

Article Type 1: Peer-reviewed papers

Upskilling Professional Driving Instructors of Young Learner Drivers: What Are We Waiting For?

Teresa Senserrick^{1,2}^a, Natalie Watson-Brown¹, Sherrie-Anne Kaye¹, Oscar Oviedo-Trespalcacios¹

¹ Centre for Accident Research and Road Safety – Queensland (CARRS-Q), Queensland University of Technology, ² Western Australian Centre for Road Safety Research, University of Western Australia

Keywords: ADAS, driving instructors, higher-order driving skills, learner drivers, parents, young drivers

<https://doi.org/10.33492/JRS-D-22-00054>

Journal of Road Safety

Vol. 34, Issue 2, 2023

Abstract

Decades of research and development to address young drivers' over-involvement in road crashes has led to critical improvements in understanding and interventions, yet has mostly focused on young drivers or their parents. Driving instructors have a key role in the young driver safety system, yet substantially less attention has been paid to their accreditation and professional development specific to teaching young drivers. Neurobiological development during mid-to-late adolescence influences how young people drive and the inflated risks they face relative to adult learners. In this paper, we discuss several of our research studies and supporting literature to argue that: (a) adept higher-order professional instruction can improve young driver safety behaviour in ways that can reduce crashes; (b) instructors are willing to be upskilled in young driver specific training needs; and (c) young drivers currently lack adequate training in new motor vehicle features that can enhance their safety, as do many adults, creating further demand on the driver-training industry. Given this body of work, we argue that the field has sufficiently progressed to know both why and how we should innovate and transform the driver training industry in ways that will improve young driver safety. However, we also note current developments appear to be working against rather than towards improvements. Therefore, there is a need to prioritise and implement change, and to harness advantages of emerging technologies. Professional development opportunities for driving instructors not only have potential to benefit the industry and young drivers, but also parents; therefore, boosting traffic safety culture across the community.

Key Findings

- Due to adolescent development, young driver training needs differ to adults
- Young drivers report poor knowledge and use of driver assistance technologies
- Developmentally appropriate training to address young driver needs is demonstrated
- Parents can lack awareness, knowledge or skills to train young drivers optimally
- Driving instructors seek but lack professional development opportunities
- Upskilling driving instructors has potential to upskill young drivers *and* parents

Introduction

Advances in the use of medical imagery in research have demonstrated shifts in brain development during mid-to-late adolescence that have significant implications for dri-

ving (Johnson & Jones, 2010; Romer et al., 2014; Watling et al., 2020). This particularly includes susceptibility to distraction, peer influences and fatigue, but there is potential for training to reduce the impact of these risks when driving (Romer et al., 2014; Senserrick et al., 2021).

^a Corresponding Author: Teresa Senserrick, 130 Victoria Park Rd, Kelvin Grove Qld, 4059, Australia; Email: teresa.senserrick@uwa.edu.au

Glossary

Advanced Driver Assistance Systems (ADAS) Safety systems designed to assist drivers with the driving task or provide an additional layer of safety during safety-critical situations. These systems are generally classified as passive or active. Passive systems may provide an audio, visual and/or haptic warning to a driver (e.g., lane departure warning), while active systems may intervene in the driving task (e.g., lane keeping assist).

Tailored interventions have shown success in reducing young driver crashes and injury outcomes, most particularly graduated licensing systems (Senserrick et al., 2021; Walshe et al., 2022). Nonetheless, the over-representation of young novice drivers in Australasian road trauma persists (NZTA, 2019; BITRE, 2022), requiring more nuanced innovations and systemic approaches that include a range of transport stakeholders to continue to achieve improvements (Goldstick et al., 2019; Oviedo-Trespalacios & Scott-Parker, 2018; Scott-Parker et al., 2016).

Most young driver safety interventions target young drivers directly and/or their parents. However, professional driving instructors also have a key role in the young driver safety system (Scott-Parker et al., 2016). While multiple non-representative studies suggest that most youth in Australasia undertake some professional lessons prior to their driving test (e.g., Begg & Brookland, 2015; Watson-Brown et al., 2019), parents also express preferences to rely on professional instructors for aspects of the learner driver stage (Rodwell et al., 2021; Watson-Brown, Mills, et al., 2021). Despite this, comparatively limited attention has been paid to optimising the impact of formal driving instruction and upskilling instructors with the latest insights in education and driving technology.

The objective of this paper is to present our position and demonstrate research support for the need to increase professional instructor competence in developmentally appropriate training for young learner drivers, including attention to technological developments, as well as acceptability of this need in the industry. We report on a series of our own studies in Australia, as well as supporting references from international literature.

Young Learner Training Needs

The Finnish Goals for Driver Education (GDE) framework (Peräaho et al., 2003) has long been considered a best-practice guide for driving instructors of young learners new to driving (see review by Bailey et al., 2022). However, it did not come with a 'how to' guide.

In 2018, we developed and tested a GDE-informed 'higher-order instruction taxonomy' based on naturalistic observation of professional driving lessons with young learner drivers, which could be used to guide the development and implementation of higher-order training for driving instructors (Watson-Brown et al., 2018). We subsequently enhanced this into a transtheoretical model combining GDE concepts of 'higher-order training' (HOT) and concepts of competence, autonomy, and relatedness (CAR)

from self-determination theory (Ryan & Deci, 2020) – the HOT-CAR model – to further guide evaluation (Watson-Brown, Scott-Parker, et al., 2021). These provided examples on how to elevate 'functional instruction' specific to the immediate driving lesson/environment into higher-order training that included elements of CAR, promoting self-reflection and self-assessment by the learner to deepen the learning on how to approach driving generally. Such learning is intended to be internalised by the learner, including an orientation towards safety, to better prepare them for post-learner independent driving.

Higher-Order Training and Safety

It was demonstrated in a self-report study of 544 learners aged 16-19 years that improved higher-order instruction aids development of a self-regulated safety orientation, which in turn is associated with reduced risky driving (Watson-Brown et al., 2019). Furthermore, self-regulated safety orientation was compared in a survey of over 1,600 learner and first-year provisional drivers, with nuanced differences identified between the licence groups in the impact on inattentive and intentional risky driving behaviours (Watson-Brown, Senserrick, et al., 2021).

Understanding these nuanced differences provides important information with regard to improvements required during the learner phase and specifically concerning training. Learner drivers' engagement in intentional risky behaviours was more likely influenced by reduced effort and lower perceived importance of safe driving behaviours (Watson-Brown, Senserrick, et al., 2021). Additionally, perceived pressure from training, supervision styles and other drivers was associated with an increased engagement in intentional risky behaviours.

Professional Instructor Needs

Based on naturalistic observation of 110 professional driving lessons with young learner drivers (n=96, instructors n=15), we also identified that learner drivers' experiences of higher-order instruction are inconsistent – more higher-order instruction was received during early rather than later logbook hours, with many missed opportunities observed (Watson-Brown, Scott-Parker, & Senserrick, 2020). Indeed, 15% of the content of the observed driving lessons was identified as higher-order instruction, and 12% as missed or untaken (perceived but not actioned) opportunities. Missed opportunities were predominantly found to concern personal and situational risk awareness, distraction and self-

evaluation (Watson-Brown, Scott-Parker, & Senserrick, 2020).

Research has shown that instructors tend to maintain the role of navigation, which is known to be a skill lacking in early independent licensure (Boccara et al., 2015). This suggests instructors delay the transfer of navigational skills during the learner phase. Importantly, instructors also were observed to struggle to effectively train young drivers who persistently travelled over the speed limit, made unsafe speed choices, and did not maintain a safe following distance to the vehicle ahead (Watson-Brown, Scott-Parker, Simons-Morton, et al., 2020).

These findings illustrate gaps where instructors require better support and training more specific to teaching young learner drivers. Moreover, in complementary research, driving instructors reported a desire to learn and apply latest insights to training young drivers, but that they lacked such professional development opportunities (Watson-Brown, Mills, et al., 2021). Further, they reported experiencing commercial and parental pressure to teach young learners how to pass the practical driving test for licensure over in-depth experience for safety.

In interviews with Queensland driving instructors (Watson-Brown, Mills, et al., 2021), instructors also reported the need to have a better understanding of graduated licensing system rationale. This understanding extended to parents about how best to use the required supervised driving hours to develop safer young drivers including the complementary roles of instructors and parents. Furthermore, these instructors recognised the need for standardisation of pre-accreditation training and learner driver training among instructors. Instructors themselves identified and articulated current shortcomings in the industry.

Rapid Technological Advances

Gaps in instructor and young driver training occur in the context of relatively rapid advances in new vehicle technology features and other driving technologies that might assist young novice drivers, such as mobile phone apps (Haque et al., 2021; Kaye et al., 2022; Oviedo-Trespalcacios et al., 2019, 2020). Young drivers are among those most likely to drive the oldest vehicles with fewer safety features (Keall & Newstead, 2013; Weast & Monfort, 2021), but also switch back and forth from newer and older vehicles, such as their parents' or instructors' vehicles, resulting in differing driving experiences.

Advanced Driver Assistance Systems (ADAS), vehicle features designed to assist drivers with the driving task, will continue to grow in the transport system. ADAS may be effective at reducing near-crash events (Yue et al., 2018) and have been predicted to reduce injury and fatal crashes (Cicchino, 2018, 2019). This is particularly important for young novice drivers in their first year of independent driving when they are most at risk of crashing (McCartt et al., 2009). Researchers in the United States recently reported that ADAS including lane departure systems, blind spot monitoring, and front crash prevention systems have the potential to reduce crashes involving young novice drivers

(Mueller & Cicchino, 2022). These authors also argue that smartphone applications that alert parents when young drivers are exceeding the posted speed limit or violating night-time driving restrictions can potentially reduce crashes, injuries and deaths.

While initial research has shown the potential safety benefits of ADAS, it is essential to acknowledge that more research is required to investigate the actual effects of ADAS on the severity of road crashes. Given that the average age of passenger vehicles in Australia is 10.1 years (BITRE, 2022), it may be some time before the full benefits of ADAS are observed on Australian roads, particularly among young drivers.

Another critical issue that deserves attention is the potential for risky behavioural adaptations towards ADAS (Oviedo-Trespalcacios, 2017). Behavioural adaptation, within the driver behaviour context, refers to specific behaviours displayed by drivers following a change in the technology, such as the adoption of new vehicle technology, with behaviours being unintended by the initiators of change (Lin et al., 2018). In this case, drivers of a vehicle with ADAS might develop specific mental models that are not safe or transferable across cars with different levels of technology. For example, drivers who use blind spot monitors could stop engaging in safety behaviours such as shoulder checks or be even more likely to engage in distracted driving. Additionally, a driver could be distracted by the ADAS interface or develop a dependency on some technologies, such as cameras and rear parking sensors, that might result in a lack of skill to park safely in a vehicle with less technology. Driving instructors can potentially play a role in preventing these behavioural adaptations that can reduce the capacity of young drivers to respond accordingly to safety-critical situations.

ADAS Knowledge and Education

Australasian consumer knowledge of the functions of ADAS is lacking (NZTA, 2021; Prabhakaran et al., 2019). This may be due to the lack of education that drivers receive about ADAS. Previous research has typically found that drivers report learning about ADAS via trial and error or from the owner's manual (Boelhouwer et al., 2020; Kaye et al., 2022; Lubkowski et al., 2021). For instance, Lubkowski et al. (2021) reported this for more than half of their 223 participants as we also found in our recent Australian study of 217 drivers who had purchased an ADAS-equipped vehicle in the previous five years (Kaye et al., 2022). Arguably, hands-on training may be more effective than learning via trial and error as this latter approach could lead to misunderstandings of how the systems operate (Abraham et al., 2017).

Our previous research has also shown that drivers are required to have a high level of education to understand the information provided within car manuals (Oviedo-Trespalcacios et al., 2021), which shows that we cannot rely on them as a source of education for young drivers regarding ADAS. Thus, it is vital for young drivers to receive appro-

prate training in ADAS-equipped vehicles, not rely on self-learning through manuals.

ADAS, Novice Drivers and Parents

There has been some research in the US that examined novice drivers' and parents' perceptions towards ADAS (e.g., Hannan et al., 2018; Weiss et al., 2018). For example, Weiss et al. (2018) found in focus group discussions with 24 teenagers (aged 16-19 years) and 12 parents that both groups identified several key benefits of ADAS, including that these advanced systems may increase driver safety and reduce crashes. However, teenagers also reported that ADAS may lead young drivers to develop a false sense of safety. Similarly, parents reported that teenagers may become more distracted in ADAS-equipped vehicles as they may be more inclined to engage in non-driving related tasks than in vehicles without these advanced systems.

Further, Hannan et al. (2018) recruited 1,000 teenage drivers (aged 16-19 years) and 1,003 parents to examine their perceptions of ADAS. Compared to parents, teenage drivers were more likely to agree that ADAS could keep drivers safe, ADAS could prevent crashes better than humans, and that ADAS could be trusted to make safe decisions in complex situations. Parents, however, were more likely than teenage drivers to report that ADAS technologies would make teenage drivers safer in situations when teenagers were driving while tired and texting when driving than without ADAS. In Hannan et al. (2018) and Weiss et al. (2018), both teenagers and parents tended to agree that new drivers should learn to drive in vehicles which are not equipped with ADAS. However, whether this would disbenefit young drivers intending to be provisional drivers of these vehicles remains untested.

These findings have implications for teaching opportunities for professional driving instructors for both young learner drivers and their parents with whom instructors typically interact as part of the licensing process. Conflicts between parents' and their young learners' knowledge, acceptance, and trust in ADAS could result in learning errors and counterproductive outcomes. In some families, particularly low socioeconomic cohorts, driving vehicles with the latest technological advances is not an immediate reality nor is there an immediate need for training. Previous research has demonstrated considerable differences in what parents and young learners expect of the learner period, including how parents should be involved, such as how much parents should structure and monitor their learner versus allowing autonomy (Laird, 2014). Conceivably, instructors can be important intermediaries to guide such decisions in ways that promote safety, such as intended by the Australian Keys2Drive initiative (Bailey et al., 2022).

Ensuring instructors are knowledgeable of ADAS generally, but also different systems in different vehicle models could significantly benefit both the young drivers and their parents. Alternatively, the ability to be able to turn off some ADAS features allows instructors discretion to do so for young drivers who will not be driving vehicles with those features in the near future.

Discussion

In this paper we have argued our position that: (a) adept higher-order professional instruction can improve young driver safety behaviour in ways that can reduce crashes; (b) instructors are willing to be upskilled in young driver specific training needs; and (c) young drivers currently lack adequate training in new vehicle features that can enhance their safety, as do many adults, creating further demand of the driver-training industry.

The systematic analysis of current instructor practices guided by an integrated theoretical framework, has enabled empirically founded improvements needed for learner driver training (Watson-Brown, 2020; Watson-Brown et al., 2019; Watson-Brown, Scott-Parker, & Senserrick, 2020). These studies informed the need for improved development of higher-order skills during the learner phase, and also that the teaching strategies and techniques are critical to training effectiveness. These are readily adaptable to the current 'train-the-trainer' model, whereby 'master' trainers could be upskilled to deliver to others within their organisation, ensuring sustainability of the learning within the industry.

These tools that are yet to be applied formally to training, account for the importance of the relationship between instructor and learner, the need for greater and more consistent higher-order instruction delivered with effective teaching strategies, and the context or system within which the learner driver traverses graduated driver licensing (Watson-Brown, Scott-Parker, et al., 2021). Upskilling professional driving instructors offers a pathway solution. Moreover, instructors report the desire in their industry to be upskilled with such learning and strategies (Watson-Brown, Mills, et al., 2021).

Currently, there are limited professional development opportunities within the driving instruction industry in which such latest learnings could be imparted. Furthermore, a common Australian instructor accreditation requirement is currently being amalgamated with equivalent requirements for heavy vehicle and motorcycle rider instruction (Australian Government, 2021); thereby reducing rather than increasing the capacity to include specialised content regarding young learners for those new to the industry. At the same time, motor vehicles that young people drive and learn in vary and are rapidly changing, with both young people and their parents reporting gaps in understanding new vehicle systems and graduated licensing systems, and their relative roles in developing safer young independent drivers. There is limited attention to whether, or how, professional instructors manage such discrepancies or differing ADAS in vehicles generally.

It is also noteworthy that, no matter how well designed and implemented, many road authority and academic project attempts to deliver young driver safety interventions to parents have failed to attract sufficient attendance or engagement of parents in their busy lives (e.g., Curry et al., 2015). Many parents willingly outsource key learning to professional driving instructors, who in contrast have a commercial imperative to provide the best training possi-

ble. In many cases, this can be the last chance to intervene at a time when the young drivers accept that they are 'learners' and are willing to take on such guidance. Once passing tests and being licensed, further driver education is mostly optional or provided through campaigns which may or may not be attended to or seem relevant to the young driver. Maximising the learning instructors can offer at this time could be key to ensuring young drivers adopt driving styles and habits orientated towards safety. Once poor habits are formed, they are very difficult to shift.

Driving instructors desire and need support to optimise their role in reducing young driver crash risk, yet currently this fails to be realised. There is a compelling need to provide professional development opportunities to ensure instruction is developmentally appropriate for young drivers and fills gaps that parents also lack. Sufficient evidence already exists to warrant conversion of known best-practice into a professional development training and implementation trial. We know how to do this, so what are we waiting for?

Author Contributions

All authors contributed to the conception of the article, drafted sections of the article and revised the article critically for intellectual contents. All authors have read and agreed to the published version of the manuscript.

Funding

This research was supported partially by the Motor Accident Insurance Commission (MAIC) Queensland. The views expressed herein are those of the authors and are not necessarily those of the MAIC. Additionally, Dr Oscar Oviedo-Trespalacios was supported by an Australian Research Council Discovery Early Career Researcher Award [DE200101079] funded by the Australian Government.

Conflicts of interest

The authors declare that there is no conflict of interest.

Data Availability Statement

Not applicable.

Article History

Received: 7/9/2022; **Received in revised form:** 3/12/2022; **Accepted:** 19/04/2023; **Available online:** 17/05/2023

This peer-reviewed paper was first submitted as an Extended Abstract and an Oral Presentation was recommended by two reviewers at the 2022 Australasian Road Safety Conference (ARSC2022) held in Christchurch, New Zealand 28-30 September 2022. The two reviewers also recommended that the Extended Abstract be expanded into a 'Full Paper' and undergo further peer-review as a journal submission by three independent experts in the field. The Extended Abstract is published in the ARSC2022 Proceedings. This 'Full Paper' version is being reproduced here with the kind permission of the authors and will only be available in this edition of the JRS.



This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CCBY-4.0). View this license's legal deed at <http://creativecommons.org/licenses/by/4.0> and legal code at <http://creativecommons.org/licenses/by/4.0/legalcode> for more information.

References

- Abraham, H., Reimer, B., & Mehler, B. (2017). Advanced driver assistance systems (ADAS): A consideration of driver perceptions on training, usage & implementation. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 61(1), 1954–1958. <https://doi.org/10.1177/1541931213601967>
- Australian Government. (2021). *Qualification details: TLI41221 - Certificate IV in Transport and Logistics (Road Transport - Car Driving Instruction) (Release 1)*: <https://training.gov.au/Training/Details/TLI41221>
- Bailey, T., Wundersitz, L., O'Donnell, K., & Rasch, A. (2022). Identifying best practices in a process evaluation of a novice driver education program. *Evaluation and Program Planning*, 93, 102105. <https://doi.org/10.1016/j.evalprogplan.2022.102105>
- Begg, D., & Brookland, R. (2015). Participation in driver education/training courses during graduated driver licensing, and the effect of a time-discount on subsequent traffic offenses: Findings from the New Zealand Drivers Study. *Journal of Safety Research*, 55, 13–20. <https://doi.org/10.1016/j.jsr.2015.07.003>
- BITRE (Bureau of Infrastructure, Transport Research Economics). (2022). *Road Trauma Australia 2021 Statistical Summary*. BITRE. https://www.bitre.gov.au/sites/default/files/documents/road_trauma_2021.pdf
- Boccaro, V., Vidal-Gomel, C., Rogalski, J., & Delhomme, P. (2015). A longitudinal study of driving instructor guidance from an activity-oriented perspective. *Applied Ergonomics, Part A*, 46, 21–29. <https://doi.org/10.1016/j.apergo.2014.06.001>
- Boelhouwer, A., van den Beukel, A. P., van der Voort, M. C., Hottentot, C., de Wit, R. Q., & Martens, M. H. (2020). How are car buyers and car sellers currently informed about ADAS? An investigation among drivers and car sellers in the Netherlands. *Transportation Research Interdisciplinary Perspectives*, 4, 100103. <https://doi.org/10.1016/j.trip.2020.100103>
- Cicchino, J. B. (2018). Effects of lane departure warning on police-reported crash rates. *Journal of Safety Research*, 66, 61–70. <https://doi.org/10.1016/j.jsr.2018.05.006>
- Cicchino, J. B. (2019). Real-world effects of rear automatic braking and other backing assistance systems. *Journal of Safety Research*, 68, 41–47. <https://doi.org/10.1016/j.jsr.2018.12.005>
- Curry, A. E., Peek-Asa, C., Hamann, C. J., & Mirman, J. H. (2015). Effectiveness of parent-focused interventions to increase teen driver safety: A critical review. *Journal of Adolescent Health*, 57(1), S6–S14. <https://doi.org/10.1016/j.jadohealth.2015.01.003>
- Goldstick, J. E., Carter, P. M., Almani, F., Brines, S. J., & Shope, J. T. (2019). Spatial variation in teens' crash rate reduction following the implementation of a graduated driver licensing program in Michigan. *Accident Analysis & Prevention*, 125, 20–28. <https://doi.org/10.1016/j.aap.2019.01.023>
- Hannan, C., Palumbo, A. J., Fisher Thiel, M. C., Weiss, E., & Seacrist, T. (2018). Advanced driver assistance systems for teen drivers: A national survey of teen and parent perceptions. *Traffic Injury Prevention*, 19(sup2), S84–S90. <https://doi.org/10.1080/015389588.2018.1494383>
- Haque, M. M., Oviedo-Trespalacios, O., Sharma, A., & Zheng, Z. (2021). Examining the driver-pedestrian interaction at pedestrian crossings in the connected environment: A Hazard-based duration modelling approach. *Transportation Research Part A: Policy and Practice*, 150, 33–48. <https://doi.org/10.1016/j.tra.2021.05.014>
- Johnson, S. B., & Jones, V. C. (2010). Adolescent development and risk of injury: using developmental science to improve interventions. *Injury Prevention*, 17(1), 50–54. <https://doi.org/10.1136/ip.2010.028126>
- Kaye, S.-A., Nandavar, S., Yasmin, S., Lewis, I., & Oviedo-Trespalacios, O. (2022). Consumer knowledge and acceptance of Advanced Driver Assistance Systems. *Transportation Research Part F: Traffic Psychology and Behaviour*, 90, 300–311. <https://doi.org/10.1016/j.trf.2022.09.004>
- Keall, M. D., & Newstead, S. (2013). Who can best influence the quality of teenagers' cars? *Traffic Injury Prevention*, 14(3), 293–298. <https://doi.org/10.1080/15389588.2012.710767>
- Laird, R. D. (2014). Parenting adolescent drivers is both a continuation of parenting from earlier periods and an anticipation of a new challenge. *Accident Analysis & Prevention*, 69, 5–14. <https://doi.org/10.1016/j.aap.2013.11.012>
- Lin, R., Ma, L., & Zhang, W. (2018). An interview study exploring Tesla drivers' behavioural adaptation. *Applied Ergonomics*, 72, 37–47. <https://doi.org/10.1016/j.apergo.2018.04.006>

- Lubkowski, S. D., Lewis, B. A., Gawron, V. J., Gaydos, T. L., Campbell, K. C., Kirkpatrick, S. A., Reagan, I. J., & Cicchino, J. B. (2021). Driver trust in and training for advanced driver assistance systems in real-world driving. *Transportation Research Part F: Traffic Psychology and Behaviour*, 81, 540–556. <https://doi.org/10.1016/j.trf.2021.07.003>
- McCartt, A. T., Mayhew, D. R., Braitman, K. A., Ferguson, S. A., & Simpson, H. M. (2009). Effects of age and experience on young driver crashes: review of recent literature. *Traffic Injury Prevention*, 10(3), 209–219. <https://doi.org/10.1080/15389580802677807>
- Mueller, A. S., & Cicchino, J. B. (2022). Teen driver crashes potentially preventable by crash avoidance features and teen-driver-specific safety technologies. *Journal of Safety Research*, 81, 305–312. <https://doi.org/10.1016/j.jsr.2022.03.007>
- NZTA (NZ Transport Agency). (2019). Road To Zero: New Zealand's Road Safety Strategy 2020-2030. New Zealand Government. https://www.transport.govt.nz/assets/Uploads/Report/Road-to-Zero-strategy_final.pdf
- NZTA (NZ Transport Agency). (2021). *How well do New Zealanders understand advanced driver assistance systems? Waka Kotahi research summary December 2021*. <https://www.nzta.govt.nz/assets/resources/research/reports/685/685-consumer-awareness-understanding-and-use-of-ADAS-summary.pdf>
- Oviedo-Trespalcacios, O. (2017). *A new model for behavioural adaptation in distracted driving* [PhD thesis, Queensland University of Technology]. http://eprints.qut.edu.au/113832/1/Oscar%20Hernando_Oviedo%20Trespalcacios_Thesis.pdf
- Oviedo-Trespalcacios, O., Nandavar, S., & Haworth, N. (2019). How do perceptions of risk and other psychological factors influence the use of in-vehicle information systems (IVIS)? *Transportation Research Part F: Traffic Psychology and Behaviour*, 67, 113–122. <https://doi.org/10.1016/j.trf.2019.10.011>
- Oviedo-Trespalcacios, O., & Scott-Parker, B. (2018). Young drivers and their cars: Safe and sound or the perfect storm? *Accident Analysis & Prevention*, 110, 18–28. <https://doi.org/10.1016/j.aap.2017.09.008>
- Oviedo-Trespalcacios, O., Tichon, J., & Briant, O. (2021). Is a flick-through enough? A content analysis of Advanced Driver Assistance Systems (ADAS) user manuals. *PLoS ONE*, 16(6), e0252688. <https://doi.org/10.1371/journal.pone.0252688>
- Oviedo-Trespalcacios, O., Vaezipour, A., Truelove, V., Kaye, S.-A., & King, M. (2020). “They would call me, and I would need to know because it is like life and death”: A qualitative examination of the acceptability of smartphone applications designed to reduce mobile phone use while driving. *Transportation Research Part F: Traffic Psychology and Behaviour*, 73, 499–513. <https://doi.org/10.1016/j.trf.2020.06.007>
- Peräaho, M., Keskinen, E., & Hatakka, M. (2003). *Driver competence in a hierarchical perspective; Implications for driver education. Prepared for the Swedish Road Administration*. http://media.freeola.com/other/23050/howtoteachthegde-matrix_1.pdf
- Prabhakharan, P., Cunningham, M. L., Bennett, J. M., & Regan, M. A. (2019). Education and training requirements for drivers of automated vehicles in Australia and New Zealand. *Proceedings of the 2019 Australasian Road Safety Conference*. <https://acrs.org.au/files/papers/arcs/2019/JACRS-D-19-00211-Prabhakharan.pdf>
- Rodwell, D., Alexander, M., Bates, L., Larue, G. S., & Watson, B. (2021). Parents' perceptions of driver education: A theoretically guided qualitative investigation. *Transportation Research Part F: Traffic Psychology and Behaviour*, 77, 293–311. <https://doi.org/10.1016/j.trf.2021.01.009>
- Romer, D., Lee, Y.-C., McDonald, C. C., & Winston, F. K. (2014). Adolescence, attention allocation, and driving safety. *Journal of Adolescent Health*, 54(5), S6–S15. <https://doi.org/10.1016/j.jadohealth.2013.10.202>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a Self-Determination Theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Scott-Parker, B., Goode, N., Salmon, P. M., & Senserrick, T. (2016). Knowing me knowing you: key players and their interactions within the young driver road safety system. *Safety Science*, 88, 88–96. <https://doi.org/10.1016/j.ssci.2016.04.022>
- Senserrick, T., Oviedo-Trespalcacios, O., Rodwell, D., & Kaye, S.-A. (2021). Driver education and training for new drivers: moving beyond current 'wisdom' to new directions. *International Encyclopedia of Transportation*, 7, 158–164. <https://doi.org/10.1016/b978-0-08-102671-7.10679-7>
- Walshe, E. A., Romer, D., Wyner, A. J., Cheng, S., Elliott, M. R., Zhang, R., Gonzalez, A. K., Oppenheimer, N., & Winston, F. K. (2022). Licensing examination and crash outcomes postlicensure in young drivers. *JAMA Network Open*, 5(4), e228780. <https://doi.org/10.1001/jamanetworkopen.2022.8780>

Watling, C. N., Shaw, L. M., & Watling, H. (2020). Sleep-impaired emotional regulation, impaired cognition, and poor sleep health are associated with risky sleepy driving in young adults. *Traffic Injury Prevention*, 21(2), 133–138. <https://doi.org/10.1080/15389588.2019.1710499>

Watson-Brown, N. (2020). *Operationalising theoretical frameworks for a best-practice model of higher-order driving instruction for learner drivers* [PhD thesis, The University of Sunshine Coast, QLD]. https://research.usc.edu.au/permalink/61USC_INST/1vg4fiv/alma99462008502621

Watson-Brown, N., Mills, L., Senserrick, T., Freeman, J., Davey, J., & Scott-Parker, B. (2021). A complex system of learning to drive: The instructor's perspective. *Safety Science*, 136, 105172. <https://doi.org/10.1016/j.ssci.2021.105172>

Watson-Brown, N., Scott-Parker, B., & Senserrick, T. (2018). Development of a higher-order instruction coding taxonomy for observational data: initial application to professional driving instruction. *Applied Ergonomics*, 70, 88–97. <https://doi.org/10.1016/j.apergo.2018.02.016>

Watson-Brown, N., Scott-Parker, B., & Senserrick, T. (2019). Association between higher-order driving instruction and risky driving behaviours: Exploring the mediating effects of a self-regulated safety orientation. *Accident Analysis & Prevention*, 131, 275–283. <https://doi.org/10.1016/j.aap.2019.07.005>

Watson-Brown, N., Scott-Parker, B., & Senserrick, T. (2020). Higher-order driving instruction and opportunities for improvement: exploring differences across learner driver experience. *Journal of Safety Research*, 75, 67–77. <https://doi.org/10.1016/j.jsr.2020.08.002>

Watson-Brown, N., Scott-Parker, B., & Senserrick, T. (2021). Higher order training supporting competence, autonomy, relatedness (HOT-CAR): A model to improve learner drivers' higher order skills. *Transportation Research Part F: Traffic Psychology and Behaviour*, 80, 79–89. <https://doi.org/10.1016/j.trf.2021.03.013>

Watson-Brown, N., Scott-Parker, B., Simons-Morton, B., & Senserrick, T. (2020). Exploring the dimensions of driving instruction through naturalistic observation of formal practical lessons with learner drivers. *Transportation Research Record*, 2674(3), 219–231. <https://doi.org/10.1177/0361198120905594>

Watson-Brown, N., Senserrick, T., Freeman, J., Davey, J., & Scott-Parker, B. (2021). Self-regulation differences across learner and probationary drivers: The impact on risky driving behaviours. *Accident Analysis & Prevention*, 154, 106064. <https://doi.org/10.1016/j.aap.2021.106064>

Weast, R. A., & Monfort, S. S. (2021). Characteristics of vehicles driven by teens and adults killed in crashes, 2013–2017. *Journal of Safety Research*, 77, 263–267. <https://doi.org/10.1016/j.jsr.2021.03.010>

Weiss, E., Fisher Thiel, M., Sultana, N., Hannan, C., & Seacrist, T. (2018). Advanced driver assistance systems for teen drivers: Teen and parent impressions, perceived need, and intervention preferences. *Traffic Injury Prevention*, 19(sup1), S120–S124. <https://doi.org/10.1080/15389588.2017.1401220>

Yue, L., Abdel-Aty, M., Wu, Y., & Wang, L. (2018). Assessment of the safety benefits of vehicles' advanced driver assistance, connectivity and low level automation systems. *Accident Analysis & Prevention*, 117, 55–64. <https://doi.org/10.1016/j.aap.2018.04.002>