones will improve speed management for the following categories of drivers?" As shown in Figure 24, only a small proportion of respondents (under 10%) believed that introducing of 30km/h speed zone would be effective in speed management of drivers of different age categories.

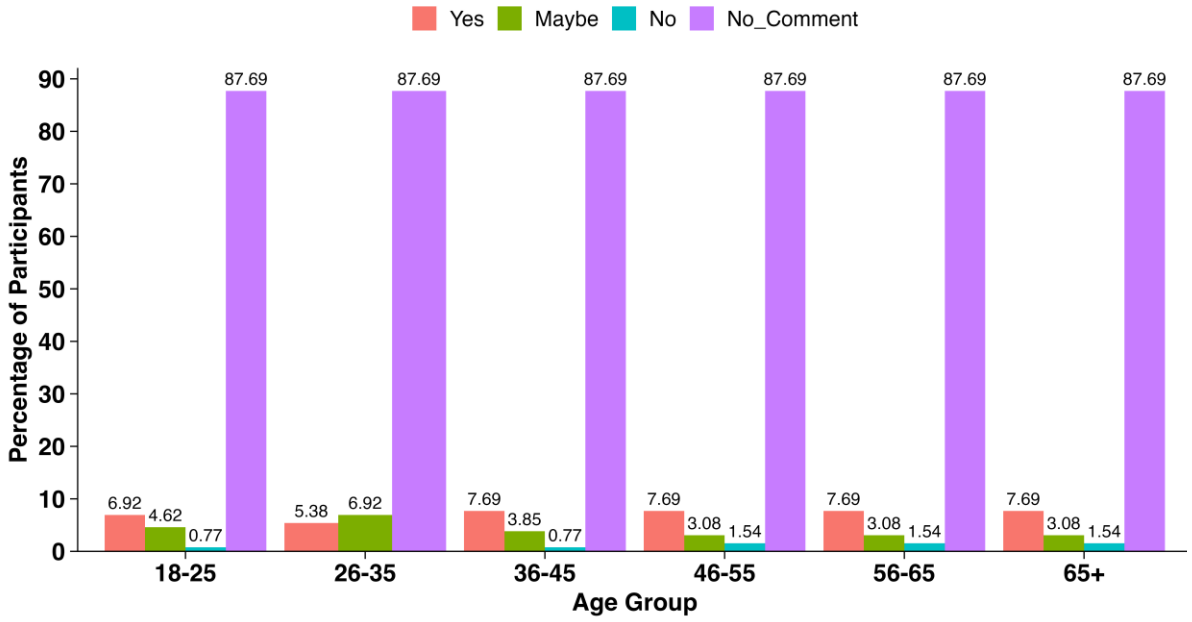

Figure 24. Participant responses on whether introducing 30 km/h speed zones would improve speed management among drivers of different age groups

5.3.2 Areas in the ACT that would benefit from 30 km/h speed zones

Participants reported several areas in the ACT that could benefit from the implementation of 30 km/h speed zones. These include: town centres, "high-traffic streets", and "locations with significant pedestrian and cyclist activity". School zones, childcare centres, hospitals, aged care facilities, and pedestrian crossings are commonly suggested areas where reduced speed limits could enhance safety. Specific suburbs and streets mentioned include Civic, Braddon, Dickson, Kingston, Forrest, Coombs, Turner, Campbell, and Amaroo. Participants highlighted particular locations such as City Walk Road, London Circuit, Theatre Lane, Cooyong Street, Lonsdale Street, Northbourne Avenue near Reid and Civic, Kingsley Road, and Russell Offices—where pedestrian risks were noted. Shopping areas like Marketplace Gungahlin, Westfield Belconnen, and the Canberra Centre were also seen as zones where lower speed limits could be beneficial. Some respondents pointed to tram station precincts, such as the Gungahlin tram station, and streets near playgrounds and parks as appropriate for reduced limits.

Other suggestions included implementing the 30 km/h speed zones only under specific circumstances – during school hours, in active roadwork zones, or in narrow residential streets. Some respondents argued that 30 km/h could be feasible in residential areas, while maintaining higher limits (e.g., 50 or 80 km/h) on main roads and connectors.

Some respondents also believe that streets near playgrounds and public spaces could benefit from reduced speeds, and it may contribute to a safer environment for vulnerable road users. In contrast, participants questioned whether lower speed limits would be effective if driver behaviour remains unchanged, and little speed compliance in low-speed zones will raise more issues in these areas. Other concerns included: driver frustration, and issues with cruise control functionality at 30 km/h. Several participants emphasized that regardless the speed limit, the focus should be on driver training, attention and decision-making, as these 'human factors' play critical role in road safety than speed limits alone.

5.3.3 ACT Government road safety initiatives and drivers' recommended initiatives

Participants were also asked about "Which ACT Government road safety initiatives to raise public awareness do you find effective and why?" and "What other initiatives would you recommend raising community awareness about speed compliance in the ACT?". Based on

survey responses, Table 6 shows the effective road safety initiatives, and the recommended initiatives are shown in Table 7.

According to the respondents, the ACT Government has implemented several road safety initiatives, including: speed cameras, social advertising campaigns, clear speed limit signage, police enforcement, and school zone awareness programs. These measures have been widely recognised as effective in improving compliance and reducing speeding-related incidents in ACT. However, drivers have suggested additional initiatives to further enhance road safety. Key recommendations include installing speed limiters in vehicles, increasing police patrols and mobile speed cameras, improving road safety education in schools and universities, and implementing harsher penalties for repeat offenders. Other suggestions include flexible school zone timings, community workshops, and incentives for safe driving, such as free license renewals for long-term compliance. By combining existing measures with these recommended initiatives, the ACT government can further strengthen road safety awareness and reduce traffic violations.

Table 6. ACT Government's Road Safety Initiatives Perceived as Effective

Initiative	Perceived as Effective
Speed Cameras	Drivers acknowledged the effectiveness of fixed and mobile speed cameras in deterring speeding.
Social Advertising Campaigns	Public safety messages on billboards, social media, and TV help raise awareness about the dangers of speeding.
Speed Limit Signs & Road Markings	Clearly visible speed limit signs and road markings were considered useful in improving compliance. 'Every K matters' campaign.
Police Presence & Random Speed Checks	Active monitoring by law enforcement was perceived as an effective deterrent for reckless driving.
School Zone Awareness Programs	Timed 40 km/h zones near schools were seen as effective in ensuring the safety of children.

Regarding the further recommendations of road safety initiatives, participants identified well-known government road safety efforts, including speed cameras, mobile detection cameras, school zones, targeted enforcement campaigns, and road signage such as speed limits and safety messages. Drink driving awareness slogans and public safety advertisements were also mentioned as visible elements of current strategies. Some respondents acknowledged

engineering interventions like speed bumps and dedicated space for cyclists, showing recognition of tangible, street-level measures aimed at protecting vulnerable road users. A smaller number referred to broader initiatives such as Vision Zero, reflecting awareness of policy-driven goals to eliminate road deaths and serious injuries.

Participants also offered a diverse range of suggestions to further improve road safety. These fell into key themes: education and awareness, enforcement, incentives, infrastructure changes, and technological enhancements. Many emphasized the importance of public education—proposing school-based programs, online training, and awareness campaigns delivered via advertising, social media, and community workshops. The frequently recommended initiatives are summarised in Table 7.

Table 7. Recommended Road Safety Initiatives by Drivers

Recommended Initiative	Description
Speed Limiters in Vehicles	Installation of speed limiters in vehicles along with notices informing drivers of their operation.
Increased Signage on Risks of Speeding	More signs displaying real consequences of speeding, including accident statistics and black spot warnings.
Higher Police Enforcement	More frequent highway patrols and police presence to enforce road rules.
Targeted Driver Education Programs	High school and university programs to educate young drivers about road safety.
Workshops on Road Safety	Community-based road safety workshops to educate the public on responsible driving.
Mobile Device Speed Camera Detection	Increased use of mobile cameras to detect drivers using mobile phones while driving.
Harsher Penalties for Offenders	Stricter fines and penalties for drink driving and repeat offenders.
Incentives for Safe Driving	Rewards such as free license or registration renewal for drivers with no violations for five years.
Infrastructure Changes	Road design modifications, such as narrower lanes and speed humps, to naturally slow traffic.
Flexible School Zone Timings	Consideration of adjusting 40 km/h school zones based on actual student crossing times.

Participants recommended the installation of speed limiters in vehicles to cap the maximum travelled speed. This intervention is believed to prevent drivers from exceeding legal speed limits. Respondents also suggested including clear notices that inform both the driver and others that the vehicle is equipped with a speed limiter. This could serve not only as a practical solution but also a behavioural nudge, reminding drivers to remain within speed limits.

Focusing on the increased signage on risks of speeding, multiple respondents emphasized the need for more impactful road signage to raise awareness of the dangers associated with

speeding. Suggestions included installing signs at accident-prone black spots that detail crash statistics and fatality numbers. These signs would serve as a constant reminder of the risks involved, which can help to personalize the consequences and promote safer driving habits through heightened awareness.

A recurring theme in the responses was the call for greater police presence and consistent enforcement of speed-related laws. Participants proposed more highway patrols, frequent random speed checks, and visible law enforcement at key points. They noted that stricter and more predictable enforcement could act as a deterrent for speeding.

Several respondents emphasized the importance of introducing structured education programs, particularly in high schools and universities. These programs would teach young drivers about the dangers of speeding, the mechanics of safe driving, and the broader social impact of road crashes. The goal is to instil responsible attitudes and decision-making before young people form risky driving habits.

Some participants advocated for road safety workshops at the community level. These would offer hands-on education and discussions about speeding, distracted driving, and other unsafe behaviours. Delivered in partnership with law enforcement or road safety organizations, the workshops would foster greater community engagement and personal accountability on the road.

Participants supported expanding the use of mobile speed and phone detection cameras to catch drivers using mobile phones while driving. These devices would help tackle distracted driving, which often coincides with speeding and increased crash risk. The presence of these technologies may encourage more responsible driving through consistent monitoring.

Stricter legal consequences were another common recommendation. Respondents proposed higher fines, longer suspensions, and tougher penalties for high-risk behaviours such as drink driving and repeated offences. The belief is that a more punitive system could better discourage dangerous driving patterns and reinforce the seriousness of speed violations.

Some of participants proposed positive reinforcement strategies to encourage long-term safe driving. For instance, drivers with clean records over a five-year period could be rewarded with reduced license or registration fees. This approach provides motivation for drivers to consistently obey traffic laws and complementing the punitive measures in place.

Regarding the infrastructure changes, suggestions also included redesigning roads to reduce speeding naturally. Examples mentioned were narrower lanes, more roundabouts, additional pedestrian crossings, and traffic calming devices like speed humps. These physical interventions slow traffic without needing constant monitoring or enforcement, promoting a safer driving environment through design.

Considering the flexible school zone timings, several respondents questioned the need for fixed school zone timings and suggested more flexible speed restrictions based on actual student crossing activity. For example, speed limits could be activated during peak school hours or when sensors detect students nearby. This would make the system more context-sensitive and likely to gain better compliance from drivers.

Several participants recommended infrastructure modifications to discourage dangerous behaviour, including traffic-calming designs, better signage in high-risk areas, and continued use of physical barriers like speed bumps. Additionally, some advocated for technological solutions in vehicles, such as speed limiters and automated alerts in high-risk zones.

6. Discussion

This study aimed to understand drivers' speeding behaviour in ACT. Specifically, participants provided their responses about their own and other drivers' speeding behaviour, their perceptions of low-speed zones, and the effectiveness of road safety initiatives in the ACT. The survey was divided into three key parts: Part I explored self-reported speeding behaviour and reasons for noncompliance to speed; Part II examined participants' perceptions of other drivers' speeding behaviour; and Part III captured drivers' views on the effectiveness of lower speed limits and potential road safety initiatives, including feedback on ACT Government efforts and suggestions for new strategies.

The survey revealed that 71.5% of participants admitted to exceeding the speed limit, suggesting that speeding is a common and normalized behaviour among ACT drivers. Speed compliance was most difficult in 40 km/h, 50 km/h, and 60 km/h zones, where participants reported that these limits often felt too slow for the road environment. In 40 km/h zones, confusion around school zone timings, lack of speed awareness, and inattention were frequently reported. Many also noted that these limits are difficult to maintain due to vehicle constraints, such as cruise control limitations at low speeds, or the need for excessive attention to the speedometer.

In 50 km/h zones, noncompliance was often linked to road design—wide, empty streets with little traffic or pedestrian activity led participants to believe higher speeds were safe. Meanwhile, in 60 km/h zones, speed limit changes from adjacent 80 km/h zones, downhill slopes, and distractions such as passenger conversations or navigation contributed to unintended speeding. Across all zones, "rushing" and "keeping up with traffic" were dominant reasons for exceeding limits. The findings indicate that drivers' speeding decisions are often unintentional and situational rather than deliberately reckless.

Participants believed that other drivers often or sometimes exceed the posted speed limit. Participants suggested that other drivers speed in lower speed zones (40–60 km/h) due to impatience, inattention, and lack of awareness—especially in school zones where signage and timing were unclear. In higher speed zones (70–100 km/h), overtaking, long highway stretches, and peer pressure were common themes. Notably, many drivers believed others were simply following traffic flow or using cruise control, resulting in unintentional speeding.

This study explored drivers' perception on reduced speed limits, especially the introduction of 30 km/h speed zones in ACT. Although 75.4% of participants agreed that reduced speed limits improve public safety, only 27.7% believed that a 30 km/h zone would be effective in improving safety, and 60.8% opposed the idea. Many expressed concerns that such limits are impractical for daily commuting and may create driver frustration. Some questioned whether these zones would influence behaviour at all without better enforcement or infrastructure changes. Conditional support was evident, with respondents favouring 30 km/h only in specific settings like school zones, local shopping streets, or high pedestrian areas.

Participants were also asked about ACT Government initiatives and additional recommendations to improve speed compliance. Existing initiatives such as speed cameras, school zone awareness programs, police enforcement, and road signage were widely recognized as effective. In addition, participants proposed additional strategies, grouped into ten main areas:

- Speed limiters in vehicles
- Increased signage on crash risks and black spots
- Higher police enforcement
- Targeted driver education in schools and universities
- Community workshops on road safety
- Mobile phone and speed detection cameras

- Harsher penalties for repeat offenders
- Incentives for safe driving (e.g., discounted registration)
- Infrastructure changes (e.g., speed humps, narrowed lanes)
- Flexible school zone timings based on actual use

These recommendations reflect a strong desire among the public for multi-layered approaches—combining enforcement, education, incentives, and road design—to improve compliance. Notably, the diversity of suggestions illustrates that many drivers are not resistant to speed management in principle but seek more context-sensitive, and targeted measures.

7. Conclusion

This study provides an analysis of drivers' speeding behaviour and perceptions of low-speed zones in the ACT. The study explored self-reported speed management behaviour, observed behaviour of other drivers, and perception toward road safety initiatives. The findings reveal that speeding is a widespread and often situational behaviour, with low-speed zones (particularly 40 km/h and 50 km/h) posing the most speed compliance challenges due to road design, distraction, vehicle control issues, and lack of awareness about zone-specific conditions like school hours.

The results suggest that speeding is often unintentional, rather than deliberate and reckless. While most participants agreed that reduced speed limits can improve public safety, many expressed concerns toward the effectiveness of 30 km/h zones. Support for such zones was more favourable in contexts with high pedestrian activity, such as near schools, parks, or shopping areas.

Participants acknowledged the value of existing ACT Government road safety initiatives and also identified several areas for improvement. Public suggestions emphasized the need for a balanced approach combining enforcement measures, enhanced education, behavioural incentives, and infrastructure redesign. Notable recommendations included vehicle speed limiters, flexible school zone timings, and rewards for long-term safe driving.

Overall, the results highlight the need for context-aware, and multidimensional strategies, revisiting the speed limits relevance for conditions, and the surroundings around. School zones, and other educational establishments, as well as areas with pedestrian and cyclist activities were identified as areas where the 30 km/h speed zones would be beneficial for road safety and vulnerable road users. However, each case needs to be assessed on a case-by-case basis. In

addition, the effectiveness of speed management in the ACT will depend on aspects like road infrastructure, enforcement, education, and policies, that align with drivers' real-world experiences and expectations. Future research and trials, particularly those evaluating 30 km/h implementations in high-risk areas, will be essential to guide evidence-based road safety improvements and foster long-term behavioural change among drivers.

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APPENDIX B

Summary Report: Stage 2

Title: Understanding young drivers' speeding behaviour in low-speed zones in ACT

Date: 10th Jul 2025

UNSW CANBERRA

Table of Contents

1. Introduction

1.1 Overview

This is the third stage of the research examining young drivers' speeding behaviour in ACT. This study builds upon the second stage of this research examining the self-reported drivers' speeding behaviour, which was conducted using a self-reported survey. Importantly, it is interesting to examine the effect of a cognitive-based training intervention on young drivers' actual and self-reported speeding behaviour. In addition, this study was conducted in a simulated environment.

Speeding is the leading cause for road fatalities and injuries, with an estimate of 1.25 million fatalities across the globe each year (World Health Organisation, 2017). This is because exceeding the speed limit reduces a drivers' reaction time to avoid a potential crash and increases a vehicle's stopping distance (National Safety Council, 2022). Studies indicate that speeding only 5kmph over the speed limit is enough to double the likelihood of a casualty crash (Department of Transport and Main Roads, 2023).

In Australia specifically, there were a total of 1,116 road fatalities in 2021 (BITRE, 2023). As a result, speed management has been recognised as a central theme in the Australian Government's National Road Safety Strategy for 2021-2030. This strategy expresses the intent of reducing the road fatality count to zero by 2030, through three key areas of effective road design, speed enforcement, and education (Infrastructure and Transport Ministers, 2021).

Of all road fatalities in Australia, young novice drivers aged from 17 to 25 years old represent approximately 19%, despite representing only 11% of the driving aged population (Australian Bureau of Statistics, 2021; BITRE, 2023). In the Australian Capital Territory (ACT), this trend was no exception, with the same demographic representing only 13.7% of all licence holders, but disproportionately involved in 24.1% of injury crashes, and 25% of fatal crashes from 2011 to 2015 (Chief Minister, Treasury and Economic Development Directorate ACT, 2018). More specifically, this study showed that Provisional 1 (P1) licensed drivers are involved in the highest number of crashes, closely followed by Provisional 2 (P2) license holders. These concerning statistics further emphasise the need to address the speed management behaviours of young novice drivers. One particular area which has shown promise in improving the speed management behaviours of this target demographic is cognitive training methods.

Cognitive-based training refers to a form of intervention in which individuals are involved cognitively in the task (Molloy et al., 2018b). Various previous studies in road, aviation, and other fields have indicated that such driver training is an effective tool in improving desired behaviours for as long as six months post-training (Gu et al., 2022; Krasnova et al., 2015; Molloy et al., 2018b).

Feedback is a cognitive-based training method that provides specific, non-biased information about one's actions. This facilitates a more accurate assessment of a given situation, ultimately providing complete and representative knowledge (Molloy et al., 2018b). Study conducted by Hill and Salzman (2012) has indicated that in a road environment, feedback can effectively improve important skills such as speed perception, and speed estimation.

Subsequent studies have investigated feedback in the road environment further; in particular, they explored various forms of feedback (performance related, safety related, finance related, or combined), as well as several delivery mediums (graphical, written, and verbal). In relation to the type of feedback, much research supports the fact that a combination of performance related, safety related, and finance related feedback had the highest effectiveness (Blair et al., 2013; Krasnova et al., 2015; Molloy et al., 2021; Molloy et al., 2023).

The compliance with speed limits in areas with a high proportion of pedestrians, such as city centres or around school zones, is poor (Molloy et al., 2023). Recent studies found that 50% of motorists travelling through school zones exceeded the speed limit by an average of 10km/h (Ellison et al., 2011). Failure to adhere to the speed limit in low-speed zones is thought to occur for various reasons including: underestimation of the outcomes associated with speeding, lack of speed awareness, attitude toward speeding, and poor speed management skills. In contrast, international practices argue that reducing speed limits to 30 km/h in the busy areas, like school zones, can reduce the number of road fatalities and contribute to safer roads, supporting the National Road Safety Strategy (Lambert & Venter, 2015) This project extends previous research by examining the potential effect of introducing low-speed zones in ACT on drivers' speed compliance and driver behaviour.

1.2. Aims and Research Questions

The aim of the present study is to understand actual drivers' speeding behaviour in low-speed zones (i.e., the areas with high proportion of pedestrians, such as city

centres, or around school zones). In addition, this research examined the effectiveness of a cognitive-based training intervention, feedback, on young drivers' speeding behaviour.

The research questions that this study seeks to address are:

1. What is young drivers' speed compliance in low-speed zones (i.e., 30 km/h, 40 km/h, 50 km/h, and 60 km/h).
2. What is the effect of a cognitive-based training intervention on young drivers' speeding behaviour?
3. What is the effect of a cognitive-based training intervention on self-reported young drivers' speeding behaviour?

2. Methodology

2.1. Participants

A total of 40 voluntary participants (5 females) were recruited for this study. All participants were 18-25 years of age (M = 22.91, SD = 3.40), and all participants held a valid Australian driver's licence (Provisional = 1; Provisional 2 = 16; Full Driver's Licence = 23). The average age that participants started driving was 18 years and 5 months (SD = 3.59). Participants spent an average of 8.87 hours driving per week (SD = 6.85), with 85% reporting that they drive mostly city/suburban routes most often. On average, participants had spent 92.2 hours driving under supervision on their Learner licence (SD = 36.22), and 707.13 hours driving without supervision (SD = 737.72). Thirty per cent of drivers reported that they had received a speeding infringement. Of these drivers, 13.33% reported that their infringement was for travelling more than 15km/h over the speed limit, whilst the remainder reported their infringement was for speeding less than 15km/h over the limit.

2.2. Design

The experimental design was comprised of a 2 x 2 mixed repeated measures design, where Training was a between-groups variable, containing two levels: (1) Control group, that received no training; and (2) Training group that received a cognitive-based training intervention in the form of performance, financial and safety feedback; consistent with previous studies on cognitive-based training (Molloy et al., 2018; 2020; 2021; 2023). The repeated measures independent variable was Time, consisting of two levels: (1) Baseline drive; and (2) Test drive. Participants were randomly allocated to one of two groups (i.e., Control group or Training group). No training intervention was provided to the control group, whilst the training group received a training intervention between the conduct of the baseline and test drives.

The dependent variables obtained from the simulated drive were selected to be appropriate measures of speeding behaviour, consistent with research by (Molloy et al., 2021). Namely, these included maximum speed (km/h), and percentage of time speeding (%). The effectiveness of the training intervention was thus measured by the analysis of these performance metrics. Maximum speed has been selected as the variable to represent the maximum exposure in the speed limit zone, while percentage of time speeding showed the frequency of exceeding the speed limit in a speed zone.

Figure 1 below shows the experimental design. Participants were recruited via the university social media page and via newsletters. The research was approved by the University of New South Wales Human Research Ethics Committee (iRECS8330; Appendix A).

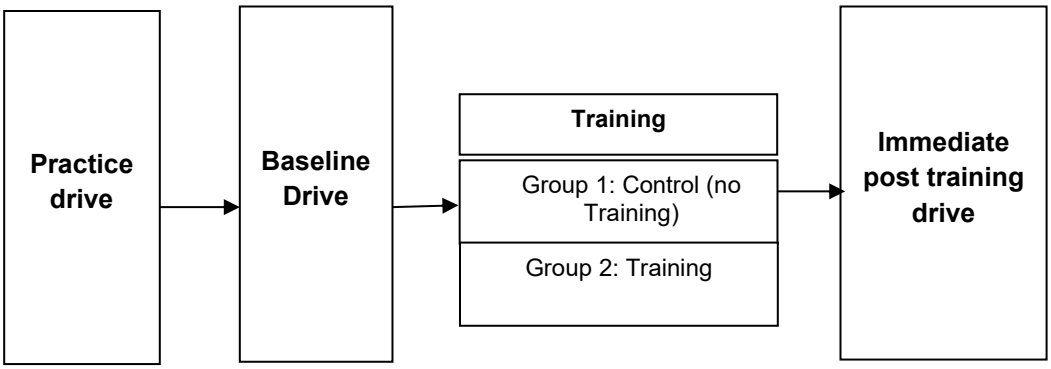

Figure 1. Design procedure

2.3. Apparatus and Materials

The apparatus included: The driving simulator was comprised of both software and hardware components. The software used in the experiment was UC-win/Road Drive Simulator version 16 (Forum8, 2023). The hardware included a Samsung S9 49inch 120Hz Curved VA Ultrawide QLED DQHD monitor, a Logitech G920 Driving Force Racing Wheel and a three- pedal set (accelerator, brake and clutch), as illustrated in Figure 2.

Figure 2. Driving simulator

The UC-win/Road software was configured to automatically log all relevant time, speed, and distance data at 0.1 second intervals. The material included two surveys, which were collected online via UNSW Qualtrics Platform. These were:

- The *demographic survey* has been developed to obtain details about participants' age, gender, and driving experience. Participants were asked to complete this questionnaire at the beginning of the first session.
- The *post-drive survey* was conducted after completing a test drive at the end of the session. The post-drive survey examined insights about drivers' self-reported speed management behaviour (i.e., speed zones that were most difficult to comply with). The post-drive questionnaire has been developed based on Molloy et al. (2018) methodology examining young novice drivers' perceived speed management behaviour.

2.4. Driving Scenarios

Three scenarios were designed within UC-win/Road Drive Simulator software to accommodate the practice, baseline and test drives. Each of the four scenarios conformed with the regulations of the ACT government regarding roads and speed zones. This included ensuring that minimum speed zone lengths, and minimum curve radii distances were upheld (Urban Services, 2023). Minimum zone lengths of 500 metres were maintained for all 30 km/h, 40 km/h, 50 km/h, and 60 km/h speed zones.

The practice drive scenario was designed to allow participants familiarisation using the Driving Simulator. This scenario consisted of a 5km route, containing three turns in a sequence (Left, Right, Left). The route contained mixed of speed zones, and surroundings were generated randomly, including trees, houses, parked cars, and other motorists. No data was recorded from this drive.

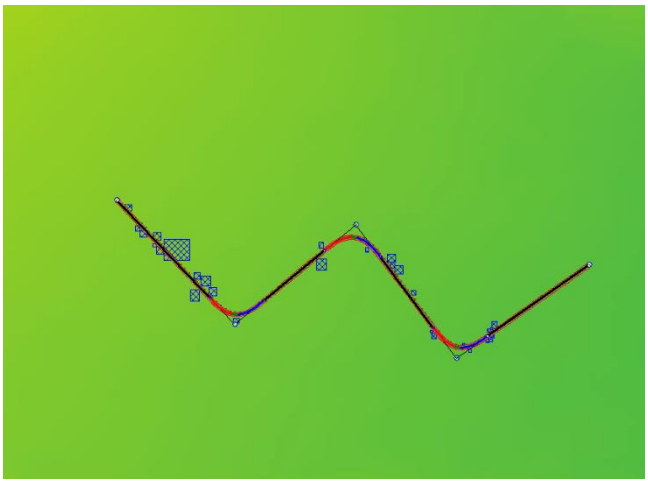

Figure 3. Practice drive design

The baseline scenario was designed to understand drivers' speed compliance prior to training and their driving behaviour at the start of the session. This scenario involved several permutations of the four speed zones (30km/h, 40km/h, 50km/h, and 60km/h). The purpose of these permutations was to randomise the order of the speed zones, performing a process known as counterbalancing. Counterbalancing is defined as the systematic variation of the order of conditions in a study, which enhances the study's internal validity by mitigating the effects of noise variables (Corriero, 2023). Initially, six permutations of each speed zone were utilised, making the baseline route 12km in length following the suggestion of Max (Max 2023). Time, distance, speed, and speed limit data was recorded by the UC-win/Road *Log* function.

The test drive scenario was designed to examine the effect of the training intervention, compared to the baseline performance. The test drive scenario was similar to the baseline drive. It involved a 12km route, utilising random permutations of the four speed zones, and road features characterising each of the speed zones (see Figure 4). Traffic was randomly generated on the road going in the opposite direction of the driving scenarios.

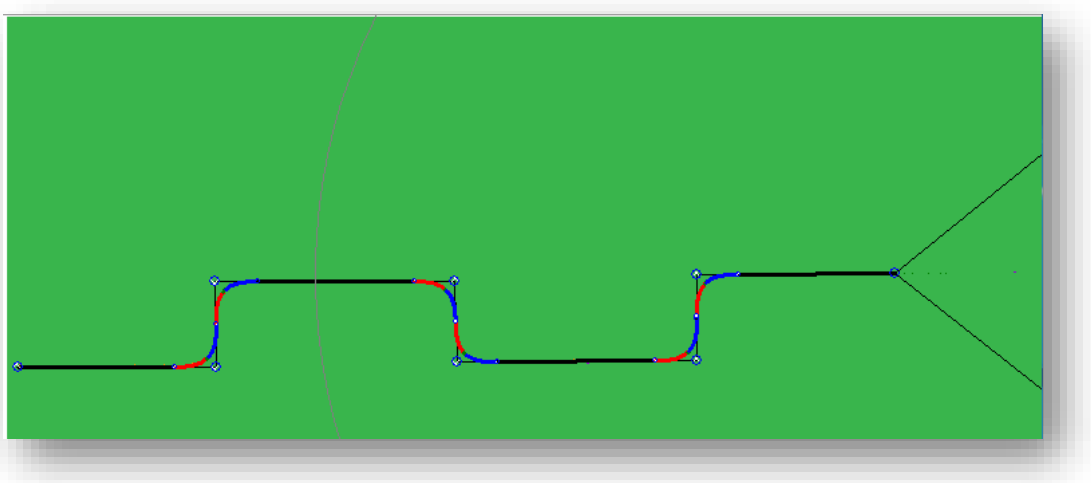

Figure 4. A snapshot of a test-driving scenario design

3. Procedure

The research consisted of one session. Prior to participants' arrival to the session, they were instructed to read, sign and return a signed copy of a participant information statement and consent form to the Chief Investigator. At the beginning of the session, all participants were initially asked to complete a demographic survey. Then, participants familiarised with a driving simulator via conducting a practice drive, and if uncomfortable discontinue the research (no participants discontinued after the practice drive). Following the practice drive, participants completed the baseline drive. Upon the finish of the baseline drive, participants in the control group were given a short break, while other participants received training in the form of feedback about their performance, financial, and safety implications. Then, participants conducted the test drive, followed by a post-drive survey. On completion of the session, participants received a $30 digital gift card for their time to complete the research. This concluded the session.

On average, the session took no longer than one hour to complete. Participants in the training group received training in the form of graphical feedback (Molloy et al., 2023). Data provided in feedback was obtained from their baseline drive through a program written in python. As shown in Figure 5, training included information about their performance (i.e., speed travelled, number of speed exceedances (a); and maximum speed at each travelled speed zone (b)); safety implications (indicating how the travelled distance from the point a driver started braking at various speed zones, where crossing a red line indicates not being able to stop in time prior to an event (i.e., incident or accident) to occur (c)); and financial implications (feedback about fines that a driver would receive if traveling over the speed limit. For example, if travelling between 10 km/h and 20 km/h above the speed limit, a full driver licence holder would receive a fine of $379 and 4 demerit points (d)).

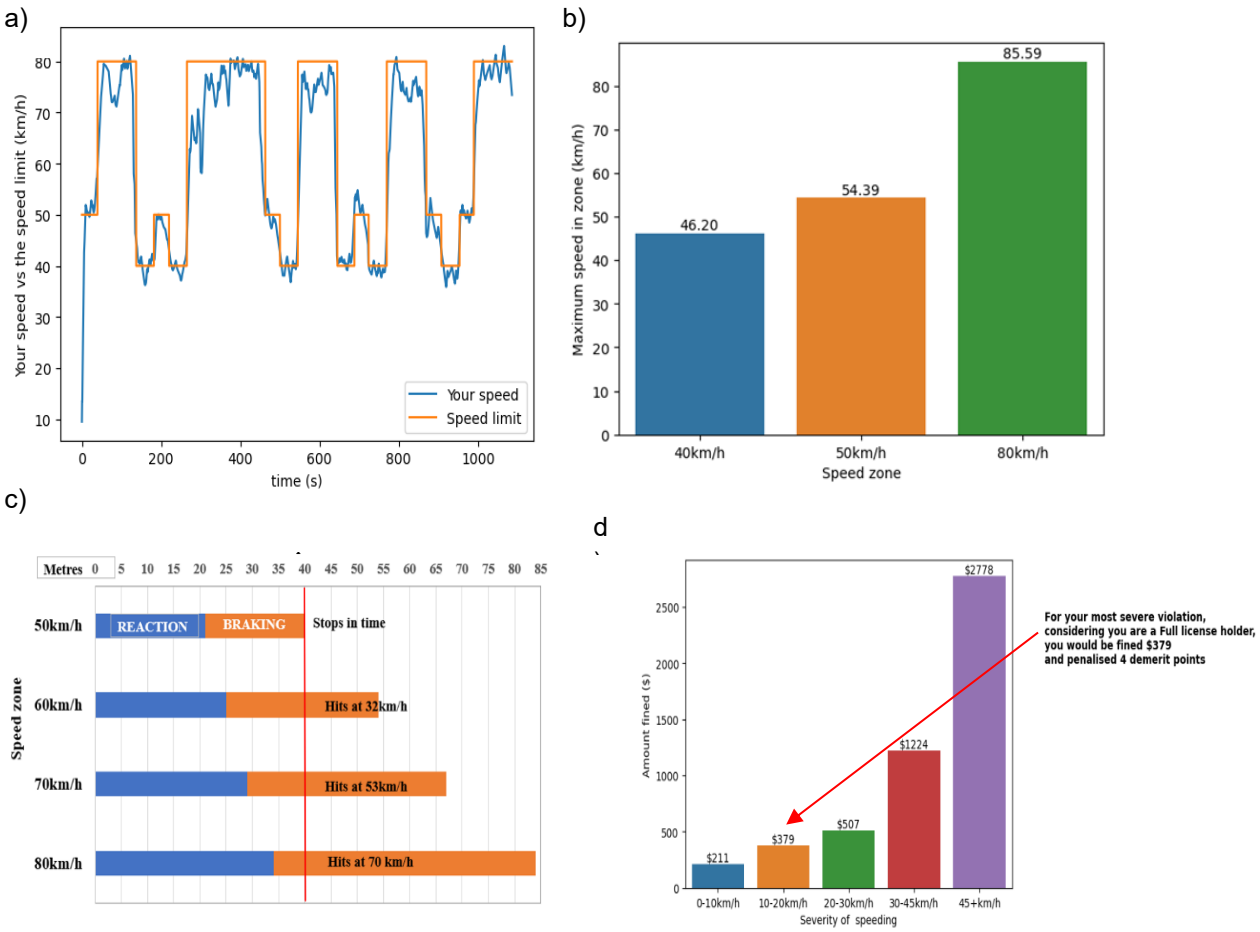

Figure 2 - Examples of performance feedback: a), b) – Performance feedback; c) safety feedback; d) financial feedback

4. Data Analysis

All data obtained from the baseline and test drives from the driving simulator (UCWinroad) was recorded onto excel files and transferred to a dedicated UNSW OneDrive folder. The data was recorded at a rate of 0.1 seconds. For each participant, maximum speed and percentage of time spent speeding was recorded for each speed limit zone, totalling 4 different zones.

All data was cleaned using the median and interquartile range to identify outliers and transform them to reduce their impact on the study. Statistical testing was then applied to the cleaned data, including a 2x2 mixed repeated measures analysis of variance (ANOVA) for the maximum speed outputs. In these tests, the between-groups independent variable was training, consisting of two levels (control, training); and the repeated measures independent variable was time, consisting of two levels (baseline, test). Independent statistical testing was utilised for the percentage of time speeding output; this was because values of zero existed in this data set, meaning it did not conform to ANOVA testing. Instead, a non-parametric

Kruskal-Wallis test was utilised. Post hoc test of Mann-Whitney was used to understand the difference between the groups. Results below demonstrate only statistically significant results. Further analysis via post hoc analysis was used to understand statistically significant Training by Time interactions.

5. Results

Table 1 provides a summary of descriptive statistics for maximum speed, in each speed zone (30 km/h, 40 km/h, 50km/h, and 60km/h), for both the baseline and test drives. It displays the mean and standard deviation for each of the dependent variables obtained from the driving simulator. In order to answer the research questions, statistical tests were performed as described in the analysis section above.

Table 1. Descriptive statistics: Maximum speed and standard deviation at the baseline, and immediate post-training

Group	**Baseline drive**	**Immediate post-training**
Variables	**M (SD)**	**M (SD)**
	30km/h speed zone	
Control	40.49 (6.21)	43.60 (8.83)
Training	42.67 (10.85)	41.73 (12.75)
	40km/h speed zone	
Control	47.21 (5.54)	49.57 (5.15)
Training	48.53 (11.92)	45.53 (0.46)
	50km/h speed zone	
Control	53.93 (4.30)	52.32 (2.65)
Training	53.32 (6.09)	53.66 (10.83)
	60km/h speed zone	
Control	61.60 (3.13)	61.36 (2.39)
Training	63.73 (8.14)	61.70 (7.65)

Table 2. Inferential statistics for maximum speed in the 30 km/h, 40 km/h, 50km/h, and 60 km/h speed zones.

Variables	MS	F	η_p^2
	30km/h speed zone		
Time	3.18	0.17	.01
Training	43.15	0.79	.02
Time * Training	76.02	4.15*	.01
	40km/h speed zone		
Time	0.31	0.04	.001
Training	270.04	12.38**	.25
Time * Training	51.99	7.47**	.16
	50km/h speed zone		
Time	5.77	1.38	.04
Training	13.03	1.34	.03
Time * Training	0.13	0.32	.001
	60km/h speed zone		
Time	.98	0.45	.01
Training	4.99	0.91	.02

Time * Training	3.41	1.56	.04

*Note: significance level, *p < .05, **p < .01, ***p < .001*

5.1. Comparison of maximum speed in each speed zone at baseline, and immediate post-training

As shown in Table 2, there were significant Time by Training interactions in the 30 km/h speed zones, F (1, 38) = 4.15, p = 0.05, Cohen's d = 0.24; and in the 40 km/h speed zone F (1, 38) = 7.48, p = 0.01, Cohen's d = 1.39. Post hoc results showed that the maximum speed for the Training group was higher than for the Control group in the 30 km/h speed zone (p = .002), and in the 40 km/h speed zone (p = .001). In the 40 km/h speed zone, there was also a significant main effect for Training. No other statistically significant differences were found.

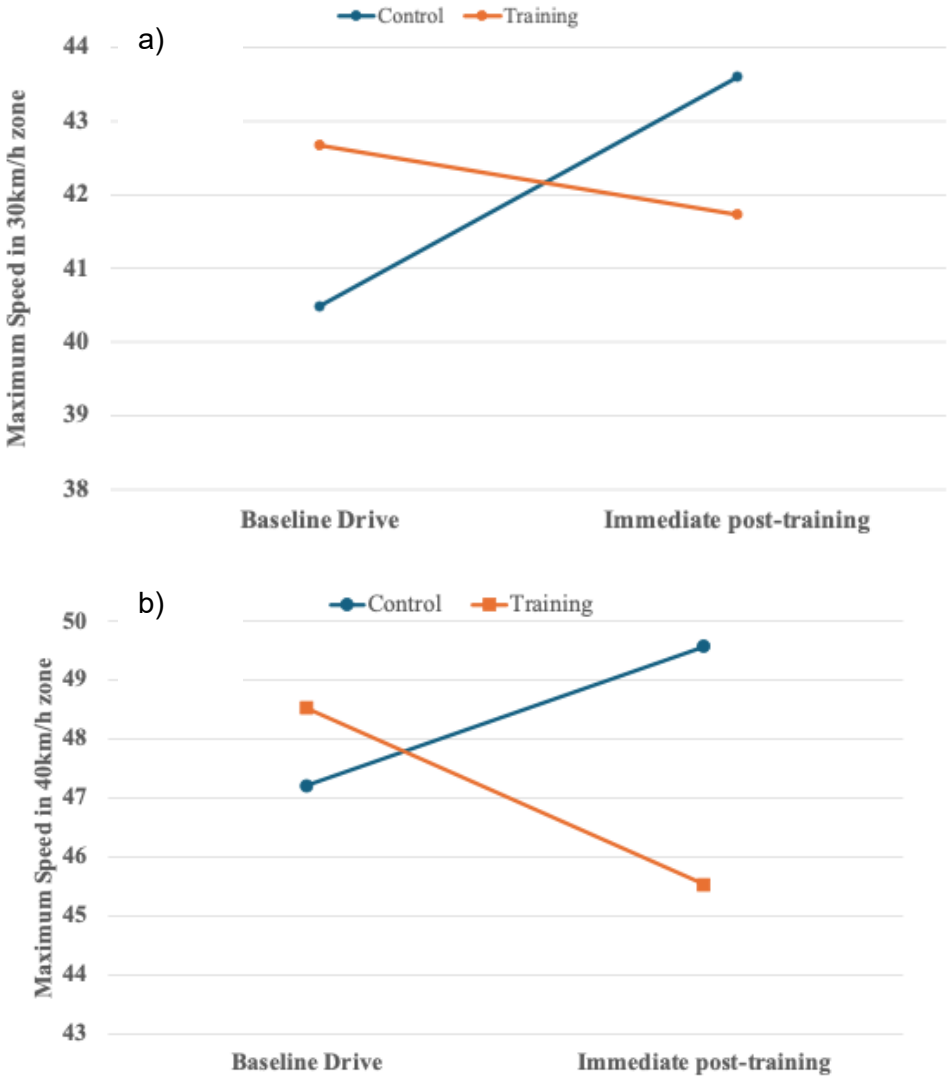

Figure 6. Maximum speed: a) 30 km/h speed zone; b) 40km/h speed zone

5.2. Comparison of percentage of time speeding in each speed zone at baseline, and immediate post-training

Table 3 shows a summary of descriptive statistics of percentage of time speeding in each speed zone, at each time period, and a summary of inferential statistics between the baseline and the immediate post-training in each speed zone.

The Kruskal-Wallis analysis showed no differences at the baseline, however there were significant differences in the immediate post-training in the 30 km/h (z (N = 40) = 7.70, p = .01, r^2 = 1.22), 40 km/h (z (N = 40) = 14.41, p < .01, r^2 = 2.28), and 50 km/h (z (N = 40) = 10.50, p < .01, r^2 = 1.66) speed zones (see Figures 7 and 8). Post hoc analysis using Mann-Whitney was used to understand the differences between the groups. The percentage of time speeding for the Training group was significantly lower compared to those in the Control group in the 30 km/h (Z = - 2.78, p < .001), 40 km/h (Z = - 3.79, p < .001), 50 km/h (Z = - 3.24, p = .001).

Table 3 - Descriptive statistics: percentage of time speeding and standard deviation data for at baseline, and immediate post-training, drives

Variable	**30 km/h speed zone**	
Group	**Baseline drive**	**Immediate post-training**
Control	52.63 (33.94)	43.85 (34.131)
Training	29.17 (32.36)	26.83 (34.19)
Significance	p = .06	p = .001
	40 km/h speed zone	
Control	24.10 (32.94)	25.78 (38.84)
Training	10.70 (17.22)	8.21 (22.39)
	p < .001	p = .17
	50 km/h speed zone	
Control	6.15 (7.15)	11.27 (16.06)
Training	6.13 (10.95)	8.15 (22.17)
	p = .06	p = .001
	60 km/h speed zone	
Control	3.59 (4.49)	5.27 (6.96)
Training	7.87 (22.66)	4.00 (7.94)
	p = .54	p = .001

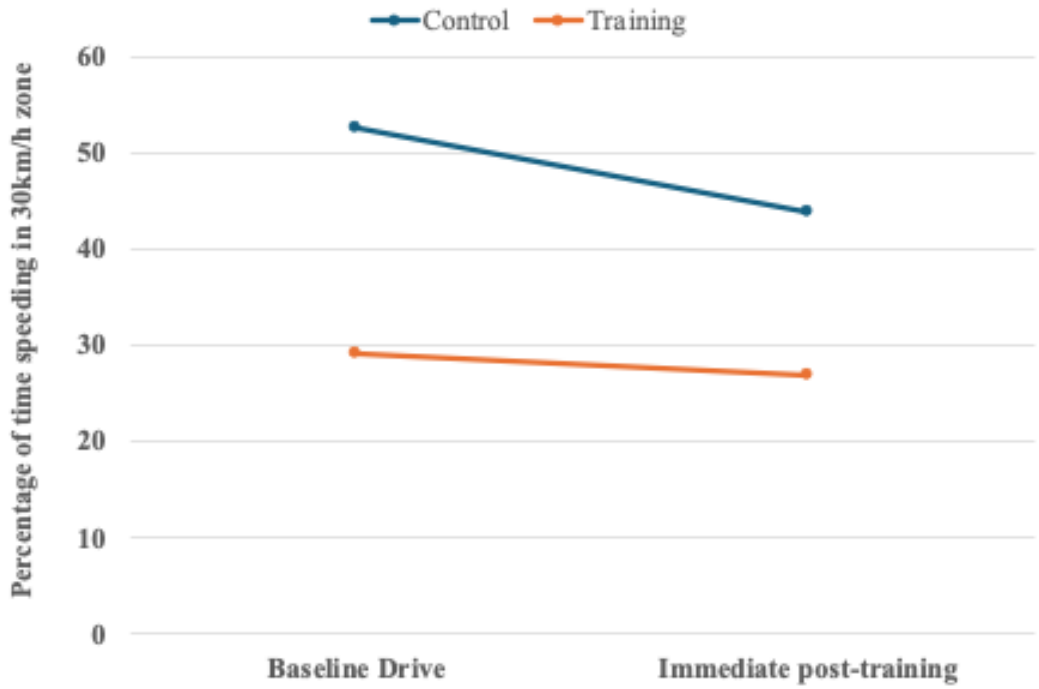

Figure 7. Percentage of time speeding in the 30km/h speed zone

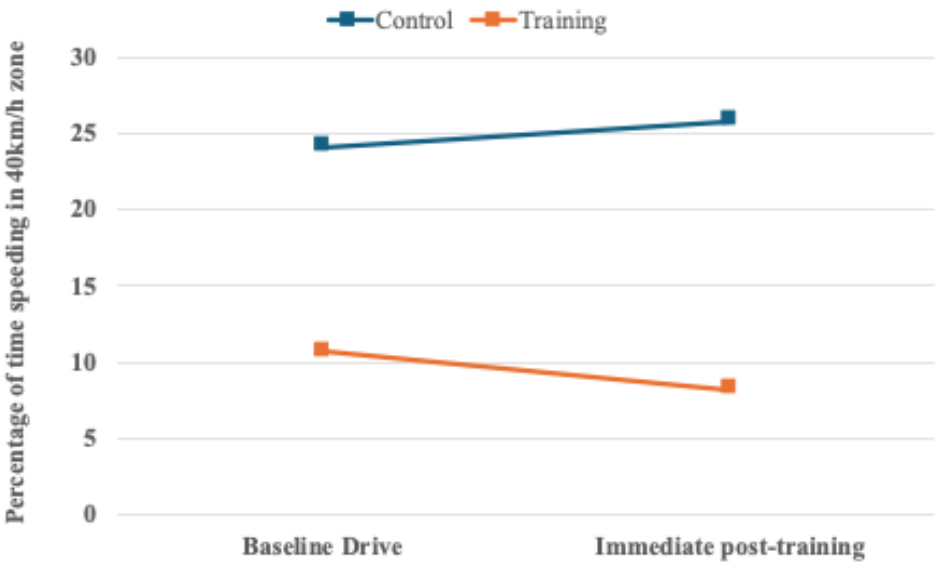

Figure 8. Percentage of time speeding in the 40km/h speed zone

5.3. Self-reported speed management behaviour

The post-driving questionnaire examined self-reported young drivers' behaviour incorporating questions about: perceived speeding behaviour, perceived percentage of time speeding, speed zones where it is more difficult to manage speed and the effectiveness of training (feedback). The results of the self-reported driving performance are discussed below.

5.3.1. Perceived speeding behaviour

After completing the drives, participants were asked whether they noticed any speed exceedances in the completed drives. Figure 9 shows that most participants reported that they noticed speeding overall. Ninety-five per cent of all participants in the Control group reported that they sped, and eighty per cent of participants in the Training group believed that they were speeding during their test drives.

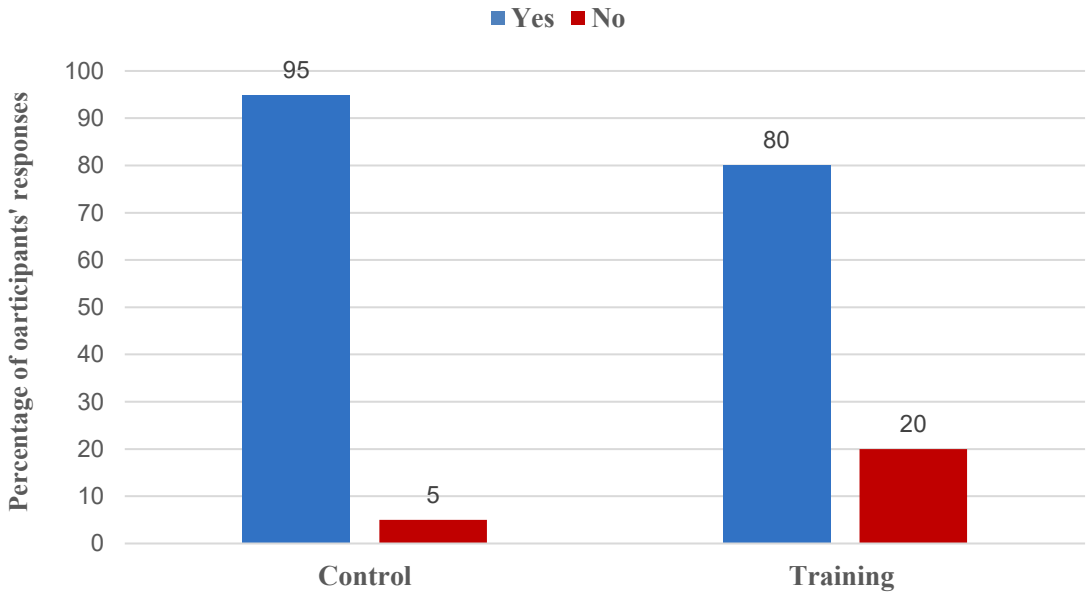

Figure 9. Participants' perceived speeding behaviour

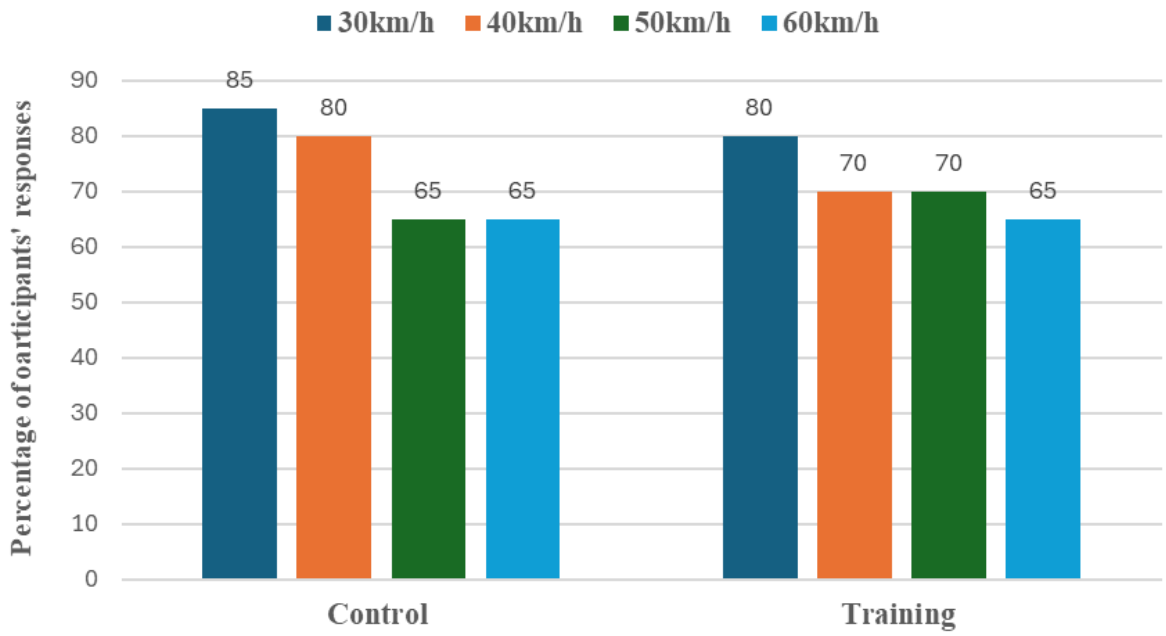

Figure 10. Percentage of drivers' perception of speeding in the 30 km/h, 40 km/h, 50 km/h and 60 km/h speed zones

Further, young drivers were asked specifically which speed zones they noticed that they were speeding in. As shown in Figure 10 above, at least 65% of participants reported speeding in each speed zone. In addition, 80-85% of drivers in the control group reported their speeding in 30 km/h and 40 km/h speed zones. Eighty per cent of participants in the Training group exceeded the speed limit in the 30 km/h speed zone, and seventy per cent in both 40 km/h and 50 km/h speed zones.

5.3.2. Perceived speed zones that are difficult to control

As shown in Figure 11, to the question "In which speed zones was it more difficult to control speed", the vast majority of the participants in control (80%) and training (85%) groups reported a 30 km/h speed zone as difficult to control speed. In both group, 15% of participants reported 40 km/h zone. In control group, 5% reported 60km/h speed zones were difficult to control speed.

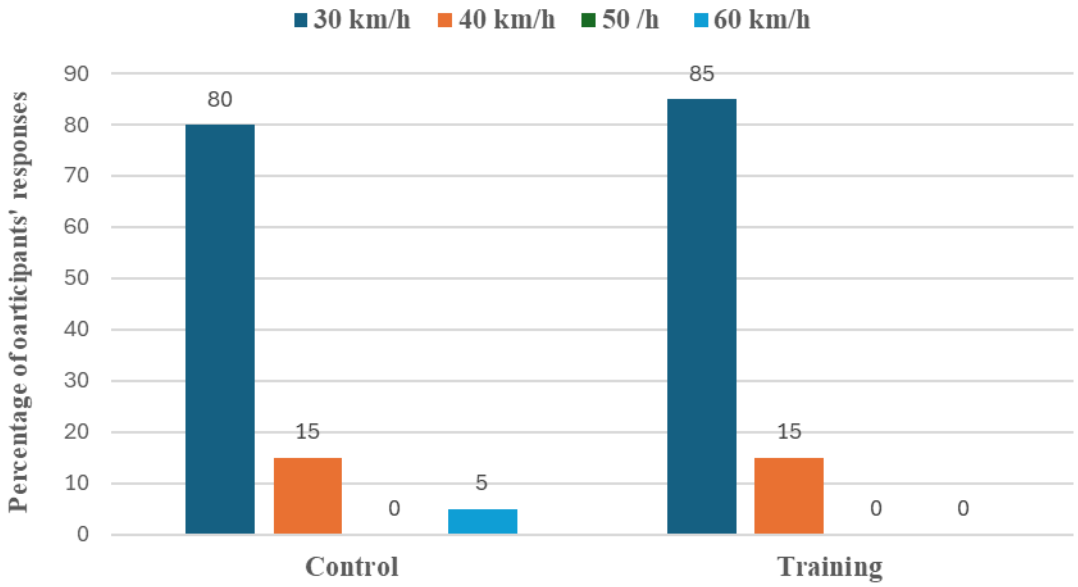

Figure 11. Percentage of young drivers' perception of speeding in the 30 km/h, 40 km/h, 50 km/h and 60 km/h speed zones

5.3.3. Effectiveness of the training

Figure 12 shows the perceived effectiveness of the training intervention, feedback, on drivers speeding behaviour. At the end of session 2, participants were asked to evaluate the effectiveness of the training intervention provided in session 1. Only the groups who were provided training were asked this question. The results revealed that the majority of participants (60%), believed that the training intervention was effective at reducing their speeding behaviour. Overall, results from the self-reported responses are consistent with those obtained from participants drives.

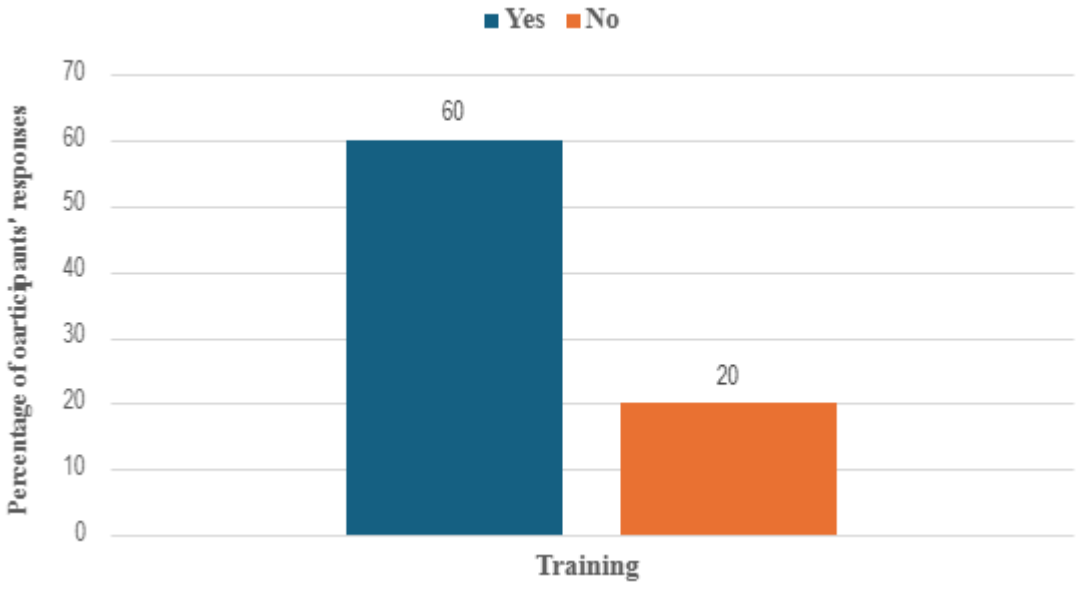

Figure 10. Perceived effectiveness of the training intervention.

4. Discussion

This research examined actual driving behaviour and speed compliance in low-speed zones in ACT. The results highlight that participants in both groups found it more challenging to comply with lower speed zones, like 30 km/h and 40 km/h speed zones, compared to other tested speed zones. Specifically, maximum speed for participants in both groups was more than 10 km/h in the 30 km/h speed zone, and less than 10 km/h in the 40 km/h speed zone. Maximum speed exposure was lower in the 50 km/h and 60 km/h speed zones. Specifically, drivers in both groups exceeded the 50 km/h speed limit by 2-3 km/h, and the 60 km/h speed limit by 1km/h over speed limits.

In addition, the 30 km/h speed zone was the speed zone in which the participants spent most time speeding, compared to other tested speed zones. Specifically, at the baseline drive, 50% of time drivers in the Control group exceeded the speed limit in the 30 km/h speed zone, followed by approximately 44% of time speeding at the test drive. Participants in the Training group spent approximately 29% of time speeding at baseline, followed by 26% of time speeding in the 30 km/h speed zone, at the test drive.

Interestingly, a cognitive-based training intervention in the form of feedback about performance, financial and safety implications was provided to the Training group after the baseline drive. The results showed a promise in improving young drivers' speed management behaviour, compared to the Control group. This is evident from the results of maximum speed in the 30 km/h and 40 km/h speed zones, where participants in the Control group drove significantly faster compared to the Training group in the test drive. Although the trend in speed reduction was notable for the Training group, however, the maximum speed still remained above the speed limit in both speed zones (i.e., 30 km/h and 40 km/h).

Surprisingly, speeding in each of four tested speed zones for some drivers in both groups was a conscious choice. This is evident from the self-reported post-drive survey results. The results showed that at least 65% of all drivers reported their speeding in each speed zone. Importantly, 95% of the drivers in the Control group and 80 % of drivers in each group reported speeding in the 30 km/h speed zone.

From a practical standpoint, this study provides evidence that the 30 km/h speed zone was the most challenging to manage speed, followed by the 40 km/h speed zone. Participants in both groups exceeded the speed limit in both speed zones at each drive. Although low-level speeding by 1-2 km/h over the speed limit was observed in the 50 km/h and 60 km/h speed zones.

Important, there was a trend toward a speed reduction notable between the Training group that received cognitive-based training in the form of feedback, and the Control group. These results are consistent with previous research, where feedback improved young drivers' speed compliance compared to those drivers who received no training (Molloy et al., 2018; Molloy et al., 2023). The significant differences in both maximum speed and percentage of time speeding in 30 km/h and 40 km/h zones between the Control and Training groups highlight the intervention's real-world applicability in environments where pedestrians, cyclists, and vulnerable road users are most at risk. Given that traditional enforcement alone may not sustainably influence drivers' behaviour, integrating such cognitive training into different licensing programs offers a low-cost, and scalable strategy to promote safer driving habits. These findings support the design of more personalised driver education that enhances situational awareness and reduces unintentional speeding—potentially reducing crash risk where it matters most.

4.1. Limitations and further research

This research showed a significant difference between the Training and Control groups in reducing speeding behaviour in the 30km/h and 40 km/h speed zones. However, participants in both groups drove over the speed limit in both speed zones. Further research, with a larger sample is needed to understand whether the effect persists if tested with larger number of participants, and whether the results sustain over the longer period of times (i.e., one week or six months post training).

The results of the mean and standard deviation of percentage of time speeding demonstrated that participants in the Control group had larger reduction from the Baseline to the immediate post-training and were higher compared to participants in the Training group. However, this was not statistically significant. Future research can further test the level of reduction of time spent travelled over the speed limits in the 30 km/h and 40 km/h speed zones. The present results can be due to large standard deviations amongst participants who took part in the research. In addition, future research can further investigate these effects amongst broader population, different age groups to understand the speed compliance for drivers in ACT.

5. Conclusions and future research

Key takeaways from this study are:

- Young drivers exceed the speed limit in low-speed zones
- Young drivers find it most challenging to comply with the 30 km/h and 40 km/h speed zones
- Cognitive-based training, in the form of feedback about performance, financial and safety implications has shown promise in improving young drivers' speeding behaviour, as evident by lower maximum speed and percentage of time speeding, compared to the Control in the 30 km/h and 40 km/h speed zones.
- At least 80% of young drivers are aware of speeding in the 30km/h and 40 km/h speed zones.
- At least 65% of drivers reported speeding in each of the four speed zones (30km/h, 40km/h, 50km/h, 60km/h
- Consistent with previous research, young drivers found it difficult to comply with the low-speed zones.
- The 30 km/h speed zone was the most challenging to manage, followed by the 40 km/h speed zone, out of the tested speed zones.

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7. Appendices

Appendix A. Human Research Ethics Approval

Dear Dr Oleksandra Molloy,

Reference Number: iRECS8330

Project Title: Understanding young drivers' speeding behaviour in low-speed zones in ACT

Approval Period: 26/05/2025 to 25/05/2030

Thank you for submitting the above research project to the HREAP Executive for ethical review. The HREAP Executive has reviewed your project and notes that the proposal meets the requirements of this National Statement and is ethically acceptable and as a result, the research project has been **approved**.

Conditions of Approval - All Projects:

The Chief Investigator will immediately report anything that might warrant a review of ethical approval of the project.

The Chief Investigator will seek approval from the HREAP Executive for any modifications to the protocol or other project documents.

The Chief Investigator will notify the HREAP Executive immediately of any protocol deviation or adverse events or safety events related to the project.

The Chief Investigator will report to the HREAP Executive annually in the specified format and notify the HREAP Executive when the project is completed at all sites.

The Chief Investigator will notify the HREAP Executive if the project is discontinued before the expected completion date, with reasons provided.

The Chief Investigator will notify the HREAP Executive of his or her inability to continue as Coordinating Chief Investigator including the name of and contact information for a replacement.

The HREAP Executive Terms of Reference, Standard Operating Procedures, membership, and standard forms are available from https://research.unsw.edu.au/research-ethics-and-compliance-support-recs.

National Statement Compliance

This HREAP Executive is constituted and operates in accordance with the National Health

and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Human Research (2023). The processes used by this HREAP Executive to review multicenter research proposals have been certified by the NHMRC.

A copy of this outcome can be accessed in iRECS

(https://irecs.unsw.edu.au/Project/Index/20287).

For questions or concerns, please contact the Ethics Administrator using the contact details

below.

Kind regards,

Research Ethics & Compliance Support (RECS)

UNSW Sydney

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